TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D9J230362**

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**January 12, 2010**

# Case Narrative
## D9J230362

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Sample Arrival and Receipt**
The following report contains the analytical results for seven water samples received at TestAmerica Denver on October 23, 2009, according to documented sample acceptance procedures. The samples were received in good condition at temperatures of 5.9°C, 5.7°C, and 4.8°C.

Samples AB-13, AB-5, AB-1, and AA2 were cancelled in accordance with the client's instructions given on October 26, 2009.

No other anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

**Analytical Comments**

The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to samples MW 9-M3, R1 BROWNS BRIDGE, R2 TILTON BRIDGE, R3 FOX BRIDGE, and R4 CONFLUENT to obtain a pH of 14 instead of the SOP required <2. The basic pH and Strata-XL cartridge are generating better internal standard recoveries for MeFOSA.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high concentrations of target analytes, samples MW 21-D2, MW 24-D1, and R4 CONFLUENT had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required.

Please note the PFCs listed below for samples MW 21-D2 and MW 24-D1 were reported from the injections on November 10, 2009,

13C5 PFNA
13C2 PFDA
13C2 PFUnA
13C2 PFDoA
Perfluorononanoic acid (PFNA)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluorotridecanoic acid (PFTriA)
Perfluorotetradecanoic acid (PFTeA)

All of the other PFCs for these two samples were reported from the injections on November 11, 2009.

Please note the PFCs listed below for samples MW 9-M3, R1 BROWNS BRIDGE, R2 TILTON BRIDGE, R3 FOX BRIDGE, and R4 CONFLUENT were reported from the injections on November 11, 2009,

18O2 PFHxS
13C4 PFOS
Perfluorobutane sulfonate (PFBS)
Perfluorohexane sulfonate (PFHxS)
Perfluorooctane sulfonate (PFOS)
Perfluorodecane sulfonate (PFDS)

All of the other PFCs for these two samples were reported from the injections on November 8, 2009.

Due to low internal standard recoveries in the samples and/or high LCS/LCSD recoveries in PFC batch 9299508, all seven samples were re-extracted out of the laboratory prescribed hold time and reanalyzed in QC batch 9321493. Due to low internal standard recoveries in the samples and/or high LCS/LCSD recoveries in FOSA batch 9301197, samples R2 TILTON BRIDGE and R4 CONFLUENT were re-extracted out of the laboratory prescribed hold time and reanalyzed in QC batch 9316449. All four batches are included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA

convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

The internal standard recoveries for 13C2 PFDA, 13C5 PFNA, 13C2 PFUnA, and/or 13C2 PFDoA associated with QC batch 9299508 were recovered below 50% in samples MW 9-M3, R1 BROWNS BRIDGE, R2 TILTON BRIDGE, and R3 FOX BRIDGE. Upon re-extraction and reanalysis in QC batch 9321493, internal standard recovery outliers were still present in samples MW 9-M3, R1 BROWNS BRIDGE, and R3 FOX BRIDGE, demonstrating that these anomalies are most likely due to matrix interference. Upon re-extraction and reanalysis in QC batch 9321493, internal standard recoveries were 100% in control in sample R2 TILTON BRIDGE. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The internal standard recovery for MeFOSA associated with QC batch 9300254 was recovered below 50% in sample MW 9-M3. The internal standard recovery of MeFOSA was recovered within the laboratory's historical limits of 37-130%, therefore, corrective action was deemed unnecessary.

The mid-level LCS/LCSD associated with QC batch 9299508 exhibited percent recoveries above the QC control limits for Perfluorooctanesulfonate (PFOS). The low-level CS associated with QC batch 9299508 exhibited a percent recovery above the QC control limits for Perfluorohexanoic acid (PFHxA). These are indicators that data may be biased high. Upon re-extraction and reanalysis in QC batch 9321493, percent recoveries were 100% in control except for Perfluorotetradecanoic acid (PFTeA). Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batch 9321493 reported the percent recoveries for several PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

| Compound | Low-Level LCS Actual Recovery | Control Limits | Low-Level LCS Actual Result | MDL |
|---|---|---|---|---|
| PFDA | 71% | 64-146% | 0.01424 ug/L | 0.00782 ug/L |
| PFTriA | 44% | 44-164% | 0.00881 ug/L | 0.01772 ug/L |
| PFDS | 40% | 37-130% | 0.00796 ug/L | 0.00915 ug/L |

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%. Please note PFDS is a non-target compound for this project.

The low-level LCS and mid-level LCS/LCSD associated with QC batch 9301197 exhibited percent recoveries and/or an internal standard recovery outside the control limits for Perfluorooctane sulfonamide (FOSA) and MeFOSA. Upon re-extraction and reanalysis in QC batch 9316449, the percent recoveries and internal standard recoveries were 100% in control. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The method required MS/MSD could not be performed for QC batches 9299508, 9299517, 9300254, 9301197, 9316449, and 9321493, due to insufficient sample volume. Method

precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

The ending Continuing Calibration Verification (CCV) standard associated with samples in QC batch 9299508 exhibited a %D value out of range, biased high, for Perfluorotridecanoic acid (PFTriA). This is an indicator that data may be biased high. As no detectable concentrations of PFTriA are present in the associated samples, corrective action is deemed unnecessary.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 21-D2 10/19/09 15:20 001** | | | | |
| Perfluorooctanoic Acid | 0.50 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.16 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.38 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.26 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.21 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.082 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.085 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.56 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.16 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.39 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.28 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.20 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.44 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.10 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.10 | 0.050 | ug/L | DEN -LC-0012 |
| **MW 24-D1 10/19/09 16:00 002** | | | | |
| Perfluorooctanoic Acid | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.44 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.97 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.23 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.12 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.49 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.46 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.85 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.48 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.018 J | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 9-M3 10/20/09 08:52 003** | | | | |
| Perfluorobutanoic acid (PFBA) | 0.053 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.076 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.048 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.042 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.12 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.041 | 0.020 | ug/L | DEN -LC-0012 |
| **R1 BROWNS BRIDGE 10/22/09 09:52 004** | | | | |
| Perfluorohexanoic acid (PFHxA) | 0.0032 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.0085 J | 0.020 | ug/L | DEN -LC-0012 |
| **R2 TILTON BRIDGE 10/22/09 09:03 005** | | | | |
| Perfluorooctanoic Acid | 0.15 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.39 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.066 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.12 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.11 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.073 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.031 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroundecanoic acid (PFUn | 0.0082 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.26 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.032 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.17 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.33 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.057 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.15 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.091 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.055 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.027 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.032 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.28 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.029 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.043 J | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.037 J | 0.050 | ug/L | DEN -LC-0012 |
| **R3 FOX BRIDGE 10/22/09 09:35 006** | | | | |
| Perfluorooctanoic Acid | 0.022 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.024 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.022 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.022 | 0.020 | ug/L | DEN -LC-0012 |

(Continued on next page)

# EXECUTIVE SUMMARY - Detection Highlights

D9J230362

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **R3 FOX BRIDGE 10/22/09 09:35 006** | | | | |
| Perfluorooctanoic Acid | 0.028 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.018 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.033 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.021 | 0.020 | ug/L | DEN -LC-0012 |
| **R4 CONFLUENT 10/22/09 10:44 007** | | | | |
| Perfluorooctanoic Acid | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.73 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.13 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.30 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.19 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.72 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.092 | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.077 | 0.050 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

**D9J230362**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

D9J230362

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Andria Lenoble | 000800 |
| DEN -LC-0012 | Jacqueline Bonnett | 003601 |
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

**D9J230362**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LM79W | 001 | MW 21-D2 | 10/19/09 | 15:20 |
| LM790 | 002 | MW 24-D1 | 10/19/09 | 16:00 |
| LM792 | 003 | MW 9-M3 | 10/20/09 | 08:52 |
| LM793 | 004 | R1 BROWNS BRIDGE | 10/22/09 | 09:52 |
| LM797 | 005 | R2 TILTON BRIDGE | 10/22/09 | 09:03 |
| LM799 | 006 | R3 FOX BRIDGE | 10/22/09 | 09:35 |
| LM8AE | 007 | R4 CONFLUENT | 10/22/09 | 10:44 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

Dalton Utilities

Client Sample ID: MW 21-D2

HPLC

Lot-Sample #...: D9J230362-001 Work Order #...: LM79W1AA Matrix.....: WATER
Date Sampled...: 10/19/09 15:20 Date Received..: 10/23/09
Prep Date.....: 10/26/09 Analysis Date..: 11/12/09
Prep Batch #...: 9299508 Analysis Time..: 04:50
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.50 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 1.0 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.16 J | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 0.38 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 0.26 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.21 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | 0.082 J | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorobutane sulfonate (PFBS) | 0.36 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.085 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 125 | (50 - 200) |
| 13C4 PFOS | 106 | (50 - 200) |
| 13C4 PFBA | 110 | (50 - 200) |
| 13C2 PFHxA | 121 | (50 - 200) |
| 18O2 PFHxS | 122 | (50 - 200) |
| 13C5 PFNA | 140 | (50 - 200) |
| 13C2 PFDA | 106 | (50 - 200) |
| 13C2 PFUnA | 101 | (50 - 200) |
| 13C2 PFDoA | 106 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 21-D2

HPLC

Lot-Sample #...: D9J230362-001 Work Order #...: LM79W1AC Matrix.....: WATER
Date Sampled...: 10/19/09 15:20 Date Received..: 10/23/09
Prep Date.....: 10/26/09 Analysis Date..: 11/06/09
Prep Batch #...: 9299517 Analysis Time..: 23:24
Dilution Factor: 1
Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.10 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 56 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 21-D2

HPLC

Lot-Sample #...: D9J230362-001
Date Sampled...: 10/19/09 15:20
Prep Date.....: 11/17/09
Prep Batch #...: 9321493
Dilution Factor: 10

Work Order #...: LM79W2AA
Date Received..: 10/23/09
Analysis Date..: 12/22/09
Analysis Time..: 06:14

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.56 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 1.0 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.16 J | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 0.39 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 0.28 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.20 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorobutane sulfonate (PFBS) | 0.44 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.10 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 81 | (50 - 200) |
| 13C4 PFOS | 80 | (50 - 200) |
| 13C4 PFBA | 91 | (50 - 200) |
| 13C2 PFHxA | 84 | (50 - 200) |
| 18O2 PFHxS | 78 | (50 - 200) |
| 13C5 PFNA | 81 | (50 - 200) |
| 13C2 PFDA | 77 | (50 - 200) |
| 13C2 PFUnA | 76 | (50 - 200) |
| 13C2 PFDoA | 75 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 21-D2**

**HPLC**

**Lot-Sample #...:** D9J230362-001 **Work Order #...:** LM79W3AA **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 15:20 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 02:27
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 117 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 24-D1**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-002 | **Work Order #...:** | LM7901AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 16:00 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/12/09 | | |
| **Prep Batch #...:** | 9299508 | **Analysis Time..:** | 05:01 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.1** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **2.1** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.44** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **1.1** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA )** | **0.97** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.23** | **0.20** | **ug/L** | **0.17** |
| **Perfluorodecanoic acid (PFDA)** | **0.12 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUn A) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDo A) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFT riA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (P FTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFB S)** | **2.3** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFH xS)** | **0.49** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 124 | (50 - 200) |
| 13C4 PFOS | 107 | (50 - 200) |
| 13C4 PFBA | 112 | (50 - 200) |
| 13C2 PFHxA | 119 | (50 - 200) |
| 18O2 PFHxS | 118 | (50 - 200) |
| 13C5 PFNA | 116 | (50 - 200) |
| 13C2 PFDA | 144 | (50 - 200) |
| 13C2 PFUnA | 139 | (50 - 200) |
| 13C2 PFDoA | 144 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 24-D1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-002 | **Work Order #...:** | LM7901AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 16:00 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9299517 | **Analysis Time..:** | 23:29 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.018 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 67 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 24-D1

HPLC

Lot-Sample #...: D9J230362-002
Date Sampled...: 10/19/09 16:00
Prep Date.....: 11/17/09
Prep Batch #...: 9321493
Dilution Factor: 10

Work Order #...: LM7902AA
Date Received..: 10/23/09
Analysis Date..: 12/22/09
Analysis Time..: 06:29

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 2.2 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 2.5 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.46 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.85 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | 0.22 | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | 0.10 J | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorobutane sulfonate (PFBS) | 2.5 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.48 | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 84 | (50 - 200) |
| 13C4 PFOS | 76 | (50 - 200) |
| 13C4 PFBA | 95 | (50 - 200) |
| 13C2 PFHxA | 83 | (50 - 200) |
| 18O2 PFHxS | 82 | (50 - 200) |
| 13C5 PFNA | 79 | (50 - 200) |
| 13C2 PFDA | 76 | (50 - 200) |
| 13C2 PFUnA | 75 | (50 - 200) |
| 13C2 PFDoA | 77 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 24-D1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-002 | **Work Order #...:** | LM7903AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 16:00 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 02:57 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 101 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 9-M3**

**HPLC**

**Lot-Sample #...:** D9J230362-003 **Work Order #...:** LM7921AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 08:52 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299508 **Analysis Time..:** 04:19
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| **Perfluorobutanoic acid (PFBA)** | **0.053** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.076** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.048** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 97 | (50 - 200) |
| 13C4 PFOS | 51 | (50 - 200) |
| 13C4 PFBA | 76 | (50 - 200) |
| 13C2 PFHxA | 115 | (50 - 200) |
| 18O2 PFHxS | 91 | (50 - 200) |
| 13C5 PFNA | 77 | (50 - 200) |
| 13C2 PFDA | 49 * | (50 - 200) |
| 13C2 PFUnA | 34 * | (50 - 200) |
| 13C2 PFDoA | 42 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 9-M3

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-003 | **Work Order #...:** | LM7921AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 08:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 21:22 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 38 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 9-M3**

**HPLC**

**Lot-Sample #...:** D9J230362-003 **Work Order #...:** LM7922AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 08:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 06:44
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| **Perfluorobutanoic acid (PFBA)** | **0.042** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.12** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.041** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 81 | (50 - 200) |
| 13C4 PFOS | 51 | (50 - 200) |
| 13C4 PFBA | 97 | (50 - 200) |
| 13C2 PFHxA | 87 | (50 - 200) |
| 18O2 PFHxS | 77 | (50 - 200) |
| 13C5 PFNA | 66 | (50 - 200) |
| 13C2 PFDA | 45 * | (50 - 200) |
| 13C2 PFUnA | 40 * | (50 - 200) |
| 13C2 PFDoA | 42 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 9-M3**

**HPLC**

**Lot-Sample #...:** D9J230362-003 **Work Order #...:** LM7923AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 08:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 03:12
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 53 | (50 - 200) |

Dalton Utilities

Client Sample ID: R1 BROWNS BRIDGE

HPLC

Lot-Sample #...: D9J230362-004 Work Order #...: LM7931AA Matrix.....: WATER
Date Sampled...: 10/22/09 09:52 Date Received..: 10/23/09
Prep Date.....: 10/26/09 Analysis Date..: 11/09/09
Prep Batch #...: 9299508 Analysis Time..: 04:30
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | ND | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (50 - 200) |
| 13C4 PFOS | 62 | (50 - 200) |
| 13C4 PFBA | 78 | (50 - 200) |
| 13C2 PFHxA | 116 | (50 - 200) |
| 18O2 PFHxS | 89 | (50 - 200) |
| 13C5 PFNA | 48 * | (50 - 200) |
| 13C2 PFDA | 60 | (50 - 200) |
| 13C2 PFUnA | 44 * | (50 - 200) |
| 13C2 PFDoA | 39 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: R1 BROWNS BRIDGE

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-004 | **Work Order #...:** | LM7931AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 09:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/28/09 | **Analysis Date..:** | 11/07/09 | | |
| **Prep Batch #...:** | 9301197 | **Analysis Time..:** | 01:25 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: R1 BROWNS BRIDGE**

**HPLC**

**Lot-Sample #...:** D9J230362-004 **Work Order #...:** LM7932AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 09:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 06:59
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.030 | ug/L | 0.011 |
| **Perfluorohexanoic acid (PFHxA)** | **0.0032 J** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| **Perfluorobutane sulfonate (PFBS)** | **0.0085 J** | **0.020** | **ug/L** | **0.0082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 77 | (50 - 200) |
| 13C4 PFOS | 55 | (50 - 200) |
| 13C4 PFBA | 96 | (50 - 200) |
| 13C2 PFHxA | 84 | (50 - 200) |
| 18O2 PFHxS | 79 | (50 - 200) |
| 13C5 PFNA | 67 | (50 - 200) |
| 13C2 PFDA | 47 * | (50 - 200) |
| 13C2 PFUnA | 38 * | (50 - 200) |
| 13C2 PFDoA | 38 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: R1 BROWNS BRIDGE**

**HPLC**

**Lot-Sample #...:** D9J230362-004 **Work Order #...:** LM7933AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 09:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 03:27
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 50 | (50 - 200) |

Dalton Utilities

Client Sample ID: R2 TILTON BRIDGE

HPLC

Lot-Sample #...: D9J230362-005 Work Order #...: LM7971AA Matrix.....: WATER
Date Sampled...: 10/22/09 09:03 Date Received..: 10/23/09
Prep Date.....: 10/26/09 Analysis Date..: 11/09/09
Prep Batch #...: 9299508 Analysis Time..: 04:41
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.15 | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | 0.39 | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | 0.066 | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | 0.12 | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | 0.11 | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | 0.073 | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | 0.031 | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | 0.0082 J | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | 0.26 | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | 0.032 | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (50 - 200) |
| 13C4 PFOS | 63 | (50 - 200) |
| 13C4 PFBA | 77 | (50 - 200) |
| 13C2 PFHxA | 93 | (50 - 200) |
| 18O2 PFHxS | 89 | (50 - 200) |
| 13C5 PFNA | 83 | (50 - 200) |
| 13C2 PFDA | 61 | (50 - 200) |
| 13C2 PFUnA | 52 | (50 - 200) |
| 13C2 PFDoA | 49 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R2 TILTON BRIDGE

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-005 | **Work Order #...:** | LM7971AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 09:03 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/28/09 | **Analysis Date..:** | 11/07/09 | | |
| **Prep Batch #...:** | 9301197 | **Analysis Time..:** | 01:30 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.043 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R2 TILTON BRIDGE

HPLC

Lot-Sample #...: D9J230362-005 Work Order #...: LM7972AA Matrix.....: WATER
Date Sampled...: 10/22/09 09:03 Date Received..: 10/23/09
Prep Date.....: 11/17/09 Analysis Date..: 12/22/09
Prep Batch #...: 9321493 Analysis Time..: 07:29
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.17 | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | 0.33 | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | 0.057 | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | 0.15 | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | 0.091 | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | 0.055 | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | 0.027 | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | 0.032 | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorobutane sulfonate (PFBS) | 0.28 | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | 0.029 J | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (50 - 200) |
| 13C4 PFOS | 71 | (50 - 200) |
| 13C4 PFBA | 120 | (50 - 200) |
| 13C2 PFHxA | 108 | (50 - 200) |
| 18O2 PFHxS | 96 | (50 - 200) |
| 13C5 PFNA | 88 | (50 - 200) |
| 13C2 PFDA | 64 | (50 - 200) |
| 13C2 PFUnA | 53 | (50 - 200) |
| 13C2 PFDoA | 50 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R2 TILTON BRIDGE

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230362-005 | Work Order #...: | LM7972AC | Matrix.....: | WATER |
| Date Sampled...: | 10/22/09 09:03 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 11/12/09 | Analysis Date..: | 12/01/09 | | |
| Prep Batch #...: | 9316449 | Analysis Time..: | 14:25 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.037 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 51 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R2 TILTON BRIDGE

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-005 | **Work Order #...:** | LM7973AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 09:03 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 03:42 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 53 | (50 - 200) |

Dalton Utilities

Client Sample ID: R3 FOX BRIDGE

HPLC

**Lot-Sample #...:** D9J230362-006 **Work Order #...:** LM7991AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9299508 **Analysis Time..:** 05:45
**Dilution Factor:** 1
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.022** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorooctanesulfonate** | **0.024** | **0.020** | **ug/L** | **0.013** |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| **Perfluoropentanoic acid (PFPA)** | **0.022 J** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.022** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 102 | (50 - 200) |
| 13C4 PFOS | 66 | (50 - 200) |
| 13C4 PFBA | 79 | (50 - 200) |
| 13C2 PFHxA | 116 | (50 - 200) |
| 18O2 PFHxS | 93 | (50 - 200) |
| 13C5 PFNA | 85 | (50 - 200) |
| 13C2 PFDA | 66 | (50 - 200) |
| 13C2 PFUnA | 43 * | (50 - 200) |
| 13C2 PFDoA | 47 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R3 FOX BRIDGE

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-006 | **Work Order #...:** | LM7991AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 09:35 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/28/09 | **Analysis Date..:** | 11/07/09 | | |
| **Prep Batch #...:** | 9301197 | **Analysis Time..:** | 01:36 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: R3 FOX BRIDGE**

**HPLC**

**Lot-Sample #...:** D9J230362-006 **Work Order #...:** LM7992AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 07:44
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.028** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorooctanesulfonate** | **0.018 J** | **0.020** | **ug/L** | **0.013** |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| **Perfluoropentanoic acid (PFPA)** | **0.033** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.021** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 91 | (50 - 200) |
| 13C4 PFOS | 70 | (50 - 200) |
| 13C4 PFBA | 112 | (50 - 200) |
| 13C2 PFHxA | 97 | (50 - 200) |
| 18O2 PFHxS | 91 | (50 - 200) |
| 13C5 PFNA | 89 | (50 - 200) |
| 13C2 PFDA | 58 | (50 - 200) |
| 13C2 PFUnA | 40 * | (50 - 200) |
| 13C2 PFDoA | 37 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: R3 FOX BRIDGE**

**HPLC**

**Lot-Sample #...:** D9J230362-006 **Work Order #...:** LM7993AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 03:57
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 42 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: R4 CONFLUENT

HPLC

Lot-Sample #...: D9J230362-007 Work Order #...: LM8AE1AA Matrix.....: WATER
Date Sampled...: 10/22/09 10:44 Date Received..: 10/23/09
Prep Date.....: 10/26/09 Analysis Date..: 11/12/09
Prep Batch #...: 9299508 Analysis Time..: 05:56
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.36** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.73** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.13 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.30** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.19 J** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.72** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (50 - 200) |
| 13C4 PFOS | 98 | (50 - 200) |
| 13C4 PFBA | 91 | (50 - 200) |
| 13C2 PFHxA | 98 | (50 - 200) |
| 18O2 PFHxS | 105 | (50 - 200) |
| 13C5 PFNA | 104 | (50 - 200) |
| 13C2 PFDA | 75 | (50 - 200) |
| 13C2 PFUnA | 92 | (50 - 200) |
| 13C2 PFDoA | 95 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: R4 CONFLUENT

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-007 | **Work Order #...:** | LM8AE1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 10:44 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/28/09 | **Analysis Date..:** | 11/07/09 | | |
| **Prep Batch #...:** | 9301197 | **Analysis Time..:** | 01:41 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.092** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 53 | (50 - 200) |

Dalton Utilities

Client Sample ID: R4 CONFLUENT

HPLC

**Lot-Sample #...:** D9J230362-007 **Work Order #...:** LM8AE2AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 10:44 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 07:59
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | ND | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 85 | (50 - 200) |
| 13C4 PFOS | 84 | (50 - 200) |
| 13C4 PFBA | 98 | (50 - 200) |
| 13C2 PFHxA | 87 | (50 - 200) |
| 18O2 PFHxS | 86 | (50 - 200) |
| 13C5 PFNA | 86 | (50 - 200) |
| 13C2 PFDA | 82 | (50 - 200) |
| 13C2 PFUnA | 79 | (50 - 200) |
| 13C2 PFDoA | 83 | (50 - 200) |

Dalton Utilities

Client Sample ID: R4 CONFLUENT

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230362-007 | **Work Order #...:** | LM8AE2AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/22/09 10:44 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/12/09 | **Analysis Date..:** | 12/01/09 | | |
| **Prep Batch #...:** | 9316449 | **Analysis Time..:** | 14:30 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.077** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 55 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: R4 CONFLUENT**

**HPLC**

**Lot-Sample #...:** D9J230362-007 **Work Order #...:** LM8AE3AA **Matrix.....:** WATER
**Date Sampled...:** 10/22/09 10:44 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 04:12
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 100 | (50 - 200) |

2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D9J230348**

**Dena Haverland**

**Dalton Utilities**
**1200 V.D. Parrot Jr. Parkway**
**Dalton, GA 30721**

**Michelle A. Johnston**
**Project Manager**

**January 15, 2010**

# Case Narrative
## D9J230348

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Sample Arrival and Receipt**
The following report contains the analytical results for thirty water samples received at TestAmerica Denver on October 23, 2009, according to documented sample acceptance procedures. The samples were received in good condition at temperatures of 5.9°C, 5.7°C, and 4.8°C. No other anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

**Analytical Comments**
The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to all thirty samples to obtain a pH of 14 instead of the SOP required <2. The basic pH is generating better internal standard recoveries for MeFOSA.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high concentrations of target analytes, samples MW 16A-M15, MW- 16-M5, MW 16B-D12, MW 15A-M16, MW 15-M17, MW 15B-D13, MW 14B-D14, MW 14-M14, MW 19A-U3, MW 14A-D5, MW 10-D4, MW 8-M12, MW 4-M8, MW 5-M7, MW 7A-U2, MW 22-M1, MW 12A-D7, MW 6-M2, MW 3-M11, MW 7-M9, MW 13A-D8, MW 13-M13, MW 12-D6, MW 19-M4, and MW 18-D9 had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required.

Please note the PFCs listed below for samples MW 3-M11, MW 7-M9, and MW 13A-D8, associated with batch 9299508, were reported from the injections on November 10, 2009,

13C5 PFNA
13C2 PFDA
13C2 PFUnA
13C2 PFDoA
Perfluorononanoic acid (PFNA)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluorotridecanoic acid (PFTriA)
Perfluorotetradecanoic acid (PFTeA)

All of the other PFCs for these two samples were reported from the injections on November 11, 2009.

Please note the PFCs listed below for samples MW 3-M11, MW 12-D6, and MW 19-M4, associated with batch 9299508, were reported from the injections on November 11, 2009,

18O2 PFHxS
13C4 PFOS
Perfluorobutane sulfonate (PFBS)
Perfluorohexane sulfonate (PFHxS)
Perfluorooctane sulfonate (PFOS)
Perfluorodecane sulfonate (PFDS)

All of the other PFCs for these two samples were reported from the injections on November 8, 2009.

Due to low internal standard recoveries in the samples and/or high LCS/LCSD percent recoveries, samples MW 16A-M15, MW 16-M5, MW 16B-D12, MW 15-M17, MW 15B-D14, MW 14B-D14, MW 14-M14, MW 14A-D5, MW 10-D4, MW 8-M12, MW 4-M8, MW 5-M7, MW 20-D3, MW 7A-U2, MW 22-M1, MW 23-U1, MW 12A-D7, MW 6-M2, M 1-M10, MW 3-M11, MW 7-M9, MW 13A-D8, MW 13-M13, MW 123-D6, and MW 19-M4 were re-extracted out of the laboratory prescribed hold time and reanalyzed. All batches have been included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

The internal standard recovery for MeFOSA associated with QC batch 9301197 was recovered below 50% in sample MW 16B-D12. Upon re-extraction and reanalysis in QC batch 9316449;

the internal standard recovery outlier was still present, demonstrating that this anomaly is most likely due to matrix interference. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The internal standard recoveries for 13C2 PFUnA, 13C2 PFDA, and/or 13C2 PFDoA associated with samples MW 5-M7, MW 20-D3, MW 23-U1, MW 6-M2, and MW 1-M10 were recovered below 50%. Upon re-extraction and reanalysis, internal standard recovery outliers were still present in samples MW 23-U1 and MW 1-M10, demonstrating that these anomalies are most likely due to matrix interference. Upon re-extraction and reanalysis, internal standard recoveries were 100% in control in samples MW 5-M7, MW 20-DD3, and MW 6-M2. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The internal standard recoveries for 13C2 PFUnA and 13C2 PFDoA associated with sample MW 22-M1 were recovered below 50%. The internal standard recoveries were recovered within the laboratory's historical limits of 37-130% for 13C2 PFUnA and 26-130% for 13C2 PFDoA, therefore, corrective action was deemed unnecessary.

The internal standard recoveries for MeFOSA associated with samples MW 16A-M15, MW 16-M5, MW 15B-D13, MW 17-D11, MW 14B-D14, MW 14-M14, MW 19A-U3, MW 10-D4, MW 12A-D7, and MW 1-M10 recovered below 50%. The internal standard recoveries were recovered within the laboratory's historical limits of 37-130%, therefore, corrective action was deemed unnecessary.

The method blank associated with QC batch 9299270 exhibited an internal standard recovery below the control limits for MeFOSA. The internal standard recoveries were recovered within the laboratory's historical limits of 37-130%, therefore, corrective action was deemed unnecessary.

The mid-level LCS/LCSD associated with QC batch 9299508 exhibited percent recoveries above the QC control limits for Perfluorooctanesulfonate (PFOS). The low-level CS associated with QC batch 9299508 exhibited a percent recovery above the QC control limits for Perfluorohexanoic acid (PFHxA). These are indicators that data may be biased high. Upon re-extraction and reanalysis in QC batch 9321493, percent recoveries were 100% in control except for Perfluorotetradecanoic acid (PFTeA). Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The mid-level LCS/LCSD associated with QC batch 9300252 exhibited an internal standard recovery above the QC control limits for 13C2 PFDA. This is an indicator the PFDA LCSD recovery may be biased low. As the PFDA LCSD recovery is within control limits corrective action is deemed unnecessary.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batches 9299269, 9321493, 9328469, and 9343491 reported the percent recoveries for several PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

| Compound | Low-Level LCS Actual Recovery | Control Limits | Low-Level LCS Actual Result | MDL |
|---|---|---|---|---|
| PFTriA | 86% | 50-150% | 0.0172 ug/L | 0.01772 ug/L |

| | | | | |
|---|---|---|---|---|
| PFTeA | 66% | 50-150% | 0.0133 ug/L | 0.01456 ug/L |
| PFTriA | 78% | 44-164% | 0.01567 ug/L | 0.01772 ug/L |
| PFTeA | 66% | 47-172% | 0.01325 ug/L | 0.01456 ug/L |
| PFDS | 40% | 37-130% | 0.00806 ug/L | 0.00915 ug/L |
| PFDA | 71% | 64-146% | 0.01424 ug/L | 0.00782 ug/L |
| PFTriA | 44% | 44-164% | 0.00881 ug/L | 0.01772 ug/L |
| PFDS | 40% | 37-130% | 0.00796 ug/L | 0.00915 ug/L |
| PFTriA | 81% | 44-164% | 0.0162 ug/L | 0.01772 ug/L |

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%.

The low-level LCS and mid-level LCS/LCSD associated with QC batch 9301197 exhibited percent recoveries, RPD data, and an internal standard recovery outside the control limits for Perfluorooctane sulfonamide (FOSA) and MeFOSA. This is an indication the FOSA data may be biased high. As no detectable concentrations are present in samples MW 16B-D12, MW17-D11, and MW 15A-M16, corrective action is deemed unnecessary. Upon re-extraction and reanalysis of samples MW 16A-M15, MW 16-M5, MW 15-M17, MW 15B-D13, MW 14B-D14, and MW 14-M14 in batch 9316449, the percent recoveries and internal standards were 100% in control. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the recommended sample holding time.

The method required MS/MSD could not be performed for QC batches 9300252, 9301197, 9316449, 9299269, 9299270, 9328469, 9299508, 9300254, 9321493, and 9343491, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

The ending Continuing Calibration Verification (CCV) standard associated with samples MW 3-M11, MW 7-M9, MW 13A-D8, MW 13-M13, MW 12-D6, and MW 19-M4, in QC batch 9299508, exhibited a %D value out of range, biased high, for Perfluorotridecanoic acid (PFTriA). This is an indicator that data may be biased high. As no detectable concentrations of PFTriA are present in the associated samples, corrective action is deemed unnecessary.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 16A-M15 10/21/09 08:51 001** | | | | |
| Perfluorooctanoic Acid | 3.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 4.2 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.99 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.5 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 1.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 7.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.42 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.51 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.015 J | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.015 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 16-M5 10/21/09 09:07 002** | | | | |
| Perfluorooctanoic Acid | 2.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.55 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.99 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.42 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.77 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.079 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.020 J | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.017 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 16B-D12 10/21/09 09:21 003** | | | | |
| Perfluorooctanoic Acid | 0.26 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.18 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.14 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.46 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.012 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.0069 J | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 15A-M16 10/21/09 10:54 005** | | | | |
| Perfluorooctanoic Acid | 0.36 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.26 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.57 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.47 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.84 | 0.40 | ug/L | DEN -LC-0012 |
| **MW 15-M17 10/21/09 11:13 006** | | | | |
| Perfluorooctanoic Acid | 3.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.8 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.5 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.4 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.7 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.2 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 13 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.32 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.27 | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.24 | 0.050 | ug/L | DEN -LC-0012 |
| **MW 15B-D13 10/21/09 11:30 007** | | | | |
| Perfluorooctanoic Acid | 6.5 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 13 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.83 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.8 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 2.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.4 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.23 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.23 | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.21 | 0.050 | ug/L | DEN -LC-0012 |
| **MW 14B-D14 10/21/09 11:50 008** | | | | |
| Perfluorooctanoic Acid | 1.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.65 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.80 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.46 J | 0.60 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 14B-D14 10/21/09 11:50 008** | | | | |
| Perfluorodecanoic acid (PFDA) | 0.066 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.028 J | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.022 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 14-M14 10/21/09 12:04 009** | | | | |
| Perfluorooctanoic Acid | 1.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.53 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.64 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.5 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.53 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.46 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.019 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.012 J | 0.050 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.012 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 19A-U3 10/21/09 08:33 010** | | | | |
| Perfluorooctanoic Acid | 0.29 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.34 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.27 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.19 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.10 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.012 J | 0.020 | ug/L | DEN -LC-0012 |
| **MW 14A-D5 10/20/09 09:08 011** | | | | |
| Perfluorodecanoic acid (PFDA) | 0.20 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.56 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.43 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.84 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.62 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.54 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.33 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.12 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.13 J | 0.30 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 14A-D5 10/20/09 09:08 011** | | | | |
| Perfluorooctanoic Acid | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.72 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.48 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.79 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.68 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.69 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.34 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.15 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.010 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 10-D4 10/20/09 09:35 012** | | | | |
| Perfluorobutane sulfonate (PFB | 3.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.78 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.37 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.78 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.81 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.9 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.42 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.83 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.0082 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 8-M12 10/20/09 09:54 013** | | | | |
| Perfluorobutane sulfonate (PFB | 1.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.66 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.9 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.93 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.25 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.3 | 0.20 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

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| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 8-M12 10/20/09 09:54 013** | | | | |
| Perfluorohexane sulfonate (PFH | 0.39 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.7 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.79 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.0 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.97 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.44 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.026 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 4-M8 10/20/09 10:07 014** | | | | |
| Perfluorobutane sulfonate (PFB | 4.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.67 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.34 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.38 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.75 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.81 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.31 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 6.2 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.78 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.35 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.40 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.67 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.70 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.26 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.074 J | 0.30 | ug/L | DEN -LC-0012 |
| **MW 5-M7 10/20/09 10:21 015** | | | | |
| Perfluorodecanoic acid (PFDA) | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.90 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.41 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.70 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.12 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.43 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.27 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.2 | 1.0 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D9J230348**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 5-M7 10/20/09 10:21 015** | | | | |
| Perfluoropentanoic acid (PFPA) | 1.7 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.72 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.36 J | 1.5 | ug/L | DEN -LC-0012 |
| **MW 20-D3 10/19/09 14:52 016** | | | | |
| Perfluorodecanoic acid (PFDA) | 0.033 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.30 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.31 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.40 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.24 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.46 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.28 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.16 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.033 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.025 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.38 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.064 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.29 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.42 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.29 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.46 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.34 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.17 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.037 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.053 | 0.030 | ug/L | DEN -LC-0012 |
| **MW 7A-U2 10/19/09 15:03 017** | | | | |
| Perfluorooctanoic Acid | 1.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.5 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 5.5 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 3.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.49 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.41 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.5 | 2.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.9 J | 2.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 6.8 | 3.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 4.5 | 2.0 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 22-M1 10/19/09 15:35 018** | | | | |
| Perfluorobutane sulfonate (PFB | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.46 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.34 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.11 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.34 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.25 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.20 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.010 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.12 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.13 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.41 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.28 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.25 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.10 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.0099 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 23-U1 10/19/09 15:47 019** | | | | |
| Perfluorobutane sulfonate (PFB | 0.016 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.016 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.022 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.030 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.018 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.021 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.024 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.023 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.028 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.021 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.013 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.0075 J | 0.030 | ug/L | DEN -LC-0012 |
| **MW 12A-D7 10/20/09 14:52 020** | | | | |
| Perfluorobutane sulfonate (PFB | 0.78 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.70 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.51 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.85 | 0.20 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 12A-D7 10/20/09 14:52 020** | | | | |
| Perfluorobutane sulfonate (PFB | 0.87 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.43 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.88 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.57 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.8 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.86 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.37 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.053 | 0.050 | ug/L | DEN -LC-0012 |
| **MW 6-M2 10/20/09 10:46 021** | | | | |
| Perfluorobutane sulfonate (PFB | 0.020 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.83 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.21 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.84 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| **MW 1-M10 10/20/09 11:28 022** | | | | |
| Perfluorobutane sulfonate (PFB | 0.27 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.039 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.060 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.098 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.091 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.030 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.26 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.047 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.016 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.074 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.081 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.11 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.034 | 0.020 | ug/L | DEN -LC-0012 |
| **MW 3-M11 10/20/09 11:38 023** | | | | |
| Perfluorobutanoic acid (PFBA) | 0.11 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.19 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.23 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.093 J | 0.20 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 3-M11 10/20/09 11:38 023** | | | | |
| Perfluorooctanoic Acid | 0.14 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.11 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.23 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.27 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.11 J | 0.20 | ug/L | DEN -LC-0012 |
| **MW 7-M9 10/20/09 11:52 024** | | | | |
| Perfluorooctanoic Acid | 0.92 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 2.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 7.1 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 3.8 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.9 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 6.9 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 3.5 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.85 J | 1.0 | ug/L | DEN -LC-0012 |
| **MW 13A-D8 10/20/09 14:37 025** | | | | |
| Perfluorooctanoic Acid | 4.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 8.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.82 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.5 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.36 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.26 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 4.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 7.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.93 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.7 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.46 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.32 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.67 | 0.50 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 13-M13 10/20/09 15:05 026** | | | | |
| Perfluorooctanoic Acid | 3.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.93 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.6 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.54 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.88 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.93 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.54 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.90 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.023 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 12-D6 10/20/09 15:16 027** | | | | |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.52 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.99 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.72 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.42 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.092 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.27 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.53 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.69 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.40 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.14 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.28 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.15 | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D9J230348

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 19-M4 10/20/09 15:33 028** | | | | |
| Perfluorooctanoic Acid | 2.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 3.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.42 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.89 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.20 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.50 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.70 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 3.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.44 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.89 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.21 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.13 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.51 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.78 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.044 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 18-D9 10/20/09 15:49 029** | | | | |
| Perfluorooctanoic Acid | 2.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.8 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.78 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.6 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.3 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.38 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.14 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.0098 J | 0.050 | ug/L | DEN -LC-0012 |
| **MW 17A-M6A 10/20/09 16:01 030** | | | | |
| Perfluorooctanoic Acid | 0.17 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.082 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.054 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.084 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.089 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.071 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.042 | 0.020 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D9J230348**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **MW 17A-M6A 10/20/09 16:01 030** | | | | |
| Perfluorobutane sulfonate (PFB | 0.26 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.019 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.017 J | 0.020 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

D9J230348

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

**D9J230348**

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Andria Lenoble | 000800 |
| DEN -LC-0012 | Jacqueline Bonnett | 003601 |
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

D9J230348

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LM75T | 001 | MW 16A-M15 | 10/21/09 | 08:51 |
| LM75X | 002 | MW 16-M5 | 10/21/09 | 09:07 |
| LM750 | 003 | MW 16B-D12 | 10/21/09 | 09:21 |
| LM751 | 004 | MW 17-D11 | 10/21/09 | 09:35 |
| LM752 | 005 | MW 15A-M16 | 10/21/09 | 10:54 |
| LM754 | 006 | MW 15-M17 | 10/21/09 | 11:13 |
| LM755 | 007 | MW 15B-D13 | 10/21/09 | 11:30 |
| LM756 | 008 | MW 14B-D14 | 10/21/09 | 11:50 |
| LM758 | 009 | MW 14-M14 | 10/21/09 | 12:04 |
| LM759 | 010 | MW 19A-U3 | 10/21/09 | 08:33 |
| LM76A | 011 | MW 14A-D5 | 10/20/09 | 09:08 |
| LM76C | 012 | MW 10-D4 | 10/20/09 | 09:35 |
| LM76D | 013 | MW 8-M12 | 10/20/09 | 09:54 |
| LM76F | 014 | MW 4-M8 | 10/20/09 | 10:07 |
| LM76G | 015 | MW 5-M7 | 10/20/09 | 10:21 |
| LM76H | 016 | MW 20-D3 | 10/19/09 | 14:52 |
| LM76K | 017 | MW 7A-U2 | 10/19/09 | 15:03 |
| LM76M | 018 | MW 22-M1 | 10/19/09 | 15:35 |
| LM76N | 019 | MW 23-U1 | 10/19/09 | 15:[illegible] |
| LM76P | 020 | MW 12A-D7 | 10/20/09 | 14:[illegible] |
| LM76R | 021 | MW 6-M2 | 10/20/09 | 10:46 |
| LM76T | 022 | MW 1-M10 | 10/20/09 | 11:28 |
| LM76W | 023 | MW 3-M11 | 10/20/09 | 11:38 |
| LM76X | 024 | MW 7-M9 | 10/20/09 | 11:52 |
| LM760 | 025 | MW 13A-D8 | 10/20/09 | 14:37 |
| LM761 | 026 | MW 13-M13 | 10/20/09 | 15:05 |
| LM764 | 027 | MW 12-D6 | 10/20/09 | 15:16 |
| LM766 | 028 | MW 19-M4 | 10/20/09 | 15:33 |
| LM769 | 029 | MW 18-D9 | 10/20/09 | 15:49 |
| LM77A | 030 | MW 17A-M6A | 10/20/09 | 16:01 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: MW 16A-M15**

**HPLC**

**Lot-Sample #...:** D9J230348-001 **Work Order #...:** LM75T1AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 08:51 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 07:24
**Dilution Factor:** 50
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **3.4** | **1.0** | **ug/L** | **0.49** |
| **Perfluorooctanesulfonate** | **4.2** | **1.0** | **ug/L** | **0.67** |
| **Perfluorobutanoic acid (PFBA)** | **0.99 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **1.5** | **1.0** | **ug/L** | **0.15** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.4** | **1.0** | **ug/L** | **0.66** |
| **Perfluorononanoic acid (PFNA)** | **1.0** | **1.0** | **ug/L** | **0.87** |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| **Perfluorobutane sulfonate (PFBS)** | **7.4** | **1.0** | **ug/L** | **0.41** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.42 J** | **1.5** | **ug/L** | **0.35** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 122 | (50 - 200) |
| 13C4 PFOS | 110 | (50 - 200) |
| 13C4 PFBA | 109 | (50 - 200) |
| 13C2 PFHxA | 115 | (50 - 200) |
| 18O2 PFHxS | 112 | (50 - 200) |
| 13C5 PFNA | 117 | (50 - 200) |
| 13C2 PFUnA | 122 | (50 - 200) |
| 13C2 PFDoA | 122 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 16A-M15

HPLC

Lot-Sample #...: D9J230348-001
Date Sampled...: 10/21/09 08:51
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM75T1AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 00:30

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.015 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 54 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 16A-M15

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-001 | Work Order #...: | LM75T2AA | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 08:51 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/27/09 | Analysis Date..: | 11/08/09 | | |
| Prep Batch #...: | 9300252 | Analysis Time..: | 00:20 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | 0.51 | 0.020 | ug/L | 0.0078 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 87 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 16A-M15

HPLC

Lot-Sample #...: D9J230348-001
Date Sampled...: 10/21/09 08:51
Prep Date.....: 11/12/09
Prep Batch #...: 9316449
Dilution Factor: 1

Work Order #...: LM75T2AC
Date Received..: 10/23/09
Analysis Date..: 12/01/09
Analysis Time..: 13:50

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (PFOSA) | 0.015 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 45 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 16-M5**

**HPLC**

**Lot-Sample #...:** D9J230348-002 **Work Order #...:** LM75X1AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 09:07 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 07:35
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.3** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **2.8** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.55** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.99** | **0.40** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.42** | **0.40** | **ug/L** | **0.35** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **2.1** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.77** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 119 | (50 - 200) |
| 13C4 PFOS | 102 | (50 - 200) |
| 13C4 PFBA | 107 | (50 - 200) |
| 13C2 PFHxA | 111 | (50 - 200) |
| 18O2 PFHxS | 105 | (50 - 200) |
| 13C5 PFNA | 112 | (50 - 200) |
| 13C2 PFUnA | 115 | (50 - 200) |
| 13C2 PFDoA | 112 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 16-M5

HPLC

Lot-Sample #...: D9J230348-002
Date Sampled...: 10/21/09 09:07
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM75X1AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 00:35

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.020 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 50 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 16-M5**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-002 | **Work Order #...:** | LM75X2AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 09:07 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 00:31 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.079** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 98 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 16-M5

HPLC

Lot-Sample #...: D9J230348-002
Date Sampled...: 10/21/09 09:07
Prep Date.....: 11/12/09
Prep Batch #...: 9316449
Dilution Factor: 1

Work Order #...: LM75X2AC
Date Received..: 10/23/09
Analysis Date..: 12/01/09
Analysis Time..: 13:55

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.017 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 44 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 16B-D12**

**HPLC**

**Lot-Sample #...:** D9J230348-003 **Work Order #...:** LM7501AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 09:21 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 07:46
**Dilution Factor:** 10
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.26** | **0.20** | **ug/L** | **0.098** |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| **Perfluorobutanoic acid (PFBA)** | **0.10 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.18 J** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.15 J** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.14 J** | **0.20** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.46** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 138 | (50 - 200) |
| 13C4 PFOS | 109 | (50 - 200) |
| 13C4 PFBA | 118 | (50 - 200) |
| 13C2 PFHxA | 128 | (50 - 200) |
| 18O2 PFHxS | 132 | (50 - 200) |
| 13C5 PFNA | 123 | (50 - 200) |
| 13C2 PFUnA | 126 | (50 - 200) |
| 13C2 PFDoA | 128 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 16B-D12

HPLC

Lot-Sample #...: D9J230348-003
Date Sampled...: 10/21/09 09:21
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM7501AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 00:41

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 27 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 16B-D12**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-003 | **Work Order #...:** | LM7502AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 09:21 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 00:42 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.012 J** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 79 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 16B-D12

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-003 | Work Order #...: | LM7502AC | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 09:21 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 11/12/09 | Analysis Date..: | 12/01/09 | | |
| Prep Batch #...: | 9316449 | Analysis Time..: | 14:00 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.0069 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 35 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 17-D11**

**HPLC**

**Lot-Sample #...:** D9J230348-004 **Work Order #...:** LM7511AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 07:57
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | ND | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 135 | (50 - 200) |
| 13C4 PFOS | 71 | (50 - 200) |
| 13C4 PFBA | 97 | (50 - 200) |
| 13C2 PFHxA | 103 | (50 - 200) |
| 18O2 PFHxS | 100 | (50 - 200) |
| 13C5 PFNA | 102 | (50 - 200) |
| 13C2 PFUnA | 68 | (50 - 200) |
| 13C2 PFDoA | 67 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 17-D11

HPLC

Lot-Sample #...: D9J230348-004
Date Sampled...: 10/21/09 09:35
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM7511AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 00:46

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 46 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 17-D11**

**HPLC**

**Lot-Sample #...:** D9J230348-004 **Work Order #...:** LM7512AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/08/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 00:53
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 75 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15A-M16

HPLC

Lot-Sample #...: D9J230348-005 Work Order #...: LM7521AA Matrix.....: WATER
Date Sampled...: 10/21/09 10:54 Date Received..: 10/23/09
Prep Date.....: 10/27/09 Analysis Date..: 11/12/09
Prep Batch #...: 9300252 Analysis Time..: 08:19
Dilution Factor: 20

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.36 J** | **0.40** | **ug/L** | **0.20** |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| **Perfluorobutanoic acid (PFBA)** | **0.26 J** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **0.57 J** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **0.47** | **0.40** | **ug/L** | **0.058** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **0.84** | **0.40** | **ug/L** | **0.16** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 112 | (50 - 200) |
| 13C4 PFOS | 102 | (50 - 200) |
| 13C4 PFBA | 102 | (50 - 200) |
| 13C2 PFHxA | 107 | (50 - 200) |
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C5 PFNA | 107 | (50 - 200) |
| 13C2 PFUnA | 106 | (50 - 200) |
| 13C2 PFDoA | 109 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 15A-M16

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-005 | **Work Order #...:** | LM7521AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 10:54 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/28/09 | **Analysis Date..:** | 11/07/09 | | |
| **Prep Batch #...:** | 9301197 | **Analysis Time..:** | 00:52 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 51 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15A-M16

HPLC

**Lot-Sample #...:** D9J230348-005 **Work Order #...:** LM7522AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 10:54 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/08/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 01:15
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 88 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 15-M17**

**HPLC**

**Lot-Sample #...:** D9J230348-006 **Work Order #...:** LM7541AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 11:13 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 08:30
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **3.0** | **1.0** | **ug/L** | **0.49** |
| **Perfluorooctanesulfonate** | **1.8** | **1.0** | **ug/L** | **0.67** |
| **Perfluorobutanoic acid (PFBA)** | **1.5** | **1.0** | **ug/L** | **0.49** |
| **Perfluoropentanoic acid (PFPA)** | **2.4** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **1.7** | **1.0** | **ug/L** | **0.15** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.2** | **1.0** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| **Perfluorobutane sulfonate (PFBS)** | **13** | **1.0** | **ug/L** | **0.41** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 122 | (50 - 200) |
| 13C4 PFOS | 94 | (50 - 200) |
| 13C4 PFBA | 110 | (50 - 200) |
| 13C2 PFHxA | 113 | (50 - 200) |
| 18O2 PFHxS | 110 | (50 - 200) |
| 13C5 PFNA | 112 | (50 - 200) |
| 13C2 PFUnA | 112 | (50 - 200) |
| 13C2 PFDoA | 111 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15-M17

HPLC

Lot-Sample #...: D9J230348-006
Date Sampled...: 10/21/09 11:13
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM7541AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 01:03

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.27 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 15-M17**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-006 | **Work Order #...:** | LM7542AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:13 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 01:26 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.32** | **0.20** | **ug/L** | **0.078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 155 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15-M17

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-006 | **Work Order #...:** | LM7542AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:13 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/12/09 | **Analysis Date..:** | 12/01/09 | | |
| **Prep Batch #...:** | 9316449 | **Analysis Time..:** | 14:05 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.24** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 56 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15B-D13

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-007 | **Work Order #...:** | LM7551AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:30 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/12/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 08:41 | | |
| **Dilution Factor:** | 50 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **6.5** | **1.0** | **ug/L** | **0.49** |
| **Perfluorooctanesulfonate** | **13** | **1.0** | **ug/L** | **0.67** |
| **Perfluorobutanoic acid (PFBA)** | **0.83 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluoropentanoic acid (PFPA)** | **2.8** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **2.4** | **1.0** | **ug/L** | **0.15** |
| **Perfluoroheptanoic acid (PFHpA)** | **2.3** | **1.0** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| **Perfluorobutane sulfonate (PFBS)** | **2.3** | **1.0** | **ug/L** | **0.41** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.4 J** | **1.5** | **ug/L** | **0.35** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 106 | (50 - 200) |
| 13C4 PFOS | 116 | (50 - 200) |
| 13C4 PFBA | 106 | (50 - 200) |
| 13C2 PFHxA | 107 | (50 - 200) |
| 18O2 PFHxS | 101 | (50 - 200) |
| 13C5 PFNA | 108 | (50 - 200) |
| 13C2 PFUnA | 102 | (50 - 200) |
| 13C2 PFDoA | 103 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 15B-D13

HPLC

Lot-Sample #...: D9J230348-007
Date Sampled...: 10/21/09 11:30
Prep Date.....: 10/28/09
Prep Batch #...: 9301197
Dilution Factor: 1

Work Order #...: LM7551AC
Date Received..: 10/23/09
Analysis Date..: 11/07/09
Analysis Time..: 01:08

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (PFOSA) | 0.23 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 59 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 15B-D13**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-007 | **Work Order #...:** | LM7552AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:30 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 01:37 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.23** | **0.20** | **ug/L** | **0.078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 128 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 15B-D13

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-007 | Work Order #...: | LM7552AC | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 11:30 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 11/12/09 | Analysis Date..: | 12/01/09 | | |
| Prep Batch #...: | 9316449 | Analysis Time..: | 14:10 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.21 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 49 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 14B-D14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-008 | Work Order #...: | LM7561AA | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 11:50 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/27/09 | Analysis Date..: | 11/12/09 | | |
| Prep Batch #...: | 9300252 | Analysis Time..: | 08:52 | | |
| Dilution Factor: | 20 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.6** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **1.1** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.65** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.1** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.80** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **2.1** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.46 J** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (50 - 200) |
| 13C4 PFOS | 111 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 102 | (50 - 200) |
| 18O2 PFHxS | 90 | (50 - 200) |
| 13C5 PFNA | 100 | (50 - 200) |
| 13C2 PFUnA | 103 | (50 - 200) |
| 13C2 PFDoA | 97 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 14B-D14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-008 | Work Order #...: | LM7561AC | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 11:50 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/28/09 | Analysis Date..: | 11/07/09 | | |
| Prep Batch #...: | 9301197 | Analysis Time..: | 01:14 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.028 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 42 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 14B-D14**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-008 | **Work Order #...:** | LM7562AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:50 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 01:48 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.066** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 80 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 14B-D14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-008 | **Work Order #...:** | LM7562AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 11:50 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/12/09 | **Analysis Date..:** | 12/01/09 | | |
| **Prep Batch #...:** | 9316449 | **Analysis Time..:** | 14:15 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.022 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 52 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 14-M14**

**HPLC**

**Lot-Sample #...:** D9J230348-009 **Work Order #...:** LM7581AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 12:04 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 09:03
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.8** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **0.53** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.64** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **2.5** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.9** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.1** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **0.53** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.46 J** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 100 | (50 - 200) |
| 13C4 PFOS | 115 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 99 | (50 - 200) |
| 18O2 PFHxS | 99 | (50 - 200) |
| 13C5 PFNA | 99 | (50 - 200) |
| 13C2 PFUnA | 99 | (50 - 200) |
| 13C2 PFDoA | 97 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 14-M14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-009 | Work Order #...: | LM7581AC | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 12:04 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/28/09 | Analysis Date..: | 11/07/09 | | |
| Prep Batch #...: | 9301197 | Analysis Time..: | 01:19 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.012 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 38 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 14-M14**

**HPLC**

**Lot-Sample #...:** D9J230348-009 **Work Order #...:** LM7582AA **Matrix.....:** WATER
**Date Sampled...:** 10/21/09 12:04 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/08/09
**Prep Batch #...:** 9300252 **Analysis Time..:** 01:59
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.019 J** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 88 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 14-M14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-009 | Work Order #...: | LM7582AC | Matrix.....: | WATER |
| Date Sampled...: | 10/21/09 12:04 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 11/12/09 | Analysis Date..: | 12/01/09 | | |
| Prep Batch #...: | 9316449 | Analysis Time..: | 14:20 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.012 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 51 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 19A-U3

HPLC

Lot-Sample #...: D9J230348-010 Work Order #...: LM7591AA Matrix.....: WATER
Date Sampled...: 10/21/09 08:33 Date Received..: 10/23/09
Prep Date.....: 10/27/09 Analysis Date..: 11/12/09
Prep Batch #...: 9300252 Analysis Time..: 09:14
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.29** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.15 J** | **0.20** | **ug/L** | **0.13** |
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| **Perfluoropentanoic acid (PFPA)** | **0.34** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.27** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.19 J** | **0.20** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.15 J** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.10 J** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 118 | (50 - 200) |
| 13C4 PFOS | 126 | (50 - 200) |
| 13C4 PFBA | 108 | (50 - 200) |
| 13C2 PFHxA | 107 | (50 - 200) |
| 18O2 PFHxS | 118 | (50 - 200) |
| 13C5 PFNA | 100 | (50 - 200) |
| 13C2 PFUnA | 108 | (50 - 200) |
| 13C2 PFDoA | 106 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 19A-U3

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-010 | **Work Order #...:** | LM7591AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 08:33 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 20:22 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 45 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 19A-U3**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-010 | **Work Order #...:** | LM7592AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/21/09 08:33 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 02:10 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.012 J** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 103 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 14A-D5**

**HPLC**

**Lot-Sample #...:** D9J230348-011 **Work Order #...:** LM76A1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:08 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 12:57
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.20** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **2.2** | **0.20** | **ug/L** | **0.082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 82 | (50 - 200) |
| 13C2 PFDA | 87 | (50 - 200) |
| 13C2 PFUnA | 68 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 14A-D5

HPLC

Lot-Sample #...: D9J230348-011
Date Sampled...: 10/20/09 09:08
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76A1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 21:50

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.010 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 52 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 14A-D5**

**HPLC**

**Lot-Sample #...:** D9J230348-011 **Work Order #...:** LM76A2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:08 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 07:03
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.3** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.56** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.43** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.84** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.62** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.54** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.33** | **0.20** | **ug/L** | **0.17** |
| **Perfluorodecanoic acid (PFDA)** | **0.12 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **2.3** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.13 J** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 106 | (50 - 200) |
| 13C4 PFOS | 104 | (50 - 200) |
| 13C4 PFBA | 115 | (50 - 200) |
| 13C2 PFHxA | 107 | (50 - 200) |
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C5 PFNA | 103 | (50 - 200) |
| 13C2 PFDA | 103 | (50 - 200) |
| 13C2 PFUnA | 98 | (50 - 200) |
| 13C2 PFDoA | 99 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 14A-D5

HPLC

Lot-Sample #...: D9J230348-011
Date Sampled...: 10/20/09 09:08
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 10

Work Order #...: LM76A3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 06:48

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 1.4 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 0.72 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.48 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 0.79 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 0.68 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.69 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | 0.34 | 0.20 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorohexane sulfonate (PFHxS) | 0.15 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 120 | (50 - 200) |
| 13C4 PFOS | 102 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 108 | (50 - 200) |
| 18O2 PFHxS | 120 | (50 - 200) |
| 13C5 PFNA | 110 | (50 - 200) |
| 13C2 PFDoA | 110 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 10-D4**

**HPLC**

**Lot-Sample #...:** D9J230348-012 **Work Order #...:** LM76C1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 13:08
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **3.9** | **0.40** | **ug/L** | **0.16** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 87 | (50 - 200) |
| 13C2 PFDA | 83 | (50 - 200) |
| 13C2 PFUnA | 77 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 10-D4

HPLC

Lot-Sample #...: D9J230348-012
Date Sampled...: 10/20/09 09:35
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76C1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:01

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.0082 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 49 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 10-D4**

**HPLC**

**Lot-Sample #...:** D9J230348-012 **Work Order #...:** LM76C2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:35 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 07:18
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **3.1** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **1.7** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.78** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **2.0** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **1.7** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.3** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.37** | **0.20** | **ug/L** | **0.17** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **4.0** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.78** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 108 | (50 - 200) |
| 13C4 PFOS | 102 | (50 - 200) |
| 13C4 PFBA | 107 | (50 - 200) |
| 13C2 PFHxA | 105 | (50 - 200) |
| 18O2 PFHxS | 106 | (50 - 200) |
| 13C5 PFNA | 104 | (50 - 200) |
| 13C2 PFDA | 104 | (50 - 200) |
| 13C2 PFUnA | 103 | (50 - 200) |
| 13C2 PFDoA | 101 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 10-D4

HPLC

Lot-Sample #...: D9J230348-012
Date Sampled...: 10/20/09 09:35
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 20

Work Order #...: LM76C3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 06:59

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 2.6 | 0.40 | ug/L | 0.20 |
| Perfluorooctanesulfonate | 2.6 | 0.40 | ug/L | 0.27 |
| Perfluorobutanoic acid (PFBA) | 0.81 | 0.40 | ug/L | 0.20 |
| Perfluoropentanoic acid (PFPA) | 1.9 | 0.60 | ug/L | 0.22 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | 0.058 |
| Perfluoroheptanoic acid (PFHpA) | 1.3 | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | 0.42 | 0.40 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorohexane sulfonate (PFHxS) | 0.83 | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 117 | (50 - 200) |
| 13C4 PFOS | 97 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 105 | (50 - 200) |
| 18O2 PFHxS | 112 | (50 - 200) |
| 13C5 PFNA | 111 | (50 - 200) |
| 13C2 PFDoA | 108 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 8-M12**

**HPLC**

**Lot-Sample #...:** D9J230348-013 **Work Order #...:** LM76D1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:54 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 13:19
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **1.3** | **0.40** | **ug/L** | **0.16** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C2 PFDA | 94 | (50 - 200) |
| 13C2 PFUnA | 91 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 8-M12

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-013 | Work Order #...: | LM76D1AC | Matrix.....: | WATER |
| Date Sampled...: | 10/20/09 09:54 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/26/09 | Analysis Date..: | 11/06/09 | | |
| Prep Batch #...: | 9299270 | Analysis Time..: | 22:06 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.026 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 50 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 8-M12**

**HPLC**

**Lot-Sample #...:** D9J230348-013 **Work Order #...:** LM76D2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 09:54 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 07:33
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.0** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **1.1** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.66** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.9** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.93** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.25** | **0.20** | **ug/L** | **0.17** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **1.3** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.39** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 102 | (50 - 200) |
| 13C4 PFOS | 100 | (50 - 200) |
| 13C4 PFBA | 113 | (50 - 200) |
| 13C2 PFHxA | 106 | (50 - 200) |
| 18O2 PFHxS | 106 | (50 - 200) |
| 13C5 PFNA | 104 | (50 - 200) |
| 13C2 PFDA | 102 | (50 - 200) |
| 13C2 PFUnA | 97 | (50 - 200) |
| 13C2 PFDoA | 104 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 8-M12

HPLC

Lot-Sample #...: D9J230348-013
Date Sampled...: 10/20/09 09:54
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 20

Work Order #...: LM76D3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 07:10

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 1.7 | 0.40 | ug/L | 0.20 |
| Perfluorooctanesulfonate | 1.4 | 0.40 | ug/L | 0.27 |
| Perfluorobutanoic acid (PFBA) | 0.79 | 0.40 | ug/L | 0.20 |
| Perfluoropentanoic acid (PFPA) | 2.0 | 0.60 | ug/L | 0.22 |
| Perfluorohexanoic acid (PFHxA) | 1.6 | 0.40 | ug/L | 0.058 |
| Perfluoroheptanoic acid (PFHpA) | 0.97 | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorohexane sulfonate (PFHxS) | 0.44 J | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 113 | (50 - 200) |
| 13C4 PFOS | 106 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 103 | (50 - 200) |
| 18O2 PFHxS | 111 | (50 - 200) |
| 13C5 PFNA | 107 | (50 - 200) |
| 13C2 PFDoA | 101 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 4-M8**

**HPLC**

**Lot-Sample #...:** D9J230348-014 **Work Order #...:** LM76F1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:07 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 13:30
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **4.6** | **0.20** | **ug/L** | **0.082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 100 | (50 - 200) |
| 13C2 PFDA | 78 | (50 - 200) |
| 13C2 PFUnA | 75 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 4-M8

HPLC

Lot-Sample #...: D9J230348-014
Date Sampled...: 10/20/09 10:07
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76F1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:12

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 63 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 4-M8**

**HPLC**

**Lot-Sample #...:** D9J230348-014 **Work Order #...:** LM76F2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:07 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 11:50
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.67** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **0.34 J** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.38 J** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **0.75** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **0.81** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.31 J** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **6.2** | **0.40** | **ug/L** | **0.16** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 103 | (50 - 200) |
| 13C4 PFOS | 98 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 94 | (50 - 200) |
| 18O2 PFHxS | 94 | (50 - 200) |
| 13C5 PFNA | 100 | (50 - 200) |
| 13C2 PFDA | 95 | (50 - 200) |
| 13C2 PFUnA | 99 | (50 - 200) |
| 13C2 PFDoA | 99 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 4-M8

HPLC

Lot-Sample #...: D9J230348-014
Date Sampled...: 10/20/09 10:07
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 10

Work Order #...: LM76F3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 07:21

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.78 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 0.35 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.40 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 0.67 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 0.70 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.26 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorohexane sulfonate (PFHxS) | 0.074 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 128 | (50 - 200) |
| 13C4 PFOS | 115 | (50 - 200) |
| 13C4 PFBA | 113 | (50 - 200) |
| 13C2 PFHxA | 118 | (50 - 200) |
| 18O2 PFHxS | 125 | (50 - 200) |
| 13C5 PFNA | 117 | (50 - 200) |
| 13C2 PFDoA | 110 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 5-M7

HPLC

**Lot-Sample #...:** D9J230348-015 **Work Order #...:** LM76G1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:21 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 13:41
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **2.1** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **4.2** | **0.20** | **ug/L** | **0.082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 83 | (50 - 200) |
| 13C2 PFDA | 62 | (50 - 200) |
| 13C2 PFUnA | 46 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 5-M7

HPLC

Lot-Sample #...: D9J230348-015
Date Sampled...: 10/20/09 10:21
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76G1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:17

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 66 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 5-M7

HPLC

Lot-Sample #...: D9J230348-015 Work Order #...: LM76G2AA Matrix.....: WATER
Date Sampled...: 10/20/09 10:21 Date Received..: 10/23/09
Prep Date.....: 11/24/09 Analysis Date..: 12/31/09
Prep Batch #...: 9328469 Analysis Time..: 08:03
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 0.90 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.41 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.70 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | 0.12 J | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorobutane sulfonate (PFBS) | 0.43 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.27 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 103 | (50 - 200) |
| 13C4 PFOS | 104 | (50 - 200) |
| 13C4 PFBA | 112 | (50 - 200) |
| 13C2 PFHxA | 108 | (50 - 200) |
| 18O2 PFHxS | 108 | (50 - 200) |
| 13C5 PFNA | 108 | (50 - 200) |
| 13C2 PFDA | 103 | (50 - 200) |
| 13C2 PFUnA | 103 | (50 - 200) |
| 13C2 PFDoA | 102 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 5-M7

HPLC

Lot-Sample #...: D9J230348-015
Date Sampled...: 10/20/09 10:21
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 50

Work Order #...: LM76G3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 07:32

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 1.3 | 1.0 | ug/L | 0.49 |
| Perfluorooctanesulfonate | 1.2 | 1.0 | ug/L | 0.67 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 1.5 | ug/L | 0.55 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 1.0 | ug/L | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.72 J | 1.0 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorohexane sulfonate (PFHxS) | 0.36 J | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (50 - 200) |
| 13C4 PFOS | 98 | (50 - 200) |
| 13C4 PFBA | 99 | (50 - 200) |
| 13C2 PFHxA | 103 | (50 - 200) |
| 18O2 PFHxS | 112 | (50 - 200) |
| 13C5 PFNA | 99 | (50 - 200) |
| 13C2 PFDoA | 96 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 20-D3

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-016 | **Work Order #...:** | LM76H1AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 14:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/09/09 | | |
| **Prep Batch #...:** | 9299269 | **Analysis Time..:** | 14:03 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.033** | **0.020** | **ug/L** | **0.0078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.30** | **0.020** | **ug/L** | **0.0082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 77 | (50 - 200) |
| 13C2 PFDA | 43 * | (50 - 200) |
| 13C2 PFUnA | 48 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 20-D3

HPLC

Lot-Sample #...: D9J230348-)16
Date Sampled...: 10/19/09 14:52
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76H1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:23

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 56 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 20-D3**

**HPLC**

**Lot-Sample #...:** D9J230348-016 **Work Order #...:** LM76H1AD **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 14:52 **Date Received..:** 10/23/09
**Prep Date.....:** 12/09/09 **Analysis Date..:** 12/29/09
**Prep Batch #...:** 9343491 **Analysis Time..:** 13:17
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.31** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorooctanesulfonate** | **0.40** | **0.020** | **ug/L** | **0.013** |
| **Perfluorobutanoic acid (PFBA)** | **0.24** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.46** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.28** | **0.020** | **ug/L** | **0.0029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.16** | **0.020** | **ug/L** | **0.013** |
| **Perfluorononanoic acid (PFNA)** | **0.033** | **0.020** | **ug/L** | **0.017** |
| **Perfluorodecanoic acid (PFDA)** | **0.025** | **0.020** | **ug/L** | **0.0078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.38** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.064** | **0.030** | **ug/L** | **0.0070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (60 - 155) |
| 13C4 PFOS | 47 | (45 - 130) |
| 13C4 PFBA | 103 | (36 - 130) |
| 13C2 PFHxA | 106 | (55 - 135) |
| 18O2 PFHxS | 81 | (61 - 130) |
| 13C5 PFNA | 72 | (54 - 132) |
| 13C2 PFDA | 54 | (53 - 130) |
| 13C2 PFUnA | 44 | (37 - 130) |
| 13C2 PFDoA | 42 | (26 - 130) |

Dalton Utilities

Client Sample ID: MW 20-D3

HPLC

Lot-Sample #...: D9J230348-016
Date Sampled...: 10/19/09 14:52
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 1

Work Order #...: LM76H2AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 07:54

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.29 | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | 0.42 | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | 0.29 | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | 0.46 | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | 0.34 | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | 0.17 | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | 0.037 | 0.020 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorohexane sulfonate (PFHxS) | 0.053 | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (50 - 200) |
| 13C4 PFOS | 59 | (50 - 200) |
| 13C4 PFBA | 84 | (50 - 200) |
| 13C2 PFHxA | 86 | (50 - 200) |
| 18O2 PFHxS | 97 | (50 - 200) |
| 13C5 PFNA | 77 | (50 - 200) |
| 13C2 PFDoA | 55 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 7A-U2**

**HPLC**

**Lot-Sample #...:** D9J230348-017 **Work Order #...:** LM76K1AA **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 15:03 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 14:14
**Dilution Factor:** 100
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 2.0 | ug/L | 0.78 |
| Perfluoroundecanoic acid (PFUnA) | ND | 2.0 | ug/L | 0.69 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 1.8 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 2.0 | ug/L | 1.5 |
| Perfluorobutane sulfonate (PFBS) | ND | 2.0 | ug/L | 0.82 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 90 | (50 - 200) |
| 13C2 PFDA | 68 | (50 - 200) |
| 13C2 PFUnA | 82 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 7A-U2

HPLC

Lot-Sample #...: D9J230348-017
Date Sampled...: 10/19/09 15:03
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76K1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:28

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 7A-U2**

**HPLC**

**Lot-Sample #...:** D9J230348-017 **Work Order #...:** LM76K2AA **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 15:03 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 12:05
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.8** | **0.40** | **ug/L** | **0.20** |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| **Perfluorobutanoic acid (PFBA)** | **1.5** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **5.5** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **3.9** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.1** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **0.49** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.41 J** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 100 | (50 - 200) |
| 13C4 PFOS | 98 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 96 | (50 - 200) |
| 18O2 PFHxS | 96 | (50 - 200) |
| 13C5 PFNA | 102 | (50 - 200) |
| 13C2 PFDA | 99 | (50 - 200) |
| 13C2 PFUnA | 96 | (50 - 200) |
| 13C2 PFDoA | 98 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 7A-U2

HPLC

Lot-Sample #...: D9J230348-017
Date Sampled...: 10/19/09 15:03
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 100

Work Order #...: LM76K3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 08:05

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.5** | **2.0** | **ug/L** | **0.98** |
| Perfluorooctanesulfonate | ND | 2.0 | ug/L | 1.3 |
| **Perfluorobutanoic acid (PFBA)** | **1.9 J** | **2.0** | **ug/L** | **0.98** |
| **Perfluoropentanoic acid (PFPA)** | **6.8** | **3.0** | **ug/L** | **1.1** |
| **Perfluorohexanoic acid (PFHxA)** | **4.5** | **2.0** | **ug/L** | **0.29** |
| Perfluoroheptanoic acid (PFHpA) | ND | 2.0 | ug/L | 1.3 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 1.7 |
| Perfluorododecanoic acid (PFDoA) | ND | 2.0 | ug/L | 1.5 |
| Perfluorohexane sulfonate (PFHxS) | ND | 3.0 | ug/L | 0.70 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 75 | (50 - 200) |
| 13C4 PFOS | 78 | (50 - 200) |
| 13C4 PFBA | 88 | (50 - 200) |
| 13C2 PFHxA | 91 | (50 - 200) |
| 18O2 PFHxS | 108 | (50 - 200) |
| 13C5 PFNA | 86 | (50 - 200) |
| 13C2 PFDoA | 85 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 22-M1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-018 | **Work Order #...:** | LM76M1AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 15:35 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/09/09 | | |
| **Prep Batch #...:** | 9299269 | **Analysis Time..:** | 14:25 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.10 J** | **0.20** | **ug/L** | **0.082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 81 | (50 - 200) |
| 13C2 PFDA | 70 | (50 - 200) |
| 13C2 PFUnA | 69 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 22-M1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-018 | Work Order #...: | LM76M1AC | Matrix.....: | WATER |
| Date Sampled...: | 10/19/09 15:35 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/26/09 | Analysis Date..: | 11/06/09 | | |
| Prep Batch #...: | 9299270 | Analysis Time..: | 22:34 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.0099 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 63 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 22-M1

HPLC

Lot-Sample #...: D9J230348-018 Work Order #...: LM76M2AA Matrix.....: WATER
Date Sampled...: 10/19/09 15:35 Date Received..: 10/23/09
Prep Date.....: 11/24/09 Analysis Date..: 12/29/09
Prep Batch #...: 9328469 Analysis Time..: 02:17
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.46** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorooctanesulfonate** | **0.34** | **0.020** | **ug/L** | **0.013** |
| **Perfluorobutanoic acid (PFBA)** | **0.11** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.34** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.25** | **0.020** | **ug/L** | **0.0029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.20** | **0.020** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| **Perfluorodecanoic acid (PFDA)** | **0.010 J** | **0.020** | **ug/L** | **0.0078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.12** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.13** | **0.030** | **ug/L** | **0.0070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 106 | (50 - 200) |
| 13C4 PFOS | 70 | (50 - 200) |
| 13C4 PFBA | 104 | (50 - 200) |
| 13C2 PFHxA | 92 | (50 - 200) |
| 18O2 PFHxS | 100 | (50 - 200) |
| 13C5 PFNA | 87 | (50 - 200) |
| 13C2 PFDA | 56 | (50 - 200) |
| 13C2 PFUnA | 41 * | (50 - 200) |
| 13C2 PFDoA | 36 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 22-M1

HPLC

Lot-Sample #...: D9J230348-018
Date Sampled...: 10/19/09 15:35
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 10

Work Order #...: LM76M3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 08:16

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.41 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 0.36 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.10 J | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 0.28 J | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 0.25 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.22 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorohexane sulfonate (PFHxS) | 0.10 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (50 - 200) |
| 13C4 PFOS | 68 | (50 - 200) |
| 13C4 PFBA | 89 | (50 - 200) |
| 13C2 PFHxA | 92 | (50 - 200) |
| 18O2 PFHxS | 101 | (50 - 200) |
| 13C5 PFNA | 74 | (50 - 200) |
| 13C2 PFDoA | 73 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 23-U1

HPLC

**Lot-Sample #...:** D9J230348-019 **Work Order #...:** LM76N1AA **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 15:47 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 14:36
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.016 J** | **0.020** | **ug/L** | **0.0082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 65 | (50 - 200) |
| 13C2 PFDA | 37 * | (50 - 200) |
| 13C2 PFUnA | 33 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 23-U1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-019 | **Work Order #...:** | LM76N1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 15:47 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9299270 | **Analysis Time..:** | 22:39 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 67 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 23-U1**

**HPLC**

**Lot-Sample #...:** D9J230348-019 **Work Order #...:** LM76N2AA **Matrix.....:** WATER
**Date Sampled...:** 10/19/09 15:47 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/29/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 02:32
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.016 J** | **0.020** | **ug/L** | **0.0098** |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| **Perfluorobutanoic acid (PFBA)** | **0.022** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.030** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.018 J** | **0.020** | **ug/L** | **0.0029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.021** | **0.020** | **ug/L** | **0.0082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 109 | (50 - 200) |
| 13C4 PFOS | 64 | (50 - 200) |
| 13C4 PFBA | 103 | (50 - 200) |
| 13C2 PFHxA | 90 | (50 - 200) |
| 18O2 PFHxS | 101 | (50 - 200) |
| 13C5 PFNA | 84 | (50 - 200) |
| 13C2 PFDA | 52 | (50 - 200) |
| 13C2 PFUnA | 45 * | (50 - 200) |
| 13C2 PFDoA | 40 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 23-U1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-019 | **Work Order #...:** | LM76N3AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/19/09 15:47 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/11/09 | | |
| **Prep Batch #...:** | 9299269 | **Analysis Time..:** | 08:27 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.024** | **0.020** | **ug/L** | **0.0098** |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| **Perfluorobutanoic acid (PFBA)** | **0.023** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.028 J** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.021** | **0.020** | **ug/L** | **0.0029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.013 J** | **0.020** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorohexane sulfonate (PFHxS)** | **0.0075 J** | **0.030** | **ug/L** | **0.0070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 92 | (50 - 200) |
| 13C4 PFOS | 50 | (50 - 200) |
| 13C4 PFBA | 85 | (50 - 200) |
| 13C2 PFHxA | 88 | (50 - 200) |
| 18O2 PFHxS | 105 | (50 - 200) |
| 13C5 PFNA | 71 | (50 - 200) |
| 13C2 PFDoA | 37 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 12A-D7**

**HPLC**

**Lot-Sample #...:** D9J230348-020 **Work Order #...:** LM76P1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 14:52 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 14:47
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **0.78** | **0.40** | **ug/L** | **0.16** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 81 | (50 - 200) |
| 13C2 PFDA | 72 | (50 - 200) |
| 13C2 PFUnA | 71 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 12A-D7

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-020 | **Work Order #...:** | LM76P1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 14:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9299270 | **Analysis Time..:** | 22:45 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.053** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 37 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: MW 12A-D7**

**HPLC**

**Lot-Sample #...:** D9J230348-020 **Work Order #...:** LM76P2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 14:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 08:33
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.6** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.70** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.51** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.85** | **0.20** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.87** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.43** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 106 | (50 - 200) |
| 13C4 PFOS | 103 | (50 - 200) |
| 13C4 PFBA | 113 | (50 - 200) |
| 13C2 PFHxA | 109 | (50 - 200) |
| 18O2 PFHxS | 113 | (50 - 200) |
| 13C5 PFNA | 112 | (50 - 200) |
| 13C2 PFDA | 103 | (50 - 200) |
| 13C2 PFUnA | 104 | (50 - 200) |
| 13C2 PFDoA | 101 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 12A-D7

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-020 | **Work Order #...:** | LM76P3AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 14:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/11/09 | | |
| **Prep Batch #...:** | 9299269 | **Analysis Time..:** | 08:38 | | |
| **Dilution Factor:** | 20 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.4** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **0.88** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.57** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.86** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| **Perfluorohexane sulfonate (PFHxS)** | **0.37 J** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 111 | (50 - 200) |
| 13C4 PFOS | 111 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 107 | (50 - 200) |
| 18O2 PFHxS | 127 | (50 - 200) |
| 13C5 PFNA | 103 | (50 - 200) |
| 13C2 PFDoA | 99 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 6-M2**

**HPLC**

**Lot-Sample #...:** D9J230348-021 **Work Order #...:** LM76R1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:46 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 14:58
**Dilution Factor:** 1
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.020** | **0.020** | **ug/L** | **0.0082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 71 | (50 - 200) |
| 13C2 PFDA | 48 * | (50 - 200) |
| 13C2 PFUnA | 43 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 6-M2

HPLC

Lot-Sample #...: D9J230348-021
Date Sampled...: 10/20/09 10:46
Prep Date.....: 10/26/09
Prep Batch #...: 9299270
Dilution Factor: 1

Work Order #...: LM76R1AC
Date Received..: 10/23/09
Analysis Date..: 11/06/09
Analysis Time..: 22:50

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 60 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 6-M2**

**HPLC**

**Lot-Sample #...:** D9J230348-021 **Work Order #...:** LM76R2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:46 **Date Received..:** 10/23/09
**Prep Date.....:** 11/24/09 **Analysis Date..:** 12/31/09
**Prep Batch #...:** 9328469 **Analysis Time..:** 08:48
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| **Perfluorobutanoic acid (PFBA)** | **0.83** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.21** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 109 | (50 - 200) |
| 13C4 PFOS | 103 | (50 - 200) |
| 13C4 PFBA | 113 | (50 - 200) |
| 13C2 PFHxA | 110 | (50 - 200) |
| 18O2 PFHxS | 111 | (50 - 200) |
| 13C5 PFNA | 112 | (50 - 200) |
| 13C2 PFDA | 105 | (50 - 200) |
| 13C2 PFUnA | 104 | (50 - 200) |
| 13C2 PFDoA | 104 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 6-M2**

**HPLC**

**Lot-Sample #...:** D9J230348-021 **Work Order #...:** LM76R3AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 10:46 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/11/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 08:50
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| **Perfluorobutanoic acid (PFBA)** | **0.84** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.22** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 119 | (50 - 200) |
| 13C4 PFOS | 90 | (50 - 200) |
| 13C4 PFBA | 104 | (50 - 200) |
| 13C2 PFHxA | 109 | (50 - 200) |
| 18O2 PFHxS | 130 | (50 - 200) |
| 13C5 PFNA | 105 | (50 - 200) |
| 13C2 PFDoA | 105 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 1-M10**

**HPLC**

**Lot-Sample #...:** D9J230348-022 **Work Order #...:** LM76T1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 11:28 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299269 **Analysis Time..:** 15:09
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.27** | **0.020** | **ug/L** | **0.0082** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 18O2 PFHxS | 68 | (50 - 200) |
| 13C2 PFDA | 44 * | (50 - 200) |
| 13C2 PFUnA | 38 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 1-M10

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-022 | Work Order #...: | LM76T1AC | Matrix.....: | WATER |
| Date Sampled...: | 10/20/09 11:28 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/27/09 | Analysis Date..: | 11/06/09 | | |
| Prep Batch #...: | 9300254 | Analysis Time..: | 20:27 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 48 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 1-M10

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-022 | **Work Order #...:** | LM76T2AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 11:28 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/24/09 | **Analysis Date..:** | 12/29/09 | | |
| **Prep Batch #...:** | 9328469 | **Analysis Time..:** | 03:32 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.039** | **0.020** | **ug/L** | **0.0098** |
| Perfluorooctanesulfonate | ND | 0.020 | ug/L | 0.013 |
| **Perfluorobutanoic acid (PFBA)** | **0.060** | **0.020** | **ug/L** | **0.0098** |
| **Perfluoropentanoic acid (PFPA)** | **0.098** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexanoic acid (PFHxA)** | **0.091** | **0.020** | **ug/L** | **0.0029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.030** | **0.020** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| **Perfluorobutane sulfonate (PFBS)** | **0.26** | **0.020** | **ug/L** | **0.0082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (50 - 200) |
| 13C4 PFOS | 65 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 90 | (50 - 200) |
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C5 PFNA | 83 | (50 - 200) |
| 13C2 PFDA | 52 | (50 - 200) |
| 13C2 PFUnA | 41 * | (50 - 200) |
| 13C2 PFDoA | 36 * | (50 - 200) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: MW 1-M10

HPLC

Lot-Sample #...: D9J230348-022
Date Sampled...: 10/20/09 11:28
Prep Date.....: 10/26/09
Prep Batch #...: 9299269
Dilution Factor: 1

Work Order #...: LM76T3AA
Date Received..: 10/23/09
Analysis Date..: 11/11/09
Analysis Time..: 09:01

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.047 | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | 0.016 J | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | 0.074 | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | 0.081 | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | 0.11 | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | 0.034 | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.020 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 108 | (50 - 200) |
| 13C4 PFOS | 51 | (50 - 200) |
| 13C4 PFBA | 83 | (50 - 200) |
| 13C2 PFHxA | 86 | (50 - 200) |
| 18O2 PFHxS | 111 | (50 - 200) |
| 13C5 PFNA | 75 | (50 - 200) |
| 13C2 PFDoA | 38 * | (50 - 200) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 3-M11**

**HPLC**

**Lot-Sample #...:** D9J230348-023 **Work Order #...:** LM76W1AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 11:38 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/09/09
**Prep Batch #...:** 9299508 **Analysis Time..:** 02:40
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| **Perfluorobutanoic acid (PFBA)** | **0.11 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.19 J** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.23** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.093 J** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 127 | (50 - 200) |
| 13C4 PFOS | 105 | (50 - 200) |
| 13C4 PFBA | 114 | (50 - 200) |
| 13C2 PFHxA | 121 | (50 - 200) |
| 18O2 PFHxS | 109 | (50 - 200) |
| 13C5 PFNA | 133 | (50 - 200) |
| 13C2 PFDA | 118 | (50 - 200) |
| 13C2 PFUnA | 120 | (50 - 200) |
| 13C2 PFDoA | 120 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 3-M11**

**HPLC**

**Lot-Sample #...:** D9J230348-023 **Work Order #...:** LM76W1AC **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 11:38 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/06/09
**Prep Batch #...:** 9300254 **Analysis Time..:** 20:33
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 50 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 3-M11**

**HPLC**

**Lot-Sample #...:** D9J230348-023 **Work Order #...:** LM76W2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 11:38 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 04:29
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.14 J** | **0.20** | **ug/L** | **0.098** |
| Perfluorooctanesulfonate | ND | 0.20 | ug/L | 0.13 |
| **Perfluorobutanoic acid (PFBA)** | **0.11 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.23 J** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.27** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| **Perfluorobutane sulfonate (PFBS)** | **0.11 J** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 103 | (50 - 200) |
| 13C4 PFOS | 101 | (50 - 200) |
| 13C4 PFBA | 111 | (50 - 200) |
| 13C2 PFHxA | 102 | (50 - 200) |
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C5 PFNA | 100 | (50 - 200) |
| 13C2 PFDA | 97 | (50 - 200) |
| 13C2 PFUnA | 96 | (50 - 200) |
| 13C2 PFDoA | 98 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 3-M11

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-023 | **Work Order #...:** | LM76W3AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 11:38 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 00:57 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 98 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 7-M9

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-024 | **Work Order #...:** | LM76X1AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 11:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/12/09 | | |
| **Prep Batch #...:** | 9299508 | **Analysis Time..:** | 03:43 | | |
| **Dilution Factor:** | 50 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.92 J** | **1.0** | **ug/L** | **0.49** |
| Perfluorooctanesulfonate | ND | 1.0 | ug/L | 0.67 |
| **Perfluorobutanoic acid (PFBA)** | **2.0** | **1.0** | **ug/L** | **0.49** |
| **Perfluoropentanoic acid (PFPA)** | **7.1** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **3.8** | **1.0** | **ug/L** | **0.15** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.0** | **1.0** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| Perfluorobutane sulfonate (PFBS) | ND | 1.0 | ug/L | 0.41 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 112 | (50 - 200) |
| 13C4 PFOS | 106 | (50 - 200) |
| 13C4 PFBA | 101 | (50 - 200) |
| 13C2 PFHxA | 108 | (50 - 200) |
| 18O2 PFHxS | 103 | (50 - 200) |
| 13C5 PFNA | 155 | (50 - 200) |
| 13C2 PFDA | 148 | (50 - 200) |
| 13C2 PFUnA | 147 | (50 - 200) |
| 13C2 PFDoA | 149 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 7-M9**

**HPLC**

**Lot-Sample #...:** D9J230348-024
**Date Sampled...:** 10/20/09 11:52
**Prep Date.....:** 10/27/09
**Prep Batch #...:** 9300254
**Dilution Factor:** 1

**Work Order #...:** LM76X1AC
**Date Received..:** 10/23/09
**Analysis Date..:** 11/06/09
**Analysis Time..:** 20:38

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 52 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 7-M9

HPLC

**Lot-Sample #...:** D9J230348-024 **Work Order #...:** LM76X2AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 11:52 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 04:44
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.0** | **1.0** | **ug/L** | **0.49** |
| Perfluorooctanesulfonate | ND | 1.0 | ug/L | 0.67 |
| **Perfluorobutanoic acid (PFBA)** | **1.9** | **1.0** | **ug/L** | **0.49** |
| **Perfluoropentanoic acid (PFPA)** | **6.9** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **3.5** | **1.0** | **ug/L** | **0.15** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.85 J** | **1.0** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorobutane sulfonate (PFBS) | ND | 1.0 | ug/L | 0.41 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 90 | (50 - 200) |
| 13C4 PFOS | 90 | (50 - 200) |
| 13C4 PFBA | 91 | (50 - 200) |
| 13C2 PFHxA | 90 | (50 - 200) |
| 18O2 PFHxS | 86 | (50 - 200) |
| 13C5 PFNA | 89 | (50 - 200) |
| 13C2 PFDA | 87 | (50 - 200) |
| 13C2 PFUnA | 79 | (50 - 200) |
| 13C2 PFDoA | 86 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 7-M9

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-024 | **Work Order #...:** | LM76X3AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 11:52 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 01:12 | | |
| **Dilution Factor:** | 50 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 129 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 13A-D8**

**HPLC**

**Lot-Sample #...:** D9J230348-025 **Work Order #...:** LM7601AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 14:37 **Date Received..:** 10/23/09
**Prep Date.....:** 10/26/09 **Analysis Date..:** 11/12/09
**Prep Batch #...:** 9299508 **Analysis Time..:** 03:54
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **4.1** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **8.3** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.82** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **2.2** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.8** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.5** | **0.40** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.36 J** | **0.40** | **ug/L** | **0.35** |
| **Perfluorodecanoic acid (PFDA)** | **0.26 J** | **0.40** | **ug/L** | **0.16** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **4.4** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.2** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 116 | (50 - 200) |
| 13C4 PFOS | 99 | (50 - 200) |
| 13C4 PFBA | 105 | (50 - 200) |
| 13C2 PFHxA | 111 | (50 - 200) |
| 18O2 PFHxS | 102 | (50 - 200) |
| 13C5 PFNA | 165 | (50 - 200) |
| 13C2 PFDA | 152 | (50 - 200) |
| 13C2 PFUnA | 149 | (50 - 200) |
| 13C2 PFDoA | 116 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 13A-D8

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-025 | Work Order #...: | LM7601AC | Matrix.....: | WATER |
| Date Sampled...: | 10/20/09 14:37 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/27/09 | Analysis Date..: | 11/07/09 | | |
| Prep Batch #...: | 9300254 | Analysis Time..: | 17:31 | | |
| Dilution Factor: | 10 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.67 | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 104 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 13A-D8**

**HPLC**

**Lot-Sample #...:** D9J230348-025 **Work Order #...:** LM7602AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 14:37 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/22/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 04:59
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **4.8** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **7.9** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.93** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **2.4** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.9** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.7** | **0.40** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.46** | **0.40** | **ug/L** | **0.35** |
| **Perfluorodecanoic acid (PFDA)** | **0.32 J** | **0.40** | **ug/L** | **0.16** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| **Perfluorobutane sulfonate (PFBS)** | **4.4** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.2** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 99 | (50 - 200) |
| 13C4 PFOS | 100 | (50 - 200) |
| 13C4 PFBA | 105 | (50 - 200) |
| 13C2 PFHxA | 99 | (50 - 200) |
| 18O2 PFHxS | 100 | (50 - 200) |
| 13C5 PFNA | 97 | (50 - 200) |
| 13C2 PFDA | 98 | (50 - 200) |
| 13C2 PFUnA | 94 | (50 - 200) |
| 13C2 PFDoA | 93 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 13A-D8**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-025 | **Work Order #...:** | LM7603AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 14:37 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 01:27 | | |
| **Dilution Factor:** | 20 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 144 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 13-M13**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-026 | **Work Order #...:** | LM7611AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:05 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/12/09 | | |
| **Prep Batch #...:** | 9299508 | **Analysis Time..:** | 04:05 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **3.0** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **2.0** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.93** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **2.6** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **2.4** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.5** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.54** | **0.20** | **ug/L** | **0.17** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **2.1** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.88** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (50 - 200) |
| 13C4 PFOS | 96 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 98 | (50 - 200) |
| 18O2 PFHxS | 118 | (50 - 200) |
| 13C5 PFNA | 112 | (50 - 200) |
| 13C2 PFDA | 101 | (50 - 200) |
| 13C2 PFUnA | 85 | (50 - 200) |
| 13C2 PFDoA | 106 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 13-M13

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-026 | **Work Order #...:** | LM7611AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:05 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 20:49 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.023 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 64 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 13-M13

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-026 | **Work Order #...:** | LM7612AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:05 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/22/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 05:14 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **3.3** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **1.6** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.93** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **2.5** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **2.3** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.5** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.54** | **0.20** | **ug/L** | **0.17** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| **Perfluorobutane sulfonate (PFBS)** | **2.4** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.90** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 90 | (50 - 200) |
| 13C4 PFOS | 89 | (50 - 200) |
| 13C4 PFBA | 102 | (50 - 200) |
| 13C2 PFHxA | 92 | (50 - 200) |
| 18O2 PFHxS | 90 | (50 - 200) |
| 13C5 PFNA | 90 | (50 - 200) |
| 13C2 PFDA | 89 | (50 - 200) |
| 13C2 PFUnA | 84 | (50 - 200) |
| 13C2 PFDoA | 82 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 13-M13**

**HPLC**

**Lot-Sample #...:** D9J230348-026 **Work Order #...:** LM7613AA **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 15:05 **Date Received..:** 10/23/09
**Prep Date.....:** 11/17/09 **Analysis Date..:** 12/24/09
**Prep Batch #...:** 9321493 **Analysis Time..:** 01:42
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 120 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 12-D6

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-027 | **Work Order #...:** | LM7641AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:16 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/09/09 | | |
| **Prep Batch #...:** | 9299508 | **Analysis Time..:** | 03:24 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **1.5** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **1.5** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.52** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.99** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.72** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.42** | **0.20** | **ug/L** | **0.17** |
| **Perfluorodecanoic acid (PFDA)** | **0.092 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **1.3** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.27 J** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (50 - 200) |
| 13C4 PFOS | 104 | (50 - 200) |
| 13C4 PFBA | 102 | (50 - 200) |
| 13C2 PFHxA | 102 | (50 - 200) |
| 18O2 PFHxS | 120 | (50 - 200) |
| 13C5 PFNA | 106 | (50 - 200) |
| 13C2 PFDA | 100 | (50 - 200) |
| 13C2 PFUnA | 81 | (50 - 200) |
| 13C2 PFDoA | 104 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 12-D6

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-027 | **Work Order #...:** | LM7641AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:16 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 21:00 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.15** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 50 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 12-D6

HPLC

Lot-Sample #...: D9J230348-027 Work Order #...: LM7642AA Matrix.....: WATER
Date Sampled...: 10/20/09 15:16 Date Received..: 10/23/09
Prep Date.....: 11/17/09 Analysis Date..: 12/22/09
Prep Batch #...: 9321493 Analysis Time..: 05:44
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 1.7 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 1.4 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.53 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 1.2 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.69 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | 0.40 | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | 0.14 J | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorobutane sulfonate (PFBS) | 1.5 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.28 J | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 99 | (50 - 200) |
| 13C4 PFOS | 97 | (50 - 200) |
| 13C4 PFBA | 111 | (50 - 200) |
| 13C2 PFHxA | 100 | (50 - 200) |
| 18O2 PFHxS | 97 | (50 - 200) |
| 13C5 PFNA | 100 | (50 - 200) |
| 13C2 PFDA | 96 | (50 - 200) |
| 13C2 PFUnA | 94 | (50 - 200) |
| 13C2 PFDoA | 89 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 12-D6

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-027 | **Work Order #...:** | LM7643AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:16 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 01:57 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 119 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 19-M4

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-028 | **Work Order #...:** | LM7661AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:33 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/26/09 | **Analysis Date..:** | 11/09/09 | | |
| **Prep Batch #...:** | 9299508 | **Analysis Time..:** | 03:35 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.0** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **3.8** | **0.20** | **ug/L** | **0.13** |
| **Perfluorobutanoic acid (PFBA)** | **0.42** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.20** | **ug/L** | **0.029** |
| **Perfluoroheptanoic acid (PFHpA)** | **0.89** | **0.20** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.20** | **0.20** | **ug/L** | **0.17** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.50** | **0.20** | **ug/L** | **0.082** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.70** | **0.30** | **ug/L** | **0.070** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 108 | (50 - 200) |
| 13C4 PFOS | 109 | (50 - 200) |
| 13C4 PFBA | 104 | (50 - 200) |
| 13C2 PFHxA | 104 | (50 - 200) |
| 18O2 PFHxS | 115 | (50 - 200) |
| 13C5 PFNA | 110 | (50 - 200) |
| 13C2 PFDA | 106 | (50 - 200) |
| 13C2 PFUnA | 87 | (50 - 200) |
| 13C2 PFDoA | 108 | (50 - 200) |

**Dalton Utilities**

**Client Sample ID: MW 19-M4**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-028 | **Work Order #...:** | LM7661AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:33 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 21:06 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.044 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 60 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 19-M4

HPLC

Lot-Sample #...: D9J230348-028
Date Sampled...: 10/20/09 15:33
Prep Date.....: 11/17/09
Prep Batch #...: 9321493
Dilution Factor: 10

Work Order #...: LM7662AA
Date Received..: 10/23/09
Analysis Date..: 12/22/09
Analysis Time..: 05:59

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 2.5 | 0.20 | ug/L | 0.098 |
| Perfluorooctanesulfonate | 3.7 | 0.20 | ug/L | 0.13 |
| Perfluorobutanoic acid (PFBA) | 0.44 | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | 0.11 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.89 | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | 0.21 | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | 0.13 J | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorobutane sulfonate (PFBS) | 0.51 | 0.20 | ug/L | 0.082 |
| Perfluorohexane sulfonate (PFHxS) | 0.78 | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 79 | (50 - 200) |
| 13C4 PFOS | 76 | (50 - 200) |
| 13C4 PFBA | 94 | (50 - 200) |
| 13C2 PFHxA | 84 | (50 - 200) |
| 18O2 PFHxS | 80 | (50 - 200) |
| 13C5 PFNA | 80 | (50 - 200) |
| 13C2 PFDA | 78 | (50 - 200) |
| 13C2 PFUnA | 76 | (50 - 200) |
| 13C2 PFDoA | 77 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 19-M4**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-028 | **Work Order #...:** | LM7663AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:33 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 11/17/09 | **Analysis Date..:** | 12/24/09 | | |
| **Prep Batch #...:** | 9321493 | **Analysis Time..:** | 02:12 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFUnA | 122 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 18-D9

HPLC

Lot-Sample #...: D9J230348-029 Work Order #...: LM7691AA Matrix.....: WATER
Date Sampled...: 10/20/09 15:49 Date Received..: 10/23/09
Prep Date.....: 10/27/09 Analysis Date..: 11/12/09
Prep Batch #...: 9300252 Analysis Time..: 09:25
Dilution Factor: 20

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **2.3** | **0.40** | **ug/L** | **0.20** |
| **Perfluorooctanesulfonate** | **1.8** | **0.40** | **ug/L** | **0.27** |
| **Perfluorobutanoic acid (PFBA)** | **0.78** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **1.6** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **0.40** | **ug/L** | **0.058** |
| **Perfluoroheptanoic acid (PFHpA)** | **1.1** | **0.40** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **4.3** | **0.40** | **ug/L** | **0.16** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.38 J** | **0.60** | **ug/L** | **0.14** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 99 | (50 - 200) |
| 13C4 PFOS | 121 | (50 - 200) |
| 13C4 PFBA | 100 | (50 - 200) |
| 13C2 PFHxA | 94 | (50 - 200) |
| 18O2 PFHxS | 96 | (50 - 200) |
| 13C5 PFNA | 91 | (50 - 200) |
| 13C2 PFUnA | 99 | (50 - 200) |
| 13C2 PFDoA | 92 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 18-D9

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-029 | **Work Order #...:** | LM7691AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:49 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/06/09 | | |
| **Prep Batch #...:** | 9300254 | **Analysis Time..:** | 21:11 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (F OSA)** | **0.0098 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 62 | (50 - 200) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: MW 18-D9

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9J230348-029 | **Work Order #...:** | LM7692AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 10/20/09 15:49 | **Date Received..:** | 10/23/09 | | |
| **Prep Date.....:** | 10/27/09 | **Analysis Date..:** | 11/08/09 | | |
| **Prep Batch #...:** | 9300252 | **Analysis Time..:** | 02:21 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorodecanoic acid (PFDA)** | **0.14** | **0.020** | **ug/L** | **0.0078** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 82 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 17A-M6A

HPLC

Lot-Sample #...: D9J230348-030 Work Order #...: LM77A1AA Matrix.....: WATER
Date Sampled...: 10/20/09 16:01 Date Received..: 10/23/09
Prep Date.....: 10/27/09 Analysis Date..: 11/12/09
Prep Batch #...: 9300252 Analysis Time..: 09:36
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | 0.17 | 0.020 | ug/L | 0.0098 |
| Perfluorooctanesulfonate | 0.082 | 0.020 | ug/L | 0.013 |
| Perfluorobutanoic acid (PFBA) | 0.054 | 0.020 | ug/L | 0.0098 |
| Perfluoropentanoic acid (PFPA) | 0.084 | 0.030 | ug/L | 0.011 |
| Perfluorohexanoic acid (PFHxA) | 0.089 | 0.020 | ug/L | 0.0029 |
| Perfluoroheptanoic acid (PFHpA) | 0.071 | 0.020 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | 0.042 | 0.020 | ug/L | 0.017 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.020 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.020 | ug/L | 0.015 |
| Perfluorobutane sulfonate (PFBS) | 0.26 | 0.020 | ug/L | 0.0082 |
| Perfluorohexane sulfonate (PFHxS) | 0.019 J | 0.030 | ug/L | 0.0070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 116 | (50 - 200) |
| 13C4 PFOS | 95 | (50 - 200) |
| 13C4 PFBA | 93 | (50 - 200) |
| 13C2 PFHxA | 85 | (50 - 200) |
| 18O2 PFHxS | 96 | (50 - 200) |
| 13C5 PFNA | 91 | (50 - 200) |
| 13C2 PFUnA | 66 | (50 - 200) |
| 13C2 PFDoA | 62 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: MW 17A-M6A**

**HPLC**

**Lot-Sample #...:** D9J230348-030 **Work Order #...:** LM77A1AC **Matrix.....:** WATER
**Date Sampled...:** 10/20/09 16:01 **Date Received..:** 10/23/09
**Prep Date.....:** 10/27/09 **Analysis Date..:** 11/06/09
**Prep Batch #...:** 9300254 **Analysis Time..:** 21:17
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 65 | (50 - 200) |

Dalton Utilities

Client Sample ID: MW 17A-M6A

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D9J230348-030 | Work Order #...: | LM77A2AA | Matrix.....: | WATER |
| Date Sampled...: | 10/20/09 16:01 | Date Received..: | 10/23/09 | | |
| Prep Date.....: | 10/27/09 | Analysis Date..: | 11/08/09 | | |
| Prep Batch #...: | 9300252 | Analysis Time..: | 02:32 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorodecanoic acid (PFDA) | 0.017 J | 0.020 | ug/L | 0.0078 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C2 PFDA | 89 | (50 - 200) |

NOTE(S):

J Estimated result. Result is less than RL.

4

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D0A150550**

**Dena Haverland**

**Dalton Utilities**
**1200 V.D. Parrot Jr. Parkway**
**Dalton, GA 30721**

**Michelle A. Johnston**
**Project Manager**

**February 11, 2010**

# Case Narrative
## D0A150550

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Sample Arrival and Receipt**
The following report contains the analytical results for thirty-three samples received at TestAmerica Denver on January 15, 2010, according to documented sample acceptance procedures. The samples were received in good condition at temperatures of 4.5°C, 2.3°C, and 2.6°C. No anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments. The low-level LCS requirement changed on January 26, 2010.

**Analytical Comments**
The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to all thirty-three samples to obtain a pH of >12 instead of the SOP required <2. The basic pH is generating better internal standard recoveries for MeFOSA.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high concentrations of target analytes, samples 17A M6A, 5 M7, 4 M8, 7 M9, 8 M12, 13 M13, 14 M14, 15 M17, 14A D5, 24 D1, 21 D2, 20 D3, 10 D4, 12 D6, 18 D9, 22 M1, 6 M2, 19 M4, 16 M5, 12A D7, 13A D8, 16B D12, 15B D13, 14B D14, 7A U2, 19A 83, 16A M15, and 15A M16 had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required.

The organic preparation chemist had to use two cartridges to extract all of the sample volume for samples 14A D5, 10 D4, 12A D7, and 7A U2, due to the first cartridges clogging.

Due to low internal standards in the samples and/or high percent recoveries in the low-level LCS and/or mid-level LCS/LCSD, all thirty-three samples were re-extracted out of the laboratory prescribed hold time and reanalyzed in QC batches 0033180, 0032537, 0034123, and 0025463. All of the batches have been included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

The internal standard recovery for 13C2 PFDA was recovered below 53% in samples 1 M10 and 3 M11. As the original internal standard recovery for sample 1 M10 was 53%, the re-extraction recovery of 47% confirms matrix interference. The laboratory believes the low internal standard recovery for sample 3 M11 is possibly due to higher concentrations of sediment in the sample as this is the third extraction.

The internal standard recovery for MeFOSA associated with QC batch 0018139 was recovered below 37% in sample 23 U1. No matrix effects were obvious that would explain the failures. Sample volume was consumed; therefore, re-extraction could not be performed.

The internal standard recovery for MeFOSA associated with QC batch 0018297 was recovered below 37% in sample 18 D9. Upon re-extraction and reanalysis in QC batch 0025463, the percent recovery outlier was still present, demonstrating this anomaly is most likely due to matrix interference. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the recommended sample holding time.

The internal standard recoveries for 13C2 PFDA and/or 13C2 PFUnA associated with QC batch 0015368 were recovered below QC limits in samples 17 D11 and 9 M3. Upon re-extraction and reanalysis in QC batch 0033180, percent recovery outliers were still present, demonstrating this anomaly is most likely due to matrix interference. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the recommended sample holding time.

The low-level LCS and mid-level LCS/LCSD associated with QC batch 0015368 exhibited percent recoveries outside the QC control limits for several compounds. This is an indicator that data may be biased high or low. Upon re-extraction and reanalysis, percent recoveries were 100% in control. Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batches 0015368, 0018141, and 0019142 reported the percent recoveries for several PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

| Compound | Low-Level LCS Actual Recovery | Control Limits | Low-Level LCS Actual Result | MDL |
|---|---|---|---|---|
| PFTriA | 54% | 44-164% | 0.01074 ug/L | 0.01772 ug/L |
| PFTeA | 38% | 47-172% | 0.00768 ug/L | 0.01456 ug/L |
| PFDS | 45% | 37-130% | 0.00874 ug/L | 0.00915 ug/L |
| PFTriA | 80.7% | 44-164% | 0.0161 ug/L | 0.01772 ug/L |
| PFTriA | 56% | 44-164% | 0.0112 ug/L | 0.01772 ug/L |
| PFTeA | 48% | 47-172% | 0.0096 ug/L | 0.01456 ug/L |

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%.

The low-level LCS and mid-level LCS/LCSD associated with QC batch 0018141 exhibited percent recoveries outside the QC control limits for several compounds. This is an indicator that data may be biased high. Upon re-extraction and reanalysis, percent recoveries were 100% in control. Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The low-level and mid-level LCS associated with QC batch 0019142 exhibited percent recoveries above the QC control limits for several compounds. This is an indicator that data may be biased high. Upon re-extraction and reanalysis, percent recoveries were 100% in control. Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

On January 26, 2010, the extraction Standard Operating Procedure (SOP) DV-OP-0019 was revised to remove the requirement for a low-level LCS. This means batches 0025463, 0032537, 0033180, and 0034123 only have a mid-level LCS or mid-level LCS/LCSD.

The method required MS/MSD could not be performed for QC batches 0015368, 0018139, 0018141, 0018297, 0025463, 0032537, and 0033180, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and/or mid-level LCS/LCSD analyses data.

Percent recoveries and RPD data could not be calculated for the laboratory generated MS/MSD associated with QC batches 0019142 and 0034123, because the samples were diluted beyond the ability to quantitate recoveries. The acceptable low-level LCS and/or mid-level LCS analysis data indicated the analytical system was operating within control.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **17A M6A 01/12/10 10:06 001** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.097 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.16 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.078 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.12 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.38 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.083 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.22 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.079 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.11 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.074 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.12 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.37 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.20 | 0.10 | ug/L | DEN -LC-0012 |
| **5 M7 01/11/10 16:06 002** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.58 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.37 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.46 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.082 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.43 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.86 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.4 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.59 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.10 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.6 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.38 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.45 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.088 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.50 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.84 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.4 | 0.10 | ug/L | DEN -LC-0012 |
| **4 M8 01/11/10 15:50 003** | | | | |
| Perfluoropentanoic acid (PFPA) | 0.58 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.29 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.57 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 3.4 | 0.40 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **4 M8 01/11/10 15:50 003** | | | | |
| Perfluorooctanoic Acid | 0.51 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.52 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.31 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.63 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.2 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.51 | 0.40 | ug/L | DEN -LC-0012 |
| **7 M9 01/11/10 16:38 004** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.38 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 3.5 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.14 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.0 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.7 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.27 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.37 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.36 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 3.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.91 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.5 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.23 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.34 J | 0.40 | ug/L | DEN -LC-0012 |
| **1 M10 01/11/10 15:10 005** | | | | |
| Perfluoropentanoic acid (PFPA) | 0.021 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.020 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.0088 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.025 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.048 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.018 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.020 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.011 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.033 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.051 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.015 J | 0.050 | ug/L | DEN -LC-0012 |
| **3 M11 01/11/10 15:24 006** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.054 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.018 J | 0.040 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.27 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.013 J | 0.030 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **3 M11 01/11/10 15:24 006** | | | | |
| Perfluorobutanoic acid (PFBA) | 0.12 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.27 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.056 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.039 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.11 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.059 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.026 J | 0.040 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.24 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.016 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.12 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.27 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.012 J | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.075 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.052 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.12 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.013 J | 0.050 | ug/L | DEN -LC-0012 |
| **8 M12 01/13/10 14:20 007** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.83 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.29 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.1 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.40 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.66 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.078 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.1 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.59 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.21 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.30 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.49 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.96 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.87 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.022 J | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **13 M13 01/12/10 12:07 008** | | | | |
| Perfluoroheptanoic acid (PFHpA | 1.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.57 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 3.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.99 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.088 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.44 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.89 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.75 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.029 J | 0.050 | ug/L | DEN -LC-0012 |
| **14 M14 01/12/10 15:45 009** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.86 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.51 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.55 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.47 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.51 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.66 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.8 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.38 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.42 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.37 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.0063 J | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **15 M17 01/12/10 15:06 010** | | | | |
| Perfluoroheptanoic acid (PFHpA | 1.2 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.99 J | 2.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.8 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.96 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.43 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 5.8 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.9 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.99 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.89 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.40 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 6.1 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.7 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.11 | 0.050 | ug/L | DEN -LC-0012 |
| **23 U1 01/11/10 14:41 011** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.015 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.045 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.031 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.030 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.032 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.019 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.028 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.013 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.036 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.0084 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.030 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.031 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.038 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.015 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.027 | 0.020 | ug/L | DEN -LC-0012 |
| **14A D5 01/13/10 13:25 012** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.74 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.56 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.23 J | 0.30 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **14A D5 01/13/10 13:25 012** | | | | |
| Perfluorobutanoic acid (PFBA) | 0.67 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.93 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 3.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.9 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.57 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.43 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.20 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.58 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.82 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 3.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.88 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.015 J | 0.050 | ug/L | DEN -LC-0012 |
| **24 D1 01/11/10 14:54 013** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.61 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.24 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.46 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.78 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.28 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 3.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.57 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.24 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.98 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.44 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.39 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.81 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.18 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.13 | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **21 D2 01/11/10 14:15 014** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.33 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.16 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.75 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.20 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.28 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.53 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.13 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.79 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.94 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.26 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.56 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.19 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.24 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.42 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.094 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.77 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.4 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.75 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.089 | 0.050 | ug/L | DEN -LC-0012 |
| **20 D3 01/11/10 16:47 015** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.12 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.55 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.046 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.28 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.29 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.30 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.087 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.18 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.11 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.48 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.045 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.24 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.26 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.33 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.17 | 0.10 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **10 D4 01/13/10 14:00 016** | | | | |
| Perfluoroheptanoic acid (PFHpA | 1.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.46 J | 0.80 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.3 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.94 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.83 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.5 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.6 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.41 J | 0.80 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.8 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.84 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.71 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.7 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.0 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.012 J | 0.050 | ug/L | DEN -LC-0012 |
| **12 D6 01/13/10 13:45 017** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.79 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.43 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.33 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.60 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.14 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.67 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.35 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.30 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.49 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.14 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.098 | 0.050 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **18 D9 01/12/10 09:32 018** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.91 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.36 J | 0.80 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.6 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.43 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.72 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.9 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.0 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.86 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.43 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.69 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.0 | 0.40 | ug/L | DEN -LC-0012 |
| **22 M1 01/11/10 14:30 020** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.37 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.46 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.39 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.45 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.39 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.38 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.46 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.50 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.18 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.48 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.53 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.1 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| **6 M2 01/11/10 16:16 021** | | | | |
| Perfluoropentanoic acid (PFPA) | 1.8 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.29 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **6 M2 01/11/10 16:16 021** | | | | |
| Perfluorobutanoic acid (PFBA) | 1.0 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.29 | 0.20 | ug/L | DEN -LC-0012 |
| **9 M3 01/11/10 15:36 022** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.017 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.15 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.056 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.058 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.018 J | 0.030 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.16 | 0.030 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.053 | 0.020 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.058 | 0.020 | ug/L | DEN -LC-0012 |
| **19 M4 01/12/10 10:38 023** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.91 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.20 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.8 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.77 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.42 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.12 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.54 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 3.0 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.67 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.3 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.58 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.36 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.38 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 2.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.037 J | 0.050 | ug/L | DEN -LC-0012 |
| **16 M5 01/12/10 13:45 024** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.81 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.27 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.2 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.71 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.44 | 0.20 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **16 M5 01/12/10 13:45 024** | | | | |
| Perfluorohexanoic acid (PFHxA) | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.9 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.69 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.31 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.1 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.58 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.42 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.99 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 1.6 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.7 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.025 J | 0.050 | ug/L | DEN -LC-0012 |
| **12A D7 01/12/10 11:46 025** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.68 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.17 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.9 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.48 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.49 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.79 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.73 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.72 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.7 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.50 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.48 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.91 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.87 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.5 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.059 | 0.050 | ug/L | DEN -LC-0012 |
| **13A D8 01/12/10 11:25 026** | | | | |
| Perfluoroheptanoic acid (PFHpA | 2.5 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 3.3 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.7 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.2 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.8 | 1.0 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **13A D8 01/12/10 11:25 026** | | | | |
| Perfluorodecanoic acid (PFDA) | 0.47 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 6.2 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 8.8 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 6.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 2.1 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.7 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 1.5 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.39 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 5.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 7.5 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 5.9 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.60 | 0.050 | ug/L | DEN -LC-0012 |
| **16B D12 01/12/10 14:09 027** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.092 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.16 | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.10 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.13 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.50 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.086 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.20 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.081 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.13 J | 0.15 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.082 J | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.11 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.35 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.16 | 0.10 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.016 J | 0.050 | ug/L | DEN -LC-0012 |
| **15B D13 01/12/10 15:17 028** | | | | |
| Perfluoroheptanoic acid (PFHpA | 2.6 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.9 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 2.4 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.95 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.7 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.8 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 13 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 7.7 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.9 | 1.5 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **15B D13 01/12/10 15:17 028** | | | | |
| Perfluoropentanoic acid (PFPA) | 2.3 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 2.0 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.70 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 2.2 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.4 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 9.9 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 6.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.12 | 0.050 | ug/L | DEN -LC-0012 |
| **14B D14 01/12/10 15:31 029** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.44 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.1 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.27 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.41 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.69 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.64 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.96 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.51 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.96 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.32 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.63 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.77 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.4 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.77 | 0.30 | ug/L | DEN -LC-0012. |
| Perfluorooctanoic Acid | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctane sulfonamide (F | 0.019 J | 0.050 | ug/L | DEN -LC-0012 |
| **7A U2 01/11/10 16:29 030** | | | | |
| Perfluoroheptanoic acid (PFHpA | 1.3 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 6.0 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.67 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.5 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 4.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.63 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.33 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.6 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.94 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 5.3 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.53 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 1.4 | 0.40 | ug/L | DEN -LC-0012 |

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# EXECUTIVE SUMMARY - Detection Highlights

D0A150550

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **7A U2 01/11/10 16:29 030** | | | | |
| Perfluorohexanoic acid (PFHxA) | 3.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.48 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.2 | 0.40 | ug/L | DEN -LC-0012 |
| **19A U3 01/12/10 09:09 031** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.22 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.43 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.17 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.13 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.32 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.27 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.17 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.35 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.19 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.38 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.16 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.13 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.33 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.23 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.14 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.32 | 0.20 | ug/L | DEN -LC-0012 |
| **16A M15 01/12/10 08:50 032** | | | | |
| Perfluoroheptanoic acid (PFHpA | 1.2 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.86 | 0.80 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.6 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.51 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.91 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.24 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 7.9 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 3.4 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 3.1 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 1.1 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorononanoic acid (PFNA) | 0.68 J | 0.80 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.5 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexane sulfonate (PFH | 0.46 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.79 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.19 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 6.3 | 0.40 | ug/L | DEN -LC-0012 |

(Continued on next page)

# EXECUTIVE SUMMARY - Detection Highlights

**D0A150550**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **16A M15 01/12/10 08:50 032** | | | | |
| Perfluorooctanesulfonate | 2.8 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 2.7 | 0.40 | ug/L | DEN -LC-0012 |
| **15A M16 01/12/10 14:43 033** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.20 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.47 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.24 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.39 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.88 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.26 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.18 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.42 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.19 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.34 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.72 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.24 | 0.20 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

**D0A150550**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

**D0A150550**

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

**D0A150550**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LR88E | 001 | 17A M6A | 01/12/10 | 10:06 |
| LR88J | 002 | 5 M7 | 01/11/10 | 16:06 |
| LR88K | 003 | 4 M8 | 01/11/10 | 15:50 |
| LR88M | 004 | 7 M9 | 01/11/10 | 16:38 |
| LR88N | 005 | 1 M10 | 01/11/10 | 15:10 |
| LR88Q | 006 | 3 M11 | 01/11/10 | 15:24 |
| LR88R | 007 | 8 M12 | 01/13/10 | 14:20 |
| LR88T | 008 | 13 M13 | 01/12/10 | 12:07 |
| LR88X | 009 | 14 M14 | 01/12/10 | 15:45 |
| LR880 | 010 | 15 M17 | 01/12/10 | 15:06 |
| LR882 | 011 | 23 U1 | 01/11/10 | 14:41 |
| LR884 | 012 | 14A D5 | 01/13/10 | 13:25 |
| LR885 | 013 | 24 D1 | 01/11/10 | 14:54 |
| LR886 | 014 | 21 D2 | 01/11/10 | 14:15 |
| LR887 | 015 | 20 D3 | 01/11/10 | 16:47 |
| LR888 | 016 | 10 D4 | 01/13/10 | 14:00 |
| LR889 | 017 | 12 D6 | 01/13/10 | 13:45 |
| LR89A | 018 | 18 D9 | 01/12/10 | 09:32 |
| LR89E | 019 | 17 D11 | 01/12/10 | 14[illegible] |
| LR89H | 020 | 22 M1 | 01/11/10 | 14:30 |
| LR89J | 021 | 6 M2 | 01/11/10 | 16:16 |
| LR89K | 022 | 9 M3 | 01/11/10 | 15:36 |
| LR89L | 023 | 19 M4 | 01/12/10 | 10:38 |
| LR89M | 024 | 16 M5 | 01/12/10 | 13:45 |
| LR89N | 025 | 12A D7 | 01/12/10 | 11:46 |
| LR89P | 026 | 13A D8 | 01/12/10 | 11:25 |
| LR89Q | 027 | 16B D12 | 01/12/10 | 14:09 |
| LR89R | 028 | 15B D13 | 01/12/10 | 15:17 |
| LR89T | 029 | 14B D14 | 01/12/10 | 15:31 |
| LR89V | 030 | 7A U2 | 01/11/10 | 16:29 |
| LR89W | 031 | 19A U3 | 01/12/10 | 09:09 |
| LR890 | 032 | 16A M15 | 01/12/10 | 08:50 |
| LR891 | 033 | 15A M16 | 01/12/10 | 14:43 |

(Continued on next page)

# SAMPLE SUMMARY

**D0A150550**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: 17A M6A**

**HPLC**

**Lot-Sample #...:** D0A150550-001 **Work Order #...:** LR88E1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:06 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 15:52
**Dilution Factor:** 5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.097 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.16** | **0.15** | **ug/L** | **0.055** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.15 | ug/L | 0.035 |
| **Perfluorobutanoic acid (PFBA)** | **0.078 J** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.12** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.38** | **0.10** | **ug/L** | **0.041** |
| **Perfluorooctanesulfonate** | **0.083 J** | **0.15** | **ug/L** | **0.067** |
| **Perfluorooctanoic Acid** | **0.22** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 94 | (60 - 155) |
| 13C4 PFOS | 88 | (45 - 130) |
| 13C4 PFBA | 85 | (36 - 130) |
| 13C2 PFHxA | 75 | (55 - 135) |
| 18O2 PFHxS | 88 | (61 - 130) |
| 13C5 PFNA | 89 | (54 - 132) |
| 13C2 PFDA | 83 | (53 - 130) |
| 13C2 PFUnA | 79 | (37 - 130) |
| 13C2 PFDoA | 70 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 17A M6A**

**HPLC**

**Lot-Sample #...:** D0A150550-001 **Work Order #...:** LR88E1AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:06 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 10:26
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 91 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 17A M6A**

**HPLC**

**Lot-Sample #...:** D0A150550-001 **Work Order #...:** LR88E2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:06 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/03/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 23:04
**Dilution Factor:** 5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.079 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.11 J** | **0.15** | **ug/L** | **0.055** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.15 | ug/L | 0.035 |
| **Perfluorobutanoic acid (PFBA)** | **0.074 J** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.12** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.37** | **0.10** | **ug/L** | **0.041** |
| Perfluorooctanesulfonate | ND | 0.15 | ug/L | 0.067 |
| **Perfluorooctanoic Acid** | **0.20** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 126 | (60 - 155) |
| 13C4 PFOS | 107 | (45 - 130) |
| 13C4 PFBA | 109 | (36 - 130) |
| 13C2 PFHxA | 116 | (55 - 135) |
| 18O2 PFHxS | 110 | (61 - 130) |
| 13C5 PFNA | 115 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 103 | (37 - 130) |
| 13C2 PFDoA | 107 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 5 M7**

**HPLC**

**Lot-Sample #...:** D0A150550-002 **Work Order #...:** LR88J1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:06 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 16:07
**Dilution Factor:** 5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.58** | **0.15** | **ug/L** | **0.066** |
| **Perfluorononanoic acid (PFNA)** | **0.10 J** | **0.20** | **ug/L** | **0.087** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.15** | **ug/L** | **0.055** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.37** | **0.15** | **ug/L** | **0.035** |
| **Perfluorobutanoic acid (PFBA)** | **0.46** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.10** | **ug/L** | **0.015** |
| **Perfluorodecanoic acid (PFDA)** | **0.082 J** | **0.10** | **ug/L** | **0.039** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.43** | **0.10** | **ug/L** | **0.041** |
| **Perfluorooctanesulfonate** | **0.86** | **0.15** | **ug/L** | **0.067** |
| **Perfluorooctanoic Acid** | **1.4** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 99 | (60 - 155) |
| 13C4 PFOS | 97 | (45 - 130) |
| 13C4 PFBA | 93 | (36 - 130) |
| 13C2 PFHxA | 86 | (55 - 135) |
| 18O2 PFHxS | 100 | (61 - 130) |
| 13C5 PFNA | 101 | (54 - 132) |
| 13C2 PFDA | 96 | (53 - 130) |
| 13C2 PFUnA | 92 | (37 - 130) |
| 13C2 PFDoA | 88 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 5 M7**

**HPLC**

**Lot-Sample #...:** D0A150550-002 **Work Order #...:** LR88J1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:06 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 12:36
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 38 | (37 - 130) |

Dalton Utilities

Client Sample ID: 5 M7

HPLC

Lot-Sample #...: D0A150550-002 Work Order #...: LR88J2AA Matrix.....: WATER
Date Sampled...: 01/11/10 16:06 Date Received..: 01/15/10
Prep Date.....: 02/02/10 Analysis Date..: 02/03/10
Prep Batch #...: 0033180 Analysis Time..: 23:34
Dilution Factor: 5

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | 0.59 | 0.15 | ug/L | 0.066 |
| Perfluorononanoic acid (PFNA) | 0.10 J | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| Perfluoropentanoic acid (PFPA) | 1.6 | 0.15 | ug/L | 0.055 |
| Perfluorohexane sulfonate (PFHxS) | 0.38 | 0.15 | ug/L | 0.035 |
| Perfluorobutanoic acid (PFBA) | 0.45 | 0.10 | ug/L | 0.049 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | 0.10 | ug/L | 0.015 |
| Perfluorodecanoic acid (PFDA) | 0.088 J | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| Perfluorobutane sulfonate (PFBS) | 0.50 | 0.10 | ug/L | 0.041 |
| Perfluorooctanesulfonate | 0.84 | 0.15 | ug/L | 0.067 |
| Perfluorooctanoic Acid | 1.4 | 0.10 | ug/L | 0.049 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 122 | (60 - 155) |
| 13C4 PFOS | 112 | (45 - 130) |
| 13C4 PFBA | 115 | (36 - 130) |
| 13C2 PFHxA | 116 | (55 - 135) |
| 18O2 PFHxS | 109 | (61 - 130) |
| 13C5 PFNA | 111 | (54 - 132) |
| 13C2 PFDA | 110 | (53 - 130) |
| 13C2 PFUnA | 111 | (37 - 130) |
| 13C2 PFDoA | 113 | (26 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 4 M8**

**HPLC**

**Lot-Sample #...:** D0A150550-003 **Work Order #...:** LR88K1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:50 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 16:22
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.60 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **0.58 J** | **0.60** | **ug/L** | **0.22** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |
| **Perfluorobutanoic acid (PFBA)** | **0.29 J** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **0.57** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **3.4** | **0.40** | **ug/L** | **0.16** |
| Perfluorooctanesulfonate | ND | 0.60 | ug/L | 0.27 |
| **Perfluorooctanoic Acid** | **0.51** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 112 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 98 | (36 - 130) |
| 13C2 PFHxA | 92 | (55 - 135) |
| 18O2 PFHxS | 114 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 102 | (37 - 130) |
| 13C2 PFDoA | 99 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 4 M8**

**HPLC**

**Lot-Sample #...:** D0A150550-003 **Work Order #...:** LR88K1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:50 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/21/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 10:52
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 40 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 4 M8**

**HPLC**

**Lot-Sample #...:** D0A150550-003 **Work Order #...:** LR88K2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:50 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/03/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 23:49
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.60 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **0.52 J** | **0.60** | **ug/L** | **0.22** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |
| **Perfluorobutanoic acid (PFBA)** | **0.31 J** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **0.63** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **4.2** | **0.40** | **ug/L** | **0.16** |
| Perfluorooctanesulfonate | ND | 0.60 | ug/L | 0.27 |
| **Perfluorooctanoic Acid** | **0.51** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 123 | (60 - 155) |
| 13C4 PFOS | 115 | (45 - 130) |
| 13C4 PFBA | 120 | (36 - 130) |
| 13C2 PFHxA | 117 | (55 - 135) |
| 18O2 PFHxS | 108 | (61 - 130) |
| 13C5 PFNA | 114 | (54 - 132) |
| 13C2 PFDA | 110 | (53 - 130) |
| 13C2 PFUnA | 115 | (37 - 130) |
| 13C2 PFDoA | 93 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 7 M9**

**HPLC**

**Lot-Sample #...:** D0A150550-004 **Work Order #...:** LR88M1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:38 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/03/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 18:19
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.38 J** | **0.60** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **3.5** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.14 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **1.0** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.7** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **0.27 J** | **0.40** | **ug/L** | **0.16** |
| Perfluorooctanesulfonate | ND | 0.60 | ug/L | 0.27 |
| **Perfluorooctanoic Acid** | **0.37 J** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 117 | (60 - 155) |
| 13C4 PFOS | 110 | (45 - 130) |
| 13C4 PFBA | 113 | (36 - 130) |
| 13C2 PFHxA | 112 | (55 - 135) |
| 18O2 PFHxS | 108 | (61 - 130) |
| 13C5 PFNA | 113 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 106 | (37 - 130) |
| 13C2 PFDoA | 107 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 7 M9

HPLC

Lot-Sample #...: D0A150550-004
Date Sampled...: 01/11/10 16:38
Prep Date.....: 01/18/10
Prep Batch #...: 0018139
Dilution Factor: 1

Work Order #...: LR88M1AC
Date Received..: 01/15/10
Analysis Date..: 01/21/10
Analysis Time..: 10:57

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 40 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 7 M9**

**HPLC**

**Lot-Sample #...:** D0A150550-004 **Work Order #...:** LR88M2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:38 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 00:04
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.36 J** | **0.60** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **3.2** | **0.60** | **ug/L** | **0.22** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |
| **Perfluorobutanoic acid (PFBA)** | **0.91** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.5** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **0.23 J** | **0.40** | **ug/L** | **0.16** |
| Perfluorooctanesulfonate | ND | 0.60 | ug/L | 0.27 |
| **Perfluorooctanoic Acid** | **0.34 J** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 129 | (60 - 155) |
| 13C4 PFOS | 122 | (45 - 130) |
| 13C4 PFBA | 128 | (36 - 130) |
| 13C2 PFHxA | 124 | (55 - 135) |
| 18O2 PFHxS | 118 | (61 - 130) |
| 13C5 PFNA | 125 | (54 - 132) |
| 13C2 PFDA | 118 | (53 - 130) |
| 13C2 PFUnA | 117 | (37 - 130) |
| 13C2 PFDoA | 125 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 1 M10**

**HPLC**

**Lot-Sample #...:** D0A150550-005 **Work Order #...:** LR88N1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:10 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 17:07
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.030 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.021 J** | **0.030** | **ug/L** | **0.011** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| **Perfluorobutanoic acid (PFBA)** | **0.020** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.0088 J** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.025** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorooctanesulfonate** | **0.048** | **0.030** | **ug/L** | **0.013** |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 97 | (60 - 155) |
| 13C4 PFOS | 63 | (45 - 130) |
| 13C4 PFBA | 96 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 103 | (61 - 130) |
| 13C5 PFNA | 82 | (54 - 132) |
| 13C2 PFDA | 53 | (53 - 130) |
| 13C2 PFUnA | 41 | (37 - 130) |
| 13C2 PFDoA | 38 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 1 M10**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-005 | **Work Order #...:** | LR88N1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/11/10 15:10 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018139 | **Analysis Time..:** | 12:56 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (PFOSA)** | **0.015 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 38 | (37 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 1 M10

HPLC

**Lot-Sample #...:** D0A150550-005 **Work Order #...:** LR88N2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:10 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 00:19
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.030 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.018 J** | **0.030** | **ug/L** | **0.011** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| **Perfluorobutanoic acid (PFBA)** | **0.020** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.011 J** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.033** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorooctanesulfonate** | **0.051** | **0.030** | **ug/L** | **0.013** |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 96 | (60 - 155) |
| 13C4 PFOS | 50 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 101 | (55 - 135) |
| 18O2 PFHxS | 86 | (61 - 130) |
| 13C5 PFNA | 64 | (54 - 132) |
| 13C2 PFDA | 47 * | (53 - 130) |
| 13C2 PFUnA | 47 | (37 - 130) |
| 13C2 PFDoA | 50 | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 3 M11**

**HPLC**

**Lot-Sample #...:** D0A150550-006 **Work Order #...:** LR88Q1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:24 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 17:22
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.054** | **0.030** | **ug/L** | **0.013** |
| **Perfluorononanoic acid (PFNA)** | **0.018 J** | **0.040** | **ug/L** | **0.017** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.27** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.013 J** | **0.030** | **ug/L** | **0.0070** |
| **Perfluorobutanoic acid (PFBA)** | **0.12** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.27** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.056** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorooctanesulfonate** | **0.039** | **0.030** | **ug/L** | **0.013** |
| **Perfluorooctanoic Acid** | **0.11** | **0.020** | **ug/L** | **0.0098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 101 | (60 - 155) |
| 13C4 PFOS | 96 | (45 - 130) |
| 13C4 PFBA | 93 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 104 | (61 - 130) |
| 13C5 PFNA | 102 | (54 - 132) |
| 13C2 PFDA | 86 | (53 - 130) |
| 13C2 PFUnA | 61 | (37 - 130) |
| 13C2 PFDoA | 43 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 3 M11

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D0A150550-006 | Work Order #...: | LR88Q1AC | Matrix.....: | WATER |
| Date Sampled...: | 01/11/10 15:24 | Date Received..: | 01/15/10 | | |
| Prep Date.....: | 01/18/10 | Analysis Date..: | 01/20/10 | | |
| Prep Batch #...: | 0018139 | Analysis Time..: | 13:01 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.013 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 71 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 3 M11

HPLC

Lot-Sample #...: D0A150550-006
Date Sampled...: 01/11/10 15:24
Prep Date.....: 02/02/10
Prep Batch #...: 0033180
Dilution Factor: 1

Work Order #...: LR88Q2AA
Date Received..: 01/15/10
Analysis Date..: 02/04/10
Analysis Time..: 00:34

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | 0.059 | 0.030 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | 0.026 J | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| Perfluoropentanoic acid (PFPA) | 0.24 | 0.030 | ug/L | 0.011 |
| Perfluorohexane sulfonate (PFHxS) | 0.016 J | 0.030 | ug/L | 0.0070 |
| Perfluorobutanoic acid (PFBA) | 0.12 | 0.020 | ug/L | 0.0098 |
| Perfluorohexanoic acid (PFHxA) | 0.27 | 0.020 | ug/L | 0.0029 |
| Perfluorodecanoic acid (PFDA) | 0.012 J | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorobutane sulfonate (PFBS) | 0.075 | 0.020 | ug/L | 0.0082 |
| Perfluorooctanesulfonate | 0.052 | 0.030 | ug/L | 0.013 |
| Perfluorooctanoic Acid | 0.12 | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 95 | (60 - 155) |
| 13C4 PFOS | 49 | (45 - 130) |
| 13C4 PFBA | 98 | (36 - 130) |
| 13C2 PFHxA | 103 | (55 - 135) |
| 18O2 PFHxS | 84 | (61 - 130) |
| 13C5 PFNA | 70 | (54 - 132) |
| 13C2 PFDA | 45 * | (53 - 130) |
| 13C2 PFUnA | 43 | (37 - 130) |
| 13C2 PFDoA | 46 | (26 - 130) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 8 M12

HPLC

Lot-Sample #...: D0A150550-007 Work Order #...: LR88R1AA Matrix.....: WATER
Date Sampled...: 01/13/10 14:20 Date Received..: 01/15/10
Prep Date.....: 01/15/10 Analysis Date..: 02/02/10
Prep Batch #...: 0015368 Analysis Time..: 17:37
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.83** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.29 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **2.1** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.40** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.66** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.078 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.3** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.1** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.8** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 113 | (60 - 155) |
| 13C4 PFOS | 119 | (45 - 130) |
| 13C4 PFBA | 107 | (36 - 130) |
| 13C2 PFHxA | 101 | (55 - 135) |
| 18O2 PFHxS | 120 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 111 | (53 - 130) |
| 13C2 PFUnA | 110 | (37 - 130) |
| 13C2 PFDoA | 105 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 8 M12

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D0A150550-007 | Work Order #...: | LR88R1AC | Matrix.....: | WATER |
| Date Sampled...: | 01/13/10 14:20 | Date Received..: | 01/15/10 | | |
| Prep Date.....: | 01/18/10 | Analysis Date..: | 01/20/10 | | |
| Prep Batch #...: | 0018297 | Analysis Time..: | 10:31 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.022 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 70 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 8 M12

HPLC

Lot-Sample #...: D0A150550-007 Work Order #...: LR88R2AA Matrix.....: WATER
Date Sampled...: 01/13/10 14:20 Date Received..: 01/15/10
Prep Date.....: 02/01/10 Analysis Date..: 02/02/10
Prep Batch #...: 0032537 Analysis Time..: 21:52
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.59** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.21 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.5** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.30** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.49** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.96** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.0** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.87** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.3** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 130 | (60 - 155) |
| 13C4 PFOS | 125 | (45 - 130) |
| 13C4 PFBA | 124 | (36 - 130) |
| 13C2 PFHxA | 117 | (55 - 135) |
| 18O2 PFHxS | 130 | (61 - 130) |
| 13C5 PFNA | 124 | (54 - 132) |
| 13C2 PFDA | 126 | (53 - 130) |
| 13C2 PFUnA | 125 | (37 - 130) |
| 13C2 PFDoA | 118 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 13 M13**

**HPLC**

**Lot-Sample #...:** D0A150550-008 **Work Order #...:** LR88T1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 12:07 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 17:52
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.5** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.57** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **3.0** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.0** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.99** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **2.4** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.088 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **2.4** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.6** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **3.3** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 119 | (60 - 155) |
| 13C4 PFOS | 124 | (45 - 130) |
| 13C4 PFBA | 114 | (36 - 130) |
| 13C2 PFHxA | 106 | (55 - 135) |
| 18O2 PFHxS | 124 | (61 - 130) |
| 13C5 PFNA | 120 | (54 - 132) |
| 13C2 PFDA | 120 | (53 - 130) |
| 13C2 PFUnA | 119 | (37 - 130) |
| 13C2 PFDoA | 110 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 13 M13

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-008 | **Work Order #...:** | LR88T1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 12:07 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 10:36 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.029 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 71 | (37 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 13 M13**

**HPLC**

**Lot-Sample #...:** D0A150550-008 **Work Order #...:** LR88T2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 12:07 **Date Received..:** 01/15/10
**Prep Date.....:** 02/01/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0032537 **Analysis Time..:** 13:33
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.2** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.44** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **2.4** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.89** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.75** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **2.1** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **2.2** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.5** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **2.8** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (60 - 155) |
| 13C4 PFOS | 106 | (45 - 130) |
| 13C4 PFBA | 110 | (36 - 130) |
| 13C2 PFHxA | 98 | (55 - 135) |
| 18O2 PFHxS | 101 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 110 | (37 - 130) |
| 13C2 PFDoA | 112 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 14 M14**

**HPLC**

**Lot-Sample #...:** D0A150550-009 **Work Order #...:** LR88X1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:45 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 18:07
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.86** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **2.4** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.51** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.55** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.6** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.47** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.51** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.4** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 123 | (60 - 155) |
| 13C4 PFOS | 128 | (45 - 130) |
| 13C4 PFBA | 114 | (36 - 130) |
| 13C2 PFHxA | 106 | (55 - 135) |
| 18O2 PFHxS | 124 | (61 - 130) |
| 13C5 PFNA | 122 | (54 - 132) |
| 13C2 PFDA | 118 | (53 - 130) |
| 13C2 PFUnA | 113 | (37 - 130) |
| 13C2 PFDoA | 110 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 14 M14**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-009 | **Work Order #...:** | LR88X1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 15:45 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 10:41 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (F OSA)** | **0.0063 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 68 | (37 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 14 M14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-009 | **Work Order #...:** | LR88X2AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 15:45 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 02/01/10 | **Analysis Date..:** | 02/02/10 | | |
| **Prep Batch #...:** | 0032537 | **Analysis Time..:** | 22:37 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.66** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.38** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.42** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.2** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.36** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.37** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.1** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 110 | (60 - 155) |
| 13C4 PFOS | 114 | (45 - 130) |
| 13C4 PFBA | 112 | (36 - 130) |
| 13C2 PFHxA | 100 | (55 - 135) |
| 18O2 PFHxS | 112 | (61 - 130) |
| 13C5 PFNA | 114 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 109 | (37 - 130) |
| 13C2 PFDoA | 107 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 15 M17**

**HPLC**

**Lot-Sample #...:** D0A150550-010 **Work Order #...:** LR8801AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:06 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 18:22
**Dilution Factor:** 50
**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.2 J** | **1.5** | **ug/L** | **0.66** |
| **Perfluorononanoic acid (PFNA)** | **0.99 J** | **2.0** | **ug/L** | **0.87** |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **1.5** | **ug/L** | **0.55** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| **Perfluorobutanoic acid (PFBA)** | **0.96 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **1.0** | **ug/L** | **0.15** |
| **Perfluorodecanoic acid (PFDA)** | **0.43 J** | **1.0** | **ug/L** | **0.39** |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **5.8** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **1.6** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **2.9** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 112 | (60 - 155) |
| 13C4 PFOS | 127 | (45 - 130) |
| 13C4 PFBA | 79 | (36 - 130) |
| 13C2 PFHxA | 101 | (55 - 135) |
| 18O2 PFHxS | 118 | (61 - 130) |
| 13C5 PFNA | 116 | (54 - 132) |
| 13C2 PFDA | 113 | (53 - 130) |
| 13C2 PFUnA | 115 | (37 - 130) |
| 13C2 PFDoA | 110 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 15 M17

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-010 | **Work Order #...:** | LR8801AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 15:06 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 10:46 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.11** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 71 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 15 M17**

**HPLC**

**Lot-Sample #...:** D0A150550-010 **Work Order #...:** LR8802AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:06 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 00:49
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.99 J** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **1.4 J** | **1.5** | **ug/L** | **0.55** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| **Perfluorobutanoic acid (PFBA)** | **0.89 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **1.0** | **ug/L** | **0.15** |
| **Perfluorodecanoic acid (PFDA)** | **0.40 J** | **1.0** | **ug/L** | **0.39** |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **6.1** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **1.6** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **2.7** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 129 | (60 - 155) |
| 13C4 PFOS | 117 | (45 - 130) |
| 13C4 PFBA | 122 | (36 - 130) |
| 13C2 PFHxA | 122 | (55 - 135) |
| 18O2 PFHxS | 112 | (61 - 130) |
| 13C5 PFNA | 119 | (54 - 132) |
| 13C2 PFDA | 115 | (53 - 130) |
| 13C2 PFUnA | 117 | (37 - 130) |
| 13C2 PFDoA | 121 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 23 U1**

**HPLC**

**Lot-Sample #...:** D0A150550-011 **Work Order #...:** LR8821AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:41 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 18:37
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.015 J** | **0.030** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.045** | **0.030** | **ug/L** | **0.011** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| **Perfluorobutanoic acid (PFBA)** | **0.031** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.030** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.032** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorooctanesulfonate** | **0.019 J** | **0.030** | **ug/L** | **0.013** |
| **Perfluorooctanoic Acid** | **0.028** | **0.020** | **ug/L** | **0.0098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 117 | (60 - 155) |
| 13C4 PFOS | 78 | (45 - 130) |
| 13C4 PFBA | 112 | (36 - 130) |
| 13C2 PFHxA | 106 | (55 - 135) |
| 18O2 PFHxS | 119 | (61 - 130) |
| 13C5 PFNA | 94 | (54 - 132) |
| 13C2 PFDA | 66 | (53 - 130) |
| 13C2 PFUnA | 61 | (37 - 130) |
| 13C2 PFDoA | 60 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 23 U1

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-011 | **Work Order #...:** | LR8821AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/11/10 14:41 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/21/10 | | |
| **Prep Batch #...:** | 0018139 | **Analysis Time..:** | 11:02 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 32 * | (37 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: 23 U1**

**HPLC**

**Lot-Sample #...:** D0A150550-011 **Work Order #...:** LR8822AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:41 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 01:04
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.013 J** | **0.030** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.036** | **0.030** | **ug/L** | **0.011** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.0084 J** | **0.030** | **ug/L** | **0.0070** |
| **Perfluorobutanoic acid (PFBA)** | **0.030** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.031** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.038** | **0.020** | **ug/L** | **0.0082** |
| **Perfluorooctanesulfonate** | **0.015 J** | **0.030** | **ug/L** | **0.013** |
| **Perfluorooctanoic Acid** | **0.027** | **0.020** | **ug/L** | **0.0098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 109 | (60 - 155) |
| 13C4 PFOS | 59 | (45 - 130) |
| 13C4 PFBA | 98 | (36 - 130) |
| 13C2 PFHxA | 107 | (55 - 135) |
| 18O2 PFHxS | 92 | (61 - 130) |
| 13C5 PFNA | 80 | (54 - 132) |
| 13C2 PFDA | 58 | (53 - 130) |
| 13C2 PFUnA | 50 | (37 - 130) |
| 13C2 PFDoA | 55 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 14A D5

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D0A150550-012 | Work Order #...: | LR8841AA | Matrix.....: | WATER |
| Date Sampled...: | 01/13/10 13:25 | Date Received..: | 01/15/10 | | |
| Prep Date.....: | 01/15/10 | Analysis Date..: | 02/02/10 | | |
| Prep Batch #...: | 0015368 | Analysis Time..: | 18:52 | | |
| Dilution Factor: | 10 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.74** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.56** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.23 J** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.67** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.93** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.22** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **3.2** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.2** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.9** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 112 | (60 - 155) |
| 13C4 PFOS | 120 | (45 - 130) |
| 13C4 PFBA | 107 | (36 - 130) |
| 13C2 PFHxA | 103 | (55 - 135) |
| 18O2 PFHxS | 115 | (61 - 130) |
| 13C5 PFNA | 117 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 113 | (37 - 130) |
| 13C2 PFDoA | 109 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 14A D5

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D0A150550-012 | Work Order #...: | LR8841AC | Matrix.....: | WATER |
| Date Sampled...: | 01/13/10 13:25 | Date Received..: | 01/15/10 | | |
| Prep Date.....: | 01/18/10 | Analysis Date..: | 01/20/10 | | |
| Prep Batch #...: | 0018297 | Analysis Time..: | 10:51 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.015 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 54 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 14A D5**

**HPLC**

**Lot-Sample #...:** D0A150550-012 **Work Order #...:** LR8842AA **Matrix.....:** WATER
**Date Sampled...:** 01/13/10 13:25 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 01:19
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.57** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.43** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.0** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.20 J** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.58** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.82** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.15 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **3.2** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.88** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.5** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 122 | (60 - 155) |
| 13C4 PFOS | 102 | (45 - 130) |
| 13C4 PFBA | 113 | (36 - 130) |
| 13C2 PFHxA | 118 | (55 - 135) |
| 18O2 PFHxS | 104 | (61 - 130) |
| 13C5 PFNA | 106 | (54 - 132) |
| 13C2 PFDA | 105 | (53 - 130) |
| 13C2 PFUnA | 110 | (37 - 130) |
| 13C2 PFDoA | 107 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 24 D1**

**HPLC**

**Lot-Sample #...:** D0A150550-013 **Work Order #...:** LR8851AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:54 **Date Received..:** 01/15/10
**Prep Date.....:** 01/15/10 **Analysis Date..:** 02/03/10
**Prep Batch #...:** 0015368 **Analysis Time..:** 18:34
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.61** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.24 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.0** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.46** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.36** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.78** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.28** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.7** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **3.5** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.8** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 117 | (60 - 155) |
| 13C4 PFOS | 112 | (45 - 130) |
| 13C4 PFBA | 116 | (36 - 130) |
| 13C2 PFHxA | 110 | (55 - 135) |
| 18O2 PFHxS | 108 | (61 - 130) |
| 13C5 PFNA | 110 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 114 | (37 - 130) |
| 13C2 PFDoA | 114 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 24 D1

HPLC

Lot-Sample #...: D0A150550-013
Date Sampled...: 01/11/10 14:54
Prep Date.....: 01/18/10
Prep Batch #...: 0018139
Dilution Factor: 1

Work Order #...: LR8851AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 13:11

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.13 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 44 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 24 D1**

**HPLC**

**Lot-Sample #...:** D0A150550-013 **Work Order #...:** LR8852AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:54 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 01:34
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.57** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.24 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.98** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.44** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.39** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.81** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.18 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.8** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **2.7** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.8** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 119 | (60 - 155) |
| 13C4 PFOS | 110 | (45 - 130) |
| 13C4 PFBA | 114 | (36 - 130) |
| 13C2 PFHxA | 117 | (55 - 135) |
| 18O2 PFHxS | 107 | (61 - 130) |
| 13C5 PFNA | 111 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 109 | (37 - 130) |
| 13C2 PFDoA | 113 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 21 D2

HPLC

Lot-Sample #...: D0A150550-014
Date Sampled...: 01/11/10 14:15
Prep Date.....: 01/15/10
Prep Batch #...: 0015368
Dilution Factor: 5

Work Order #...: LR8861AA
Date Received..: 01/15/10
Analysis Date..: 02/02/10
Analysis Time..: 19:22

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | 0.33 | 0.15 | ug/L | 0.066 |
| Perfluorononanoic acid (PFNA) | 0.16 J | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| Perfluoropentanoic acid (PFPA) | 0.75 | 0.15 | ug/L | 0.055 |
| Perfluorohexane sulfonate (PFHxS) | 0.20 | 0.15 | ug/L | 0.035 |
| Perfluorobutanoic acid (PFBA) | 0.28 | 0.10 | ug/L | 0.049 |
| Perfluorohexanoic acid (PFHxA) | 0.53 | 0.10 | ug/L | 0.015 |
| Perfluorodecanoic acid (PFDA) | 0.13 | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| Perfluorobutane sulfonate (PFBS) | 0.79 | 0.10 | ug/L | 0.041 |
| Perfluorooctanesulfonate | 1.6 | 0.15 | ug/L | 0.067 |
| Perfluorooctanoic Acid | 0.94 | 0.10 | ug/L | 0.049 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 92 | (60 - 155) |
| 13C4 PFOS | 93 | (45 - 130) |
| 13C4 PFBA | 90 | (36 - 130) |
| 13C2 PFHxA | 80 | (55 - 135) |
| 18O2 PFHxS | 92 | (61 - 130) |
| 13C5 PFNA | 91 | (54 - 132) |
| 13C2 PFDA | 87 | (53 - 130) |
| 13C2 PFUnA | 85 | (37 - 130) |
| 13C2 PFDoA | 81 | (26 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 21 D2

HPLC

Lot-Sample #...: D0A150550-014 Work Order #...: LR8861AC Matrix.....: WATER
Date Sampled...: 01/11/10 14:15 Date Received..: 01/15/10
Prep Date.....: 01/18/10 Analysis Date..: 01/20/10
Prep Batch #...: 0018139 Analysis Time..: 13:16
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.089 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 42 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 21 D2**

**HPLC**

**Lot-Sample #...:** D0A150550-014 **Work Order #...:** LR8862AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:15 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 01:49
**Dilution Factor:** 5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.26** | **0.15** | **ug/L** | **0.066** |
| **Perfluorononanoic acid (PFNA)** | **0.15 J** | **0.20** | **ug/L** | **0.087** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.56** | **0.15** | **ug/L** | **0.055** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.19** | **0.15** | **ug/L** | **0.035** |
| **Perfluorobutanoic acid (PFBA)** | **0.24** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.42** | **0.10** | **ug/L** | **0.015** |
| **Perfluorodecanoic acid (PFDA)** | **0.094 J** | **0.10** | **ug/L** | **0.039** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.77** | **0.10** | **ug/L** | **0.041** |
| **Perfluorooctanesulfonate** | **1.4** | **0.15** | **ug/L** | **0.067** |
| **Perfluorooctanoic Acid** | **0.75** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 131 | (60 - 155) |
| 13C4 PFOS | 104 | (45 - 130) |
| 13C4 PFBA | 115 | (36 - 130) |
| 13C2 PFHxA | 120 | (55 - 135) |
| 18O2 PFHxS | 109 | (61 - 130) |
| 13C5 PFNA | 109 | (54 - 132) |
| 13C2 PFDA | 103 | (53 - 130) |
| 13C2 PFUnA | 104 | (37 - 130) |
| 13C2 PFDoA | 107 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 20 D3

HPLC

Lot-Sample #...: D0A150550-015 Work Order #...: LR8871AA Matrix.....: WATER
Date Sampled...: 01/11/10 16:47 Date Received..: 01/15/10
Prep Date.....: 01/15/10 Analysis Date..: 02/02/10
Prep Batch #...: 0015368 Analysis Time..: 19:52
Dilution Factor: 5

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.12 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.55** | **0.15** | **ug/L** | **0.055** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.046 J** | **0.15** | **ug/L** | **0.035** |
| **Perfluorobutanoic acid (PFBA)** | **0.28** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.29** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.30** | **0.10** | **ug/L** | **0.041** |
| **Perfluorooctanesulfonate** | **0.087 J** | **0.15** | **ug/L** | **0.067** |
| **Perfluorooctanoic Acid** | **0.18** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 88 | (60 - 155) |
| 13C4 PFOS | 90 | (45 - 130) |
| 13C4 PFBA | 87 | (36 - 130) |
| 13C2 PFHxA | 78 | (55 - 135) |
| 18O2 PFHxS | 93 | (61 - 130) |
| 13C5 PFNA | 91 | (54 - 132) |
| 13C2 PFDA | 84 | (53 - 130) |
| 13C2 PFUnA | 83 | (37 - 130) |
| 13C2 PFDoA | 79 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 20 D3**

**HPLC**

**Lot-Sample #...:** D0A150550-015
**Date Sampled...:** 01/11/10 16:47
**Prep Date.....:** 01/18/10
**Prep Batch #...:** 0018139
**Dilution Factor:** 1

**Work Order #...:** LR8871AC
**Date Received..:** 01/15/10
**Analysis Date..:** 01/21/10
**Analysis Time..:** 11:07

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 39 | (37 - 130) |

Dalton Utilities

Client Sample ID: 20 D3

HPLC

Lot-Sample #...: D0A150550-015 Work Order #...: LR8872AA Matrix.....: WATER
Date Sampled...: 01/11/10 16:47 Date Received..: 01/15/10
Prep Date.....: 02/02/10 Analysis Date..: 02/04/10
Prep Batch #...: 0033180 Analysis Time..: 10:36
Dilution Factor: 5

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.11 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.48** | **0.15** | **ug/L** | **0.055** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.045 J** | **0.15** | **ug/L** | **0.035** |
| **Perfluorobutanoic acid (PFBA)** | **0.24** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.26** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.33** | **0.10** | **ug/L** | **0.041** |
| Perfluorooctanesulfonate | ND | 0.15 | ug/L | 0.067 |
| **Perfluorooctanoic Acid** | **0.17** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 84 | (60 - 155) |
| 13C4 PFOS | 77 | (45 - 130) |
| 13C4 PFBA | 90 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 79 | (61 - 130) |
| 13C5 PFNA | 83 | (54 - 132) |
| 13C2 PFDA | 76 | (53 - 130) |
| 13C2 PFUnA | 82 | (37 - 130) |
| 13C2 PFDoA | 83 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 10 D4

HPLC

Lot-Sample #...: D0A150550-016
Date Sampled...: 01/13/10 14:00
Prep Date.....: 01/15/10
Prep Batch #...: 0015368
Dilution Factor: 20

Work Order #...: LR8881AA
Date Received..: 01/15/10
Analysis Date..: 02/02/10
Analysis Time..: 20:07

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | 1.4 | 0.60 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | 0.46 J | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| Perfluoropentanoic acid (PFPA) | 2.3 | 0.60 | ug/L | 0.22 |
| Perfluorohexane sulfonate (PFHxS) | 0.94 | 0.60 | ug/L | 0.14 |
| Perfluorobutanoic acid (PFBA) | 0.83 | 0.40 | ug/L | 0.20 |
| Perfluorohexanoic acid (PFHxA) | 1.9 | 0.40 | ug/L | 0.058 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorobutane sulfonate (PFBS) | 4.5 | 0.40 | ug/L | 0.16 |
| Perfluorooctanesulfonate | 2.6 | 0.60 | ug/L | 0.27 |
| Perfluorooctanoic Acid | 3.1 | 0.40 | ug/L | 0.20 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 92 | (60 - 155) |
| 13C4 PFOS | 104 | (45 - 130) |
| 13C4 PFBA | 94 | (36 - 130) |
| 13C2 PFHxA | 85 | (55 - 135) |
| 18O2 PFHxS | 98 | (61 - 130) |
| 13C5 PFNA | 99 | (54 - 132) |
| 13C2 PFDA | 95 | (53 - 130) |
| 13C2 PFUnA | 94 | (37 - 130) |
| 13C2 PFDoA | 95 | (26 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 10 D4

HPLC

Lot-Sample #...: D0A150550-016
Date Sampled...: 01/13/10 14:00
Prep Date.....: 01/18/10
Prep Batch #...: 0018297
Dilution Factor: 1

Work Order #...: LR8881AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 11:01

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.012 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 61 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 10 D4**

**HPLC**

**Lot-Sample #...:** D0A150550-016 **Work Order #...:** LR8882AA **Matrix.....:** WATER
**Date Sampled...:** 01/13/10 14:00 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 10:51
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.2** | **0.60** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.41 J** | **0.80** | **ug/L** | **0.35** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.84** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **0.71** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.7** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **4.6** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **2.2** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **3.0** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 91 | (60 - 155) |
| 13C4 PFOS | 95 | (45 - 130) |
| 13C4 PFBA | 101 | (36 - 130) |
| 13C2 PFHxA | 91 | (55 - 135) |
| 18O2 PFHxS | 86 | (61 - 130) |
| 13C5 PFNA | 94 | (54 - 132) |
| 13C2 PFDA | 94 | (53 - 130) |
| 13C2 PFUnA | 94 | (37 - 130) |
| 13C2 PFDoA | 95 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 12 D6

HPLC

Lot-Sample #...: D0A150550-017 Work Order #...: LR8891AA Matrix.....: WATER
Date Sampled...: 01/13/10 13:45 Date Received..: 01/15/10
Prep Date.....: 01/15/10 Analysis Date..: 02/02/10
Prep Batch #...: 0015368 Analysis Time..: 20:22
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.79** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.43** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.33** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.60** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.2** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.14 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.6** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.5** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.7** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 85 | (60 - 155) |
| 13C4 PFOS | 88 | (45 - 130) |
| 13C4 PFBA | 87 | (36 - 130) |
| 13C2 PFHxA | 75 | (55 - 135) |
| 18O2 PFHxS | 87 | (61 - 130) |
| 13C5 PFNA | 87 | (54 - 132) |
| 13C2 PFDA | 85 | (53 - 130) |
| 13C2 PFUnA | 83 | (37 - 130) |
| 13C2 PFDoA | 88 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 12 D6

HPLC

Lot-Sample #...: D0A150550-017
Date Sampled...: 01/13/10 13:45
Prep Date.....: 01/18/10
Prep Batch #...: 0018297
Dilution Factor: 1

Work Order #...: LR8891AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 11:06

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.098 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 61 | (37 - 130) |

Dalton Utilities

Client Sample ID: 12 D6

HPLC

Lot-Sample #...: D0A150550-017 Work Order #...: LR8892AA Matrix.....: WATER
Date Sampled...: 01/13/10 13:45 Date Received..: 01/15/10
Prep Date.....: 02/02/10 Analysis Date..: 02/04/10
Prep Batch #...: 0033180 Analysis Time..: 11:06
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.67** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.35 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.30** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.49** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.0** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.14 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.5** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.2** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.5** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 83 | (60 - 155) |
| 13C4 PFOS | 81 | (45 - 130) |
| 13C4 PFBA | 92 | (36 - 130) |
| 13C2 PFHxA | 87 | (55 - 135) |
| 18O2 PFHxS | 82 | (61 - 130) |
| 13C5 PFNA | 88 | (54 - 132) |
| 13C2 PFDA | 84 | (53 - 130) |
| 13C2 PFUnA | 84 | (37 - 130) |
| 13C2 PFDoA | 87 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 18 D9**

**HPLC**

**Lot-Sample #...:** D0A150550-018
**Date Sampled...:** 01/12/10 09:32
**Prep Date.....:** 01/15/10
**Prep Batch #...:** 0015368
**Dilution Factor:** 20

**Work Order #...:** LR89A1AA
**Date Received..:** 01/15/10
**Analysis Date..:** 02/02/10
**Analysis Time..:** 20:37

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.91** | **0.60** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.36 J** | **0.80** | **ug/L** | **0.35** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **1.6** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.43 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **0.72** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.2** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **4.1** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **1.9** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **2.0** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 102 | (60 - 155) |
| 13C4 PFOS | 112 | (45 - 130) |
| 13C4 PFBA | 101 | (36 - 130) |
| 13C2 PFHxA | 90 | (55 - 135) |
| 18O2 PFHxS | 108 | (61 - 130) |
| 13C5 PFNA | 106 | (54 - 132) |
| 13C2 PFDA | 100 | (53 - 130) |
| 13C2 PFUnA | 98 | (37 - 130) |
| 13C2 PFDoA | 103 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 18 D9**

**HPLC**

**Lot-Sample #...:** D0A150550-018 **Work Order #...:** LR89A1AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 09:32 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 11:11
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 35 * | (37 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: 18 D9

HPLC

Lot-Sample #...: D0A150550-018 Work Order #...: LR89A2AA Matrix.....: WATER
Date Sampled...: 01/12/10 09:32 Date Received..: 01/15/10
Prep Date.....: 02/02/10 Analysis Date..: 02/04/10
Prep Batch #...: 0033180 Analysis Time..: 11:21
Dilution Factor: 20

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.86** | **0.60** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.43 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **0.69** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.1** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **4.4** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **1.6** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **2.0** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 90 | (60 - 155) |
| 13C4 PFOS | 89 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 88 | (61 - 130) |
| 13C5 PFNA | 94 | (54 - 132) |
| 13C2 PFDA | 91 | (53 - 130) |
| 13C2 PFUnA | 93 | (37 - 130) |
| 13C2 PFDoA | 95 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 18 D9**

**HPLC**

**Lot-Sample #...:** D0A150550-018 **Work Order #...:** LR89A2AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 09:32 **Date Received..:** 01/15/10
**Prep Date.....:** 01/25/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0025463 **Analysis Time..:** 18:01
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 35 * | (37 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: 17 D11

HPLC

Lot-Sample #...: D0A150550-019 Work Order #...: LR89E1AA Matrix.....: WATER
Date Sampled...: 01/12/10 14:24 Date Received..: 01/15/10
Prep Date.....: 01/15/10 Analysis Date..: 02/02/10
Prep Batch #...: 0015368 Analysis Time..: 20:52
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.030 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| Perfluoropentanoic acid (PFPA) | ND | 0.030 | ug/L | 0.011 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| Perfluorohexanoic acid (PFHxA) | ND | 0.020 | ug/L | 0.0029 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorooctanesulfonate | ND | 0.030 | ug/L | 0.013 |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 79 | (60 - 155) |
| 13C4 PFOS | 47 | (45 - 130) |
| 13C4 PFBA | 77 | (36 - 130) |
| 13C2 PFHxA | 74 | (55 - 135) |
| 18O2 PFHxS | 81 | (61 - 130) |
| 13C5 PFNA | 64 | (54 - 132) |
| 13C2 PFDA | 38 * | (53 - 130) |
| 13C2 PFUnA | 28 * | (37 - 130) |
| 13C2 PFDoA | 28 | (26 - 130) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

Dalton Utilities

Client Sample ID: 17 D11

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-019 | **Work Order #...:** | LR89E1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 14:24 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 11:16 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 66 | (37 - 130) |

Dalton Utilities

Client Sample ID: 17 D11

HPLC

Lot-Sample #...: D0A150550-019 Work Order #...: LR89E2AA Matrix.....: WATER
Date Sampled...: 01/12/10 14:24 Date Received..: 01/15/10
Prep Date.....: 02/02/10 Analysis Date..: 02/04/10
Prep Batch #...: 0033180 Analysis Time..: 11:36
Dilution Factor: 1

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.030 | ug/L | 0.013 |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| Perfluoropentanoic acid (PFPA) | ND | 0.030 | ug/L | 0.011 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| Perfluorobutanoic acid (PFBA) | ND | 0.020 | ug/L | 0.0098 |
| Perfluorohexanoic acid (PFHxA) | ND | 0.020 | ug/L | 0.0029 |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorooctanesulfonate | ND | 0.030 | ug/L | 0.013 |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 76 | (60 - 155) |
| 13C4 PFOS | 43 * | (45 - 130) |
| 13C4 PFBA | 76 | (36 - 130) |
| 13C2 PFHxA | 76 | (55 - 135) |
| 18O2 PFHxS | 68 | (61 - 130) |
| 13C5 PFNA | 62 | (54 - 132) |
| 13C2 PFDA | 42 * | (53 - 130) |
| 13C2 PFUnA | 39 | (37 - 130) |
| 13C2 PFDoA | 40 | (26 - 130) |

NOTE(S):

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: 22 M1**

**HPLC**

**Lot-Sample #...:** D0A150550-020 **Work Order #...:** LR89H1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:30 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 05:56
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.37** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.46** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.39** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.15 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.45** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.39** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.6** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.3** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 115 | (60 - 155) |
| 13C4 PFOS | 122 | (45 - 130) |
| 13C4 PFBA | 119 | (36 - 130) |
| 13C2 PFHxA | 100 | (55 - 135) |
| 18O2 PFHxS | 122 | (61 - 130) |
| 13C5 PFNA | 110 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 114 | (37 - 130) |
| 13C2 PFDoA | 110 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 22 M1**

**HPLC**

**Lot-Sample #...:** D0A150550-020 **Work Order #...:** LR89H1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:30 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 13:26
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 38 | (37 - 130) |

Dalton Utilities

Client Sample ID: 22 M1

HPLC

**Lot-Sample #...:** D0A150550-020 **Work Order #...:** LR89H2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 14:30 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 11:51
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.38** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.46** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.50** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.18 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.48** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.53** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **2.1** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.5** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 85 | (60 - 155) |
| 13C4 PFOS | 80 | (45 - 130) |
| 13C4 PFBA | 85 | (36 - 130) |
| 13C2 PFHxA | 81 | (55 - 135) |
| 18O2 PFHxS | 77 | (61 - 130) |
| 13C5 PFNA | 83 | (54 - 132) |
| 13C2 PFDA | 78 | (53 - 130) |
| 13C2 PFUnA | 80 | (37 - 130) |
| 13C2 PFDoA | 85 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 6 M2**

**HPLC**

**Lot-Sample #...:** D0A150550-021 **Work Order #...:** LR89J1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:16 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 18:42
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.30 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **1.1** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.29** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.20 | ug/L | 0.082 |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 94 | (60 - 155) |
| 13C4 PFOS | 81 | (45 - 130) |
| 13C4 PFBA | 89 | (36 - 130) |
| 13C2 PFHxA | 94 | (55 - 135) |
| 18O2 PFHxS | 85 | (61 - 130) |
| 13C5 PFNA | 87 | (54 - 132) |
| 13C2 PFDA | 82 | (53 - 130) |
| 13C2 PFUnA | 85 | (37 - 130) |
| 13C2 PFDoA | 85 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 6 M2**

**HPLC**

**Lot-Sample #...:** D0A150550-021 **Work Order #...:** LR89J1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:16 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 13:31
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 44 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 6 M2**

**HPLC**

**Lot-Sample #...:** D0A150550-021 **Work Order #...:** LR89J2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:16 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 12:06
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.30 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **1.0** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.29** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.20 | ug/L | 0.082 |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 89 | (60 - 155) |
| 13C4 PFOS | 82 | (45 - 130) |
| 13C4 PFBA | 87 | (36 - 130) |
| 13C2 PFHxA | 83 | (55 - 135) |
| 18O2 PFHxS | 80 | (61 - 130) |
| 13C5 PFNA | 91 | (54 - 132) |
| 13C2 PFDA | 86 | (53 - 130) |
| 13C2 PFUnA | 87 | (37 - 130) |
| 13C2 PFDoA | 86 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 9 M3**

**HPLC**

**Lot-Sample #...:** D0A150550-022 **Work Order #...:** LR89K1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:36 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 18:57
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.017 J** | **0.030** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.15** | **0.030** | **ug/L** | **0.011** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| **Perfluorobutanoic acid (PFBA)** | **0.056** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.058** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorooctanesulfonate | ND | 0.030 | ug/L | 0.013 |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (60 - 155) |
| 13C4 PFOS | 56 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 103 | (55 - 135) |
| 18O2 PFHxS | 87 | (61 - 130) |
| 13C5 PFNA | 80 | (54 - 132) |
| 13C2 PFDA | 51 * | (53 - 130) |
| 13C2 PFUnA | 45 | (37 - 130) |
| 13C2 PFDoA | 44 | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 9 M3

HPLC

Lot-Sample #...: D0A150550-022
Date Sampled...: 01/11/10 15:36
Prep Date.....: 01/18/10
Prep Batch #...: 0018139
Dilution Factor: 1

Work Order #...: LR89K1AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 13:36

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 37 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 9 M3**

**HPLC**

**Lot-Sample #...:** D0A150550-022 **Work Order #...:** LR89K2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 15:36 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 12:21
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.018 J** | **0.030** | **ug/L** | **0.013** |
| Perfluorononanoic acid (PFNA) | ND | 0.040 | ug/L | 0.017 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.030 | ug/L | 0.015 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.040 | ug/L | 0.018 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.030 | ug/L | 0.015 |
| **Perfluoropentanoic acid (PFPA)** | **0.16** | **0.030** | **ug/L** | **0.011** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.030 | ug/L | 0.0070 |
| **Perfluorobutanoic acid (PFBA)** | **0.053** | **0.020** | **ug/L** | **0.0098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.058** | **0.020** | **ug/L** | **0.0029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.020 | ug/L | 0.0078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.020 | ug/L | 0.0069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.020 | ug/L | 0.0082 |
| Perfluorooctanesulfonate | ND | 0.030 | ug/L | 0.013 |
| Perfluorooctanoic Acid | ND | 0.020 | ug/L | 0.0098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 69 | (60 - 155) |
| 13C4 PFOS | 43 * | (45 - 130) |
| 13C4 PFBA | 72 | (36 - 130) |
| 13C2 PFHxA | 74 | (55 - 135) |
| 18O2 PFHxS | 65 | (61 - 130) |
| 13C5 PFNA | 59 | (54 - 132) |
| 13C2 PFDA | 46 * | (53 - 130) |
| 13C2 PFUnA | 46 | (37 - 130) |
| 13C2 PFDoA | 45 | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 19 M4**

**HPLC**

**Lot-Sample #...:** D0A150550-023 **Work Order #...:** LR89L1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:38 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 00:12
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.91** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.20 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.8** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.77** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.42** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.12 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.54** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **3.0** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **2.1** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (60 - 155) |
| 13C4 PFOS | 98 | (45 - 130) |
| 13C4 PFBA | 102 | (36 - 130) |
| 13C2 PFHxA | 107 | (55 - 135) |
| 18O2 PFHxS | 95 | (61 - 130) |
| 13C5 PFNA | 101 | (54 - 132) |
| 13C2 PFDA | 94 | (53 - 130) |
| 13C2 PFUnA | 100 | (37 - 130) |
| 13C2 PFDoA | 102 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 19 M4**

**HPLC**

**Lot-Sample #...:** D0A150550-023 **Work Order #...:** LR89L1AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:38 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 11:21
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.037 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 76 | (37 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 19 M4**

**HPLC**

**Lot-Sample #...:** D0A150550-023 **Work Order #...:** LR89L2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 10:38 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 03:18
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.67** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.3** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.58** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.36** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.1** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.38** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **2.2** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.6** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 94 | (60 - 155) |
| 13C4 PFOS | 92 | (45 - 130) |
| 13C4 PFBA | 94 | (36 - 130) |
| 13C2 PFHxA | 95 | (55 - 135) |
| 18O2 PFHxS | 93 | (61 - 130) |
| 13C5 PFNA | 92 | (54 - 132) |
| 13C2 PFDA | 93 | (53 - 130) |
| 13C2 PFUnA | 96 | (37 - 130) |
| 13C2 PFDoA | 91 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 16 M5**

**HPLC**

**Lot-Sample #...:** D0A150550-024 **Work Order #...:** LR89M1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 13:45 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 00:27
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.81** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.27 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.2** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.71** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.44** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.1** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **2.1** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.7** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.9** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 118 | (60 - 155) |
| 13C4 PFOS | 108 | (45 - 130) |
| 13C4 PFBA | 117 | (36 - 130) |
| 13C2 PFHxA | 121 | (55 - 135) |
| 18O2 PFHxS | 104 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 108 | (53 - 130) |
| 13C2 PFUnA | 107 | (37 - 130) |
| 13C2 PFDoA | 110 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 16 M5

HPLC

Lot-Sample #...: D0A150550-024
Date Sampled...: 01/12/10 13:45
Prep Date.....: 01/18/10
Prep Batch #...: 0018297
Dilution Factor: 1

Work Order #...: LR89M1AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 11:26

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.025 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 68 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 16 M5

HPLC

Lot-Sample #...: D0A150550-024
Date Sampled...: 01/12/10 13:45
Prep Date.....: 02/03/10
Prep Batch #...: 0034123
Dilution Factor: 10

Work Order #...: LR89M2AA
Date Received..: 01/15/10
Analysis Date..: 02/05/10
Analysis Time..: 03:33

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.69** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.31 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.1** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.58** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.42** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.99** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.6** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **1.6** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.7** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 96 | (60 - 155) |
| 13C4 PFOS | 94 | (45 - 130) |
| 13C4 PFBA | 95 | (36 - 130) |
| 13C2 PFHxA | 94 | (55 - 135) |
| 18O2 PFHxS | 93 | (61 - 130) |
| 13C5 PFNA | 99 | (54 - 132) |
| 13C2 PFDA | 97 | (53 - 130) |
| 13C2 PFUnA | 99 | (37 - 130) |
| 13C2 PFDoA | 98 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 12A D7**

**HPLC**

**Lot-Sample #...:** D0A150550-025 **Work Order #...:** LR89N1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 11:46 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 14:22
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.68** | **0.30** | **ug/L** | **0.13** |
| **Perfluorononanoic acid (PFNA)** | **0.17 J** | **0.40** | **ug/L** | **0.17** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.9** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.48** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.49** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.2** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.79** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.73** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.6** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 111 | (60 - 155) |
| 13C4 PFOS | 126 | (45 - 130) |
| 13C4 PFBA | 113 | (36 - 130) |
| 13C2 PFHxA | 91 | (55 - 135) |
| 18O2 PFHxS | 117 | (61 - 130) |
| 13C5 PFNA | 119 | (54 - 132) |
| 13C2 PFDA | 111 | (53 - 130) |
| 13C2 PFUnA | 109 | (37 - 130) |
| 13C2 PFDoA | 112 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 12A D7**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-025 | **Work Order #...:** | LR89N1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 11:46 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 11:31 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (F OSA)** | **0.059** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 61 | (37 - 130) |

Dalton Utilities

Client Sample ID: 12A D7

HPLC

Lot-Sample #...: D0A150550-025 Work Order #...: LR89N2AA Matrix.....: WATER
Date Sampled...: 01/12/10 11:46 Date Received..: 01/15/10
Prep Date.....: 02/03/10 Analysis Date..: 02/05/10
Prep Batch #...: 0034123 Analysis Time..: 03:48
Dilution Factor: 10

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.72** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.7** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.50** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.48** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.91** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.87** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.5** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 100 | (60 - 155) |
| 13C4 PFOS | 97 | (45 - 130) |
| 13C4 PFBA | 101 | (36 - 130) |
| 13C2 PFHxA | 98 | (55 - 135) |
| 18O2 PFHxS | 96 | (61 - 130) |
| 13C5 PFNA | 102 | (54 - 132) |
| 13C2 PFDA | 101 | (53 - 130) |
| 13C2 PFUnA | 104 | (37 - 130) |
| 13C2 PFDoA | 103 | (26 - 130) |

Dalton Utilities

Client Sample ID: 13A D8

HPLC

Lot-Sample #...: D0A150550-026 Work Order #...: LR89P1AA Matrix.....: WATER
Date Sampled...: 01/12/10 11:25 Date Received..: 01/15/10
Prep Date.....: 01/19/10 Analysis Date..: 01/31/10
Prep Batch #...: 0019142 Analysis Time..: 00:57
Dilution Factor: 50

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **2.5** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **3.3** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.7** | **1.5** | **ug/L** | **0.35** |
| **Perfluorobutanoic acid (PFBA)** | **1.2** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **2.8** | **1.0** | **ug/L** | **0.15** |
| **Perfluorodecanoic acid (PFDA)** | **0.47 J** | **1.0** | **ug/L** | **0.39** |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **6.2** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **8.8** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **6.4** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 117 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 122 | (36 - 130) |
| 13C2 PFHxA | 123 | (55 - 135) |
| 18O2 PFHxS | 110 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 112 | (53 - 130) |
| 13C2 PFUnA | 119 | (37 - 130) |
| 13C2 PFDoA | 117 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 13A D8

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-026 | **Work Order #...:** | LR89P1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 11:25 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 11:36 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (F OSA)** | **0.60** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 70 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 13A D8**

**HPLC**

**Lot-Sample #...:** D0A150550-026 **Work Order #...:** LR89P2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 11:25 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 04:03
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **2.1** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **2.7** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexane sulfonate (PFHxS)** | **1.5** | **1.5** | **ug/L** | **0.35** |
| **Perfluorobutanoic acid (PFBA)** | **1.0** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **2.4** | **1.0** | **ug/L** | **0.15** |
| **Perfluorodecanoic acid (PFDA)** | **0.39 J** | **1.0** | **ug/L** | **0.39** |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **5.0** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **7.5** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **5.9** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 104 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 109 | (36 - 130) |
| 13C2 PFHxA | 111 | (55 - 135) |
| 18O2 PFHxS | 107 | (61 - 130) |
| 13C5 PFNA | 107 | (54 - 132) |
| 13C2 PFDA | 111 | (53 - 130) |
| 13C2 PFUnA | 116 | (37 - 130) |
| 13C2 PFDoA | 112 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 16B D12**

**HPLC**

**Lot-Sample #...:** D0A150550-027 **Work Order #...:** LR89Q1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 14:09 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 01:12
**Dilution Factor:** 5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.092 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.16** | **0.15** | **ug/L** | **0.055** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.15 | ug/L | 0.035 |
| **Perfluorobutanoic acid (PFBA)** | **0.10** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.13** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.50** | **0.10** | **ug/L** | **0.041** |
| **Perfluorooctanesulfonate** | **0.086 J** | **0.15** | **ug/L** | **0.067** |
| **Perfluorooctanoic Acid** | **0.20** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 116 | (60 - 155) |
| 13C4 PFOS | 98 | (45 - 130) |
| 13C4 PFBA | 116 | (36 - 130) |
| 13C2 PFHxA | 118 | (55 - 135) |
| 18O2 PFHxS | 104 | (61 - 130) |
| 13C5 PFNA | 109 | (54 - 132) |
| 13C2 PFDA | 101 | (53 - 130) |
| 13C2 PFUnA | 105 | (37 - 130) |
| 13C2 PFDoA | 99 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 16B D12**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-027 | **Work Order #...:** | LR89Q1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 14:09 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 01/18/10 | **Analysis Date..:** | 01/20/10 | | |
| **Prep Batch #...:** | 0018297 | **Analysis Time..:** | 11:41 | | |
| **Dilution Factor:** | 1 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctane sulfonamide (FOSA)** | **0.016 J** | **0.050** | **ug/L** | **0.0057** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 58 | (37 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 16B D12

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D0A150550-027 | **Work Order #...:** | LR89Q2AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 01/12/10 14:09 | **Date Received..:** | 01/15/10 | | |
| **Prep Date.....:** | 02/03/10 | **Analysis Date..:** | 02/05/10 | | |
| **Prep Batch #...:** | 0034123 | **Analysis Time..:** | 04:18 | | |
| **Dilution Factor:** | 5 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.081 J** | **0.15** | **ug/L** | **0.066** |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.087 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.15 | ug/L | 0.075 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.089 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.15 | ug/L | 0.073 |
| **Perfluoropentanoic acid (PFPA)** | **0.13 J** | **0.15** | **ug/L** | **0.055** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.15 | ug/L | 0.035 |
| **Perfluorobutanoic acid (PFBA)** | **0.082 J** | **0.10** | **ug/L** | **0.049** |
| **Perfluorohexanoic acid (PFHxA)** | **0.11** | **0.10** | **ug/L** | **0.015** |
| Perfluorodecanoic acid (PFDA) | ND | 0.10 | ug/L | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.10 | ug/L | 0.034 |
| **Perfluorobutane sulfonate (PFBS)** | **0.35** | **0.10** | **ug/L** | **0.041** |
| Perfluorooctanesulfonate | ND | 0.15 | ug/L | 0.067 |
| **Perfluorooctanoic Acid** | **0.16** | **0.10** | **ug/L** | **0.049** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (60 - 155) |
| 13C4 PFOS | 95 | (45 - 130) |
| 13C4 PFBA | 102 | (36 - 130) |
| 13C2 PFHxA | 99 | (55 - 135) |
| 18O2 PFHxS | 97 | (61 - 130) |
| 13C5 PFNA | 100 | (54 - 132) |
| 13C2 PFDA | 94 | (53 - 130) |
| 13C2 PFUnA | 100 | (37 - 130) |
| 13C2 PFDoA | 98 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 15B D13**

**HPLC**

**Lot-Sample #...:** D0A150550-028 **Work Order #...:** LR89R1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:17 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 01:27
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **2.6** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **2.9** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexane sulfonate (PFHxS)** | **2.4** | **1.5** | **ug/L** | **0.35** |
| **Perfluorobutanoic acid (PFBA)** | **0.95 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **2.7** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **1.8** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **13** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **7.7** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 123 | (60 - 155) |
| 13C4 PFOS | 117 | (45 - 130) |
| 13C4 PFBA | 126 | (36 - 130) |
| 13C2 PFHxA | 128 | (55 - 135) |
| 18O2 PFHxS | 116 | (61 - 130) |
| 13C5 PFNA | 117 | (54 - 132) |
| 13C2 PFDA | 115 | (53 - 130) |
| 13C2 PFUnA | 122 | (37 - 130) |
| 13C2 PFDoA | 119 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 15B D13

HPLC

Lot-Sample #...: D0A150550-028
Date Sampled...: 01/12/10 15:17
Prep Date.....: 01/18/10
Prep Batch #...: 0018297
Dilution Factor: 1

Work Order #...: LR89R1AC
Date Received..: 01/15/10
Analysis Date..: 01/20/10
Analysis Time..: 11:46

Matrix.....: WATER

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.12 | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 66 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 15B D13**

**HPLC**

**Lot-Sample #...:** D0A150550-028 **Work Order #...:** LR89R2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:17 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 04:48
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.9** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **2.3** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexane sulfonate (PFHxS)** | **2.0** | **1.5** | **ug/L** | **0.35** |
| **Perfluorobutanoic acid (PFBA)** | **0.70 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **2.2** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **1.4** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **9.9** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **6.3** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 90 | (60 - 155) |
| 13C4 PFOS | 93 | (45 - 130) |
| 13C4 PFBA | 96 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 88 | (61 - 130) |
| 13C5 PFNA | 94 | (54 - 132) |
| 13C2 PFDA | 91 | (53 - 130) |
| 13C2 PFUnA | 97 | (37 - 130) |
| 13C2 PFDoA | 99 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 14B D14**

**HPLC**

**Lot-Sample #...:** D0A150550-029 **Work Order #...:** LR89T1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:31 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 14:37
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.44** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.1** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.27 J** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.41** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.69** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.1** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.64** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **0.96** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 100 | (60 - 155) |
| 13C4 PFOS | 104 | (45 - 130) |
| 13C4 PFBA | 93 | (36 - 130) |
| 13C2 PFHxA | 81 | (55 - 135) |
| 18O2 PFHxS | 102 | (61 - 130) |
| 13C5 PFNA | 103 | (54 - 132) |
| 13C2 PFDA | 95 | (53 - 130) |
| 13C2 PFUnA | 92 | (37 - 130) |
| 13C2 PFDoA | 93 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 14B D14

HPLC

| | | | | | |
|---|---|---|---|---|---|
| Lot-Sample #...: | D0A150550-029 | Work Order #...: | LR89T1AC | Matrix.....: | WATER |
| Date Sampled...: | 01/12/10 15:31 | Date Received..: | 01/15/10 | | |
| Prep Date.....: | 01/18/10 | Analysis Date..: | 01/20/10 | | |
| Prep Batch #...: | 0018297 | Analysis Time..: | 11:56 | | |
| Dilution Factor: | 1 | | | | |
| | | Method.....: | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | 0.019 J | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 60 | (37 - 130) |

NOTE(S):

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 14B D14**

**HPLC**

**Lot-Sample #...:** D0A150550-029 **Work Order #...:** LR89T2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 15:31 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 05:03
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.51** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.96** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.32** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.63** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.77** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.4** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.77** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **1.1** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 109 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 77 | (36 - 130) |
| 13C2 PFHxA | 116 | (55 - 135) |
| 18O2 PFHxS | 111 | (61 - 130) |
| 13C5 PFNA | 118 | (54 - 132) |
| 13C2 PFDA | 116 | (53 - 130) |
| 13C2 PFUnA | 120 | (37 - 130) |
| 13C2 PFDoA | 119 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: 7A U2**

**HPLC**

**Lot-Sample #...:** D0A150550-030 **Work Order #...:** LR89V1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:29 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 19:12
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.3** | **0.60** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **6.0** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.67** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **1.5** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **4.1** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **0.63** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **0.33 J** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **2.6** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 114 | (60 - 155) |
| 13C4 PFOS | 107 | (45 - 130) |
| 13C4 PFBA | 114 | (36 - 130) |
| 13C2 PFHxA | 118 | (55 - 135) |
| 18O2 PFHxS | 103 | (61 - 130) |
| 13C5 PFNA | 113 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 111 | (37 - 130) |
| 13C2 PFDoA | 108 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 7A U2**

**HPLC**

**Lot-Sample #...:** D0A150550-030
**Date Sampled...:** 01/11/10 16:29
**Prep Date.....:** 01/18/10
**Prep Batch #...:** 0018139
**Dilution Factor:** 1

**Work Order #...:** LR89V1AC
**Date Received..:** 01/15/10
**Analysis Date..:** 01/21/10
**Analysis Time..:** 11:12

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 47 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 7A U2**

**HPLC**

**Lot-Sample #...:** D0A150550-030 **Work Order #...:** LR89V2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 16:29 **Date Received..:** 01/15/10
**Prep Date.....:** 02/02/10 **Analysis Date..:** 02/04/10
**Prep Batch #...:** 0033180 **Analysis Time..:** 12:36
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.94** | **0.60** | **ug/L** | **0.26** |
| Perfluorononanoic acid (PFNA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **5.3** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.53 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **1.4** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **3.4** | **0.40** | **ug/L** | **0.058** |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **0.48** | **0.40** | **ug/L** | **0.16** |
| Perfluorooctanesulfonate | ND | 0.60 | ug/L | 0.27 |
| **Perfluorooctanoic Acid** | **2.2** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 94 | (60 - 155) |
| 13C4 PFOS | 87 | (45 - 130) |
| 13C4 PFBA | 94 | (36 - 130) |
| 13C2 PFHxA | 88 | (55 - 135) |
| 18O2 PFHxS | 88 | (61 - 130) |
| 13C5 PFNA | 97 | (54 - 132) |
| 13C2 PFDA | 90 | (53 - 130) |
| 13C2 PFUnA | 95 | (37 - 130) |
| 13C2 PFDoA | 95 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 19A U3**

**HPLC**

**Lot-Sample #...:** D0A150550-031 **Work Order #...:** LR89W1AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 09:09 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 01:57
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.22 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.43** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.17 J** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.13 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.32** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.27** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.17 J** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **0.35** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 125 | (60 - 155) |
| 13C4 PFOS | 116 | (45 - 130) |
| 13C4 PFBA | 123 | (36 - 130) |
| 13C2 PFHxA | 130 | (55 - 135) |
| 18O2 PFHxS | 109 | (61 - 130) |
| 13C5 PFNA | 123 | (54 - 132) |
| 13C2 PFDA | 115 | (53 - 130) |
| 13C2 PFUnA | 118 | (37 - 130) |
| 13C2 PFDoA | 119 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 19A U3**

**HPLC**

**Lot-Sample #...:** D0A150550-031 **Work Order #...:** LR89W1AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 09:09 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 12:01
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 49 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 19A U3**

**HPLC**

**Lot-Sample #...:** D0A150550-031 **Work Order #...:** LR89W2AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 09:09 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 05:18
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.19 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.38** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.16 J** | **0.30** | **ug/L** | **0.070** |
| **Perfluorobutanoic acid (PFBA)** | **0.13 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.33** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.23** | **0.20** | **ug/L** | **0.082** |
| **Perfluorooctanesulfonate** | **0.14 J** | **0.30** | **ug/L** | **0.13** |
| **Perfluorooctanoic Acid** | **0.32** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 102 | (60 - 155) |
| 13C4 PFOS | 92 | (45 - 130) |
| 13C4 PFBA | 102 | (36 - 130) |
| 13C2 PFHxA | 98 | (55 - 135) |
| 18O2 PFHxS | 93 | (61 - 130) |
| 13C5 PFNA | 99 | (54 - 132) |
| 13C2 PFDA | 96 | (53 - 130) |
| 13C2 PFUnA | 100 | (37 - 130) |
| 13C2 PFDoA | 96 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 16A M15**

**HPLC**

**Lot-Sample #...:** D0A150550-032 **Work Order #...:** LR8901AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 08:50 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 02:12
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.2** | **0.60** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.86** | **0.80** | **ug/L** | **0.35** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **1.6** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.51 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **0.91** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.4** | **0.40** | **ug/L** | **0.058** |
| **Perfluorodecanoic acid (PFDA)** | **0.24 J** | **0.40** | **ug/L** | **0.16** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **7.9** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **3.4** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **3.1** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 101 | (60 - 155) |
| 13C4 PFOS | 94 | (45 - 130) |
| 13C4 PFBA | 108 | (36 - 130) |
| 13C2 PFHxA | 107 | (55 - 135) |
| 18O2 PFHxS | 92 | (61 - 130) |
| 13C5 PFNA | 96 | (54 - 132) |
| 13C2 PFDA | 97 | (53 - 130) |
| 13C2 PFUnA | 100 | (37 - 130) |
| 13C2 PFDoA | 99 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 16A M15**

**HPLC**

**Lot-Sample #...:** D0A150550-032 **Work Order #...:** LR8901AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 08:50 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 12:06
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 62 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 16A M15**

**HPLC**

**Lot-Sample #...:** D0A150550-032 **Work Order #...:** LR8902AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 08:50 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 05:33
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **1.1** | **0.60** | **ug/L** | **0.26** |
| **Perfluorononanoic acid (PFNA)** | **0.68 J** | **0.80** | **ug/L** | **0.35** |
| Perfluorododecanoic acid (PFDoA) | ND | 0.60 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.80 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.60 | ug/L | 0.29 |
| **Perfluoropentanoic acid (PFPA)** | **1.5** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexane sulfonate (PFHxS)** | **0.46 J** | **0.60** | **ug/L** | **0.14** |
| **Perfluorobutanoic acid (PFBA)** | **0.79** | **0.40** | **ug/L** | **0.20** |
| **Perfluorohexanoic acid (PFHxA)** | **1.2** | **0.40** | **ug/L** | **0.058** |
| **Perfluorodecanoic acid (PFDA)** | **0.19 J** | **0.40** | **ug/L** | **0.16** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| **Perfluorobutane sulfonate (PFBS)** | **6.3** | **0.40** | **ug/L** | **0.16** |
| **Perfluorooctanesulfonate** | **2.8** | **0.60** | **ug/L** | **0.27** |
| **Perfluorooctanoic Acid** | **2.7** | **0.40** | **ug/L** | **0.20** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 94 | (60 - 155) |
| 13C4 PFOS | 97 | (45 - 130) |
| 13C4 PFBA | 103 | (36 - 130) |
| 13C2 PFHxA | 95 | (55 - 135) |
| 18O2 PFHxS | 91 | (61 - 130) |
| 13C5 PFNA | 96 | (54 - 132) |
| 13C2 PFDA | 95 | (53 - 130) |
| 13C2 PFUnA | 98 | (37 - 130) |
| 13C2 PFDoA | 98 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: 15A M16

HPLC

**Lot-Sample #...:** D0A150550-033 **Work Order #...:** LR8911AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 14:43 **Date Received..:** 01/15/10
**Prep Date.....:** 01/19/10 **Analysis Date..:** 01/31/10
**Prep Batch #...:** 0019142 **Analysis Time..:** 02:27
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.20 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.47** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.24** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.39** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.88** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.26** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 103 | (60 - 155) |
| 13C4 PFOS | 94 | (45 - 130) |
| 13C4 PFBA | 109 | (36 - 130) |
| 13C2 PFHxA | 110 | (55 - 135) |
| 18O2 PFHxS | 97 | (61 - 130) |
| 13C5 PFNA | 99 | (54 - 132) |
| 13C2 PFDA | 93 | (53 - 130) |
| 13C2 PFUnA | 97 | (37 - 130) |
| 13C2 PFDoA | 98 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: 15A M16**

**HPLC**

**Lot-Sample #...:** D0A150550-033 **Work Order #...:** LR8911AC **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 14:43 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/20/10
**Prep Batch #...:** 0018297 **Analysis Time..:** 12:11
**Dilution Factor:** 1

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.050 | ug/L | 0.0057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 63 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: 15A M16**

**HPLC**

**Lot-Sample #...:** D0A150550-033 **Work Order #...:** LR8912AA **Matrix.....:** WATER
**Date Sampled...:** 01/12/10 14:43 **Date Received..:** 01/15/10
**Prep Date.....:** 02/03/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0034123 **Analysis Time..:** 05:48
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.18 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.42** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.19 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.34** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.72** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.24** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 98 | (60 - 155) |
| 13C4 PFOS | 96 | (45 - 130) |
| 13C4 PFBA | 105 | (36 - 130) |
| 13C2 PFHxA | 101 | (55 - 135) |
| 18O2 PFHxS | 93 | (61 - 130) |
| 13C5 PFNA | 106 | (54 - 132) |
| 13C2 PFDA | 98 | (53 - 130) |
| 13C2 PFUnA | 105 | (37 - 130) |
| 13C2 PFDoA | 103 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

6

# ALSTON&BIRD LLP

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March 4, 2010

***VIA COURIER***

Gail Mitchell, Deputy Director
Water Protection Division
U.S. EPA Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-8960

**Re: October 6, 2009, Information Request – Section 308 of the Clean Water Act - Dalton Utilities Land Application System**

Dear Ms. Mitchell:

Enclosed with this letter is information from Dalton Utilities in response to EPA's October 6, 2009, Section 308 of the Clean Water Act request (the "Request") addressed to Mr. Don Cope, President and CEO of Dalton Utilities. The enclosures are a letter dated March 2, 2010, with a certification signed pursuant to the Request and information responsive to Paragraph 5 of Enclosure A of the Request, **LAS Sampling Locations**. Also enclosed are results for samples of (1) influent and effluent wastewater and (2) public drinking water systems.

Please contact me if have any questions regarding the information supplied pursuant to the Request.

Sincerely,

Lee A. DeHihns, III

LAD:gba
Enclosures

LEGAL02/31578197v13

Dalton
UTILITIES

March 2, 2010

Ms. Gail Mitchell, Deputy Director
Clean Water Enforcement Branch
Water Protection Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Re: Information Request Pursuant to Section 308 of the Clean Water Act
Analytical Sample Results

Dear Ms. Mitchell,

With respect to the EPA's Information Request pursuant to Section 308 of the Clean Water Act dated October 6, 2009, Dalton Utilities is submitting these final analytical sample results to you for your review and records.

Samples of the locations stipulated in the aforementioned Information Request's Enclosure A, Paragraph 5 were collected as required in January 2010 and submitted to a contract lab for analysis. The final analytical results of these sampling events are contained in Attachments A and B which are provided herein as bound reports titled Test America Laboratories, Inc. Analytical Report on Perfluorocarbon (PFC) Analysis Lot # D0A150550 and D0A220629 which contains 2,032 and 749 pages, respectively.

Additionally, Dalton Utilities has conducted additional sampling of the influent, untreated wastewater, and effluent, treated wastewater, from the Riverbend and Loopers wastewater treatment plants. The final analytical results of these sampling events are contained in Attachments C and D which are provided herein as bound reports titled Test America Laboratories, Inc. Analytical Report on Perfluorocarbon (PFC) Analysis Lot # D0A150558 and D0B100546 which contains 636 and 198 pages, respectively.

As you are aware, representatives from the EPA and Georgia Environmental Protection Division (EPD) collected samples of the public drinking water systems in the Northwest Georgia area on January 26, 2010, for PFC analysis. Simultaneous with this sampling event, Dalton Utilities collected samples of the raw and treated drinking water from our three water treatment facilities. The final analytical results of this sampling event are contained in Attachment E which is provided herein as a bound report titled Test America

Laboratories, Inc. Analytical Report on Perfluorocarbon (PFC) Analysis Lot # D0A290548 which contains 413 pages.

For your convenience, a summary of the sample identifications indicated in the attachments and the corresponding locations are included in Attachment F.

As always, Dalton Utilities will update you as the projects discussed with you proceed. If you have any questions, please contact me at 706-529-1091 or dcope@dutil.com.

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Sincerely,

Don Cope
President & CEO

Attachments (6)

c: Mr. Allen Barnes, Georgia Environmental Protection Division (cover letter only)
Dr. Marlin Gottschalk, Sustainability Division Georgia Department of Natural Resources (cover letter only)
Dr. Bert Langley, Georgia Environmental Protection Division (cover letter only)
Lee A. DeHihns, Esq.

Summary of Sample Identifications and Locations

| Attachment | Lot # | Type of Sample | Sample ID | Sample Location/Description |
|---|---|---|---|---|
| A | D0A150550 | Monitoring Well | 17A M6A | 17A M6A |
| A | D0A150550 | Monitoring Well | 5 M7 | 5 M7 |
| A | D0A150550 | Monitoring Well | 4 M8 | 4 M8 |
| A | D0A150550 | Monitoring Well | 7 M9 | 7 M9 |
| A | D0A150550 | Monitoring Well | 1 M10 | 1 M10 |
| A | D0A150550 | Monitoring Well | 3 M11 | 3 M11 |
| A | D0A150550 | Monitoring Well | 8 M12 | 8 M12 |
| A | D0A150550 | Monitoring Well | 13 M13 | 13 M13 |
| A | D0A150550 | Monitoring Well | 14 M14 | 14 M14 |
| A | D0A150550 | Monitoring Well | 15 M17 | 15 M17 |
| A | D0A150550 | Monitoring Well | 23 U1 | 23 U1 |
| A | D0A150550 | Monitoring Well | 14A D5 | 14A D5 |
| A | D0A150550 | Monitoring Well | 24 D1 | 24 D1 |
| A | D0A150550 | Monitoring Well | 21 D2 | 21 D2 |
| A | D0A150550 | Monitoring Well | 20 D3 | 20 D3 |
| A | D0A150550 | Monitoring Well | 10 D4 | 10 D4 |
| A | D0A150550 | Monitoring Well | 12 D6 | 12 D6 |
| A | D0A150550 | Monitoring Well | 18 D9 | 18 D9 |
| A | D0A150550 | Monitoring Well | 17 D11 | 17 D11 |
| A | D0A150550 | Monitoring Well | 22 M1 | 22 M1 |
| A | D0A150550 | Monitoring Well | 6 M2 | 6 M2 |
| A | D0A150550 | Monitoring Well | 9 M3 | 9 M3 |
| A | D0A150550 | Monitoring Well | 19 M4 | 19 M4 |
| A | D0A150550 | Monitoring Well | 16 M5 | 16 M5 |
| A | D0A150550 | Monitoring Well | 12A D7 | 12A D7 |
| A | D0A150550 | Monitoring Well | 13A D8 | 13A D8 |
| A | D0A150550 | Monitoring Well | 16B D12 | 16B D12 |
| A | D0A150550 | Monitoring Well | 15B D13 | 15B D13 |
| A | D0A150550 | Monitoring Well | 14B D14 | 14B D14 |
| A | D0A150550 | Monitoring Well | 7A U2 | 7A U2 |
| A | D0A150550 | Monitoring Well | 19A U3 | 19A U3 |
| A | D0A150550 | Monitoring Well | 16A M15 | 16A M15 |
| A | D0A150550 | Monitoring Well | 15A M16 | 15A M16 |
| B | D0A220629 | Surface Water | Tilton | Tilton Bridge |
| B | D0A220629 | Surface Water | Fox | Fox Bridge |
| B | D0A220629 | Surface Water | Browns | Browns Bridge |
| B | D0A220629 | Surface Water | Confluent | Confluent |
| C | D0A150558 | Influent | I-3 | Influent - Riverbend |
| C | D0A150558 | Effluent | E-3 | Effluent - Riverbend |
| C | D0A150558 | Influent | I-4 | Influent - Loopers |
| C | D0A150558 | Effluent | E-4 | Effluent - Loopers |
| D | D0B100546 | Influent | I-3 | Riverbend Influent |
| D | D0B100546 | Effluent | E-3 | Riverbend Effluent |
| D | D0B100546 | Influent | I-4 | Loopers Influent |
| D | D0B100546 | Effluent | E-4 | Loopers Effluent |
| E | D0A290548 | Public Water System | River Water Raw | River Water Raw |
| E | D0A290548 | Public Water System | River Water Finished | River Water Finished |
| E | D0A290548 | Public Water System | Freeman Springs Raw | Freeman Springs Raw |
| E | D0A290548 | Public Water System | Freeman Springs Finished | Freeman Springs Finished |
| E | D0A290548 | Public Water System | Mill Creek Raw | Mill Creek Raw |
| E | D0A290548 | Public Water System | Mill Creek Finished | Mill Creek Finished |

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 280-2464-1

Job Description: PFC Analyses

For:
Dalton Utilities
1200 V.D. Parrott Jr. Parkway
Dalton, GA 30721

Attention: Ms. Dena Haverland

2010 JUN -8 P 2:48

Approved for release.
Michelle Johnston
Project Manager I
5/11/2010 1:41 PM

Michelle Johnston
Project Manager I
michelle.johnston@testamericainc.com
05/11/2010

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

The Lab Certification ID# is E87667.

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

**TestAmerica Laboratories, Inc.**
TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002
Tel (303) 736-0100 Fax (303) 431-7171 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH nelac

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# CASE NARRATIVE
## Client: Dalton Utilities
## Project: PFC Analysis
## Report Number: 280-2464-1

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

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

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

**Receipt**

The following report contains the analytical results for thirty-seven water samples received at TestAmerica Denver on April 16, 2010 according to documented sample acceptance procedures. The samples were received in good condition at temperatures of 8.4°C and 8.9°C.

The samples were received above the recommended temperature of 4 +/- 2°C. The client was notified on April 16, 2010.

Sample IDs were logged as instructed by the client via e-mail on April 19, 2010.

| Sample # | Current Name: | Change To: |
|---|---|---|
| 1 | Well #16 | MW 16 - M5 |
| 2 | Well #16B | MW 16B - D12 |
| 3 | Well #17 | MW 17 - D11 |
| 4 | Well #15A | MW 15A - M16 |
| 5 | Well #15 | MW 15 - M17 |
| 6 | Well #15B | MW 15B - D13 |
| 7 | Well #14B | MW 14B - D14 |
| 8 | Well #14 | MW 14 - M14 |
| 9 | Well #12 | MW 12 - D6 |
| 10 | Well #14A | MW 14A - D5 |
| 11 | Well #10 | MW 10 - D4 |
| 12 | Well #9 | MW 9 - M3 |
| 13 | Well #1 | MW 1 - M10 |
| 14 | Well #3 | MW 3 - M11 |
| 15 | Well #8 | MW 8 - M12 |
| 16 | Well #4 | MW 4 - M8 |
| 17 | Well #5 | MW 5 - M7 |
| 18 | Well #6 | MW 6 - M2 |
| 19 | Well #7A | MW 7A - U2 |
| 20 | Well #7 | MW 7 - M9 |
| 21 | Well #21 | MW 21 - D2 |
| 22 | Well #22 | MW 22 - M1 |
| 23 | Well #23 | MW 23 - U1 |
| 24 | Well #24 | MW 21 - D1 |
| 25 | Well #20 | MW 20 - D3 |
| 26 | Well #16A | MW 16A - M15 |
| 27 | Well #19A | MW 19A - U3 |
| 28 | Well #18 | MW 18 - D9 |
| 29 | Well #17A | MW 17A - M6A |
| 30 | Well #19 | MW 19 - M4 |
| 31 | Well #13A | MW 13A - D8 |
| 32 | Well #12A | MW 12A - D7 |
| 33 | Well #13 | MW 13 - M13 |
| 34 | R1 BROWNS | No Change |
| 35 | R2 TILTON | No Change |
| 36 | R3 FOX | No Change |
| 37 | R4 CONFLUENT | No Change |

No other anomalies were encountered during sample receipt.

**PFC**

Samples MW 16-M5 (280-2464-1), MW 16B-D12 (280-2464-2), MW 17-D11 (280-2464-3), MW 15A-M16 (280-2464-4), MW 15-M17

(280-2464-5), MW 15B-D13 (280-2464-6), MW 14B-D14 (280-2464-7), MW 14-M14 (280-2464-8), MW 12-D6 (280-2464-9), MW 14A-D5 (280-2464-10), MW 10-D4 (280-2464-11), MW 9-M3 (280-2464-12), MW 1-M10 (280-2464-13), MW 3-M11 (280-2464-14), MW 8-M12 (280-2464-15), MW 4-M8 (280-2464-16), MW 5-M7 (280-2464-17), MW 6-M2 (280-2464-18), MW 7A-U2 (280-2464-19), MW 7-M9 (280-2464-20), MW 21-D2 (280-2464-21), MW 22-M1 (280-2464-22), MW 23-U1 (280-2464-23), MW 21-D1 (280-2464-24), MW 20-D3 (280-2464-25), MW 16A-M15 (280-2464-26), MW 19A-U3 (280-2464-27), MW 18-D9 (280-2464-28), MW 17A-M6A (280-2464-29), MW 19-M4 (280-2464-30), MW 13A-D8 (280-2464-31), MW 12A-D7 (280-2464-32), MW 13-M13 (280-2464-33), R1 BROWNS (280-2464-34), R2 TILTON (280-2464-35), R3 FOX (280-2464-36) and R4 CONFLUENT (280-2464-37) were analyzed for PFC in accordance with SOP DV-LC-0012. The samples were prepared on 04/19/2010 and 04/22/2010 and analyzed on 05/04/2010 and 05/05/2010.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to high concentrations of target analytes, samples MW 16-M5 (280-2464-1), MW 16B-D12 (280-2464-2), MW 15A-M16 (280-2464-4), MW 15-M17 (280-2464-5), MW 15B-D13 (280-2464-6), MW 14B-D14 (280-2464-7), MW 14-M14 (280-2464-8), MW 12-D6 (280-2464-9), MW 14A-D5 (280-2464-10), MW 10-D4 (280-2464-11), MW 3-M11 (280-2464-14), MW 8-M12 (280-2464-15), MW 4-M8 (280-2464-16), MW 5-M7 (280-2464-17), MW 6-M2 (280-2464-18), MW 7A-U2 (280-2464-19), MW 7-M9 (280-2464-20), MW 21-D2 (280-2464-21), MW 22-M1 (280-2464-22), MW 23-U1 (280-2464-23), MW 21-D1 (280-2464-24) MW 20-D3 (280-2464-25), MW 16A-M15 (280-2464-26), MW 19A-U3 (280-2464-27), MW 18-D9 (280-2464-28), MW 17A-M6A (280-2464-29), MW 19-M4 (280-2464-30), MW 13A-D8 (280-2464-31), MW 12A-D7 (280-2464-32), MW 13-M13 (280-2464-33) and R4 CONFLUENT (280-2464-37) had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required.

The internal standard recovery for 13C2 PFDA associated with prep batch 280-11478 was recovered below the control limits in sample MW 1-M10 (280-2464-13). This anomaly is due to obvious matrix interferences; therefore, corrective action is deemed unnecessary.

13C2 PFDoA failed the internal standard recovery criteria low for MB 280-12133/1-A in prep batch 12133. All associated samples' internal standards for 13C2 PFDoA were within acceptance criteria; therefore, corrective action was deemed unnecessary.

The method required MS/MSD analyses could not be performed on prep batches 280-11478, 280-11481 and 280-12133, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable LCS/LCSD data.

Refer to the QC report for details.

No other difficulties were encountered during the PFC analyses.

All other quality control parameters were within the acceptance limits.

**FOSA**

Samples MW 16-M5 (280-2464-1), MW 16B-D12 (280-2464-2), MW 17-D11 (280-2464-3), MW 15A-M16 (280-2464-4), MW 15-M17 (280-2464-5), MW 15B-D13 (280-2464-6), MW 14B-D14 (280-2464-7), MW 14-M14 (280-2464-8), MW 12-D6 (280-2464-9), MW 14A-D5 (280-2464-10), MW 10-D4 (280-2464-11), MW 9-M3 (280-2464-12), MW 1-M10 (280-2464-13), MW 3-M11 (280-2464-14), MW 8-M12 (280-2464-15), MW 4-M8 (280-2464-16), MW 5-M7 (280-2464-17), MW 6-M2 (280-2464-18), MW 7A-U2 (280-2464-19), MW 7-M9 (280-2464-20), MW 21-D2 (280-2464-21), MW 22-M1 (280-2464-22), MW 23-U1 (280-2464-23), MW 21-D1 (280-2464-24), MW 20-D3 (280-2464-25), MW 16A-M15 (280-2464-26), MW 19A-U3 (280-2464-27), MW 18-D9 (280-2464-28), MW 17A-M6A (280-2464-29), MW 19-M4 (280-2464-30), MW 13A-D8 (280-2464-31), MW 12A-D7 (280-2464-32), MW 13-M13 (280-2464-33), R1 BROWNS (280-2464-34), R2 TILTON (280-2464-35), R3 FOX (280-2464-36) and R4 CONFLUENT (280-2464-37) were analyzed for FOSA in accordance with SOP DV-LC-0012. The samples were prepared on 04/19/2010 and analyzed on 04/22/2010 and 04/29/2010.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to a high concentration of the target analyte, sample MW 13A-D8 (280-2464-31) had to be analyzed at a dilution. The reporting limits have been adjusted relative to the dilution required.

The internal standard recovery for MeFOSA associated with prep batch 280-11519 was recovered below the control limits in sample MW 20-D3 (280-2464-25). Upon re-extraction and reanalysis, the internal standard recovery outlier was still present, demonstrating this anomaly is most likely due to matrix interference. The original data has been reported.

The method required MS/MSD analyses could not be performed on prep batches 280-11517 and 280-11519, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable LCS/LCSD data.

The Continuing Calibration Verification (CCV) standard associated with sample MW 7A-U2 (280-2464-19) in analytical batch 280-12181 exhibited a %D value out of range, biased high, for Perfluorooctane Sulfonamide (FOSA) and MeFOSA. This is an indicator that data may be biased high. As no detectable concentration of FOSA is present in the associated sample, corrective action is deemed unnecessary.

No other difficulties were encountered during the FOSA analyses.

All other quality control parameters were within the acceptance limits.

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver Job No.: 280-2464-1

SDG No.:

Instrument ID: LC_LCMS5 Analysis Batch Number: 13802

Lab Sample ID: STD020 280-13802/5 IC Client Sample ID:

S. Castagna 5-10-10

Date Analyzed: 05/04/10 16:54 Lab File ID: pc50E04029.d GC Column: Eclipse+C18 ID:

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexanoic acid (PFHxA) | 6.14 | Baseline | williamst | 05/04/10 18:00 |
| Perfluorooctane Sulfonamide | 7.86 | Baseline | williamst | 05/04/10 18:00 |

Lab Sample ID: ICV 280-13802/10 Client Sample ID:

Date Analyzed: 05/04/10 17:58 Lab File ID: pc50E04034.d GC Column: Eclipse+C18 ID:

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorobutane Sulfonate (PFBS) | 5.66 | Baseline | williamst | 05/04/10 18:15 |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-1** | **MW 16-M5** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.9 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.42 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.92 | | 0.59 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.64 | | 0.59 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.41 | J | 0.79 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 3.1 | | 0.59 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.4 | | 0.59 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.015 | J | 0.049 | ug/L | PFC -FOSA |
| **280-2464-2** | **MW 16B-D12** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.33 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.083 | J | 0.099 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.084 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.10 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.17 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.28 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.15 | | 0.15 | ug/L | DV-LC-0012 |
| **280-2464-4** | **MW 15A-M16** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.79 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.30 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.23 | J | 0.30 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.070 | J | 0.30 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.41 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.28 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.53 | | 0.30 | ug/L | DV-LC-0012 |
| **280-2464-5** | **MW 15-M17** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 13 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 1.3 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.55 | J | 0.99 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 1.1 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.6 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.8 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.2 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.5 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.15 | | 0.051 | ug/L | PFC -FOSA |

## EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-6** | **MW 15B-D13** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.3 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.71 | J | 0.99 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 2.1 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 1.8 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 2.0 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 6.4 | | 0.99 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 14 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.1 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.14 | | 0.054 | ug/L | PFC -FOSA |
| **280-2464-7** | **MW 14B-D14** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.6 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.44 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.61 | | 0.30 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.33 | | 0.30 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.78 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.21 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.2 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 1.3 | | 0.30 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.2 | | 0.30 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.016 | J | 0.050 | ug/L | PFC -FOSA |
| **280-2464-8** | **MW 14-M14** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.47 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.48 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.84 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.50 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.54 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.0 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.0085 | J | 0.050 | ug/L | PFC -FOSA |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-9** | **MW 12-D6** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 2.0 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.58 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.22 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.76 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.28 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.1 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.39 | J | 0.79 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.7 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.0 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.5 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.23 | | 0.050 | ug/L | PFC -FOSA |
| **280-2464-10** | **MW 14A-D5** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 3.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.56 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.21 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.64 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.18 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.78 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.45 | J | 0.80 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.5 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 1.2 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.1 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.022 | J | 0.051 | ug/L | PFC -FOSA |
| **280-2464-11** | **MW 10-D4** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 4.2 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.83 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 1.3 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.87 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.5 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.9 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.7 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.7 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.014 | J | 0.051 | ug/L | PFC -FOSA |
| **280-2464-12** | **MW 9-M3** | | | | | |
| Perfluorobutanioc acid (PFBA) | | 0.044 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.017 | J | 0.030 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.052 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.13 | | 0.030 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.0084 | J | 0.049 | ug/L | PFC -FOSA |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-13** | **MW 1-M10** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.14 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.036 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.018 | J | 0.030 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.029 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.040 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.018 | J | 0.030 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.035 | | 0.030 | ug/L | DV-LC-0012 |
| **280-2464-14** | **MW 3-M11** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.084 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.13 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.25 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.13 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.23 | J | 0.30 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.0060 | J | 0.047 | ug/L | PFC -FOSA |
| **280-2464-15** | **MW 8-M12** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.7 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.73 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.98 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.42 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.0 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.1 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.025 | J | 0.051 | ug/L | PFC -FOSA |
| **280-2464-16** | **MW 4-M8** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 4.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.34 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.30 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.58 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.72 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.36 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.57 | J | 0.60 | ug/L | DV-LC-0012 |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-17** | **MW 5-M7** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.46 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.44 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.79 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.40 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.5 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.92 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.8 | | 0.60 | ug/L | DV-LC-0012 |
| **280-2464-18** | **MW 6-M2** | | | | | |
| Perfluorobutanioc acid (PFBA) | | 0.81 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.25 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.5 | | 0.60 | ug/L | DV-LC-0012 |
| **280-2464-19** | **MW 7A-U2** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.38 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 1.6 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.90 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.28 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 3.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 5.7 | | 0.60 | ug/L | DV-LC-0012 |
| **280-2464-20** | **MW 7-M9** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.23 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.60 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.36 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.1 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.34 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.7 | | 0.60 | ug/L | DV-LC-0012 |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-21** | **MW 21-D2** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.5 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.36 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.21 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.69 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.39 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.82 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.8 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 3.6 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.2 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.17 | | 0.051 | ug/L | PFC -FOSA |
| **280-2464-22** | **MW 22-M1** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.28 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.36 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.30 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.41 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.91 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 1.3 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.45 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.015 | J | 0.048 | ug/L | PFC -FOSA |
| **280-2464-24** | **MW 21-D1** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.1 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.71 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.48 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.66 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.0 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 4.6 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.88 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.16 | | 0.051 | ug/L | PFC -FOSA |
| **280-2464-25** | **MW 20-D3** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.27 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.21 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.11 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.050 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.23 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.17 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.47 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.0097 | J | 0.050 | ug/L | PFC -FOSA |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-26** | **MW 16A-M15** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 8.6 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.84 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.41 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 1.4 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.51 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.4 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 1.1 | J | 2.0 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 3.3 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 5.4 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.9 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.017 | J | 0.050 | ug/L | PFC -FOSA |
| **280-2464-27** | **MW 19A-U3** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.28 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.14 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.30 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.20 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.42 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.48 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.36 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.55 | | 0.15 | ug/L | DV-LC-0012 |
| **280-2464-28** | **MW 18-D9** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 3.9 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.58 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.84 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.39 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.0 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.8 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.0 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.3 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.0065 | J | 0.052 | ug/L | PFC -FOSA |
| **280-2464-29** | **MW 17A-M6A** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.32 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.080 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.085 | J | 0.10 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.18 | | 0.10 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.080 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.11 | J | 0.15 | ug/L | DV-LC-0012 |

## EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-30** | **MW 19-M4** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.41 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.37 | J | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.93 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.69 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 2.1 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 3.1 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.6 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.030 | J | 0.051 | ug/L | PFC -FOSA |
| **280-2464-31** | **MW 13A-D8** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 4.0 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.93 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.58 | J | 1.0 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 2.2 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 1.4 | J | 1.5 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 2.2 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 5.9 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 9.8 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.8 | | 1.5 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.28 | | 0.25 | ug/L | PFC -FOSA |
| **280-2464-32** | **MW 12A-D7** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.80 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.47 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.82 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.43 | J | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 1.2 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 1.5 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 1.1 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.6 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.028 | J | 0.055 | ug/L | PFC -FOSA |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-33** | **MW 13-M13** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 3.0 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.93 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 1.8 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 1.1 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 2.3 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.59 | J | 0.80 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 3.5 | | 0.40 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 2.4 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.9 | | 0.60 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.027 | J | 0.048 | ug/L | PFC -FOSA |
| **280-2464-34** | **R1 BROWNS** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.0088 | J | 0.020 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.0047 | J | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.011 | J | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.016 | J | 0.030 | ug/L | DV-LC-0012 |
| **280-2464-35** | **R2 TILTON** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.20 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.036 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.033 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.046 | | 0.029 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.024 | J | 0.029 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.076 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorononanoic acid (PFNA) | | 0.020 | J | 0.039 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.14 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.35 | | 0.029 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.096 | | 0.029 | ug/L | DV-LC-0012 |
| Perfluoroundecanoic acid (PFUnA) | | 0.011 | J | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.040 | J | 0.051 | ug/L | PFC -FOSA |
| **280-2464-36** | **R3 FOX** | | | | | |
| Perfluorohexanoic acid (PFHxA) | | 0.020 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.022 | | 0.020 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 0.023 | J | 0.030 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.023 | J | 0.030 | ug/L | DV-LC-0012 |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-2464-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-2464-37** | **R4 CONFLUENT** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.0 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.14 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorodecanoic acid (PFDA) | | 0.11 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluoroheptanoic acid (PFHpA) | | 0.12 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexane Sulfonate (PFHxS) | | 0.055 | J | 0.15 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.19 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.31 | | 0.099 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonate (PFOS) | | 1.2 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 0.32 | | 0.15 | ug/L | DV-LC-0012 |
| Perfluorooctane Sulfonamide | | 0.21 | | 0.055 | ug/L | PFC -FOSA |

# METHOD SUMMARY

Client: Dalton Utilities

Job Number: 280-2464-1

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Water** | | | |
| Perfluoronated Hydrocarbons | TAL DEN | TAL-DEN DV-LC-0012 | |
| Solid-Phase Extraction (SPE) | TAL DEN | | SW846 3535 |
| FOSA in Water (LC/MS/MS) | TAL DEN | TAL-DEN PFC -FOSA | |
| Solid-Phase Extraction (SPE) | TAL DEN | | SW846 3535 |

**Lab References:**

TAL DEN = TestAmerica Denver

**Method References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-DEN = TestAmerica Laboratories, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

Client: Dalton Utilities

Job Number: 280-2464-1

| Method | Analyst | Analyst ID |
|---|---|---|
| TAL-DEN DV-LC-0012 | Meyer, Andrew GC | AGCM |
| TAL-DEN PFC -FOSA | Meyer, Andrew GC | AGCM |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16-M5**

Lab Sample ID: 280-2464-1

Client Matrix: Water

Date Sampled: 04/12/2010 0806

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04038.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 252.9 mL |
| Date Analyzed: | 05/04/2010 1850 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.9 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.42 | | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.15 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.29 | 0.59 |
| Perfluoroheptanoic acid (PFHpA) | 0.92 | | 0.26 | 0.59 |
| Perfluorohexane Sulfonate (PFHxS) | 0.64 | | 0.14 | 0.59 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | 0.41 | J | 0.34 | 0.79 |
| Perfluorooctanoic acid (PFOA) | 2.3 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 3.1 | | 0.26 | 0.59 |
| Perfluoropentanoic acid (PFPA) | 1.4 | | 0.22 | 0.59 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.59 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.79 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 104 | | 60 - 155 |
| 13C4 PFOS | 96 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 100 | | 55 - 135 |
| 13C5 PFNA | 105 | | 54 - 132 |
| 13C2 PFDA | 100 | | 53 - 130 |
| 13C2 PFUnA | 102 | | 37 - 130 |
| 13C2 PFDoA | 94 | | 26 - 130 |
| 18O2 PFHxS | 101 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16B-D12**

Lab Sample ID: 280-2464-2
Client Matrix: Water

Date Sampled: 04/12/2010 0817
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04039.d |
| Dilution: | 5.0 | | | Initial Weight/Volume: | 252.4 mL |
| Date Analyzed: | 05/04/2010 1902 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.33 | | 0.041 | 0.099 |
| Perfluorobutanioc acid (PFBA) | 0.083 | J | 0.049 | 0.099 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.039 | 0.099 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.074 | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.084 | J | 0.065 | 0.15 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.035 | 0.15 |
| Perfluorohexanoic acid (PFHxA) | 0.10 | | 0.014 | 0.099 |
| Perfluorononanoic acid (PFNA) | ND | | 0.086 | 0.20 |
| Perfluorooctanoic acid (PFOA) | 0.17 | | 0.048 | 0.099 |
| Perfluorooctane Sulfonate (PFOS) | 0.28 | | 0.066 | 0.15 |
| Perfluoropentanoic acid (PFPA) | 0.15 | | 0.054 | 0.15 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.072 | 0.15 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.088 | 0.20 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.034 | 0.099 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 121 | | 60 - 155 |
| 13C4 PFOS | 108 | | 45 - 130 |
| 13C4 PFBA | 124 | | 36 - 130 |
| 13C2 PFHxA | 117 | | 55 - 135 |
| 13C5 PFNA | 118 | | 54 - 132 |
| 13C2 PFDA | 110 | | 53 - 130 |
| 13C2 PFUnA | 107 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 111 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 17-D11**

Lab Sample ID: 280-2464-3

Client Matrix: Water

Date Sampled: 04/12/2010 0832

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04040.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250.3 mL |
| Date Analyzed: | 05/04/2010 1915 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.0082 | 0.020 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.0098 | 0.020 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.0078 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.030 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.013 | 0.030 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.0070 | 0.030 |
| Perfluorohexanoic acid (PFHxA) | ND | | 0.0029 | 0.020 |
| Perfluorononanoic acid (PFNA) | ND | | 0.017 | 0.040 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.0098 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.013 | 0.030 |
| Perfluoropentanoic acid (PFPA) | ND | | 0.011 | 0.030 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.015 | 0.030 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.018 | 0.040 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.0069 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 97 | | 60 - 155 |
| 13C4 PFOS | 50 | | 45 - 130 |
| 13C4 PFBA | 122 | | 36 - 130 |
| 13C2 PFHxA | 104 | | 55 - 135 |
| 13C5 PFNA | 79 | | 54 - 132 |
| 13C2 PFDA | 53 | | 53 - 130 |
| 13C2 PFUnA | 46 | | 37 - 130 |
| 13C2 PFDoA | 41 | | 26 - 130 |
| 18O2 PFHxS | 95 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15A-M16**

Lab Sample ID: 280-2464-4
Client Matrix: Water

Date Sampled: 04/12/2010 0850
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04041.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 250.6 mL |
| Date Analyzed: | 05/04/2010 1928 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.79 | | 0.082 | 0.20 |
| Perfluorobutanioc acid (PFBA) | 0.30 | | 0.098 | 0.20 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.078 | 0.20 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.15 | 0.30 |
| Perfluoroheptanoic acid (PFHpA) | 0.23 | J | 0.13 | 0.30 |
| Perfluorohexane Sulfonate (PFHxS) | 0.070 | J | 0.070 | 0.30 |
| Perfluorohexanoic acid (PFHxA) | 0.41 | | 0.029 | 0.20 |
| Perfluorononanoic acid (PFNA) | ND | | 0.17 | 0.40 |
| Perfluorooctanoic acid (PFOA) | 0.28 | | 0.098 | 0.20 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.13 | 0.30 |
| Perfluoropentanoic acid (PFPA) | 0.53 | | 0.11 | 0.30 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.15 | 0.30 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.18 | 0.40 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.069 | 0.20 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 103 | | 60 - 155 |
| 13C4 PFOS | 92 | | 45 - 130 |
| 13C4 PFBA | 94 | | 36 - 130 |
| 13C2 PFHxA | 102 | | 55 - 135 |
| 13C5 PFNA | 105 | | 54 - 132 |
| 13C2 PFDA | 97 | | 53 - 130 |
| 13C2 PFUnA | 99 | | 37 - 130 |
| 13C2 PFDoA | 92 | | 26 - 130 |
| 18O2 PFHxS | 96 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15-M17**

Lab Sample ID: 280-2464-5
Client Matrix: Water

Date Sampled: 04/12/2010 0912
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04042.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 252.0 mL |
| Date Analyzed: | 05/04/2010 1941 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 13 | | 0.41 | 0.99 |
| Perfluorobutanioc acid (PFBA) | 1.3 | | 0.49 | 0.99 |
| Perfluorodecanoic acid (PFDA) | 0.55 | J | 0.39 | 0.99 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 1.1 | J | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 1.6 | | 0.14 | 0.99 |
| Perfluorononanoic acid (PFNA) | ND | | 0.86 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 2.8 | | 0.49 | 0.99 |
| Perfluorooctane Sulfonate (PFOS) | 2.2 | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 2.5 | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.72 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 0.99 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 105 | | 60 - 155 |
| 13C4 PFOS | 101 | | 45 - 130 |
| 13C4 PFBA | 104 | | 36 - 130 |
| 13C2 PFHxA | 104 | | 55 - 135 |
| 13C5 PFNA | 108 | | 54 - 132 |
| 13C2 PFDA | 105 | | 53 - 130 |
| 13C2 PFUnA | 105 | | 37 - 130 |
| 13C2 PFDoA | 103 | | 26 - 130 |
| 18O2 PFHxS | 105 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15B-D13**

Lab Sample ID: 280-2464-6

Client Matrix: Water

Date Sampled: 04/12/2010 0930

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04043.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 251.8 mL |
| Date Analyzed: | 05/04/2010 1954 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.3 | | 0.41 | 0.99 |
| Perfluorobutanioc acid (PFBA) | 0.71 | J | 0.49 | 0.99 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 0.99 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 2.1 | | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | 1.8 | | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 2.0 | | 0.14 | 0.99 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 6.4 | | 0.49 | 0.99 |
| Perfluorooctane Sulfonate (PFOS) | 14 | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 2.1 | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.72 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 0.99 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 109 | | 60 - 155 |
| 13C4 PFOS | 105 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 112 | | 55 - 135 |
| 13C5 PFNA | 108 | | 54 - 132 |
| 13C2 PFDA | 108 | | 53 - 130 |
| 13C2 PFUnA | 108 | | 37 - 130 |
| 13C2 PFDoA | 107 | | 26 - 130 |
| 18O2 PFHxS | 108 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14B-D14**

Lab Sample ID: 280-2464-7
Client Matrix: Water

Date Sampled: 04/12/2010 0956
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04044.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 251.4 mL |
| Date Analyzed: | 05/04/2010 2006 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.6 | | 0.082 | 0.20 |
| Perfluorobutanioc acid (PFBA) | 0.44 | | 0.097 | 0.20 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.078 | 0.20 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.15 | 0.30 |
| Perfluoroheptanoic acid (PFHpA) | 0.61 | | 0.13 | 0.30 |
| Perfluorohexane Sulfonate (PFHxS) | 0.33 | | 0.069 | 0.30 |
| Perfluorohexanoic acid (PFHxA) | 0.78 | | 0.029 | 0.20 |
| Perfluorononanoic acid (PFNA) | 0.21 | J | 0.17 | 0.40 |
| Perfluorooctanoic acid (PFOA) | 1.2 | | 0.097 | 0.20 |
| Perfluorooctane Sulfonate (PFOS) | 1.3 | | 0.13 | 0.30 |
| Perfluoropentanoic acid (PFPA) | 1.2 | | 0.11 | 0.30 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.14 | 0.30 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.18 | 0.40 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.069 | 0.20 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 113 | | 60 - 155 |
| 13C4 PFOS | 108 | | 45 - 130 |
| 13C4 PFBA | 118 | | 36 - 130 |
| 13C2 PFHxA | 109 | | 55 - 135 |
| 13C5 PFNA | 116 | | 54 - 132 |
| 13C2 PFDA | 110 | | 53 - 130 |
| 13C2 PFUnA | 110 | | 37 - 130 |
| 13C2 PFDoA | 103 | | 26 - 130 |
| 18O2 PFHxS | 105 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14-M14**

Lab Sample ID: 280-2464-8

Client Matrix: Water

Date Sampled: 04/12/2010 1017

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04046.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.6 mL |
| Date Analyzed: | 05/04/2010 2032 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.47 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.48 | | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.84 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.50 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.79 |
| Perfluorooctanoic acid (PFOA) | 1.2 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 0.54 | J | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 2.0 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.79 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 102 | | 60 - 155 |
| 13C4 PFOS | 97 | | 45 - 130 |
| 13C4 PFBA | 105 | | 36 - 130 |
| 13C2 PFHxA | 99 | | 55 - 135 |
| 13C5 PFNA | 107 | | 54 - 132 |
| 13C2 PFDA | 100 | | 53 - 130 |
| 13C2 PFUnA | 99 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 95 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 12-D6**

Lab Sample ID: 280-2464-9

Client Matrix: Water

Date Sampled: 04/12/2010 1032

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04047.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.8 mL |
| Date Analyzed: | 05/04/2010 2045 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 2.0 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.58 | | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | 0.22 | J | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.76 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.28 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | 0.39 | J | 0.35 | 0.79 |
| Perfluorooctanoic acid (PFOA) | 1.7 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 2.0 | | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.5 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.79 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 103 | | 60 - 155 |
| 13C4 PFOS | 96 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 100 | | 55 - 135 |
| 13C5 PFNA | 104 | | 54 - 132 |
| 13C2 PFDA | 99 | | 53 - 130 |
| 13C2 PFUnA | 101 | | 37 - 130 |
| 13C2 PFDoA | 96 | | 26 - 130 |
| 18O2 PFHxS | 96 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14A-D5**

Lab Sample ID: 280-2464-10
Client Matrix: Water

Date Sampled: 04/12/2010 1047
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04048.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.5 mL |
| Date Analyzed: | 05/04/2010 2058 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 3.2 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.56 | | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | 0.21 | J | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.64 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.18 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 0.78 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | 0.45 | J | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 1.5 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 1.2 | | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.1 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 103 | | 60 - 155 |
| 13C4 PFOS | 96 | | 45 - 130 |
| 13C4 PFBA | 111 | | 36 - 130 |
| 13C2 PFHxA | 100 | | 55 - 135 |
| 13C5 PFNA | 106 | | 54 - 132 |
| 13C2 PFDA | 99 | | 53 - 130 |
| 13C2 PFUnA | 104 | | 37 - 130 |
| 13C2 PFDoA | 97 | | 26 - 130 |
| 18O2 PFHxS | 99 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 10-D4**

Lab Sample ID: 280-2464-11
Client Matrix: Water

Date Sampled: 04/12/2010 1105
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04049.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 251.0 mL |
| Date Analyzed: | 05/04/2010 2110 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 4.2 | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | 0.83 | J | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 1.3 | J | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | 0.87 | J | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 1.5 | | 0.14 | 1.0 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 2.9 | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | 2.7 | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 1.7 | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.73 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 107 | | 60 - 155 |
| 13C4 PFOS | 102 | | 45 - 130 |
| 13C4 PFBA | 103 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 111 | | 54 - 132 |
| 13C2 PFDA | 105 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 102 | | 26 - 130 |
| 18O2 PFHxS | 104 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 9-M3**

Lab Sample ID: 280-2464-12

Client Matrix: Water

Date Sampled: 04/12/2010 1126

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04050.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250.4 mL |
| Date Analyzed: | 05/04/2010 2123 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.0082 | 0.020 |
| Perfluorobutanioc acid (PFBA) | 0.044 | | 0.0098 | 0.020 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.0078 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.030 |
| Perfluoroheptanoic acid (PFHpA) | 0.017 | J | 0.013 | 0.030 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.0070 | 0.030 |
| Perfluorohexanoic acid (PFHxA) | 0.052 | | 0.0029 | 0.020 |
| Perfluorononanoic acid (PFNA) | ND | | 0.017 | 0.040 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.0098 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.013 | 0.030 |
| Perfluoropentanoic acid (PFPA) | 0.13 | | 0.011 | 0.030 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.015 | 0.030 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.018 | 0.040 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.0069 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 108 | | 60 - 155 |
| 13C4 PFOS | 70 | | 45 - 130 |
| 13C4 PFBA | 111 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 92 | | 54 - 132 |
| 13C2 PFDA | 76 | | 53 - 130 |
| 13C2 PFUnA | 73 | | 37 - 130 |
| 13C2 PFDoA | 64 | | 26 - 130 |
| 18O2 PFHxS | 102 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 1-M10**

Lab Sample ID: 280-2464-13

Client Matrix: Water

Date Sampled: 04/12/2010 1220

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04051.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 251.9 mL |
| Date Analyzed: | 05/04/2010 2136 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.14 | | 0.0082 | 0.020 |
| Perfluorobutanioc acid (PFBA) | 0.036 | | 0.0097 | 0.020 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.0078 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.030 |
| Perfluoroheptanoic acid (PFHpA) | 0.018 | J | 0.013 | 0.030 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.0069 | 0.030 |
| Perfluorohexanoic acid (PFHxA) | 0.029 | | 0.0029 | 0.020 |
| Perfluorononanoic acid (PFNA) | ND | | 0.017 | 0.040 |
| Perfluorooctanoic acid (PFOA) | 0.040 | | 0.0097 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | 0.018 | J | 0.013 | 0.030 |
| Perfluoropentanoic acid (PFPA) | 0.035 | | 0.011 | 0.030 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.014 | 0.030 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.018 | 0.040 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.0068 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 100 | | 60 - 155 |
| 13C4 PFOS | 49 | | 45 - 130 |
| 13C4 PFBA | 105 | | 36 - 130 |
| 13C2 PFHxA | 107 | | 55 - 135 |
| 13C5 PFNA | 76 | | 54 - 132 |
| 13C2 PFDA | 52 | X | 53 - 130 |
| 13C2 PFUnA | 46 | | 37 - 130 |
| 13C2 PFDoA | 42 | | 26 - 130 |
| 18O2 PFHxS | 95 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 3-M11**

Lab Sample ID: 280-2464-14

Client Matrix: Water

Date Sampled: 04/12/2010 1244

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04052.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 250.3 mL |
| Date Analyzed: | 05/04/2010 2149 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.084 | J | 0.082 | 0.20 |
| Perfluorobutanioc acid (PFBA) | 0.13 | J | 0.098 | 0.20 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.078 | 0.20 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.15 | 0.30 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.13 | 0.30 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.070 | 0.30 |
| Perfluorohexanoic acid (PFHxA) | 0.25 | | 0.029 | 0.20 |
| Perfluorononanoic acid (PFNA) | ND | | 0.17 | 0.40 |
| Perfluorooctanoic acid (PFOA) | 0.13 | J | 0.098 | 0.20 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.13 | 0.30 |
| Perfluoropentanoic acid (PFPA) | 0.23 | J | 0.11 | 0.30 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.15 | 0.30 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.18 | 0.40 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.069 | 0.20 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 108 | | 60 - 155 |
| 13C4 PFOS | 96 | | 45 - 130 |
| 13C4 PFBA | 104 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 111 | | 54 - 132 |
| 13C2 PFDA | 102 | | 53 - 130 |
| 13C2 PFUnA | 102 | | 37 - 130 |
| 13C2 PFDoA | 95 | | 26 - 130 |
| 18O2 PFHxS | 100 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 8-M12**

Lab Sample ID: 280-2464-15
Client Matrix: Water

Date Sampled: 04/12/2010 1303
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04053.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.8 mL |
| Date Analyzed: | 05/04/2010 2202 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.7 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.73 | | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.98 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.42 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.79 |
| Perfluorooctanoic acid (PFOA) | 2.2 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 2.0 | | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 2.1 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.79 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 107 | | 60 - 155 |
| 13C4 PFOS | 100 | | 45 - 130 |
| 13C4 PFBA | 111 | | 36 - 130 |
| 13C2 PFHxA | 106 | | 55 - 135 |
| 13C5 PFNA | 112 | | 54 - 132 |
| 13C2 PFDA | 109 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 102 | | 26 - 130 |
| 18O2 PFHxS | 105 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 4-M8**

Lab Sample ID: 280-2464-16

Client Matrix: Water

Date Sampled: 04/12/2010 1327

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04054.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.1 mL |
| Date Analyzed: | 05/04/2010 2214 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 4.2 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.34 | J | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.30 | J | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 0.58 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 0.72 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 0.36 | J | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 0.57 | J | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 108 | | 60 - 155 |
| 13C4 PFOS | 102 | | 45 - 130 |
| 13C4 PFBA | 116 | | 36 - 130 |
| 13C2 PFHxA | 107 | | 55 - 135 |
| 13C5 PFNA | 114 | | 54 - 132 |
| 13C2 PFDA | 107 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 106 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 5-M7**

Lab Sample ID: 280-2464-17

Client Matrix: Water

Date Sampled: 04/12/2010 1339

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13803 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11478 | | Lab File ID: | pc50E04055.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.1 mL |
| Date Analyzed: | 05/04/2010 2227 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.46 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.44 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.79 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.40 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 1.5 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 0.92 | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.8 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 110 | | 60 - 155 |
| 13C4 PFOS | 107 | | 45 - 130 |
| 13C4 PFBA | 123 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 113 | | 54 - 132 |
| 13C2 PFDA | 109 | | 53 - 130 |
| 13C2 PFUnA | 111 | | 37 - 130 |
| 13C2 PFDoA | 103 | | 26 - 130 |
| 18O2 PFHxS | 106 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 6-M2**

Lab Sample ID: 280-2464-18
Client Matrix: Water

Date Sampled: 04/12/2010 1353
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04060.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.3 mL |
| Date Analyzed: | 05/04/2010 2331 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.81 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 0.25 | J | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.5 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 114 | | 60 - 155 |
| 13C4 PFOS | 108 | | 45 - 130 |
| 13C4 PFBA | 111 | | 36 - 130 |
| 13C2 PFHxA | 113 | | 55 - 135 |
| 13C5 PFNA | 119 | | 54 - 132 |
| 13C2 PFDA | 108 | | 53 - 130 |
| 13C2 PFUnA | 112 | | 37 - 130 |
| 13C2 PFDoA | 105 | | 26 - 130 |
| 18O2 PFHxS | 108 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 7A-U2**

Lab Sample ID: 280-2464-19

Client Matrix: Water

Date Sampled: 04/12/2010 1412

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04061.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.0 mL |
| Date Analyzed: | 05/04/2010 2344 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.38 | J | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 1.6 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.90 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.28 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 3.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 1.2 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 5.7 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 110 | | 60 - 155 |
| 13C4 PFOS | 106 | | 45 - 130 |
| 13C4 PFBA | 116 | | 36 - 130 |
| 13C2 PFHxA | 106 | | 55 - 135 |
| 13C5 PFNA | 116 | | 54 - 132 |
| 13C2 PFDA | 109 | | 53 - 130 |
| 13C2 PFUnA | 109 | | 37 - 130 |
| 13C2 PFDoA | 104 | | 26 - 130 |
| 18O2 PFHxS | 107 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 7-M9**

Lab Sample ID: 280-2464-20

Client Matrix: Water

Date Sampled: 04/12/2010 1434

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04062.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.3 mL |
| Date Analyzed: | 05/04/2010 2357 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.23 | J | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.60 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.36 | J | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.1 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 0.34 | J | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 2.7 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 106 | | 60 - 155 |
| 13C4 PFOS | 102 | | 45 - 130 |
| 13C4 PFBA | 112 | | 36 - 130 |
| 13C2 PFHxA | 107 | | 55 - 135 |
| 13C5 PFNA | 111 | | 54 - 132 |
| 13C2 PFDA | 105 | | 53 - 130 |
| 13C2 PFUnA | 105 | | 37 - 130 |
| 13C2 PFDoA | 103 | | 26 - 130 |
| 18O2 PFHxS | 102 | | 61 - 130 |

## Analytical Data

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 21-D2**

Lab Sample ID: 280-2464-21
Client Matrix: Water

Date Sampled: 04/12/2010 1448
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04063.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 252.1 mL |
| Date Analyzed: | 05/05/2010 0010 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.5 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.36 | J | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | 0.21 | J | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.69 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.39 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 0.82 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.79 |
| Perfluorooctanoic acid (PFOA) | 1.8 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 3.6 | | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.2 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.79 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 106 | | 60 - 155 |
| 13C4 PFOS | 98 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 107 | | 55 - 135 |
| 13C5 PFNA | 108 | | 54 - 132 |
| 13C2 PFDA | 103 | | 53 - 130 |
| 13C2 PFUnA | 103 | | 37 - 130 |
| 13C2 PFDoA | 98 | | 26 - 130 |
| 18O2 PFHxS | 99 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 22-M1**

Lab Sample ID: 280-2464-22
Client Matrix: Water

Date Sampled: 04/12/2010 1500
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04064.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.4 mL |
| Date Analyzed: | 05/05/2010 0022 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.28 | J | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.36 | J | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.30 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 0.41 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 0.91 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 1.3 | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 0.45 | J | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 107 | | 60 - 155 |
| 13C4 PFOS | 104 | | 45 - 130 |
| 13C4 PFBA | 108 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 112 | | 54 - 132 |
| 13C2 PFDA | 107 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 101 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 23-U1**

Lab Sample ID: 280-2464-23

Client Matrix: Water

Date Sampled: 04/12/2010 1512

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04065.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 252.6 mL |
| Date Analyzed: | 05/05/2010 0035 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.41 | 0.99 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.48 | 0.99 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 0.99 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.34 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | ND | | 0.14 | 0.99 |
| Perfluorononanoic acid (PFNA) | ND | | 0.86 | 2.0 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.48 | 0.99 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | ND | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.72 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 0.99 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 102 | | 60 - 155 |
| 13C4 PFOS | 99 | | 45 - 130 |
| 13C4 PFBA | 105 | | 36 - 130 |
| 13C2 PFHxA | 102 | | 55 - 135 |
| 13C5 PFNA | 106 | | 54 - 132 |
| 13C2 PFDA | 103 | | 53 - 130 |
| 13C2 PFUnA | 104 | | 37 - 130 |
| 13C2 PFDoA | 98 | | 26 - 130 |
| 18O2 PFHxS | 104 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 21-D1**

Lab Sample ID: 280-2464-24
Client Matrix: Water

Date Sampled: 04/12/2010 1524
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

Method: DV-LC-0012
Preparation: 3535
Dilution: 50
Date Analyzed: 05/05/2010 0048
Date Prepared: 04/19/2010 1225

Analysis Batch: 280-13804
Prep Batch: 280-11481

Instrument ID: LC_LCMS5
Lab File ID: pc50E04066.d
Initial Weight/Volume: 250.0 mL
Final Weight/Volume: 5000 uL
Injection Volume: 30 uL

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.1 | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.75 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 0.71 | J | 0.66 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | 0.48 | J | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 0.66 | J | 0.15 | 1.0 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 2.0 | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | 4.6 | | 0.67 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 0.88 | J | 0.55 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.73 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.89 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 104 | | 60 - 155 |
| 13C4 PFOS | 97 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 106 | | 55 - 135 |
| 13C5 PFNA | 110 | | 54 - 132 |
| 13C2 PFDA | 102 | | 53 - 130 |
| 13C2 PFUnA | 102 | | 37 - 130 |
| 13C2 PFDoA | 98 | | 26 - 130 |
| 18O2 PFHxS | 101 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 20-D3**

Lab Sample ID: 280-2464-25
Client Matrix: Water

Date Sampled: 04/12/2010 1539
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04068.d |
| Dilution: | 5.0 | | | Initial Weight/Volume: | 250.8 mL |
| Date Analyzed: | 05/05/2010 0114 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.27 | | 0.041 | 0.10 |
| Perfluorobutanioc acid (PFBA) | 0.21 | | 0.049 | 0.10 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.039 | 0.10 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.074 | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.11 | J | 0.066 | 0.15 |
| Perfluorohexane Sulfonate (PFHxS) | 0.050 | J | 0.035 | 0.15 |
| Perfluorohexanoic acid (PFHxA) | 0.23 | | 0.015 | 0.10 |
| Perfluorononanoic acid (PFNA) | ND | | 0.087 | 0.20 |
| Perfluorooctanoic acid (PFOA) | 0.17 | | 0.049 | 0.10 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.066 | 0.15 |
| Perfluoropentanoic acid (PFPA) | 0.47 | | 0.055 | 0.15 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.073 | 0.15 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.088 | 0.20 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.034 | 0.10 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 111 | | 60 - 155 |
| 13C4 PFOS | 103 | | 45 - 130 |
| 13C4 PFBA | 115 | | 36 - 130 |
| 13C2 PFHxA | 112 | | 55 - 135 |
| 13C5 PFNA | 117 | | 54 - 132 |
| 13C2 PFDA | 109 | | 53 - 130 |
| 13C2 PFUnA | 103 | | 37 - 130 |
| 13C2 PFDoA | 97 | | 26 - 130 |
| 18O2 PFHxS | 110 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16A-M15**

Lab Sample ID: 280-2464-26
Client Matrix: Water

Date Sampled: 04/13/2010 0843
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

Method: DV-LC-0012
Preparation: 3535
Dilution: 50
Date Analyzed: 05/05/2010 0126
Date Prepared: 04/19/2010 1225

Analysis Batch: 280-13804
Prep Batch: 280-11481

Instrument ID: LC_LCMS5
Lab File ID: pc50E04069.d
Initial Weight/Volume: 251.2 mL
Final Weight/Volume: 5000 uL
Injection Volume: 30 uL

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 8.6 | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | 0.84 | J | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | 0.41 | J | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 1.4 | J | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | 0.51 | J | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 1.4 | | 0.14 | 1.0 |
| Perfluorononanoic acid (PFNA) | 1.1 | J | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 3.3 | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | 5.4 | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 1.9 | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.72 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 105 | | 60 - 155 |
| 13C4 PFOS | 103 | | 45 - 130 |
| 13C4 PFBA | 118 | | 36 - 130 |
| 13C2 PFHxA | 106 | | 55 - 135 |
| 13C5 PFNA | 108 | | 54 - 132 |
| 13C2 PFDA | 108 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 100 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 19A-U3**

Lab Sample ID: 280-2464-27
Client Matrix: Water

Date Sampled: 04/13/2010 0914
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04070.d |
| Dilution: | 5.0 | | | Initial Weight/Volume: | 252.8 mL |
| Date Analyzed: | 05/05/2010 0139 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.28 | | 0.041 | 0.099 |
| Perfluorobutanioc acid (PFBA) | 0.14 | | 0.048 | 0.099 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.039 | 0.099 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.074 | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.30 | | 0.065 | 0.15 |
| Perfluorohexane Sulfonate (PFHxS) | 0.20 | | 0.034 | 0.15 |
| Perfluorohexanoic acid (PFHxA) | 0.42 | | 0.014 | 0.099 |
| Perfluorononanoic acid (PFNA) | ND | | 0.086 | 0.20 |
| Perfluorooctanoic acid (PFOA) | 0.48 | | 0.048 | 0.099 |
| Perfluorooctane Sulfonate (PFOS) | 0.36 | | 0.066 | 0.15 |
| Perfluoropentanoic acid (PFPA) | 0.55 | | 0.054 | 0.15 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.072 | 0.15 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.088 | 0.20 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.034 | 0.099 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 109 | | 60 - 155 |
| 13C4 PFOS | 99 | | 45 - 130 |
| 13C4 PFBA | 130 | | 36 - 130 |
| 13C2 PFHxA | 110 | | 55 - 135 |
| 13C5 PFNA | 116 | | 54 - 132 |
| 13C2 PFDA | 104 | | 53 - 130 |
| 13C2 PFUnA | 102 | | 37 - 130 |
| 13C2 PFDoA | 97 | | 26 - 130 |
| 18O2 PFHxS | 107 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 18-D9**

Lab Sample ID: 280-2464-28
Client Matrix: Water

Date Sampled: 04/13/2010 0953
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

Method: DV-LC-0012
Preparation: 3535
Dilution: 20
Date Analyzed: 05/05/2010 0152
Date Prepared: 04/19/2010 1225

Analysis Batch: 280-13804
Prep Batch: 280-11481

Instrument ID: LC_LCMS5
Lab File ID: pc50E04071.d
Initial Weight/Volume: 250.9 mL
Final Weight/Volume: 5000 uL
Injection Volume: 30 uL

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 3.9 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.58 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.84 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.39 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.0 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 1.8 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 2.0 | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.3 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 106 | | 60 - 155 |
| 13C4 PFOS | 105 | | 45 - 130 |
| 13C4 PFBA | 116 | | 36 - 130 |
| 13C2 PFHxA | 110 | | 55 - 135 |
| 13C5 PFNA | 111 | | 54 - 132 |
| 13C2 PFDA | 108 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 102 | | 26 - 130 |
| 18O2 PFHxS | 104 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 17A-M6A**

Lab Sample ID: 280-2464-29

Client Matrix: Water

Date Sampled: 04/13/2010 1015

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04072.d |
| Dilution: | 5.0 | | | Initial Weight/Volume: | 250.2 mL |
| Date Analyzed: | 05/05/2010 0205 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.32 | | 0.041 | 0.10 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.049 | 0.10 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.039 | 0.10 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.074 | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.080 | J | 0.066 | 0.15 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.035 | 0.15 |
| Perfluorohexanoic acid (PFHxA) | 0.085 | J | 0.015 | 0.10 |
| Perfluorononanoic acid (PFNA) | ND | | 0.087 | 0.20 |
| Perfluorooctanoic acid (PFOA) | 0.18 | | 0.049 | 0.10 |
| Perfluorooctane Sulfonate (PFOS) | 0.080 | J | 0.066 | 0.15 |
| Perfluoropentanoic acid (PFPA) | 0.11 | J | 0.055 | 0.15 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.073 | 0.15 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.089 | 0.20 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.034 | 0.10 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 107 | | 60 - 155 |
| 13C4 PFOS | 98 | | 45 - 130 |
| 13C4 PFBA | 121 | | 36 - 130 |
| 13C2 PFHxA | 106 | | 55 - 135 |
| 13C5 PFNA | 113 | | 54 - 132 |
| 13C2 PFDA | 105 | | 53 - 130 |
| 13C2 PFUnA | 103 | | 37 - 130 |
| 13C2 PFDoA | 96 | | 26 - 130 |
| 18O2 PFHxS | 102 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 19-M4**

Lab Sample ID: 280-2464-30
Client Matrix: Water

Date Sampled: 04/13/2010 1047
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04073.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 251.4 mL |
| Date Analyzed: | 05/05/2010 0217 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.41 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.37 | J | 0.19 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.93 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.69 | | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 2.1 | | 0.19 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 3.1 | | 0.26 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.6 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 104 | | 60 - 155 |
| 13C4 PFOS | 103 | | 45 - 130 |
| 13C4 PFBA | 103 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 109 | | 54 - 132 |
| 13C2 PFDA | 106 | | 53 - 130 |
| 13C2 PFUnA | 104 | | 37 - 130 |
| 13C2 PFDoA | 98 | | 26 - 130 |
| 18O2 PFHxS | 103 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 13A-D8**

Lab Sample ID: 280-2464-31
Client Matrix: Water

Date Sampled: 04/13/2010 1112
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04074.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 250.7 mL |
| Date Analyzed: | 05/05/2010 0230 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 4.0 | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | 0.93 | J | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | 0.58 | J | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | 2.2 | | 0.66 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | 1.4 | J | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 2.2 | | 0.15 | 1.0 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | 5.9 | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | 9.8 | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | 2.8 | | 0.55 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.73 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 102 | | 60 - 155 |
| 13C4 PFOS | 105 | | 45 - 130 |
| 13C4 PFBA | 110 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 106 | | 54 - 132 |
| 13C2 PFDA | 105 | | 53 - 130 |
| 13C2 PFUnA | 103 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 102 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 12A-D7**

Lab Sample ID: 280-2464-32

Client Matrix: Water

Date Sampled: 04/13/2010 1135

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04075.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.7 mL |
| Date Analyzed: | 05/05/2010 0243 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.80 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.47 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 0.82 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 0.43 | J | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 1.2 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | ND | | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 1.5 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 1.1 | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 1.6 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 105 | | 60 - 155 |
| 13C4 PFOS | 103 | | 45 - 130 |
| 13C4 PFBA | 116 | | 36 - 130 |
| 13C2 PFHxA | 109 | | 55 - 135 |
| 13C5 PFNA | 111 | | 54 - 132 |
| 13C2 PFDA | 104 | | 53 - 130 |
| 13C2 PFUnA | 104 | | 37 - 130 |
| 13C2 PFDoA | 99 | | 26 - 130 |
| 18O2 PFHxS | 108 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 13-M13**

Lab Sample ID: 280-2464-33

Client Matrix: Water

Date Sampled: 04/13/2010 1148

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04076.d |
| Dilution: | 20 | | | Initial Weight/Volume: | 250.3 mL |
| Date Analyzed: | 05/05/2010 0256 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 3.0 | | 0.16 | 0.40 |
| Perfluorobutanioc acid (PFBA) | 0.93 | | 0.20 | 0.40 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.16 | 0.40 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.30 | 0.60 |
| Perfluoroheptanoic acid (PFHpA) | 1.8 | | 0.26 | 0.60 |
| Perfluorohexane Sulfonate (PFHxS) | 1.1 | | 0.14 | 0.60 |
| Perfluorohexanoic acid (PFHxA) | 2.3 | | 0.058 | 0.40 |
| Perfluorononanoic acid (PFNA) | 0.59 | J | 0.35 | 0.80 |
| Perfluorooctanoic acid (PFOA) | 3.5 | | 0.20 | 0.40 |
| Perfluorooctane Sulfonate (PFOS) | 2.4 | | 0.27 | 0.60 |
| Perfluoropentanoic acid (PFPA) | 2.9 | | 0.22 | 0.60 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.29 | 0.60 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.35 | 0.80 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.14 | 0.40 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 103 | | 60 - 155 |
| 13C4 PFOS | 103 | | 45 - 130 |
| 13C4 PFBA | 114 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 110 | | 54 - 132 |
| 13C2 PFDA | 106 | | 53 - 130 |
| 13C2 PFUnA | 106 | | 37 - 130 |
| 13C2 PFDoA | 100 | | 26 - 130 |
| 18O2 PFHxS | 98 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R1 BROWNS**

Lab Sample ID: 280-2464-34
Client Matrix: Water

Date Sampled: 04/15/2010 0847
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13804 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-11481 | | Lab File ID: | pc50E04077.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 252.5 mL |
| Date Analyzed: | 05/05/2010 0309 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 04/19/2010 1225 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.0088 | J | 0.0082 | 0.020 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.0097 | 0.020 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.0077 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.030 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.013 | 0.030 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.0069 | 0.030 |
| Perfluorohexanoic acid (PFHxA) | 0.0047 | J | 0.0029 | 0.020 |
| Perfluorononanoic acid (PFNA) | ND | | 0.017 | 0.040 |
| Perfluorooctanoic acid (PFOA) | 0.011 | J | 0.0097 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | 0.016 | J | 0.013 | 0.030 |
| Perfluoropentanoic acid (PFPA) | ND | | 0.011 | 0.030 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.014 | 0.030 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.018 | 0.040 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.0068 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 95 | | 60 - 155 |
| 13C4 PFOS | 77 | | 45 - 130 |
| 13C4 PFBA | 121 | | 36 - 130 |
| 13C2 PFHxA | 97 | | 55 - 135 |
| 13C5 PFNA | 97 | | 54 - 132 |
| 13C2 PFDA | 75 | | 53 - 130 |
| 13C2 PFUnA | 58 | | 37 - 130 |
| 13C2 PFDoA | 46 | | 26 - 130 |
| 18O2 PFHxS | 86 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R2 TILTON**

Lab Sample ID: 280-2464-35

Client Matrix: Water

Date Sampled: 04/15/2010 0807

Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13805 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-12133 | | Lab File ID: | pc50E04082.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 255.3 mL |
| Date Analyzed: | 05/05/2010 0413 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/22/2010 1800 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.20 | | 0.0081 | 0.020 |
| Perfluorobutanioc acid (PFBA) | 0.036 | | 0.0096 | 0.020 |
| Perfluorodecanoic acid (PFDA) | 0.033 | | 0.0077 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.029 |
| Perfluoroheptanoic acid (PFHpA) | 0.046 | | 0.013 | 0.029 |
| Perfluorohexane Sulfonate (PFHxS) | 0.024 | J | 0.0068 | 0.029 |
| Perfluorohexanoic acid (PFHxA) | 0.076 | | 0.0028 | 0.020 |
| Perfluorononanoic acid (PFNA) | 0.020 | J | 0.017 | 0.039 |
| Perfluorooctanoic acid (PFOA) | 0.14 | | 0.0096 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | 0.35 | | 0.013 | 0.029 |
| Perfluoropentanoic acid (PFPA) | 0.096 | | 0.011 | 0.029 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.014 | 0.029 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.017 | 0.039 |
| Perfluoroundecanoic acid (PFUnA) | 0.011 | J | 0.0067 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 98 | | 60 - 155 |
| 13C4 PFOS | 66 | | 45 - 130 |
| 13C4 PFBA | 109 | | 36 - 130 |
| 13C2 PFHxA | 102 | | 55 - 135 |
| 13C5 PFNA | 95 | | 54 - 132 |
| 13C2 PFDA | 64 | | 53 - 130 |
| 13C2 PFUnA | 44 | | 37 - 130 |
| 13C2 PFDoA | 32 | | 26 - 130 |
| 18O2 PFHxS | 98 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R3 FOX**

Lab Sample ID: 280-2464-36
Client Matrix: Water

Date Sampled: 04/15/2010 0835
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13805 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-12133 | | Lab File ID: | pc50E04083.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 251.1 mL |
| Date Analyzed: | 05/05/2010 0425 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/22/2010 1800 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.0082 | 0.020 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.0098 | 0.020 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.0078 | 0.020 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.015 | 0.030 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.013 | 0.030 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.0069 | 0.030 |
| Perfluorohexanoic acid (PFHxA) | 0.020 | | 0.0029 | 0.020 |
| Perfluorononanoic acid (PFNA) | ND | | 0.017 | 0.040 |
| Perfluorooctanoic acid (PFOA) | 0.022 | | 0.0097 | 0.020 |
| Perfluorooctane Sulfonate (PFOS) | 0.023 | J | 0.013 | 0.030 |
| Perfluoropentanoic acid (PFPA) | 0.023 | J | 0.011 | 0.030 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.014 | 0.030 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.018 | 0.040 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.0069 | 0.020 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 99 | | 60 - 155 |
| 13C4 PFOS | 69 | | 45 - 130 |
| 13C4 PFBA | 90 | | 36 - 130 |
| 13C2 PFHxA | 103 | | 55 - 135 |
| 13C5 PFNA | 100 | | 54 - 132 |
| 13C2 PFDA | 70 | | 53 - 130 |
| 13C2 PFUnA | 45 | | 37 - 130 |
| 13C2 PFDoA | 32 | | 26 - 130 |
| 18O2 PFHxS | 94 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R4 CONFLUENT**

Lab Sample ID: 280-2464-37
Client Matrix: Water

Date Sampled: 04/15/2010 0920
Date Received: 04/16/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-13805 | | Instrument ID: | LC_LCMS5 |
| Preparation: | 3535 | Prep Batch: 280-12133 | | Lab File ID: | pc50E04084.d |
| Dilution: | 5.0 | | | Initial Weight/Volume: | 251.9 mL |
| Date Analyzed: | 05/05/2010 0438 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/22/2010 1800 | | | Injection Volume: | 30 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.0 | | 0.041 | 0.099 |
| Perfluorobutanioc acid (PFBA) | 0.14 | | 0.049 | 0.099 |
| Perfluorodecanoic acid (PFDA) | 0.11 | | 0.039 | 0.099 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.074 | 0.15 |
| Perfluoroheptanoic acid (PFHpA) | 0.12 | J | 0.065 | 0.15 |
| Perfluorohexane Sulfonate (PFHxS) | 0.055 | J | 0.035 | 0.15 |
| Perfluorohexanoic acid (PFHxA) | 0.19 | | 0.014 | 0.099 |
| Perfluorononanoic acid (PFNA) | ND | | 0.086 | 0.20 |
| Perfluorooctanoic acid (PFOA) | 0.31 | | 0.049 | 0.099 |
| Perfluorooctane Sulfonate (PFOS) | 1.2 | | 0.066 | 0.15 |
| Perfluoropentanoic acid (PFPA) | 0.32 | | 0.054 | 0.15 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.072 | 0.15 |
| Perfluorotridecanoic Acid (PFTriA) | ND | | 0.088 | 0.20 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.034 | 0.099 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 106 | | 60 - 155 |
| 13C4 PFOS | 95 | | 45 - 130 |
| 13C4 PFBA | 114 | | 36 - 130 |
| 13C2 PFHxA | 108 | | 55 - 135 |
| 13C5 PFNA | 106 | | 54 - 132 |
| 13C2 PFDA | 99 | | 53 - 130 |
| 13C2 PFUnA | 92 | | 37 - 130 |
| 13C2 PFDoA | 86 | | 26 - 130 |
| 18O2 PFHxS | 105 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16-M5**

Lab Sample ID: 280-2464-1
Client Matrix: Water

Date Sampled: 04/12/2010 0806
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22066.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 254 mL |
| Date Analyzed: | 04/22/2010 1840 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.015 | J | 0.0056 | 0.049 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 66 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16B-D12**

Lab Sample ID: 280-2464-2
Client Matrix: Water

Date Sampled: 04/12/2010 0817
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D22067.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 238 mL |
| Date Analyzed: | 04/22/2010 1845 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0060 | 0.053 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 59 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 17-D11**

Lab Sample ID: 280-2464-3
Client Matrix: Water

Date Sampled: 04/12/2010 0832
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D22068.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 248 mL |
| Date Analyzed: | 04/22/2010 1850 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0058 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 73 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15A-M16**

Lab Sample ID: 280-2464-4
Client Matrix: Water

Date Sampled: 04/12/2010 0850
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22069.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 257 mL |
| Date Analyzed: | 04/22/2010 1855 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0056 | 0.049 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 62 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15-M17**

Lab Sample ID: 280-2464-5
Client Matrix: Water

Date Sampled: 04/12/2010 0912
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22070.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 244 mL |
| Date Analyzed: | 04/22/2010 1900 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.15 | | 0.0059 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 72 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 15B-D13**

Lab Sample ID: 280-2464-6
Client Matrix: Water

Date Sampled: 04/12/2010 0930
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22072.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 232 mL |
| Date Analyzed: | 04/22/2010 1910 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.14 | | 0.0062 | 0.054 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 72 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14B-D14**

Lab Sample ID: 280-2464-7
Client Matrix: Water

Date Sampled: 04/12/2010 0956
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22073.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 04/22/2010 1915 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.016 | J | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 57 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14-M14**

Lab Sample ID: 280-2464-8
Client Matrix: Water

Date Sampled: 04/12/2010 1017
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22074.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 04/22/2010 1920 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.0085 | J | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 62 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 12-D6**

Lab Sample ID: 280-2464-9
Client Matrix: Water

Date Sampled: 04/12/2010 1032
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D22075.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 248 mL |
| Date Analyzed: | 04/22/2010 1925 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.23 | | 0.0058 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 73 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 14A-D5**

Lab Sample ID: 280-2464-10
Client Matrix: Water

Date Sampled: 04/12/2010 1047
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D22076.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 243 mL |
| Date Analyzed: | 04/22/2010 1930 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.022 | J | 0.0059 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 70 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 10-D4**

Lab Sample ID: 280-2464-11
Client Matrix: Water

Date Sampled: 04/12/2010 1105
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D22077.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 243 mL |
| Date Analyzed: | 04/22/2010 1935 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.014 | J | 0.0059 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 75 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 9-M3**

Lab Sample ID: 280-2464-12
Client Matrix: Water

Date Sampled: 04/12/2010 1126
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22078.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 254 mL |
| Date Analyzed: | 04/22/2010 1940 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.0084 | J | 0.0056 | 0.049 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 72 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 1-M10**

Lab Sample ID: 280-2464-13
Client Matrix: Water

Date Sampled: 04/12/2010 1220
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D29016a.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 249 mL |
| Date Analyzed: | 04/29/2010 1013 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 51 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 3-M11**

Lab Sample ID: 280-2464-14
Client Matrix: Water

Date Sampled: 04/12/2010 1244
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D29017a.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 264 mL |
| Date Analyzed: | 04/29/2010 1018 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.0060 | J | 0.0054 | 0.047 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 50 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 8-M12**

Lab Sample ID: 280-2464-15
Client Matrix: Water

Date Sampled: 04/12/2010 1303
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D29018a.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 245 mL |
| Date Analyzed: | 04/29/2010 1023 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.025 | J | 0.0058 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 61 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 4-M8**

Lab Sample ID: 280-2464-16
Client Matrix: Water

Date Sampled: 04/12/2010 1327
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D29019a.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 268 mL |
| Date Analyzed: | 04/29/2010 1028 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0053 | 0.047 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 67 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 5-M7**

Lab Sample ID: 280-2464-17
Client Matrix: Water

Date Sampled: 04/12/2010 1339
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | Lab File ID: | PC30D29020a.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 236 mL |
| Date Analyzed: | 04/29/2010 1033 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0060 | 0.053 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 56 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 6-M2**

Lab Sample ID: 280-2464-18
Client Matrix: Water

Date Sampled: 04/12/2010 1353
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D29021a.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 04/29/2010 1038 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 74 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 7A-U2**

Lab Sample ID: 280-2464-19
Client Matrix: Water

Date Sampled: 04/12/2010 1412
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12181 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D22086.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 04/22/2010 2021 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 66 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 7-M9**

Lab Sample ID: 280-2464-20
Client Matrix: Water

Date Sampled: 04/12/2010 1434
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11517 | | Lab File ID: | PC30D29023a.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 240 mL |
| Date Analyzed: | 04/29/2010 1048 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0059 | 0.052 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 47 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 21-D2**

Lab Sample ID: 280-2464-21
Client Matrix: Water

Date Sampled: 04/12/2010 1448
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22044.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 247 mL |
| Date Analyzed: | 04/22/2010 1649 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.17 | | 0.0058 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 82 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 22-M1**

Lab Sample ID: 280-2464-22
Client Matrix: Water

Date Sampled: 04/12/2010 1500
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22045.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 260 mL |
| Date Analyzed: | 04/22/2010 1654 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.015 | J | 0.0055 | 0.048 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 62 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 23-U1**

Lab Sample ID: 280-2464-23
Client Matrix: Water

Date Sampled: 04/12/2010 1512
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22046.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 227 mL |
| Date Analyzed: | 04/22/2010 1700 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0063 | 0.055 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 56 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 21-D1**

Lab Sample ID: 280-2464-24
Client Matrix: Water

Date Sampled: 04/12/2010 1524
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22047.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 246 mL |
| Date Analyzed: | 04/22/2010 1705 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.16 | | 0.0058 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 72 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 20-D3**

Lab Sample ID: 280-2464-25
Client Matrix: Water

Date Sampled: 04/12/2010 1539
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22048.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 04/22/2010 1710 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.0097 | J | 0.0057 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 34 | X | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 16A-M15**

Lab Sample ID: 280-2464-26
Client Matrix: Water

Date Sampled: 04/13/2010 0843
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22049.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 248 mL |
| Date Analyzed: | 04/22/2010 1715 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.017 | J | 0.0058 | 0.050 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 41 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 19A-U3**

Lab Sample ID: 280-2464-27

Client Matrix: Water

Date Sampled: 04/13/2010 0914

Date Received: 04/16/2010 0900

**PFC -FOSA FOSA In Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22050.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 244 mL |
| Date Analyzed: | 04/22/2010 1720 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0059 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 45 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 18-D9**

Lab Sample ID: 280-2464-28
Client Matrix: Water

Date Sampled: 04/13/2010 0953
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22052.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 242 mL |
| Date Analyzed: | 04/22/2010 1730 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.0065 | J | 0.0059 | 0.052 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 60 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 17A-M6A**

Lab Sample ID: 280-2464-29

Client Matrix: Water

Date Sampled: 04/13/2010 1015

Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22053.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 241 mL |
| Date Analyzed: | 04/22/2010 1735 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0059 | 0.052 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 62 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 19-M4**

Lab Sample ID: 280-2464-30
Client Matrix: Water

Date Sampled: 04/13/2010 1047
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22054.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 247 mL |
| Date Analyzed: | 04/22/2010 1740 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.030 | J | 0.0058 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 66 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 13A-D8**

Lab Sample ID: 280-2464-31
Client Matrix: Water

Date Sampled: 04/13/2010 1112
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-13078 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D29015a.d |
| Dilution: | 5.0 | | Initial Weight/Volume: | 252 mL |
| Date Analyzed: | 04/29/2010 1008 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.28 | | 0.028 | 0.25 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 105 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 12A-D7**

Lab Sample ID: 280-2464-32
Client Matrix: Water

Date Sampled: 04/13/2010 1135
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22056.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 229 mL |
| Date Analyzed: | 04/22/2010 1750 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.028 | J | 0.0062 | 0.055 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 48 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **MW 13-M13**

Lab Sample ID: 280-2464-33

Client Matrix: Water

Date Sampled: 04/13/2010 1148

Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22057.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 263 mL |
| Date Analyzed: | 04/22/2010 1755 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.027 | J | 0.0054 | 0.048 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 68 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R1 BROWNS**

Lab Sample ID: 280-2464-34
Client Matrix: Water

Date Sampled: 04/15/2010 0847
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | | Lab File ID: | PC30D22058.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 255 mL |
| Date Analyzed: | 04/22/2010 1800 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0056 | 0.049 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 67 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R2 TILTON**

Lab Sample ID: 280-2464-35

Client Matrix: Water

Date Sampled: 04/15/2010 0807

Date Received: 04/16/2010 0900

**P C -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | A alysis Batch: 280-12058 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | P ep Batch: 280-11519 | | Lab File ID: | PC30D22059.d |
| Dilution: | 1.0 | | | Initial Weight/Volume: | 243 mL |
| Date Analyzed: | 04/22/2010 1805 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.040 | J | 0.0059 | 0.051 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 73 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R3 FOX**

Lab Sample ID: 280-2464-36

Client Matrix: Water

Date Sampled: 04/15/2010 0835

Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22060.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 256 mL |
| Date Analyzed: | 04/22/2010 1810 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.0056 | 0.049 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 90 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-2464-1

**Client Sample ID:** **R4 CONFLUENT**

Lab Sample ID: 280-2464-37
Client Matrix: Water

Date Sampled: 04/15/2010 0920
Date Received: 04/16/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-12058 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-11519 | Lab File ID: | PC30D22061.d |
| Dilution: | 1.0 | | Initial Weight/Volume: | 228 mL |
| Date Analyzed: | 04/22/2010 1815 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 04/19/2010 1600 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | 0.21 | | 0.0063 | 0.055 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 82 | | 37 - 130 |

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# ALSTON&BIRD LLP

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**Lee A. DeHihns, III** **Direct Dial: 404-881-7151** **E-mail: lee.dehihns@alston.com**

May 27, 2010

***VIA OVERNIGHT DELIVERY***

Gail Mitchell, Deputy Director
Water Protection Division
U.S. EPA Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-8960

2010 JUN -8 P 2:48

**Re: October 6, 2009, Information Request – Section 308 of the Clean Water Act - Dalton Utilities Land Application System**

Dear Ms. Mitchell:

This letter provides information from Dalton Utilities in connection with its ongoing responses to EPA's October 6, 2009, Section 308 of the Clean Water Act request (the "Request") addressed to Mr. Don Cope, President and CEO of Dalton Utilities. The enclosures are a letter dated May 26, 2010, with a certification signed pursuant to the Request and analytical information in response to Paragraph 3 of Enclosure A of the Request, **Monthly Progress Report.**

Please contact me if have any questions regarding the information supplied pursuant to the Request.

Sincerely,

Lee A. DeHihns III

Lee A. DeHihns, III

LAD:gba
Enclosures

LEGAL02/31941350v1

Dalton
UTILITIES

May 26, 2010

Ms. Gail Mitchell, Deputy Director
Clean Water Enforcement Branch
Water Protection Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Re: Information Request Pursuant to Section 308 of the Clean Water Act
Monthly Progress Report

Dear Ms. Mitchell,

In accordance with the Information Request pursuant to Section 308 of the Clean Water Act dated October 6, 2009, Dalton Utilities is submitting this Monthly Progress Report to you.

Dalton Utilities has submitted all the information to date as required by EPA's Information Request pursuant to Section 308 of the Clean Water Act dated October 6, 2009 (the "Request").

With respect to the Drinking Water Well Survey, Dalton Utilities has instituted the quarterly sampling of the seven private drinking water wells shown to have levels of Perfluorooctanoic Acid (PFOA) or Perfluorooctane Sulfonate (PFOS) above the contract laboratory's reporting limit or level of quantification and below the published public health advisory level as well as the two additional wells found to have levels of Perfluoridated Chemicals (PFC) other than PFOA or PFOS above the contract laboratory's reporting limit or level of quantification. The final sampling event scheduled for these locations occurred in May 2010. The final analytical results of this sampling event will be submitted to you after receipt.

In accordance with the Composted Biosolids Monitoring Plan, Dalton Utilities has sampled the on-site inventory of finished compost twice and submitted all analytical results received to date to you. This sampling is scheduled to be repeated in June and October 2010.

Additionally, samples of the locations stipulated in the aforementioned Information Request's Enclosure A, Paragraph 5 were collected for the final quarter in April 2010.

The results are contained in Attachment A which is provided herein as a bound report titled Test America Laboratories, Inc. Analytical Report on Perfluorocarbon (PFC) Analysis Job # 280-2464-1 which contains 1,024 pages.

If you have any questions, please contact me at 706-529-1091 or dcope@dutil.com.

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

Sincerely,

Don Cope
President & CEO

Attachment

c: Mr. Allen Barnes, Georgia Environmental Protection Division (cover letter only)
Dr. Marlin Gottschalk, Sustainability Division Georgia Department of Natural Resources (cover letter only)
Dr. Becky Champion, Georgia Environmental Protection Division (cover letter only)
Dr. Bert Langley, Georgia Environmental Protection Division (cover letter only)
Lee A. DeHihns, Esq.

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October 26, 2009

***BY COURIER***

Gail Mitchell, Deputy Director
Water Protection Division
U.S. EPA Region 4
Atlanta Federal Center
61 Forsyth Street
Atlanta, Georgia 30303-8960

**Re: October 6, 2009, Information Request – Section 308 of the Clean Water Act - Dalton Utilities Land Application System**

Dear Ms. Mitchell:

Enclosed with this letter is information from Dalton Utilities in response to EPA's October 6, 2009, Section 308 of the Clean Water Act request (the "Request") addressed to Mr. Don Cope, President and CEO of Dalton Utilities. The enclosures include an October 23, 2009, letter with certification signed pursuant to the Request and information responsive to Paragraph 6 of Enclosure A.

Please contact me if have any questions regarding the information supplied pursuant to the Request.

Sincerely,

Lee A. DeHihns, III

LAD:gba
Enclosures

LEGAL02/31578197v3

Dalton
UTILITIES

October 23, 2009

Ms. Gail Mitchell
Clean Water Enforcement Branch
Water Protection Division
U.S. Environmental Protection Agency, Region 4
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Re: Monitoring Well Information

Dear Ms. Mitchell,

In accordance with the Information Request pursuant to Section 308 of the Clean Water Act dated October 6, 2009, Dalton Utilities is submitting to you the well construction diagrams for Land Application System (LAS) monitoring wells D-5, D-7, D-8, D-12, D-13, D-14, U-2, U-3, M-15, and M-16. The requested records are attached herein as Attachment A.

The well construction diagram for monitoring well M-12 is not included herein as installation and well construction data for this well is not available.

If you have any questions, please contact me at 706-529-1091 or dcope@dutil.com.

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false*

*information, including the possibility of fine and imprisonment for knowing violations.*

Sincerely,

Don Cope
President & CEO

Attachment

C: Dr. Carol Couch, Georgia Environmental Protection Division (cover letter only)
Dr. Marlin Gottschalk, Sustainability Division Georgia Department of Natural Resources (cover letter only)
Dr. Bert Langley, Georgia Environmental Protection Division (cover letter only)
Lee A. DeHihns, Esq.

# MONITORING WELL INSTALLATION LOG

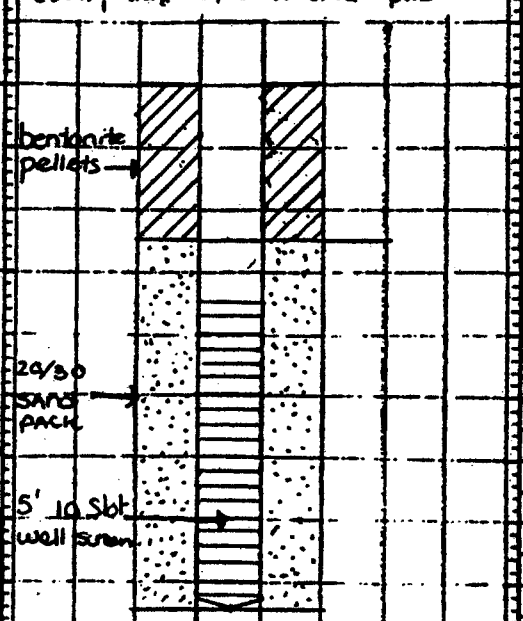
| | | | |
|---|---|---|---|
| JOB NO. 963-3082 | PROJECT DU/LAS/GA | WELL NO. B-6 | SHEET 1 OF 1 |
| GA INSP. JGC | DRILLING METHOD HSA 4.25" ID | GROUND ELEV. | WATER DEPTH |
| WEATHER M Sunny | DRILLING COMPANY ATE | COLLAR ELEV. | DATE/TIME |
| TEMP. 45°F | DRILL RIG CME 850 DRILLER | STARTED 14:00 TIME / 11-8-96 DATE | COMPLETED 14:22 TIME / 11-8-96 DATE |

## MATERIALS INVENTORY

| | | | | | |
|---|---|---|---|---|---|
| WELL CASING | 2 in. dia. 6.0 ft | WELL SCREEN | 2 in. dia. 5 ft | BENTONITE SEAL | Pellets |
| CASING TYPE | SCH 40 PVC | SCREEN TYPE | SCH 40 PVC | INSTALLATION METHOD | Poured |
| JOINT TYPE | flush thread | SLOT SIZE | 10 | FILTER PACK QTY. | 3.5 bags @ 50 lb |
| GROUT QUANTITY | N/A | CENTRALIZERS | — | FILTER PACK TYPE | 20/30 Sand |
| GROUT TYPE | N/A | DRILLING MUD TYPE | — | INSTALLATION METHOD | Poured w/ funnel |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | yellow-br - olive SILTY SAND (alluvium) |
| 2.0 | |
| 4.0 | gray-olive, yellow-br. SHALE |
| 6.0 | |
| 8.0 | REFUSAL @ 8.5' |
| 10.0 | |

## WELL SKETCH




## INSTALLATION NOTES

Augered to 8.5' bgs. Installed 5' 10-slot PVC screen for 3.5-8.5' bgs. Installed PVC riser casing for 2.5' ags to 3.5' bgs. Installed 20/30 sand pack from 2.5-8.5'. Installed bentonite pellets from 0-2.5. Installed locking protective cover and 2x2' concrete pad.

## WELL DEVELOPMENT NOTES

Not developed as of 12-1-96.

# MONITORING WELL INSTALLATION LOG

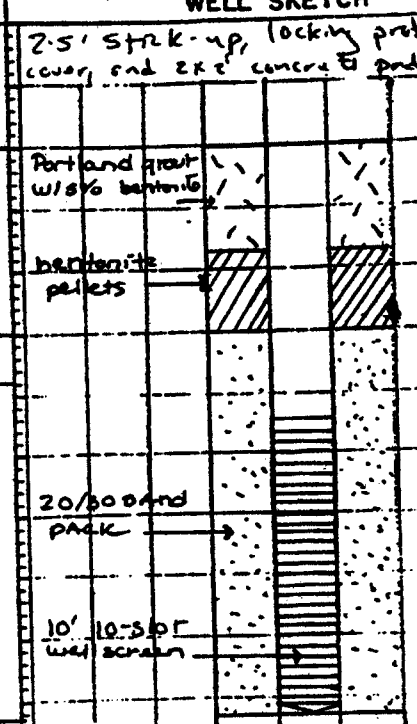
| | | | |
|---|---|---|---|
| JOB NO. 963-3062 | PROJECT DU/LAS/GA | WELL NO. B-13 | SHEET 1 OF 1 |
| GA INSP. GA | DRILLING METHOD HSA 4.25" I.D | GROUND ELEV. | WATER DEPTH |
| WEATHER cloudy | DRILLING COMPANY ATE | COLLAR ELEV. | DATE/TIME |
| TEMP. 45°F | DRILL RIG CME 850 | DRILLER DAN | STARTED 10:00 / 11/22/96 (TIME / DATE) COMPLETED 11:00 / 11/22/96 (TIME / DATE) |

## MATERIALS INVENTORY

| | | | | | |
|---|---|---|---|---|---|
| WELL CASING | 2 in. dia. 11 ft | WELL SCREEN | 2 in. dia. 10 ft | BENTONITE SEAL | pellets |
| CASING TYPE | SCH 40 PVC | SCREEN TYPE | SCH 40 PVC | INSTALLATION METHOD | poured |
| JOINT TYPE | flush thread | SLOT SIZE | 10 | FILTER PACK QTY. | 7 bags @ 50 lb |
| GROUT QUANTITY | — | CENTRALIZERS | — | FILTER PACK TYPE | 20/30 SAND PACK |
| GROUT TYPE | Portland w/ 5% bentonite | DRILLING MUD TYPE | — | INSTALLATION METHOD | Poured w/ H2O |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | yellow-brown/red brown |
| 2.0 | CLAYEY SILT (ML) |
| 4.0 | (weathered shale) |
| 6.0 | Tan CLAYEY silt (weathered shale) |
| 8.0 | |
| 10.0 | |
| 12.0 | Gray SHALE |
| 14.0 | |
| 16.0 | |
| 18.0 | |
| 20.0 | END at 18.5' |

## WELL SKETCH




## INSTALLATION NOTES

Augered to 18.5'
installed 10' 10-slot well screen from 18.5' to 8.5' bgs
installed well casing from 8.5' bgs to 2.5' ags
installed sand from 18.5' to 6' bgs.
installed bentonite pellets from 6' to 3.5' bgs
Grouted to surface w/ Portland Cement + 5% bentonite mixture.
Installed locking protective cover and 2x2 concrete pad.

## WELL DEVELOPMENT NOTES

Bailed 45 gallons w/ Stainless steel bailer.
Bailed dry four times.
Water turbid.

# MONITORING WELL INSTALLATION LOG

D-8

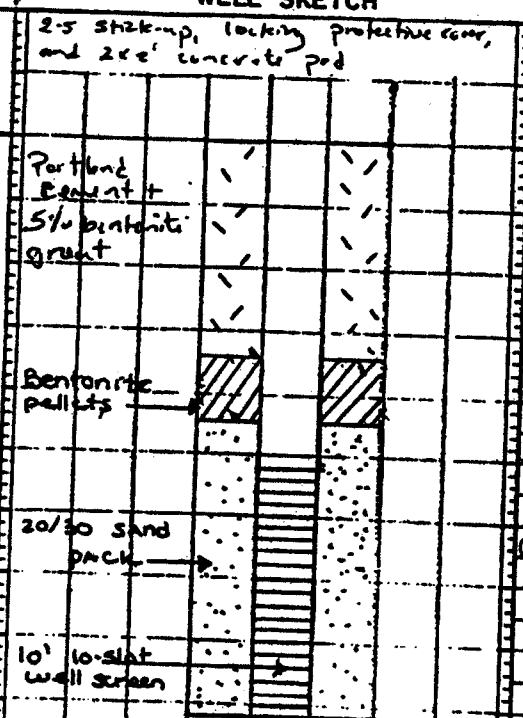
| | | | |
|---|---|---|---|
| JOB NO. 903-3062 | PROJECT DU/LAS/GA | WELL NO. B-14 | SHEET 1 OF |
| GA REQ. [illegible] | DRILLING METHOD 4 1/4 A 4.25" I.D | GROUND ELEV. | WATER DEPTH |
| WEATHER [illegible] | DRILLING COMPANY ATE | COLLAR ELEV. | DATE/TIME |
| TEMP. [illegible] | DRILL RIG CME 850 DRILLER DAN | STARTED 16h00 TIME / 20/11/96 DATE | COMPLETED TIME / 11/20/96 DATE |

## MATERIALS INVENTORY

| | | |
|---|---|---|
| WELL CASING 2 in. dia. 15.5 ft | WELL SCREEN 2 in. dia. 10 ft | BENTONITE SEAL pellets |
| CASING TYPE 40 SCH PVC | SCREEN TYPE SCH 40 PVC | INSTALLATION METHOD poured |
| JOINT TYPE Flush thread | SLOT SIZE 10 | FILTER PACK QTY. 7 bgs @ 50 lb |
| GROUT QUANTITY — | CENTRALIZERS — | FILTER PACK TYPE 20/30 Sand pack |
| GROUT TYPE Portland w/ 5% bentonite | DRILLING MUD TYPE — | INSTALLATION METHOD poured w/water |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | red-brown/yellow-br tan SILT, little sand little clay, tr gravel (weathered shale) |
| 5.0 | |
| 10.0 | |
| 15.0 | gray SHALE |
| 20.0 | |
| 25.0 | END @ 23' |

## WELL SKETCH




## INSTALLATION NOTES

Augered to 23'

Installed pvc 10 ft 10 slot well screen from 23' to 13' bgs

Installed SCH 40 pvc well casing from 13' bgs to 2.5 ags installed 20/30 sand pack from 23 bgs to 11 bgs installed bentonite pellets from 11 bgs to @ 5 bgs. Grouted to surface w/ Portland Cement + 5% bentonite mixture. Installed locking, protective cover and 2x2 concrete pad.

## WELL DEVELOPMENT NOTES

Bailed 60 gallons w/ stainless steel bailer Bailed dry 4 times. Water turbid.

# MONITORING WELL INSTALLATION LOG

JOB NO. 9103-30602 PROJECT DU/LAS/GA WELL NO. B-9 SHEET 1 OF 1
GA DISP. G.A. DRILLING METHOD HSA 4-25" ID GROUND ELEV. WATER DEPTH
WEATHER Cloudy DRILLING COMPANY ATE COLLAR ELEV. DATE/TIME 11/14/96
TEMP. 40°F DRILL RIG CME 850 DRILLER DAN STARTED 11h00 11/14/96 (TIME / DATE) COMPLETED 13h40/11/14/96 (TIME / DATE)

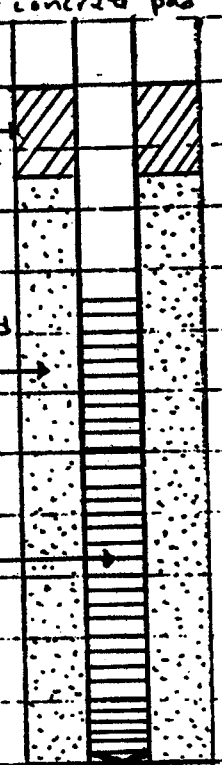
## MATERIALS INVENTORY

WELL CASING 2 in. dia. 6.0 LF
CASING TYPE SCH 40 PVC
JOINT TYPE Flush thread
GROUT QUANTITY NONE
GROUT TYPE N/A

WELL SCREEN 2 in. dia. 7.5 LF
SCREEN TYPE SCH 40 PVC
SLOT SIZE 10
CENTRALIZERS —
DRILLING MUD TYPE —

BENTONITE SEAL Pallets
INSTALLATION METHOD Poured
FILTER PACK QTY. 5 bgs @ 50 lb
FILTER PACK TYPE 20/30 Sand
INSTALLATION METHOD poured w/water

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION | WELL SKETCH |
|---|---|---|
| | GROUND SURFACE | 2.5' stick-up, locking protective cover and 2x2' concrete pad |
| 0.0 | red-br / yellow-br SILT to CLAYEY SILT (weathered shale) | bentonite pellets |
| 2.0 | | |
| 4.0 | | 20/30 sand pack |
| 6.0 | | |
| | Gray SHALE | 7.5' 10 slot well screen |
| 8.0 | | |
| 10.0 | | |
| | Refusal at 11' | |
| 12.0 | | |



## INSTALLATION NOTES

Augered to 11 ft
installed 7.5' ft screen from 11 ft to 3.5 bgs
installed 40 pvc casing from 3.5 bgs to 2.5 bgs
installed 20/30 filter sand from 11' bgs to 1.5 bgs
installed bentonite pellets from 1.5 bgs to surface
Installed locking protective cover and 2x2' concrete pad.

## WELL DEVELOPMENT NOTES

Bailed ~~12 gall~~ 20 gallons w/ stainless steel bailer. Bailed dry 4 times. Water turbid



Golder Associates

# MONITORING WELL INSTALLATION LOG

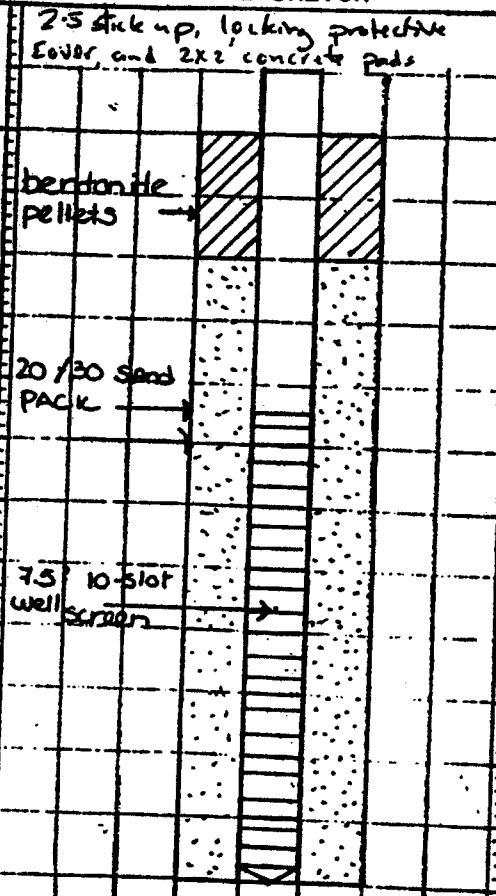
JOB NO. 963-3002 PROJECT DU/LAS / GA WELL NO. B-8 SHEET 1 OF 1
GA INSP. G. A. DRILLING METHOD HSA 4 1/2" ID GROUND ELEV. WATER DEPTH 3'
WEATHER 34 DRILLING COMPANY ATE COLLAR ELEV. DATE/TIME 11/13/96
TEMP. cloudy DRILL MG. CME 850 DRILLER DALI STARTED 13h00 / 11/13/96 FINISHED 13h30 / 11/13/96

## MATERIALS INVENTORY

WELL CASING 2 in. dia. 7 ft. WELL SCREEN 2 in. dia. 7.5 ft. BENTONITE SEAL Pellets
CASING TYPE SCH 40 PVC SCREEN TYPE SCH 40 PVC INSTALLATION METHOD POURED
JOINT TYPE FLUSH THREAD SLOT SIZE 10 FILTER PACK QTY. 5 bags @ 50 lb
GROUT QUANTITY NONE CENTRALIZERS — FILTER PACK TYPE 20/30 SAND PACK
GROUT TYPE NONE DRILLING MUD TYPE — INSTALLATION METHOD poured w/ water

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | yellow-brown SILT to CLAYEY SILT |
| 2.0 | |
| 4.0 | |
| 6.0 | tan SILT, tr clay tr sand (weathered shale) |
| 8.0 | |
| 10.0 | |
| 12.0 | REFUSAL @ 12' |

## WELL SKETCH




## INSTALLATION NOTES

Augered to 12' bgs
Installed SCH 40 PVC 10 slot well screen from 12' to 4.5' bgs
Installed well casing from 4.5' bgs to 2.5 abs
Installed 20/30 sand pack from 12' to 2' 3"
Installed bentonite pellets from 2' 3" to surface. Installed locking protective cover and 2x2' concrete pad

## WELL DEVELOPMENT NOTES

Bailed 50 gallons w/ stainless steel bailer
Water turbid

# MONITORING WELL INSTALLATION LOG

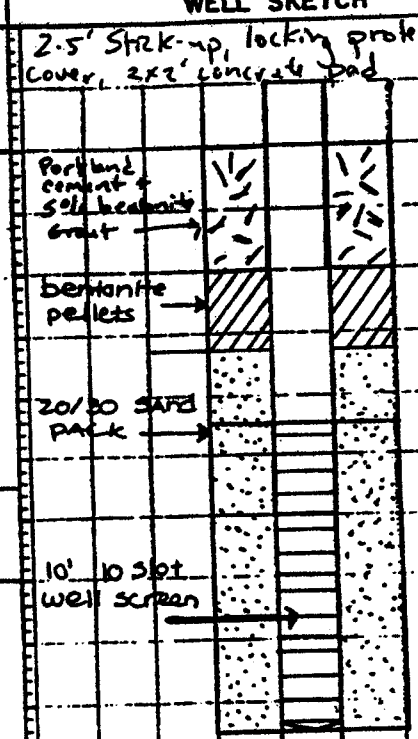
JOB NO. 963-3002 PROJECT Du/LAS/GA WELL NO. B-7 SHEET 1 OF 1
GA INSP. G.A. DRILLING METHOD HSA GROUND ELEV. WATER DEPTH 15' bgs
WEATHER cloudy DRILLING COMPANY ATE COLLAR ELEV. DATE/TIME
TEMP. 30°F DRILL RIG CME 850 DRILLER DAN STARTED 7h30 11/13/96 (TIME / DATE) COMPLETED 8h30 11/13/96 (TIME / DATE)

## MATERIALS INVENTORY

WELL CASING 2 in. dia. 11.5 ft. WELL SCREEN 2 in. dia. 10 ft. BENTONITE SEAL Pelet
CASING TYPE SCH 40 PVC SCREEN TYPE SCH 40 PVC INSTALLATION METHOD Poured
JOINT TYPE Flush THREAD SLOT SIZE 10 FILTER PACK QTY. 7 bgs @ 50 lb
GROUT QUANTITY CENTRALIZERS - FILTER PACK TYPE 20/30 sand pack
GROUT TYPE Portland w/ 5% bentonite DRILLING MUD TYPE - INSTALLATION METHOD poured / water

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | Yellow Brown SILT |
| 2.0 | traces of sand, tr of gravel, tr clay |
| 4.0 | |
| 6.0 | (weathered shale) |
| 8.0 | |
| 10.0 | |
| 12.0 | Tan SILT (weathered shale) |
| 14.0 | ~~Red~~ med-gray SHALE |
| 16.0 | |
| 18.0 | |
| 20.0 | END @ 20' |

## WELL SKETCH




## INSTALLATION NOTES

Augered to ~~[illegible]~~ (19')
installed SCH 40 PVC 10 slot well screen from 19' to 9' BGS
Installed well casing from 9' to 2.5 AGS
Installed 20/30 sand pack from 19' to 6.5 bgs
Installed pellets from 6.5 to 4' bgs
Grouted to surface w/ portland + 5% grout. Installed locking protective cover and 2x2' concrete pads

## WELL DEVELOPMENT NOTES

Bailed 25 gallons w/ stainless steel bailer. Bailed dry 4 times. Water turbid

# MONITORING WELL INSTALLATION LOG

U-2

JOB NO. 963-3062 PROJECT DU/LAS/GA WELL NO. B-4 SHEET 1 OF 1
GA INSP. JGC DRILLING METHOD HSA 4-25" ID GROUND ELEV. WATER DEPTH
WEATHER Cloudy DRILLING COMPANY ATE COLLAR ELEV. DATE/TIME
TEMP. 60°F DRILL RIG CME 850 DRILLER DAN STARTED 14:30 (TIME) 11-6-96 (DATE) COMPLETED 15:30 (TIME) 11/96 (DATE)

## MATERIALS INVENTORY

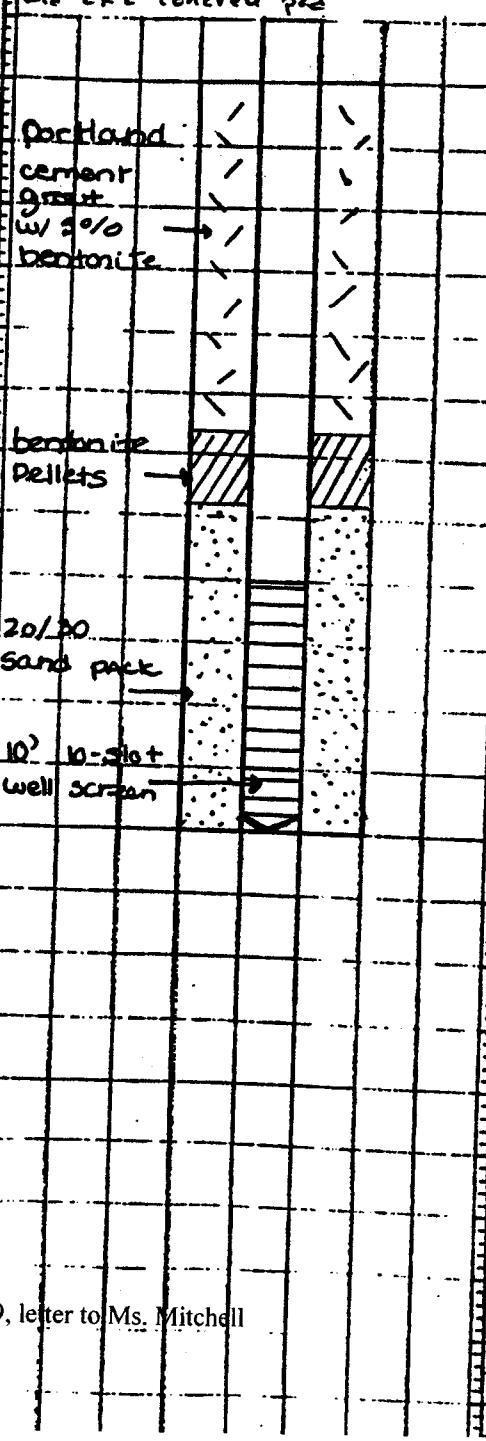
WELL CASING 2 in. dia. ft
CASING TYPE SCH 40 PVC
JOINT TYPE Flush Thread
GROUT QUANTITY
GROUT TYPE Portland w/ 5% bentonite

WELL SCREEN 2 in. dia. 10 ft
SCREEN TYPE SCH 40 PVC
SLOT SIZE 10
CENTRALIZERS —
DRILLING MUD TYPE —

BENTONITE SEAL Pellets
INSTALLATION METHOD Poured
FILTER PACK QTY. 7 bags @ 50 lb
FILTER PACK TYPE 20/30 Sand
INSTALLATION METHOD Poured w/ H2O

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | Red-br to yellow-br SILTY CLAY / CLAYEY SILT (CH/ML) (weathered shale) |
| 5.0 | |
| 10.0 | |
| | olive CLAYEY SILT – SILTY CLAY (weathered shale) |
| 15.0 | |
| 20.0 | |
| | med. gray LIMESTONE |
| 25.0 | |
| 30.0 | END @ 30' |

WELL SKETCH




INSTALLATION NOTES

Augered to 30' bgs. Installed SCH 40 PVC 10-slot screen from 20-30' bgs. Installed well casing from 2.5' bags to 20' bgs. Installed 20/30 sand pack from 17-30' bgs. Installed bentonite pellets from 14-17 bgs. Grouted to surface w/ portland + 5% bentonite grout. Installed locking cover and 2x2' concrete pad

WELL DEVELOPMENT NOTES

Bailed 38 gallons with stainless steel bailers. Bailed dry 3 times. Water turbid.

# MONITORING WELL INSTALLATION LOG

U-3

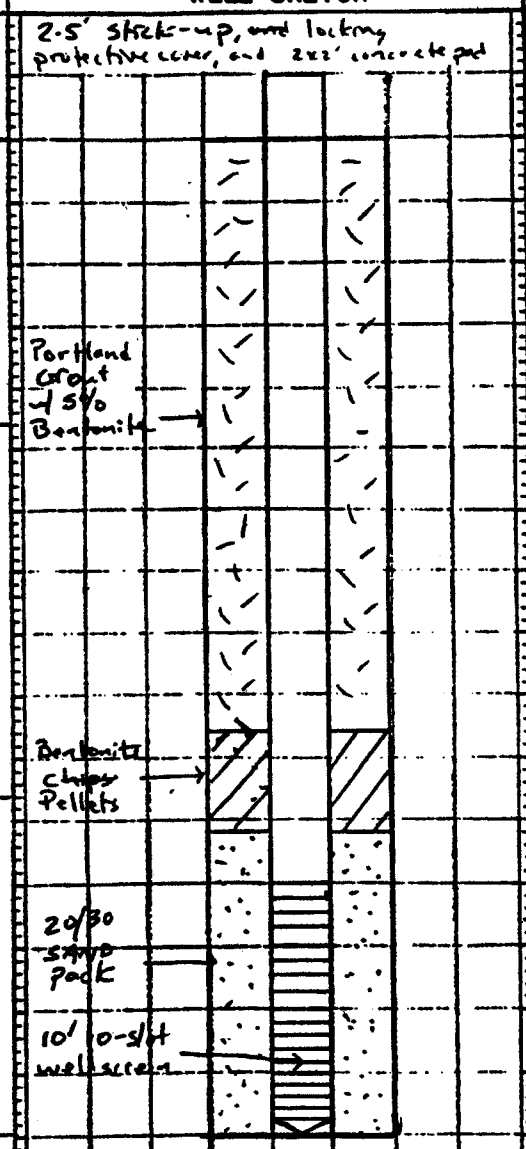
| | | | |
|---|---|---|---|
| JOB NO. 963-3062 | PROJECT DU/IAS/GA | WELL NO. B-1 | SHEET 1 OF 1 |
| GA INSP. JGC | DRILLING METHOD HSA 4.25" ID | GROUND ELEV. | WATER DEPTH |
| WEATHER P.Cloudy | DRILLING COMPANY ATG | COLLAR ELEV. | DATE/TIME |
| TEMP. 45°F | DRILL RIG CME 850 DRILLER DAN | STARTED 16:30 (TIME) / 11/4/96 (DATE) | COMPLETED 17:30 (TIME) / 11/4/96 (DATE) |

## MATERIALS INVENTORY

| | | |
|---|---|---|
| WELL CASING 2 in. dia. 32.5 ft | WELL SCREEN 2 in. dia. 10 ft | BENTONITE SEAL Pellets |
| CASING TYPE SCH 40 PVC | SCREEN TYPE PVC SCH 40 | INSTALLATION METHOD Poured |
| JOINT TYPE FLUSH THREAD | SLOT SIZE 10 | FILTER PACK QTY. 7 bags @ 50 lbs ea. |
| GROUT QUANTITY | CENTRALIZERS N/A | FILTER PACK TYPE 20/30 SAND |
| GROUT TYPE Cement w/ 5% bentonite | DRILLING MUD TYPE N/A | INSTALLATION METHOD Poured w/ water |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | Dry compact 4-br SANDY SILT to CLAYEY SILT (ML) (weathered shale) |
| 5.0 | |
| 10.0 | |
| | dry to moist tan/olive/gray SANDY SILT TO CLAYEY SILT (ML) (weathered shale) |
| 15.0 | |
| 20.0 | |
| 25.0 | |
| | moist to wet med/dk gray SHALE |
| 30.0 | |
| 35.0 | |
| 40.0 | END @ 40' |

**WELL SKETCH**




**INSTALLATION NOTES**

Advanced auger to 40' bgs. Installed 10' 10-slot SCH 40 PVC well screen from 30 to 40. Installed 20/30 sand pack from 28 to 40. Installed bentonite pellets from 28 to 24. Installed cement grout w/ 5% bentonite from 24' to ground surface. Installed locking protective cover and 2x2' concrete pad.

**WELL DEVELOPMENT NOTES**

Bailed 50 gallons w/ stainless steel bailer. Water turbid but becomes clear when fine clay settles.



Golder Associates

# MONITORING WELL INSTALLATION LOG

M-15

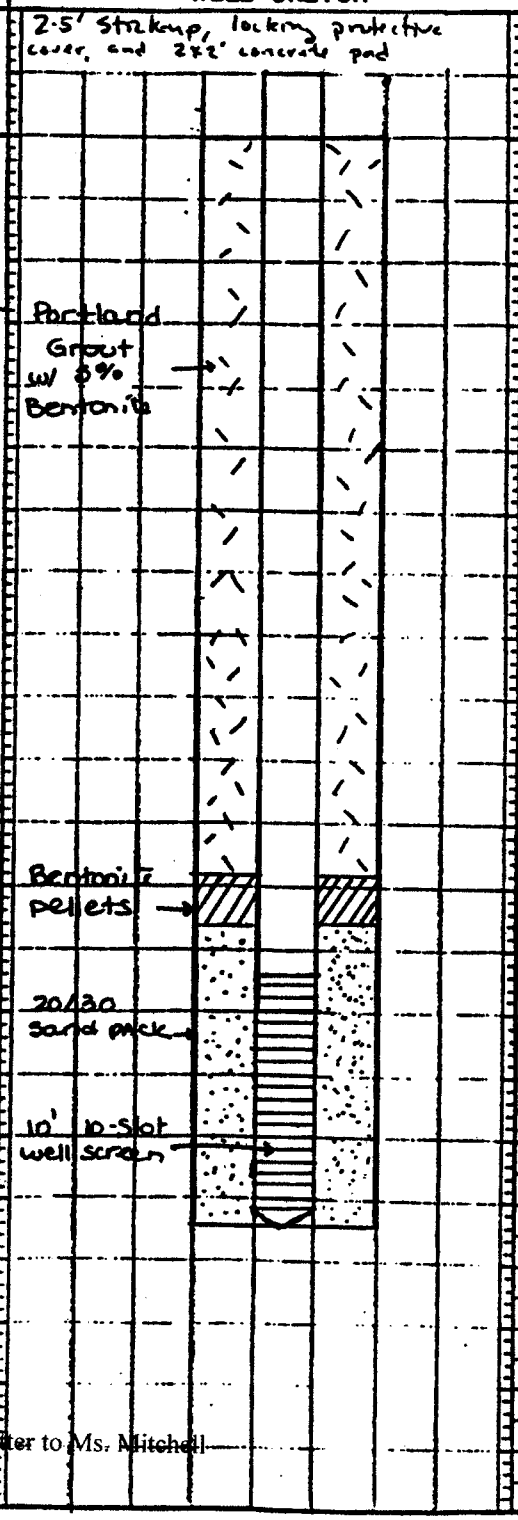
| | | | |
|---|---|---|---|
| JOB NO. 963-3042 | PROJECT DU/LAS/GA | WELL NO. B-2 | SHEET 1 OF 1 |
| GA INSP. JGL | DRILLING METHOD HSA 4.25" ID | GROUND ELEV. | WATER DEPTH |
| WEATHER Cloudy | DRILLING COMPANY ATE | COLLAR ELEV. | DATE/TIME |
| TEMP. 50°F | DRILL RIG CME 850 DRILLER DAN | STARTED 11:00 / 11/5/96 (TIME / DATE) | COMPLETED 14:00 11/5/96 (TIME / DATE) |

## MATERIALS INVENTORY

| | | |
|---|---|---|
| WELL CASING 2 in. dia. 35 ft | WELL SCREEN 2 in. dia. 10 ft | BENTONITE SEAL Pellets |
| CASING TYPE SCH 40 PVC | SCREEN TYPE SCH 40 PVC | INSTALLATION METHOD Poured |
| JOINT TYPE FLUSH THREAD | SLOT SIZE 10 | FILTER PACK QTY. 7 bags @ 50 lb |
| GROUT QUANTITY — | CENTRALIZERS — | FILTER PACK TYPE 20/30 sand |
| GROUT TYPE Portland w/ 5% bentonite | DRILLING MUD TYPE — | INSTALLATION METHOD Poured w/ $H_2O$ |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | dense yellow-brown to reddish CLAYEY SILT (ML) |
| 5.0 | (shale saprolite) |
| | dense to very dense tan/gray CLAYEY SILT (ML) |
| 10.0 | |
| 15.0 | (weathered shale saprolite) |
| 20.0 | |
| 25.0 | |
| 30.0 | |
| | olive/gray CLAYEY SILT |
| 35.0 | (weathered shale) |
| 40.0 | ~~Red~~ med gray SHALE |
| 45.0 | END @ 43.5' |

### WELL SKETCH




### INSTALLATION NOTES

Augered to 43.5' w/ 4.25" ID flights. Installed SCH 40 PVC 10-slot well screen from 33.5-43.5' bgs. Installed well casing from 2.5' ags to 33.5' bgs. Installed 20/30 Sand pack from 31.5-43.5'. Installed pellets from 28.5-31.5' bgs. Grouted to surface. Installed locking protective cover and 2x2' concrete pad.

### WELL DEVELOPMENT NOTES

Bailed 35 gallons w/ stainless steel bailer. Water turbid.



Golder Associates

# MONITORING WELL INSTALLATION LOG

M-16

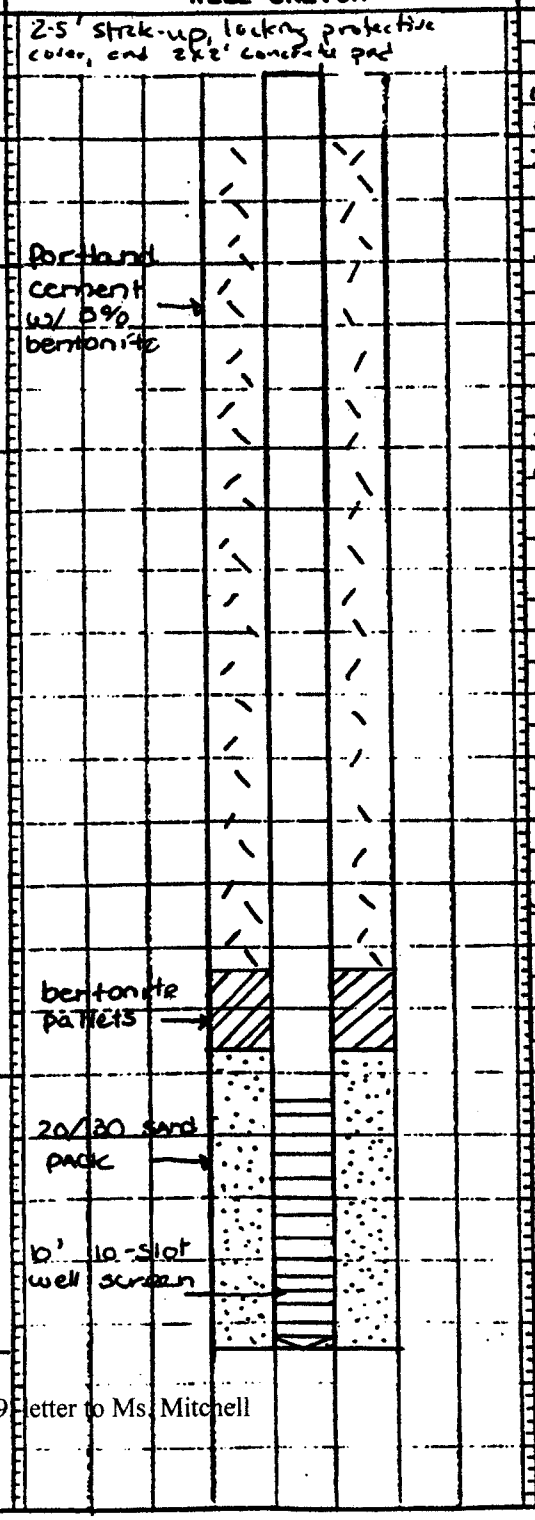
| | | | |
|---|---|---|---|
| JOB NO. 963-3062 | PROJECT DU/LAS/GA | WELL NO. B-3 | SHEET 1 OF 1 |
| GA INSP. JGC | DRILLING METHOD HSA 4.25" ID | GROUND ELEV. | WATER DEPTH |
| WEATHER Cloudy | DRILLING COMPANY ATE | COLLAR ELEV. | DATE/TIME |
| TEMP. 58°F | DRILL RIG CME 850 DRILLER DAN | STARTED 08:00 / 11-6-96 (TIME / DATE) | COMPLETED 11:00 / 11-6-96 (TIME / DATE) |

## MATERIALS INVENTORY

| | | |
|---|---|---|
| WELL CASING 2 in. dia. 41.0 ft | WELL SCREEN 2 in. dia. 10 ft | BENTONITE SEAL Pellets |
| CASING TYPE SCH 40 PVC | SCREEN TYPE SCH 40 PVC | INSTALLATION METHOD Poured |
| JOINT TYPE FLUSH THREAD | SLOT SIZE 10 | FILTER PACK QTY. |
| GROUT QUANTITY — | CENTRALIZERS — | FILTER PACK TYPE 20/30 Sand |
| GROUT TYPE Portland w/ 5% bentonite | DRILLING MUD TYPE — | INSTALLATION METHOD Poured w/ H2O |

| ELEV./DEPTH | SOIL/ROCK DESCRIPTION |
|---|---|
| | GROUND SURFACE |
| 0.0 | dense yellow brown to olive CLAYEY SILT (saprolite shale) |
| 5.0 | dense yellow-brown/olive/red-brown CLAYEY SILT (ML) (saprolite shale) |
| 10.0 | |
| 15.0 | yellow brow/olive CLAYEY SILT (ML) (saprolite shale) |
| 20.0 | |
| 25.0 | |
| 30.0 | |
| 35.0 | |
| 40.0 | ~~Red~~ med. gray SHALE |
| 45.0 | |
| 50.0 | END @ 48.6' |

**WELL SKETCH**




**INSTALLATION NOTES**

Augered to 48.5' bgs. Installed 10' PVC 10-slot well screen from 38.5-48.5'. Installed well casing from 2.5' ags to 38.5' bgs. Poured sand w/ water from 36.5-48.5' bgs. Poured bentonite pellets from ~~[illegible]~~ grouted to surface with cement + 5% bentonite. Installed locking protective cover and 2x2' concrete pad.

**WELL DEVELOPMENT NOTES**

Bailed 30 gallons w/ stainless steel bailer. Bailed dry 4 times. Water turbid.

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# Analytical Report

## Fluorochemical Characterization of Aqueous and Solid Samples

**MPI Report No. L0018099**

***Testing Laboratory***

MPI Research, Inc.
3058 Research Drive
State College, PA 16801

***Requester/Project Manager***

Dena Haverland
Dalton Utilities
PO BOX 869
Dalton, GA 30722
Phone: 706-529-1010

# 1 Introduction

Results are reported for the analysis of water and solid samples received at MPI Research from Dalton Utilities. The MPI Research study number assigned to the project is L0018099. Table I lists the target analytes quantitated for the samples.

Table I. Target Analytes for Quantitation

| Compound Name | Acronym |
|---|---|
| Perfluorobutyric Acid | C4 Acid |
| Perfluoropentanoic Acid | C5 Acid |
| Perfluorohexanoic Acid | C6 Acid |
| Perfluoroheptanoic Acid | C7 Acid |
| Perfluorooctanoic Acid | C8 Acid |
| Perfluorononanoic Acid | C9 Acid |
| Perfluorodecanoic Acid | C10 Acid |
| Perfluoroundecanoic Acid | C11 Acid |
| Perfluorododecanoic Acid | C12 Acid |
| Perfluorotridecanoic Acid | C13 Acid |
| Perfluorotetradecanoic Acid | C14 Acid |
| Perfluorobutanesulfonate | C4 Sulfonate or PFBS |
| Perfluorohexanesulfonate | C6 Sulfonate or PFHS |
| Perfluorooctanesulfonate | C8 Sulfonate or PFOS |
| Perfluorooctanesulfonamide | FOSA |

# 2 Sample Receipt

A total of sixty samples were received from David White at Dalton Utilities for this study. The samples were collected between May 26, 2009 and May 28, 2009. The samples arrived on May 29, 2009 via FED Ex and were logged in under MPI Research login number L0018099. The shipment was received cooled with wet ice. The samples were stored refrigerated from receipt until analysis. Chain-of-custody information is presented in Attachment A.

# 3 Methods - Analytical and Preparatory

## 3.1 Water Sample Preparation

Ten milliliters of sample was transferred into a 50 mL centrifuge tube. Samples designated as lab spikes were fortified appropriately with analyte and surrogate. All samples were fortified with a 50 µL portion of a 100 ng/mL surrogate spiking solution containing PFOA (m+4). Ten milliliters of acetonitrile was added to the sample. After shaking, the sample was sonicated for approximately 2 hours then centrifuged at 3000 rpm for ~10 minutes. A 1 mL portion of the

supernatant was transferred to an autosampler vial and fortified with 20 µL of a 25 ng/mL internal standard solution. The samples were then analyzed using electrospray LC/MS/MS.

## 3.2 Solid Sample Preparation

One gram of solid was measured into a 50 mL centrifuge tube. Samples designated as lab spikes were fortified appropriately with analyte and surrogate. All samples were fortified with a 40 µL portion of a 100 ng/mL surrogate spiking solution of PFOA (m+4). Eight milliliters of 80:20 acetonitrile: water was added to the sample. After shaking, the sample was sonicated for approximately 2 hours then centrifuged at 3000 rpm for 10 minutes. A 1 mL portion of the supernatant was transferred to an autosampler vial and fortified with 20 µL of a 25 ng/mL internal standard solution. The samples were then analyzed using electrospray LC/MS/MS.

## 3.3 Sample Analysis by LC/MS/MS

In High Pressure Liquid Chromatography (HPLC), an aliquot of extract is injected and passed through a liquid-phase chromatographic column. Based on the affinity of the analyte for the stationary phase in the column relative to the liquid mobile phase, the analyte is retained for a characteristic amount of time. Following HPLC separation, mass spectrometry provides a rapid and accurate means for analyzing a wide range of organic compounds. Molecules are ionized, fragmented, and detected. The ions characteristic of the compounds are observed and quantitated against calibration standards.

An HP1100 system interfaced to an Applied Biosystems API 5000 LC/MS/MS was used to analyze the sample extracts for quantitation. A gradient elution through a Phenomenex Luna 3µ C8(2) Mercury, 20 x 4.0 mm column was used for separation.

The following gradient was performed:

Mobile Phase (A): 2mM Ammonium Acetate in Water
Mobile Phase (B): Methanol

| Time | %A | %B |
|---|---|---|
| 0.0 | 90 | 10 |
| 0.5 | 90 | 10 |
| 2.0 | 10 | 90 |
| 5.0 | 10 | 90 |
| 5.1 | 0 | 100 |
| 6.0 | 0 | 100 |
| 6.1 | 90 | 10 |
| 10.0 | 90 | 10 |

The following parameter ; were used for operation of the mass spectrometer:

| Parameter | Setting |
|---|---|
| Ionization Mode | Electrospray |
| Polarity | Negative |
| Transitions Monitored | 213→169 (C4 Acid) |
| | 263→219 (C5 Acid) |
| | 313→269 (C6 Acid) |
| | 363→319 (C7 Acid) |
| | 413→369 (C8 Acid) |
| | 463→419 (C9 Acid) |
| | 513→469 (C10 Acid) |
| | 563→519 (C11 Acid) |
| | 613→569 (C12 Acid) |
| | 663→619 (C13 Acid) |
| | 713→669 (C14 Acid) |
| | 299→80 (PFBS) |
| | 399→80 (PFHS) |
| | 499→80 (PFOS) |
| | 498→78 (FOSA) |
| | 415→370 (Internal Std. $^{13}$C PFOA (m+2)) |
| | 417→372 (Surrogate $^{13}$C PFOA (m+4)) |
| Gas Temperature | 450°C |

# 4 *Analysis by LCMSMS*

## 4.1 Calibration

For the water sample analysis, a 9 -point calibration curve was analyzed throughout the analytical sequence for all compounds of interest. The calibration points were prepared at 0.0125, 0.025, 0.050, 0.100, 0.250, 0.500, 1.0, 2.5 and 5.0 ng/mL (ppb) each containing 0.5 ng/mL $^{13}$C-PFOA (m+2). For the solid sample analysis, an 8-point calibration curve was analyzed throughout the analytical sequence for all compounds of interest. The calibration points were prepared at 0.025, 0.050, 0.100, 0.250, 0.500, 1.0, 2.5 and 5.0 ng/mL (ppb) each containing 0.5 ng/mL $^{13}$C-PFOA (m+2). Standard preparation details can be found in Attachment D.

The ratio of the analyte concentration to the IS concentration versus the ratio of the analyte instrument response (area) to the IS response (area) was plotted for each point. Using linear regression with 1/x weighting, the slope, y-intercept and coefficient of determination ($r^2$) were determined. A calibration curve is acceptable if $r^2 \geq 0.985$.

For the results reported here, calibration criteria were met. The calibration curves are included in the raw data in Attachment C.

## 4.2 Surrogates

$^{13}C$ labeled-perfluorooctanoic acid ($^{13}C$ PFOA (m+4)) is used as a surrogate for the water and solid samples.

$^{13}C$ PFOA (m+4) recoveries can be found in Attachment B.

## 4.3 Laboratory Control Spikes

Laboratory control spikes in the analytical set were prepared during each extraction set by adding a known concentration of the analyte to laboratory reagents and/or controls. Laboratory control spikes are used to assess method accuracy. The laboratory control spikes must show recoveries between 70-130% or the data is rejected. For the results reported here, the laboratory control spikes were within the acceptable range. Laboratory control spike recoveries are given in Attachment B.

## 4.4 Matrix Spikes

Seven matrix spikes, five for water and two for solids, were prepared by adding a known concentration of the target analyte to a sample. Matrix spikes are used to assess method accuracy in the matrix. The matrix spikes should show recoveries between 70-130%. For the results reported here, the matrix spikes were within the acceptable range with the exceptions of:

L18099-19 (MW M10) Spk C at 0.5 ng/mL for C5 Acid, C7 Acid, C8 Acid, C10 Acid and C13 Acid, which gave high recoveries after two separate preparations.

L18099-32 (MW D6) Spk D at 0.5 ng/mL for C13 Acid, which gave high recoveries after two separate preparations.

L18099-41 (SP CA15) Spk C at 0.5 ng/mL for C6 Acid, and C8 Acid, which gave high recoveries after two separate preparations.

L18099-57 (River R1) Spk D at 0.5 ng/mL for C9 Acid, C12 Acid, and C13 Acid, which gave high recoveries after two separate preparations.

L18099-2 (AC 6 Soil) Spk C at 5.0 ng/mL for C11 Acid, which gave high recoveries after two separate preparations.

## 4.5 Laboratory Duplicates

Five water samples and two solid samples were prepared in duplicate and analyzed. Duplicate results are given along with the sample results in Attachment B.

## 5 Data Summary

Please see Attachment B for a detailed listing of the analytical results. For the water samples the results are reported in parts per billion (ng/mL) on an as-received basis. For the solid samples, the results are reported in parts per billion (ng/g), on a dry-weight basis.

## 6 Data/Sample Retention

Samples are disposed of 60 days after the report is issued unless otherwise specified by the project manager. All electronic data is archived on retrievable media and hard copy reports are stored in data folders maintained by MPI Research. Hardcopy data is stored for a minimum of five years. The client will be notified 30 days prior to the disposal of hardcopy data.

## 7 Attachments

7.1 Attachment A: Chain of Custody

7.2 Attachment B: Analytical Results

7.3 Attachment C: Raw Analytical Data for Water

7.4 Attachment D: Raw Analytical Data for Solids

## 8 *Signatures*

Mark Neeley, Research Chemist Associate II — Date: 6-26-09

Karen Rishra, Manager, Analytical — Date: 06/29/09

Other Lab Members Contributing to Data:
**Sarah Coghlan**
**Sharareh Zolghadr**

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Analytical Report

# Summary of Fluorochemical Residues in Water Samples

| Sample ID | C4 Acid Perfluorobutyric Acid Analyte Found (ng/mL, ppb) | C5 Acid Perfluoropentanoic Acid Analyte Found (ng/mL, ppb) | C6 Acid Perfluorohexanoic Acid Analyte Found (ng/mL, ppb) | C7 Acid Perfluoroheptanoic Acid Analyte Found (ng/mL, ppb) | C8 Acid Perfluorooctanoic Acid Analyte Found (ng/mL, ppb) |
|---|---|---|---|---|---|
| MW M10 | ND | 0.0373 | 0.0498 | ND | ND |
| MW M10* | ND | 0.0586 | 0.0614 | NQ | ND |
| MW M11 | 0.173 | 0.427 | 0.574 | 0.154 | 0.287 |
| MW M9 | 1.01 | 4.58 | 2.44 | 0.564 | 0.512 |
| MW D2 | 0.275 | 0.909 | 0.713 | 0.472 | 1.10 |
| MW M1 | 0.0993 | 0.411 | 0.426 | 0.295 | 0.604 |
| MW U1 | ND | 0.0278 | NQ | ND | ND |
| MW D3 | 0.251 | 0.664 | 0.380 | 0.161 | 0.228 |
| MW D1 | 0.0950 | 0.434 | 0.487 | 0.387 | 1.21 |
| MW M5 | 0.529 | 1.90 | 1.98 | 1.35 | 2.87 |
| MW M6A | 0.0515 | 0.171 | 0.148 | 0.145 | 0.331 |
| MW M17 | 1.38 | 3.10 | 2.36 | 2.01 | 4.40 |
| MW M14 | 0.681 | 3.28 | 3.01 | 1.50 | 2.44 |
| MW M13 | 0.931 | 3.62 | 3.42 | 2.45 | 4.41 |
| MW D6 | 0.550 | 1.92 | 1.680 | 1.13 | 2.73 |
| MW D6* | 0.447 | 1.68 | 1.640 | 1.01 | 2.60 |
| MW D4 | 0.759 | 2.49 | 2.54 | 1.95 | 4.16 |
| MW M3 | 0.0318 | 0.139 | 0.0613 | ND | ND |
| MW M7 | 0.414 | 1.82 | 1.69 | 0.906 | 1.71 |
| MW M2 | 0.959 | 2.13 | 0.397 | NQ | ND |
| MW M8 | 0.381 | 0.885 | 0.868 | 0.421 | 1.08 |
| MW M12 | 0.749 | 2.68 | 2.28 | 1.51 | 2.97 |
| SP AC5 | 0.566 | 1.26 | 0.746 | 0.309 | 0.479 |
| SP BA2 | 0.665 | 1.37 | 0.811 | 0.328 | 0.469 |
| SP BA2* | 0.742 | 1.47 | 0.963 | 0.341 | 0.539 |
| SP CA15 | 0.684 | 1.45 | 0.723 | 0.261 | 0.509 |
| SP CA15* | 0.805 | 1.58 | 1.04 | 0.306 | 0.658 |
| SP AC2 | 0.609 | 1.40 | 0.797 | 0.305 | 0.591 |
| SP AC15 | 0.710 | 1.53 | 0.964 | 0.312 | 0.592 |
| SP AC4 | 0.646 | 1.48 | 0.994 | 0.331 | 0.702 |
| SP AC14 | 0.755 | 1.67 | 1.17 | 0.349 | 0.754 |
| SP CB14A | 0.869 | 1.77 | 0.935 | 0.314 | 0.692 |
| SP CB12 | 0.751 | 1.43 | 0.749 | 0.274 | 0.531 |
| SP BB9 | 0.785 | 1.50 | 0.763 | 0.260 | 0.568 |
| SP BB13 | 0.761 | 1.52 | 0.767 | 0.270 | 0.565 |
| SP CA2 | 0.776 | 1.43 | 0.709 | 0.275 | 0.527 |
| SP CB3 | 0.903 | 1.69 | 0.878 | 0.316 | 0.615 |
| SP BB12 | 0.998 | 1.80 | 1.13 | 0.358 | 0.755 |
| SP BA4 | 0.839 | 1.57 | 0.824 | 0.305 | 0.566 |
| MW D11 | ND | ND | ND | ND | ND |
| MW D9 | 0.774 | 2.02 | 1.79 | 1.44 | 3.21 |
| MW M4 | 0.530 | 2.50 | 2.25 | 1.48 | 3.89 |
| River R1 | ND | ND | ND | ND | ND |
| River R1* | ND | ND | ND | ND | ND |
| River R2 | 0.0494 | 0.184 | 0.188 | 0.112 | 0.358 |
| River R3 | ND | 0.0386 | ND | ND | 0.0310 |
| River R4 | 0.0468 | 0.195 | 0.170 | 0.0822 | 0.266 |

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Analytical Report

## Summary of Fluorochemical Residues in Water Samples (continued)

| Sample ID | C9 Acid Perfluorononanoic Acid Analyte Found (ng/mL, ppb) | C10 Acid Perfluorodecanoic Acid Analyte Found (ng/mL, ppb) | C11 Acid Perfluoroundecanoic Acid Analyte Found (ng/mL, ppb) | C12 Acid Perfluorododecanoic Acid Analyte Found (ng/mL, ppb) | C13 Acid Perfluorotridecanoic Acid Analyte Found (ng/mL, ppb) |
|---|---|---|---|---|---|
| MW M10 | ND | ND | ND | ND | ND |
| MW M10* | ND | ND | ND | ND | ND |
| MW M11 | 0.0308 | ND | ND | ND | ND |
| MW M9 | ND | ND | ND | ND | ND |
| MW D2 | 0.131 | 0.0825 | ND | ND | ND |
| MW M1 | ND | ND | ND | ND | ND |
| MW U1 | ND | ND | ND | ND | ND |
| MW D3 | ND | ND | ND | ND | ND |
| MW D1 | 0.104 | 0.128 | ND | ND | ND |
| MW M5 | 0.449 | 0.0578 | ND | ND | ND |
| MW M6A | 0.0730 | NQ | ND | ND | ND |
| MW M17 | 1.17 | 0.856 | 0.137 | ND | ND |
| MW M14 | 0.129 | ND | ND | ND | ND |
| MW M13 | 0.811 | 0.120 | ND | ND | ND |
| MW D6 | 0.575 | 0.211 | ND | ND | ND |
| MW D6* | 0.497 | 0.190 | ND | ND | ND |
| MW D4 | 0.543 | 0.0966 | ND | ND | ND |
| MW M3 | ND | ND | ND | ND | ND |
| MW M7 | 0.0940 | 0.0978 | ND | ND | ND |
| MW M2 | ND | ND | ND | ND | ND |
| MW M8 | 0.108 | 0.106 | ND | ND | ND |
| MW M12 | 0.452 | 0.167 | ND | ND | ND |
| SP AC5 | 0.104 | 0.227 | 0.109 | ND | ND |
| SP BA2 | 0.0652 | 0.162 | 0.107 | ND | ND |
| SP BA2* | 0.0764 | 0.173 | 0.117 | ND | ND |
| SP CA15 | 0.113 | 0.200 | 0.118 | ND | ND |
| SP CA15* | 0.120 | 0.225 | 0.141 | ND | ND |
| SP AC2 | 0.127 | 0.246 | 0.164 | ND | NQ |
| SP AC15 | 0.0832 | 0.152 | 0.105 | ND | ND |
| SP AC4 | 0.126 | 0.267 | 0.187 | ND | NQ |
| SP AC14 | 0.137 | 0.233 | 0.172 | ND | ND |
| SP CB14A | 0.119 | 0.218 | 0.151 | ND | ND |
| SP CB12 | 0.118 | 0.192 | 0.114 | ND | ND |
| SP BB9 | 0.0984 | 0.180 | 0.107 | ND | ND |
| SP BB13 | 0.103 | 0.194 | 0.119 | ND | ND |
| SP CA2 | 0.107 | 0.194 | 0.106 | ND | ND |
| SP CB3 | 0.108 | 0.186 | 0.108 | ND | ND |
| SP BB12 | 0.132 | 0.254 | 0.159 | ND | ND |
| SP BA4 | 0.108 | 0.208 | 0.118 | ND | ND |
| MW D11 | ND | ND | ND | ND | ND |
| MW D9 | 0.604 | 0.103 | ND | ND | ND |
| MW M4 | 0.333 | 0.217 | ND | ND | ND |
| River R1 | ND | ND | ND | ND | ND |
| River R1* | ND | ND | ND | ND | ND |
| River R2 | 0.0646 | 0.0807 | ND | ND | ND |
| River R3 | ND | ND | ND | ND | ND |
| River R4 | 0.0504 | 0.0763 | ND | ND | ND |

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Analytical Report

## Summary of Fluorochemical Residues in Water Samples (continued)

| Sample ID | C14 Acid Perfluorotetradecanoic Acid Analyte Found (ng/mL, ppb) | PFBS Perfluorobutanesulfonate Analyte Found (ng/mL, ppb) | PFHS Perfluorohexanesulfonate Analyte Found (ng/mL, ppb) | PFOS Perfluorooctanesulfonate Analyte Found (ng/mL, ppb) | FOSA Perfluorooctane sulfonamide Analyte Found (ng/mL, ppb) |
|---|---|---|---|---|---|
| MW M10 | ND | 0.145 | ND | ND | ND |
| MW M10* | ND | 0.188 | ND | ND | ND |
| MW M11 | ND | 0.227 | 0.0362 | 0.152 | ND |
| MW M9 | ND | 0.282 | 0.108 | ND | ND |
| MW D2 | ND | 0.749 | 0.155 | 1.07 | 0.0429 |
| MW M1 | ND | 0.180 | 0.159 | 0.451 | ND |
| MW U1 | ND | ND | ND | ND | ND |
| MW D3 | ND | 0.281 | 0.0381 | 0.105 | ND |
| MW D1 | ND | 0.588 | 0.263 | 1.98 | ND |
| MW M5 | ND | 2.19 | 0.841 | 2.52 | ND |
| MW M6A | ND | 0.454 | NQ | 0.127 | ND |
| MW M17 | ND | 19.4 | 0.219 | 2.31 | 0.134 |
| MW M14 | ND | 0.698 | 0.719 | 0.753 | ND |
| MW M13 | ND | 2.49 | 1.00 | 2.18 | ND |
| MW D6 | ND | 1.57 | 0.337 | 1.93 | 0.0842 |
| MW D6* | ND | 1.42 | 0.279 | 1.83 | 0.0742 |
| MW D4 | ND | 4.36 | 0.958 | 3.35 | ND |
| MW M3 | ND | ND | ND | ND | ND |
| MW M7 | ND | 0.406 | 0.361 | 0.986 | ND |
| MW M2 | ND | NQ | ND | ND | ND |
| MW M8 | ND | 4.79 | 0.0695 | 0.479 | ND |
| MW M12 | ND | 1.62 | 0.515 | 2.08 | ND |
| SP AC5 | ND | 1.24 | ND | 0.287 | 0.0265 |
| SP BA2 | ND | 1.10 | NQ | 0.236 | NQ |
| SP BA2* | ND | 1.23 | 0.0290 | 0.259 | 0.0277 |
| SP CA15 | ND | 2.23 | 0.0594 | 0.289 | 0.0321 |
| SP CA15* | ND | 2.40 | 0.0682 | 0.348 | 0.0395 |
| SP AC2 | ND | 1.38 | 0.0301 | 0.350 | 0.0487 |
| SP AC15 | ND | 1.59 | 0.0390 | 0.272 | 0.0259 |
| SP AC4 | ND | 1.59 | 0.0336 | 0.387 | 0.0565 |
| SP AC14 | ND | 1.77 | 0.0430 | 0.380 | 0.0513 |
| SP CB14A | ND | 3.86 | 0.0417 | 0.336 | 0.0414 |
| SP CB12 | ND | 3.21 | 0.0686 | 0.281 | 0.0269 |
| SP BB9 | ND | 3.01 | 0.0439 | 0.275 | 0.0264 |
| SP BB13 | ND | 2.92 | 0.0508 | 0.280 | 0.0291 |
| SP CA2 | ND | 3.19 | 0.0690 | 0.277 | 0.0274 |
| SP CB3 | ND | 3.66 | 0.0464 | 0.276 | 0.0253 |
| SP BB12 | ND | 3.99 | 0.0833 | 0.382 | 0.0413 |
| SP BA4 | ND | 3.18 | 0.0697 | 0.292 | 0.0319 |
| MW D11 | ND | ND | ND | NQ | ND |
| MW D9 | ND | 5.11 | 0.531 | 2.94 | ND |
| MW M4 | ND | 0.641 | 1.00 | 5.15 | 0.0329 |
| River R1 | ND | NQ | ND | NQ | ND |
| River R1* | ND | NQ | ND | NQ | ND |
| River R2 | ND | 0.319 | 0.0484 | 0.665 | 0.0575 |
| River R3 | ND | NQ | ND | 0.0477 | ND |
| River R4 | ND | 0.295 | 0.0368 | 0.601 | 0.0442 |

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## Recovery Summary of Fluorochemical Residues in Water Samples

| Sample Description | Amount Spiked (ng/mL) | C4 Acid Amt Found in Sample (ng/mL) | C4 Acid Amount Recovered (ng/mL) | C4 Acid Recovery (%) | C5 Acid Amt Found in Sample (ng/mL) | C5 Acid Amount Recovered (ng/mL) | C5 Acid Recovery (%) | C6 Acid Amt Found in Sample (ng/mL) | C6 Acid Amount Recovered (ng/mL) | C6 Acid Recovery (%) | C7 Acid Amt Found in Sample (ng/mL) | C7 Acid Amount Recovered (ng/mL) | C7 Acid Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A (061809A) 0.05 ng/mL | 0.05 | ND | 0.0541 | 108 | ND | 0.0581 | 116 | ND | 0.0600 | 120 | ND | 0.0582 | 116 |
| Reagent Spike B (061809A) 0.5 ng/mL | 0.5 | ND | 0.408 | 82 | ND | 0.410 | 82 | ND | 0.393 | 79 | ND | 0.469 | 94 |
| Reagent Spike A (061809B) 0.05 ng/mL | 0.05 | ND | 0.0557 | 111 | ND | 0.0480 | 96 | ND | 0.0646 | 129 | ND | 0.0489 | 98 |
| Reagent Spike B (061809B) 0.5 ng/mL | 0.5 | ND | 0.395 | 79 | ND | 0.398 | 80 | ND | 0.363 | 73 | ND | 0.463 | 93 |
| Reagent Spike A (062309A) 0.05 ng/mL | 0.05 | ** | ** | ** | ** | ** | ** | ND | 0.0531 | 106 | ** | ** | ** |
| Reagent Spike B (062309A) 0.5 ng/mL | 0.5 | ** | ** | ** | ** | ** | ** | ND | 0.496 | 99 | ** | ** | ** |
| MW M10 Matrix Spike (L18099-19 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.589 | 118 | 0.0373 | 0.733 | 139^ | 0.0498 | 0.694 | 129 | ND | 0.780 | 158^ |
| MW D6 Matrix Spike (L18099-32 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | 0.550 | 0.923 | 75 | 1.92 | 2.33 | 82 | 1.68 | 2.14 | 92 | 1.13 | 1.65 | 104 |
| SP BA2 Matrix Spike (L18099-40 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | 0.665 | 1.03 | 73 | 1.37 | 1.81 | 88 | 0.811 | 1.25 | 88 | 0.328 | 0.899 | 114 |
| SP CA15 Matrix Spike (L18099-41 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.684 | 1.16 | 95 | 1.45 | 2.02 | 114 | 0.723 | 1.46 | 147^ | 0.261 | 0.903 | 128 |
| River R1 Matrix Spike (L18099-57 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.495 | 99 | ND | 0.581 | 116 | ND | 0.523 | 105 | ND | 0.644 | 129 |

| Sample Description | Amount Spiked (ng/mL) | C8 Acid Amt Found in Sample (ng/mL) | C8 Acid Amount Recovered (ng/mL) | C8 Acid Recovery (%) | C9 Acid Amt Found in Sample (ng/mL) | C9 Acid Amount Recovered (ng/mL) | C9 Acid Recovery (%) | C10 Acid Amt Found in Sample (ng/mL) | C10 Acid Amount Recovered (ng/mL) | C10 Acid Recovery (%) | C11 Acid Amt Found in Sample (ng/mL) | C11 Acid Amount Recovered (ng/mL) | C11 Acid Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A (061809A) 0.05 ng/mL | 0.05 | ND | 0.0569 | 114 | ND | 0.0612 | 122 | ND | 0.0486 | 97 | ND | 0.0602 | 120 |
| Reagent Spike B (061809A) 0.5 ng/mL | 0.5 | ND | 0.395 | 79 | ND | 0.433 | 87 | ND | 0.435 | 87 | ND | 0.398 | 80 |
| Reagent Spike A (061809B) 0.05 ng/mL | 0.05 | ND | 0.0533 | 107 | ND | 0.0468 | 94 | ND | 0.0581 | 116 | ND | 0.0575 | 115 |
| Reagent Spike B (061809B) 0.5 ng/mL | 0.5 | ND | 0.397 | 79 | ND | 0.403 | 81 | ND | 0.417 | 83 | ND | 0.368 | 74 |
| Reagent Spike A (062309A) 0.05 ng/mL | 0.05 | ND | 0.0443 | 89 | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| Reagent Spike B (062309A) 0.5 ng/mL | 0.5 | ND | 0.589 | 118 | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| MW M10 Matrix Spike (L18099-19 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.654 | 131^ | ND | 0.607 | 121 | ND | 0.686 | 137^ | ND | 0.600 | 120 |
| MW D6 Matrix Spike (L18099-32 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | 2.73 | 3.32 | 118 | 0.575 | 1.15 | 115 | 0.211 | 0.830 | 124 | ND | 0.505 | 101 |
| SP BA2 Matrix Spike (L18099-40 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | 0.469 | 0.94 | 94 | 0.0652 | 0.555 | 98 | 0.162 | 0.744 | 116 | 0.107 | 0.585 | 96 |
| SP CA15 Matrix Spike (L18099-41 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.509 | 1.18 | 134^ | 0.113 | 0.671 | 112 | 0.200 | 0.765 | 113 | 0.118 | 0.728 | 122 |
| River R1 Matrix Spike (L18099-57 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.610 | 122 | ND | 0.704 | 141^ | ND | 0.627 | 125 | ND | 0.620 | 124 |

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**Analysis not required.
^ Confirmation analysis was performed for the out of range recovery. The second analysis confirmed the high recovery, a matrix effect is suspected to be the cause.

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## Recovery Summary of Fluorochemical Residues in Water Samples (continued)

| Sample Description | Amount Spiked (ng/mL) | C12 Acid Amt Found in Sample (ng/mL) | C12 Acid Amount Recovered (ng/mL) | C12 Acid Recovery (%) | C13 Acid Amt Found in Sample (ng/mL) | C13 Acid Amount Recovered (ng/mL) | C13 Acid Recovery (%) | C14 Acid Amt Found in Sample (ng/mL) | C14 Acid Amount Recovered (ng/mL) | C14 Acid Recovery (%) | PFBS Amt Found in Sample (ng/mL) | PFBS Amount Recovered (ng/mL) | PFBS Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A (061809A) 0.05 ng/mL | 0.05 | ND | 0.0574 | 115 | ND | 0.0513 | 103 | ND | 0.0647 | 129 | ND | 0.0546 | 109 |
| Reagent Spike B (061809A) 0.5 ng/mL | 0.5 | ND | 0.395 | 79 | ND | 0.427 | 85 | ND | 0.408 | 82 | ND | 0.442 | 88 |
| Reagent Spike A (061809B) 0.05 ng/mL | 0.05 | ND | 0.0606 | 121 | ND | 0.0580 | 116 | ND | 0.0518 | 104 | ND | 0.0652 | 130 |
| Reagent Spike B (061809B) 0.5 ng/mL | 0.5 | ND | 0.366 | 73 | ND | 0.390 | 78 | ND | 0.384 | 77 | ND | 0.393 | 79 |
| Reagent Spike A (062309A) 0.05 ng/mL | 0.05 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ND | 0.041 | 82 |
| Reagent Spike B (062309A) 0.5 ng/mL | 0.5 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ND | 0.516 | 103 |
| MW M10 Matrix Spike (L18099-19 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.641 | 128 | ND | 0.725 | 145^ | ND | 0.603 | 121 | 0.145 | 0.718 | 115 |
| MW D6 Matrix Spike (L18099-32 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.577 | 115 | ND | 0.716 | 143^ | ND | 0.597 | 119 | 1.57 | 1.93 | 72 |
| SP BA2 Matrix Spike (L18099-40 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.484 | 97 | ND | 0.607 | 121 | ND | 0.477 | 95 | 1.10 | 1.53 | 86 |
| SP CA15 Matrix Spike (L18099-41 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.566 | 113 | ND | 0.572 | 114 | ND | 0.515 | 103 | 2.23 | 2.86 | 126 |
| River R1 Matrix Spike (L18099-57 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.672 | 134^ | ND | 0.708 | 142^ | ND | 0.622 | 124 | NQ | 0.598 | 120 |

| Sample Description | Amount Spiked (ng/mL) | PFHS Amt Found in Sample (ng/mL) | PFHS Amount Recovered (ng/mL) | PFHS Recovery (%) | PFOS Amt Found in Sample (ng/mL) | PFOS Amount Recovered (ng/mL) | PFOS Recovery (%) | FOSA Amt Found in Sample (ng/mL) | FOSA Amount Recovered (ng/mL) | FOSA Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A (061809A) 0.05 ng/mL | 0.05 | ND | 0.0568 | 114 | ND | 0.0514 | 103 | ND | 0.0541 | 108 |
| Reagent Spike B (061809A) 0.5 ng/mL | 0.5 | ND | 0.416 | 83 | ND | 0.407 | 81 | ND | 0.440 | 88 |
| Reagent Spike A (061809B) 0.05 ng/mL | 0.05 | ND | 0.0541 | 108 | ND | 0.0584 | 117 | ND | 0.0497 | 99 |
| Reagent Spike B (061809B) 0.5 ng/mL | 0.5 | ND | 0.413 | 83 | ND | 0.398 | 80 | ND | 0.401 | 80 |
| Reagent Spike A (062309A) 0.05 ng/mL | 0.05 | ** | ** | ** | ND | 0.0432 | 86 | ** | ** | ** |
| Reagent Spike B (062309A) 0.5 ng/mL | 0.5 | ** | ** | ** | ND | 0.545 | 109 | ** | ** | ** |
| MW M10 Matrix Spike (L18099-19 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.575 | 115 | ND | 0.585 | 117 | ND | 0.609 | 122 |
| MW D6 Matrix Spike (L18099-32 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | 0.337 | 0.783 | 89 | 1.93 | 2.47 | 108 | 0.0842 | 0.625 | 108 |
| SP BA2 Matrix Spike (L18099-40 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | NQ | 0.415 | 83 | 0.236 | 0.632 | 79 | NQ | 0.470 | 94 |
| SP CA15 Matrix Spike (L18099-41 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.0594 | 0.515 | 91 | 0.289 | 0.779 | 98 | 0.0321 | 0.553 | 104 |
| River R1 Matrix Spike (L18099-57 Spk D, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.595 | 119 | NQ | 0.561 | 112 | ND | 0.650 | 130 |

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**Analysis not required.
^ Confirmation analysis was performed for the out of range recovery. The second analysis confirmed the high recovery, a matrix effect is suspected to be the cause.

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## Recovery Summary of $^{13}C$ PFOA (m+4) in Water Samples

| Client Sample ID | MPI Sample ID | Amount Spiked (ng/mL, ppb) | Amount Recovered (ng/mL, ppb) | Recovery (%) |
|---|---|---|---|---|
| NA | Reagent Control (061809A) | 0.50 | 0.616 | 123 |
| NA | Reagent Spike A (061809A) | 0.05 | 0.0585 | 117 |
| NA | Reagent Spike B (061809A) | 0.50 | 0.442 | 88 |
| NA | Reagent Control (061809B) | 0.50 | 0.669 | 134 |
| NA | Reagent Spike A (061809B) | 0.05 | 0.0497 | 99 |
| NA | Reagent Spike B (061809B) | 0.50 | 0.452 | 90 |
| MW M10 Spike C | L18099-19 Spike C | 0.50 | 0.638 | 128 |
| MW M10 | L18099-19 | 0.50 | 0.597 | 119 |
| MW M10* | L18099-19 DUP | 0.50 | 0.595 | 119 |
| MW M11 | L18099-20 | 0.50 | 0.693 | 139 |
| MW M9 | L18099-21 | 0.50 | 0.613 | 123 |
| MW D2 | L18099-22 | 0.50 | 0.640 | 128 |
| MW M1 | L18099-23 | 0.50 | 0.595 | 119 |
| MW U1 | L18099-24 | 0.50 | 0.602 | 120 |
| MW D3 | L18099-25 | 0.50 | 0.562 | 112 |
| MW D1 | L18099-26 | 0.50 | 0.630 | 126 |
| MW M5 | L18099-27 | 0.50 | 0.636 | 127 |
| MW M6A | L18099-28 | 0.50 | 0.619 | 124 |
| MW M17 | L18099-29 | 0.50 | 0.603 | 121 |
| MW M14 | L18099-30 | 0.50 | 0.640 | 128 |
| MW M13 | L18099-31 | 0.50 | 0.664 | 133 |
| MW D6 Spike D | L18099-32 Spike D | 0.50 | 0.625 | 125 |
| MW D6 | L18099-32 | 0.50 | 0.673 | 135 |
| MW D6* | L18099-32 DUP | 0.50 | 0.550 | 110 |
| MW D4 | L18099-33 | 0.50 | 0.535 | 107 |
| MW M3 | L18099-34 | 0.50 | 0.574 | 115 |
| MW M7 | L18099-35 | 0.50 | 0.533 | 107 |
| MW M2 | L18099-36 | 0.50 | 0.522 | 104 |
| MW M8 | L18099-37 | 0.50 | 0.561 | 112 |
| MW M12 | L18099-38 | 0.50 | 0.580 | 116 |
| SP AC5 | L18099-39 | 0.50 | 0.529 | 106 |
| SP BA2 Spike E | L18099-40 Spike E | 0.50 | 0.586 | 117 |
| SP BA2 | L18099-40 | 0.50 | 0.558 | 112 |
| SP BA2* | L18099-40 DUP | 0.50 | 0.590 | 118 |
| SP CA15 Spike C | L18099-41 Spike C | 0.50 | 0.619 | 124 |
| SP CA15 | L18099-41 | 0.50 | 0.615 | 123 |
| SP CA15* | L18099-41 DUP | 0.50 | 0.540 | 108 |
| SP AC2 | L18099-42 | 0.50 | 0.565 | 113 |
| SP AC15 | L18099-43 | 0.50 | 0.545 | 109 |
| SP AC4 | L18099-44 | 0.50 | 0.564 | 113 |
| SP AC14 | L18099-45 | 0.50 | 0.579 | 116 |
| SP CB14A | L18099-46 | 0.50 | 0.586 | 117 |
| SP CB12 | L18099-47 | 0.50 | 0.577 | 115 |
| SP BB9 | L18099-48 | 0.50 | 0.551 | 110 |
| SP BB13 | L18099-49 | 0.50 | 0.517 | 103 |
| SP CA2 | L18099-50 | 0.50 | 0.579 | 116 |
| SP CB3 | L18099-51 | 0.50 | 0.680 | 136 |
| SP BB12 | L18099-52 | 0.50 | 0.647 | 129 |
| SP BA4 | L18099-53 | 0.50 | 0.611 | 122 |
| MW D11 | L18099-54 | 0.50 | 0.606 | 121 |
| MW D9 | L18099-55 | 0.50 | 0.645 | 129 |
| MW M4 | L18099-56 | 0.50 | 0.623 | 125 |
| River R1 Spike D | L18099-57 Spike D | 0.50 | 0.730 | 146 |
| River R1 | L18099-57 | 0.50 | 0.604 | 121 |
| River R1* | L18099-57 DUP | 0.50 | 0.689 | 138 |
| River R2 | L18099-58 | 0.50 | 0.595 | 119 |
| River R3 | L18099-59 | 0.50 | 0.628 | 126 |
| River R4 | L18099-60 | 0.50 | 0.628 | 126 |

* Laboratory Duplicate

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Analytical Report

# Summary of Fluorochemical Residues in Solid Samples

| Sample ID | C4 Acid Perfluorobutyric Acid Analyte Found (µg/kg) Dry Weight | C5 Acid Perfluoropentanoic Acid Analyte Found (µg/kg) Dry Weight | C6 Acid Perfluorohexanoic Acid Analyte Found (µg/kg) Dry Weight | C7 Acid Perfluoroheptanoic Acid Analyte Found (µg/kg) Dry Weight | C8 Acid Perfluorooctanoic Acid Analyte Found (µg/kg) Dry Weight ppl |
|---|---|---|---|---|---|
| Compost | 712 | 408 | 559 | 499 | 4420 |
| AC 6 Soil | 1.36 | 4.20 | 2.88 | 1.58 | 6.83 |
| AC 6 Soil* | 1.63 | 4.38 | 3.42 | 1.68 | 7.75 |
| BA 11 Soil | 2.44 | 6.79 | 4.68 | 1.59 | 8.64 |
| BA 12 Soil | 6.30 | 7.97 | 7.31 | 2.72 | 14.3 |
| BB 13 Soil | 4.48 | 15.6 | 11.0 | 6.58 | 21.3 |
| CA 5 Soil | 4.60 | 11.1 | 6.37 | 2.89 | 16.9 |
| CA 12 Soil | 3.43 | 11.6 | 7.76 | 3.36 | 12.2 |
| CB 4 Soil | 3.71 | 10.0 | 4.89 | 1.34 | 5.34 |
| CB 14A Soil | 7.37 | 32.3 | 21.5 | 8.75 | 29.7 |
| BB 9 Soil | 1.15 | 5.48 | 3.88 | 1.62 | 8.46 |
| CA 9B Soil | 1.89 | 3.95 | 3.77 | 2.18 | 16.7 |
| CB 13 Soil | 3.27 | 10.2 | 9.22 | 4.46 | 17.7 |
| AC 13 Soil | 1.30 | 8.94 | 5.43 | 2.36 | 7.36 |
| BA 5 Soil | 4.86 | 13.4 | 7.96 | 6.08 | 37.0 |
| BB 12 Soil | 3.90 | 12.3 | 7.45 | 3.27 | 12.8 |
| STP 2 Sludge | ND | 224 | 157 | ND | 87.5 |
| STP 2 Sludge* | ND | 215 | 187 | ND | 81.3 |
| STP 3 Sludge | ND | 281 | 128 | ND | 68.2 |
| STP 4 Sludge | 152 | 415 | 190 | 33.8 | 134 |

*Laboratory Duplicate
ND = Not Detected = Response below the LOQ of 0.2 µg/kg (wet weight)

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Analytical Report

## Summary of Fluorochemical Residues in Solid Samples (continued)

| Sample ID | C9 Acid Perfluorononanoic Acid Analyte Found (µg/kg) Dry Weight | C10 Acid Perfluorodecanoic Acid Analyte Found (µg/kg) Dry Weight | C11 Acid Perfluoroundecanoic Acid Analyte Found (µg/kg) Dry Weight | C12 Acid Perfluorododecanoic Acid Analyte Found (µg/kg) Dry Weight | C13 Acid Perfluorotridecanoic Acid Analyte Found (µg/kg) Dry Weight |
|---|---|---|---|---|---|
| Compost | 681 | 3160 | 1400 | 654 | 441 |
| AC 6 Soil | 3.89 | 20.1 | 60.2 | 44.2 | 44.0 |
| AC 6 Soil* | 4.36 | 19.2 | 53.9 | 41.9 | 47.0 |
| BA 11 Soil | 5.44 | 48.6 | 117 | 53.2 | 47.4 |
| BA 12 Soil | 9.89 | 33.8 | 37.1 | 10.5 | 9.99 |
| BB 13 Soil | 17.8 | 93.7 | 433 | 109 | 282 |
| CA 5 Soil | 8.54 | 48.8 | 52.4 | 34.6 | 23.0 |
| CA 12 Soil | 7.96 | 40.4 | 124 | 59.7 | 96.3 |
| CB 4 Soil | 3.26 | 22.3 | 81.9 | 18.4 | 24.9 |
| CB 14A Soil | 19.2 | 70.6 | 164 | 105 | 166 |
| BB 9 Soil | 3.90 | 24.3 | 43.3 | 25.2 | 35.0 |
| CA 9B Soil | 9.34 | 44.0 | 39.3 | 26.2 | 16.9 |
| CB 13 Soil | 11.4 | 46.5 | 132 | 52.1 | 93.3 |
| AC 13 Soil | 3.33 | 16.6 | 50.5 | 33.5 | 37.5 |
| BA 5 Soil | 8.06 | 53.2 | 14.8 | 27.6 | 4.96 |
| BB 12 Soil | 12.6 | 58.9 | 123 | 41.0 | 83.6 |
| STP 2 Sludge | ND | ND | 93.2 | ND | ND |
| STP 2 Sludge* | ND | ND | 66.7 | ND | ND |
| STP 3 Sludge | ND | 92.1 | 102 | ND | 49.2 |
| STP 4 Sludge | 47.6 | 208 | 347 | 74.0 | 195 |

*Laboratory Duplicate
ND = Not Detected = Response below the LOQ of 0.2 µg/kg (wet weight)

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Analytical Report

## Summary of Fluorochemical Residues in Solid Samples (continued)

| Sample ID | C14 Acid Perfluorotetradecanoic Acid Analyte Found (µg/kg) Dry Weight | PFBS Perfluorobutanesulfonate Analyte Found (µg/kg) Dry Weight | PFHS Perfluorohexanesulfonate Analyte Found (µg/kg) Dry Weight | PFOS Perfluorooctanesulfonate Analyte Found (µg/kg) Dry Weight | FOSA Perfluorooctane sulfonamide Analyte Found (µg/kg) Dry Weight |
|---|---|---|---|---|---|
| Compost | 129 | 1370 | 72.3 | 2500 | 108 |
| AC 6 Soil | 22.7 | 4.56 | 0.589 | 67.7 | 188 |
| AC 6 Soil* | 25.4 | 5.06 | 0.706 | 64.8 | 176 |
| BA 11 Soil | 19.2 | 12.8 | 0.732 | 135 | 358 |
| BA 12 Soil | 4.29 | 7.85 | 1.24 | 174 | 12.5 |
| BB 13 Soil | 42.8 | 36.6 | 1.35 | 243 | 349 |
| CA 5 Soil | 15.3 | 15.8 | 1.98 | 288 | 323 |
| CA 12 Soil | 23.9 | 40.3 | 0.932 | 78.9 | 52.2 |
| CB 4 Soil | 5.51 | 9.35 | 0.509 | 37.7 | 242 |
| CB 14A Soil | 50.0 | 84.5 | 3.01 | 147 | 187 |
| BB 9 Soil | 13.1 | 15.9 | 0.893 | 85.7 | 49.3 |
| CA 9B Soil | 11.6 | 7.50 | 1.58 | 283 | 169 |
| CB 13 Soil | 37.5 | 15.3 | 2.00 | 144 | 166 |
| AC 13 Soil | 19.0 | 6.81 | 0.671 | 46.6 | 332 |
| BA 5 Soil | 6.83 | 1.87 | 1.99 | 178 | 32.6 |
| BB 12 Soil | 17.5 | 24.0 | 0.975 | 153 | 66.3 |
| STP 2 Sludge | ND | 74.3 | ND | 171 | 144 |
| STP 2 Sludge* | ND | 82.4 | ND | 136 | 94.4 |
| STP 3 Sludge | ND | 1290 | ND | 84.7 | 27.5 |
| STP 4 Sludge | ND | 1940 | ND | 170 | 58.0 |

*Laboratory Duplicate
ND = Not Detected = Response below the LOQ of 0.2 µg/kg (wet weight)

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## Recovery Summary of Fluorochemical Residues in Solid Samples

| Sample Description | Amount Spiked* (ng/mL) | C4 Acid Amt Found in Sample (ng/mL) | C4 Acid Amount Recovered (ng/mL) | C4 Acid Recovery (%) | C5 Acid Amt Found in Sample (ng/mL) | C5 Acid Amount Recovered (ng/mL) | C5 Acid Recovery (%) | C6 Acid Amt Found in Sample (ng/mL) | C6 Acid Amount Recovered (ng/mL) | C6 Acid Recovery (%) | C7 Acid Amt Found in Sample (ng/mL) | C7 Acid Amount Recovered (ng/mL) | C7 Acid Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A 0.05 ng/mL | 0.05 | ND | 0.0364 | 73 | ND | 0.0454 | 91 | ND | 0.0542 | 108 | ND | 0.0444 | 89 |
| Reagent Spike B 0.5 ng/mL | 0.5 | ND | 0.441 | 88 | ND | 0.433 | 87 | ND | 0.437 | 87 | ND | 0.496 | 99 |
| AC 6 Soil Matrix Spike (L18099-2 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.122 | 0.611 | 98 | 0.377 | 0.742 | 73 | 0.259 | 0.761 | 100 | 0.142 | 0.596 | 91 |
| AC 6 Soil Matrix Spike (L18099-2 Spk D, 5 ng/mL Lab Spike) | 5.0 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** |
| STP 2 Sludge Matrix Spike (L18099-16 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.356 | 71 | 0.0925 | 0.569 | 95 | 0.0648 | 0.613 | 110 | ND | 0.552 | 110 |

| Sample Description | Amount Spiked* (ng/mL) | C8 Acid Amt Found in Sample (ng/mL) | C8 Acid Amount Recovered (ng/mL) | C8 Acid Recovery (%) | C9 Acid Amt Found in Sample (ng/mL) | C9 Acid Amount Recovered (ng/mL) | C9 Acid Recovery (%) | C10 Acid Amt Found in Sample (ng/mL) | C10 Acid Amount Recovered (ng/mL) | C10 Acid Recovery (%) | C11 Acid Amt Found in Sample (ng/mL) | C11 Acid Amount Recovered (ng/mL) | C11 Acid Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A 0.05 ng/mL | 0.05 | ND | 0.0492 | 98 | ND | 0.0619 | 124 | ND | 0.0541 | 108 | ND | 0.0538 | 108 |
| Reagent Spike B 0.5 ng/mL | 0.5 | ND | 0.466 | 93 | ND | 0.517 | 103 | ND | 0.461 | 92 | ND | 0.502 | 100 |
| AC 6 Soil Matrix Spike (L18099-2 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.613 | 1.26 | 129 | 0.349 | 0.916 | 113 | 1.81 | 2.36 | 110 | ** | ** | ** |
| AC 6 Soil Matrix Spike (L18099-2 Spk D, 5 ng/mL Lab Spike) | 5.0 | ** | ** | ** | ** | ** | ** | ** | ** | ** | 5.41 | 12.2 | 136^ |
| STP 2 Sludge Matrix Spike (L18099-16 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | 0.0361 | 0.634 | 120 | ND | 0.504 | 101 | ND | 0.527 | 105 | 0.0384 | 0.562 | 105 |

| Sample Description | Amount Spiked* (ng/mL) | C12 Acid Amt Found in Sample (ng/mL) | C12 Acid Amount Recovered (ng/mL) | C12 Acid Recovery (%) | C13 Acid Amt Found in Sample (ng/mL) | C13 Acid Amount Recovered (ng/mL) | C13 Acid Recovery (%) | C14 Acid Amt Found in Sample (ng/mL) | C14 Acid Amount Recovered (ng/mL) | C14 Acid Recovery (%) | PFBS Amt Found in Sample (ng/mL) | PFBS Amount Recovered (ng/mL) | PFBS Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A 0.05 ng/mL | 0.05 | ND | 0.0496 | 99 | ND | 0.0624 | 125 | ND | 0.0539 | 108 | ND | 0.0561 | 112 |
| Reagent Spike B 0.5 ng/mL | 0.5 | ND | 0.457 | 91 | ND | 0.470 | 94 | ND | 0.472 | 94 | ND | 0.408 | 82 |
| AC 6 Soil Matrix Spike (L18099-2 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 3.96 | 4.47 | 102 | ** | ** | ** | ** | ** | ** | 0.409 | 1.04 | 126 |
| AC 6 Soil Matrix Spike (L18099-2 Spk D, 5 ng/mL Lab Spike) | 5.0 | ** | ** | ** | 3.95 | 9.50 | 111 | 2.04 | 7.94 | 118 | ** | ** | ** |
| STP 2 Sludge Matrix Spike (L18099-16 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.408 | 82 | ND | 0.541 | 108 | ND | 0.595 | 119 | 0.0306 | 0.591 | 112 |

| Sample Description | Amount Spiked* (ng/mL) | PFHS Amt Found in Sample (ng/mL) | PFHS Amount Recovered (ng/mL) | PFHS Recovery (%) | PFOS Amt Found in Sample (ng/mL) | PFOS Amount Recovered (ng/mL) | PFOS Recovery (%) | FOSA Amt Found in Sample (ng/mL) | FOSA Amount Recovered (ng/mL) | FOSA Recovery (%) |
|---|---|---|---|---|---|---|---|---|---|---|
| Reagent Spike A 0.05 ng/mL | 0.05 | ND | 0.0564 | 113 | ND | 0.0507 | 101 | ND | 0.0506 | 101 |
| Reagent Spike B 0.5 ng/mL | 0.5 | ND | 0.460 | 92 | ND | 0.448 | 90 | ND | 0.480 | 96 |
| AC 6 Soil Matrix Spike (L18099-2 Spk C, 0.5 ng/mL Lab Spike) | 0.5 | 0.0529 | 0.603 | 110 | ** | ** | ** | ** | ** | ** |
| AC 6 Soil Matrix Spike (L18099-2 Spk D, 5 ng/mL Lab Spike) | 5.0 | ** | ** | ** | 6.08 | 10.7 | 92 | 16.9 | 20.9 | 80 |
| STP 2 Sludge Matrix Spike (L18099-16 Spk E, 0.5 ng/mL Lab Spike) | 0.5 | ND | 0.492 | 98 | 0.0704 | 0.580 | 102 | 0.0595 | 0.522 | 93 |

ND = Not detected = Response less than 0.025 ng/mL.
*Spiking levels refer to the amount of analyte in the extracts.
**Analysis not required.
^ Confirmation analysis was performed for the out of range recovery. The second analysis confirmed the high recovery, a matrix effect is suspected to be the cause.

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## Recovery Summary of $^{13}C$ PFOA (m+4) in Solid Samples

| Client Sample ID | MPI Sample ID | Amount Spiked (ng/mL) | Amount Recovered (ng/mL) | Recovery (%) |
|---|---|---|---|---|
| NA | Reagent Control | 0.50 | 0.832 | 166 |
| NA | Reagent Spike A | 0.05 | 0.0565 | 113 |
| NA | Reagent Spike B | 0.50 | 0.516 | 103 |
| Compost | L18099-1 | 0.50 | 0.589 | 118 |
| AC 6 Soil Matrix Spike | L18099-2 Spike C | 0.50 | 0.733 | 147 |
| AC 6 Soil Matrix Spike | L18099-2 Spike D | 5.0 | 6.51 | 130 |
| AC 6 Soil | L18099-2 | 0.50 | 0.650 | 130 |
| AC 6 Soil* | L18099-2 DUP | 0.50 | 0.670 | 134 |
| BA 11 Soil | L18099-3 | 0.50 | 0.719 | 144 |
| BA 12 Soil | L18099-4 | 0.50 | 0.726 | 145 |
| BB 13 Soil | L18099-5 | 0.50 | 0.592 | 118 |
| CA 5 Soil | L18099-6 | 0.50 | 0.656 | 131 |
| CA 12 Soil | L18099-7 | 0.50 | 0.595 | 119 |
| CB 4 Soil | L18099-8 | 0.50 | 0.634 | 127 |
| CB 14A Soil | L18099-9 | 0.50 | 0.612 | 122 |
| BB 9 Soil | L18099-10 | 0.50 | 0.643 | 129 |
| CA 9B Soil | L18099-11 | 0.50 | 0.609 | 122 |
| CB 13 Soil | L18099-12 | 0.50 | 0.616 | 123 |
| AC 13 Soil | L18099-13 | 0.50 | 0.578 | 116 |
| BA 5 Soil | L18099-14 | 0.50 | 0.612 | 122 |
| BB 12 Soil | L18099-15 | 0.50 | 0.628 | 126 |
| STP 2 Sludge Matrix Spike | L18099-16 Spike E | 0.50 | 0.586 | 117 |
| STP 2 Sludge | L18099-16 | 0.50 | 0.553 | 111 |
| STP 2 Sludge* | L18099-16 DUP | 0.50 | 0.568 | 114 |
| STP 3 Sludge | L18099-17 | 0.50 | 0.564 | 113 |
| STP 4 Sludge | L18099-18 | 0.50 | 0.605 | 121 |

*Laboratory Duplicate

**Supporting Information for:**

# Quantitative Determination of Perfluorochemicals and Fluorotelomer Alcohols in Plants from Biosolid-amended Fields using LC/MS/MS and GC/MS

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**Number of Supporting Information pages (including this title page): 16**

**Experimental Section (p. S2-S6)**

**List of Tables (p. S7-S12):**
Table SI1: Target Analytes and Optimized Parameters for PFCs using LC/MS/MS
Table SI2: Target Analytes and Optimized Parameters for FTOHs using GC/MS
Table SI3: Results of Pair-wise Multiple Comparison Procedure (Tukey Test)
Table SI4: Selection of Extractant for FTOH in Plant Material based on Response of Analyte (n=4)
Table SI5: Mean Concentration Ratio of Quantitation- and Qualification-based Calibrations
Table SI6: Recoveries (n=4) upon Extract Blow-Down Test for FTOHs Analysis
Table SI7: Concentrations of FTOHs in Plants (n=3) from near Decatur, AL (ng/g dw)
Table SI8: Grass/Soil (GSAFs) & Grass/Organic-Matter (GOMAFs) Accumulation Factors from Analytical Concentrations (ng/g)

**List of Figures (p. S13-S16):**
Figure SI1: A Schematic Diagram for Extraction Method Development for PFCs in Plant Samples
Figure SI2: Determination of Extraction Rounds required for PFCs in Plant Material
Figure SI3: Determination of Extraction Rounds required for FTOHs in Plant Material
Figure SI4: Confirmation of FTOH Peaks in Plant Extracts with a TMSI-Derivatization

**Experimental Section**

**SI 1.1. Chemicals.** Except as noted below, all chemicals used in this study were of the highest purity offered by the suppliers, uniformly ≥97% purity. Perfluoro-n-hexanoic acid, perfluoro-n-octanoic acid, perfluoro-n-nonanoic acid, perfluoro-n-decanoic acid, perfluoro-n-[1,2-$^{13}$C]hexanoic acid, perfluoro-n-[1,2,3,4-$^{13}$C]octanoic acid, perfluoro-n-[1,2,3,4,5-$^{13}$C]nonanoic acid, perfluoro-n-[1,2-$^{13}$C]decanoic acid all were purchased as certified standards from Wellington Laboratories through TerraChem (Shawnee Mission, KS, USA). Certified standards (50 μg/ml) of 6:2*n*FTOH; 8:2*n*FTOH; 10:2*n*FTOH; 1D,1D,2H,2H-$^{13}C_2$-perfluoro-1-decanol (M8:2*n*FTOH); and 1D,1D,2H,2H-$^{13}C_2$-perfluoro-1-dodecanol (M10:2*n*FTOH); 7:2*s*FTOH (1-perfluoroheptylethanol); and 8:2FT-acrylate in methanol were purchased from Wellington Laboratories, Inc. (Ontario, Canada) and TerraChem, Inc. (Shawnee Mission, KS, USA).

Methanol (MeOH), acetonitrile (ACN), ethyl-acetate (EtOAc), glacial acetic acid (HAc), hydrochloric acid (HCl), dichloromethane (DCM), and methyl *tert*-butyl ether (MTBE) were purchased from Fisher Chemical (Fairlawn, NJ, USA). Trimethylsilylimidazole (TMSI) was purchased from Regis Technologies, Inc. (Morton Grove, IL, USA). Tetrabutylammonium hydrogen sulfate (TBAHS) and sodium carbonate were purchased from Aldrich Chemical (Milwaukee, WI, USA). Hydrophilic-lipophilic balanced (HLB®) cartridges (150 mg, 6 cm$^3$ and 6 g, 35 cm$^3$) were purchased from Waters (Milford, MA, USA).

Throughout the experiment, 18-MΩ water, polished by passage through a 35-cm$^3$ Oasis HLB cartridge, was used to prepare standards and chemical stocks. For the ion-pairing agent, a TBAHS mixture (TBA-mix) was prepared by slowly combining two parts 0.25 M $Na_2CO_3$ solution and one part 0.50 M TBAHS solution by volume to avoid spillage caused by $CO_2$ generation. The resulting mixture was polished by passage through HLB cartridge as well to remove PFOA, which we observed to be present in the TBAHS product as purchased.

**SI 1.2. Extracts Cleanup for PFC Analysis.** Test extracts were cleaned up with an ion-pairing method and prepared for LC/MS/MS analysis. In brief, about half of each extract

was completely dried in a 12-mL glass vial under vacuum with a SPE assembly, and 4 mL of TBA mixture and 5 mL of MTBE were added in sequence. After vortexing and freezing, the MTBE fraction was collected into a new vial and evaporated with a SPE assembly. The final-dried extract was reconstituted with 1 mL of 60:40 ACN:$H_2O$ containing mass-labeled PFCs as matrix internal standards (Table SI1) before LC/MS/MS analysis.

**SI 1.3. Selection of Extractant for FTOHs in Plant Samples.** Three organic extractants were tested for their maximum yields of FTOHs in plant (MTBE, EtOAc, and DCM). About 1 g of plant sample weighed into a 16-mL PPCO centrifuge tube and 5 mL of polished water was added to increase fluidity of sample-extractant mixture. Each test extractant (2.5 mL) was subsequently added and the prepared plant-water-extractant mixture was rotated overnight on a Labquake rotisserie (Testwave LLC, Sparks, NV). After centrifugation at 10,000×*g* for 30 min in a Sorvall® RCSC centrifuge and the organic fraction was separated with a 1,000 μL Hamilton syringe, transferred to a pre-weighed 12-mL glass vial, and kept at -20°C during which water exsolved to form ice crystals. One milliliter of extract was transferred into a GC vial and 20 μL of $^{13}C$-labeled 10:2 FTOH (50 ng/mL) was added as the internal matrix standard prior to GC/MS analysis. Results of these efforts are summarized in Table SI4.

**SI 1.4. Evaluation of the Effect of Sample Blow-Down.** Due to the presumed low concentrations of FTOHs in plants samples and the sensitivity of our GC/MS, we concentrated the final EtOAc extract (~ 6 mL) to 1 mL under a gentle stream of nitrogen gas. Before concentrating, we checked this procedure for its effect on potential loss of our semi-volatile target analytes. For our check of this procedure, we prepared four replicate glass vials for each treatment; 1) 1 mL EtOAc + 1 ng FTOHs spike, 2) 3 mL EtOAc + 1 ng FTOHs spike, and 3) 5 mL EtOAc + 1 ng FTOHs spike. In addition, we directly prepared 1 ng FTOHs/mL as a recovery standard. All samples of treatment 2 and 3 were reduced to 1 mL under a gentle stream of nitrogen gas, and transferred to a GC vial. The spiked EtOAc in treatment 1 was also transferred to a GC vial. All final 1 mL

samples received 1 ng $^{13}$C-10:2 FTOH before GC/MS submission. Results of this sample blow-down test are summarized in Table SI6.

**SI 1.5. LC/MS/MS Analysis and Quantitation.** Analyses were carried out on a Waters Acquity UPLC coupled to a Waters Quattro Premier XE MS/MS. The UPLC was customized for PFC analyses by: i) replacing solvent lines with polyetheretherketone (PEEK) tubing; ii) by-passing solvent degassers; and iii) inserting a C18 trap column at the down-gradient most point of the water line. Details are provided in an earlier paper [1].

For analysis, 20 μL of extract was introduced into a 50-uL loop, using 'partial loop with needle overfill' mode, to a BEH $C_{18}$ analytical column, 100×2.1×2.1 (mm length × mm inside diameter × um particle size). The UPLC was operated using ACN and water mobile phases adjusted to pH 4 with glacial acetic acid. Starting at 35/65 ACN/water (*v/v*), the gradient was increased linearly to 90% ACN over 5 min at a flow rate of 0.5 mL/min, holding for 6 min, linearly ramping back to original condition at 11.1 min, from which time we held composition constant until the end of analysis at 13 min. Upon elution from the UPLC, extracts were introduced to the mass spectrometer operated in the electrospray negative ionization (-ESI) mode with the capillary potential set at -600 V. The source and desolvation temperature were maintained at 140 °C and 350 °C, respectively. The desolvation gas and cone gas from the $N_2$ generator was maintained at a flow rate of 800 L/h and 25 L/h, respectively. Analyte-specific MS/MS parameters were optimized for PFCs analysis (Table SI2). The Ar collision gas was set to flow at 0.45 mL/min. The detector was operated in multiple-reaction-monitoring (MRM) mode, with the detector multiplier set to -700 V.

Calibrations were constructed with linear regressions of 1/X-weighted untransformed data and plots of peak area/internal standard area versus calibration standard concentration/internal standard area. Calibration curves consisted of ten calibration points (0.02 to 5 ng/g). Standards were interspersed with every 8 to 10 extracts and blanks throughout the sample runs. No carry-overs were found in any blanks. Quantitation of target analytes was performed using authentic mass-labeled matrix internal standards (Table SI1). C7 and PFOS, for which we did not have authentic mass-

labeled standards at the time of analysis, were quantified using the $^{13}C_4$-PFOA and $^{13}C_2$-PFDA as surrogate matrix internal standards, respectively.

**SI 1.6. GC/MS Analysis and Quantitation.** The mass selective detector (MSD) was operated in the positive chemical-ionization (PCI) mode with methane reagent gas for quantitative analyses. All system operations were controlled by Enhanced Chemstation D.02.00275. Compound separation and quantification were performed on a Restek (Bellefonte, PA, USA) Rtx-1701 capillary column, 30 m × 0.25 mm I.D. × 0.25 μm film thickness with a 10-m deactivated Integra-Guard™ guard column as the inlet. Sample volumes of 1 μL were injected in the pulse-splitless mode at 40 PSI for 0.90 s into a 4-mm ID gooseneck inlet liner. GC system inlet and MS interface temperatures were set at 140 °C and 290 °C, respectively. The column temperature was programmed as follows: held at 60 °C for 1 min, then ramped up at 3 °C/min to 75 °C, then at 20 °C/min to 185 °C with ballistic heating to a final temperature of 260 °C, which was held for 6 min. The carrier gas was helium at a constant flow of 1 ml/min. The MSD operating parameters were routinely set by the tune file. EM potential was set at + 1624 volts. MS source temperature was set at 250 °C and the quadrupoles at 150 °C. A selected-ion-monitoring (SIM) program was constructed, in which quantifying ions $[M+H]^+$ and qualifying fragment ions were specified (Table SI2).

**SI 1.7. Extraction QA/QC.** Repeated extractions commonly are used to deplete completely PFC residues in matrices of interest. Using our selected extractant, we determined that two extraction rounds were enough to withdraw more than 90% of total PFC yields except PFBS (Figure SI2). Interferences of co-eluting organic components from biological matrices have been found to cause analytical errors for some PFCs analyzed with LC/MS/MS due to their similarity in parent ion and daughter ion. We confirmed peak identities and quantitation using retention time comparison with authentic mass-labeled standards and two ion-transitions widely monitored in current PFC analyses. Quantifying PFC residues in plant extract with two mass-transitions independently, we obtained a near unity of a ratio of qualification- and quantitation-based determinations for

all PFCs besides C14 and PFBS for which qualification-ion transitions were too low to quantitate (Table SI5).

Unlike PFCs, FTOHs spiked and aged for 5 days in background plants were not completely recovered after 4 rounds of overnight extractions (Figure SI3). The recoveries of analytes leveled off in the range of around 62% (8:2 FT Acrylate) to 86% (10:2 FTOH). We recorded the weight of the test tube before and after overnight rotation every extraction round, but typically less than 1% loss of mass was observed. Using a TMSI-derivatization technique, we confirmed the identity of target FTOH peaks in plant extracts (Figure SI4). Elution of all target analytes shifted forward in time with TMSI-derivatization, and the corresponding FTOH-analyte peak disappeared. The effects of sample blow-off were statistically insignificant for 5mL-to-1mL concentration (Table SI6). Thus, we concentrated all EtOAc extracts (5 ~ 6 mL) from 3 extraction rounds to 1 mL prior to analysis to improve the sensitivity of our procedure for detecting low FTOH concentrations.

**Supporting Information Reference:**

1. Washington, J. W.; Henderson, W. M.; Ellington, J. J.; Jenkins, T. M.; Evans, J. J., Analysis of perfluorinated carboxylic acids in soils II: optimization of chromatography and extraction. *J. Chromatogr. A* **2008,** *1181*, (1-2), 21-32.

es and Optimized Parameters for PFCs using LC/MS/MS

| | Acronym | Quantitation Transition (m/z) | Qualification Transition (m/z) | Cone Voltage (V) | Collision (eV) |
|---|---|---|---|---|---|
| | PFHxA (C6) | 312.95 > 268.95 | 312.95 > 118.80 | 13 | 10 |
| | PFHpA (C7) | 362.95 > 319.00 | 362.95 > 168.85 | 13 | 10 |
| | PFOA (C8) | 412.95 > 368.95 | 412.95 > 168.85 | 14 | 10 |
| | PFNA (C9) | 463.00 > 419.00 | 463.00 > 218.85 | 15 | 12 |
| | PFDA (C10) | 512.90 > 469.00 | 512.90 > 218.85 | 15 | 12 |
| | PFUnDA (C11) | 562.90 > 518.95 | 562.90 > 218.85 | 15 | 13 |
| | PFDoDA (C12) | 612.90 > 568.95 | 612.90 > 318.70 | 16 | 13 |
| | PFTriDA (C13) | 662.90 > 618.90 | 662.90 > 318.70 | 16 | 13 |
| id | PFTeDA (C14) | 712.90 > 668.85 | 712.90 > 318.70 | 18 | 15 |
| | PFBS (S4) | 298.90 > 79.85 | 298.90 > 98.85 | 40 | 30 |
| | PFHxS (S6) | 398.90 > 79.85 | 398.90 > 98.85 | 50 | 40 |
| | PFOS (S8) | 498.90 > 79.85 | 498.90 > 98.85 | 60 | 50 |

| | Use[1)] | Acronym | Quantitation (m/z) |
|---|---|---|---|
| ic acid | Matrix internal standard | $^{13}C_2$-PFHxA | 314.95 > 268.95 |
| ınoic acid | Matrix internal standard | $^{13}C_4$-PFOA | 417.00 > 372.00 |
| $^{3}C_8$]octanoic acid | Recovery internal standard | $^{13}C_8$-PFOA | 420.95 > 376.00 |
| ›nanoic acid | Matrix internal standard | $^{13}C_5$-PFNA | 468.10 > 423.00 |
| ic acid | Matrix internal standard | $^{13}C_2$-PFDA | 514.90 > 470.00 |
| noic acid | Matrix internal standard | $^{13}C_2$-PFUnDA | 564.90 > 520.00 |
| noic acid | Matrix internal standard | $^{13}C_2$-PFDoDA | 614.90 > 570.00 |

d: Matrix internal standard is added to calibration stock solution and recovery internal standard is spiked before extraction

es and Optimized Parameters for FTOHs using GC/MS

| | Formula | Acronym | Ions in PCI (m/z) | PCI TMSI Derivatives (m/z) |
|---|---|---|---|---|
| -1-ol | $CF_3(CF_2)_5CH_2$-$CH_2$-OH | 6:2 FTOH | 365*[1)], 327 | 437 |
| ı-1-ol | $CF_3(CF_2)_7CH_2$-$CH_2$-OH | 8:2 FTOH | 465*, 427 | 537 |
| :an-1-ol | $CF_3(CF_2)_9CH_2$-$CH_2$-OH | 10:2 FTOH | 565*, 527 | 637 |
| 'ecan-1-ol | $CF_3(CF_2)_{11}CH_2$-$CH_2$-OH | 12:2 FTOH | 665*, 627 | 737 |
| lecan-1-ol | $CF_3(CF_2)_{13}CH_2$-$CH_2$-OH | 14:2 FTOH | 765*, 727 | 837 |
| | $[CF_3(CF_2)_6](CH_3)$-CH-OH | 7:2 sFTOH | 415*, 395 | 487 |
| | $[CF_3(CF_2)_8](CH_3)$-CH-OH | 9:2 sFTOH | 515*, 577 | 587 |
| | $[CF_3(CF_2)_{10}](CH_3)$-CH-OH | 11:2 sFTOH | 615*, 677 | 687 |
| | $[CF_3(CF_2)_{12}](CH_3)$-CH-OH | 13:2 sFTOH | 715*, 777 | 787 |
| ate | $F(CF_2)_8CH_2$-$CH_2$-OC(O)CH=$CH_2$ | 8:2 FT-acrylate | 519* | |
| | **Use[2)]** | **Acronym** | **Ions in PCI (m/z)** | |
| ɔdecan-1-ol | Recovery internal standard | m8:2 FTOH | 469*,431 | |
| ɔdodecan-1-ol | Matrix internal standard | m10:2 FTOH | 569*,531 | |

cipal ion for quantitation

:es were used for recovery check and matrix compensation

**ir-wise Multiple Comparison Procedure (Tukey Test[1])**

| C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 [3] | C14 | S4 | S8 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.012 | <0.001 | <0.001 | 0.001 | <0.001 | <0.001 | <0.001 | yes | 0.806 | no | yes |
| 0.369 | 0.032 | <0.001 | 0.001 | <0.001 | <0.001 | 0.004 | no | 0.241 | no | no |
| 0.945 | 0.016 | 0.040 | 0.197 | <0.001 | 0.001 | 0.223 | no | 0.155 | no | no |
| 0.031 | <0.001 | 0.007 | 0.036 | <0.001 | <0.001 | 0.007 | no | 0.034 | no | no |
| 0.167 | 0.976 | 0.025 | 0.036 | <0.001 | 0.003 | 0.141 | no | 0.991 | no | no |
| <0.001 | <0.001 | 0.859 | 1 | 0.957 | 0.497 | 0.357 | no | 0.057 | no | no |

presence of statistically significant differences in PFCs recovered between extraction methods. Consequently, the Tukey st for differences between extraction methods on a pair-wise basis for each analyte. Levels of significance (*p*) from the

nd 1% HAc abbreviations denote a 50:50/DCM:MeOH (v/v), a 25:75/HCl:MeOH (v/v), a MTBE ion-pairing, and a treatment, respectively

l not meet the ANOVA assumptions, as a result, Kruskal-Wallis one-way ANOVA on ranks was performed at a

**xtractant for FTOH in Plant Material based on Internal-Standard Corrected Response of Analyte (n=4)**

| 6:2 FTOH | 7:2s FTOH | m8:2 FTOH | 8:2 FTOH | 9:2s FTOH | 10:2 FTOH | 11:2s FTOH | 12:2 FTOH | 13:2s FTOH | 14:2 FTOH |
|---|---|---|---|---|---|---|---|---|---|
| 15916 | 4988 | 37809 | 28521 | 3748 | 17041 | 1445 | 6247 | 498 | 1725 |
| 5 | 8 | 23 | 7 | 8 | 22 | 7 | 20 | 13 | 7 |
| **21771[1]** | 7511 | **43684** | **37219** | 5611 | **24717** | 1903 | **7937** | 535 | 2516 |
| 18 | 31 | 10 | 11 | 11 | 26 | 13 | 10 | 26 | 11 |
| 14116 | **10836** | 38978 | 31259 | **6517** | 16167 | **2000** | 6507 | **692** | **2876** |
| 26 | 34 | 13 | 8 | 14 | 44 | 63 | 45 | 60 | 43 |

displayed in bold

**tration Ratio[1)] of Quantitation- and Qualification-based Calibrations**

| C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | S4 | S8 |
|---|---|---|---|---|---|---|---|---|---|
| .03 | 0.96 | 1.01 | 0.98 | 1.02 | 1.02 | 1.07 | -[2)] | - | 0.94 |
| .04 | 0.04 | 0.04 | 0.15 | 0.02 | 0.08 | 0.05 | - | - | 0.05 |

ndent extractions (n=4); each extract analyzed one time
not calculated due to low responses of their qualification ions

**=4) upon Extract Blow-Down Test for FTOHs Analysis**

| | 6:2 FTOH | 7:2s FTOH | m8:2 FTOH | 8:2 FTOH | 10:2 FTOH | 8:2 Acrylate |
|---|---|---|---|---|---|---|
| | 98% | 102% | 99% | 99% | 101% | 102% |
| | 8% | 5% | 5% | 2% | 4% | 5% |
| | 95% | 97% | 98% | 99% | 103% | 92% |
| | 6% | 10% | 7% | 7% | 6% | 10% |
| | 96% | 99% | 96% | 94% | 100% | 92% |
| | 7% | 1% | 8% | 7% | 3% | 4% |

**ıs of FTOHs in Plants (n=3) from near Decatur, AL (ng/g dw)**

| 6:2 TOH | 7:2s FTOH | 8:2 FTOH | 9:2s FTOH | 10:2 FTOH | 11:2s FTOH | 8:2 Acryl | 12:2 FTOH | 13:2s FTOH | 14:2 FTOH | % Rec[1)] |
|---|---|---|---|---|---|---|---|---|---|---|
| _OQ | <LOQ | <LOQ | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | 54<br>4 |
| _OQ | 0.54<br>0.12 | 1.14<br>0.14 | <LOQ | <LOQ | N.D. | N.D. | <LOQ | N.D. | <LOQ | 52<br>5 |
| _OQ | <LOQ | 0.69<br>0.04 | N.D | <LOQ | N.D. | <LOQ | N.D. | N.D. | N.D. | 54<br>4 |
| _OQ | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | 56<br>1 |
| 0.66<br>0.08 | <LOQ | 1.50<br>0.15 | <LOQ | 1.35<br>0.20 | <LOQ | N.D. | 0.47<br>0.05 | N.D. | N.D. | 80<br>4 |
| | | | | | | | | | | |
| _OQ | <LOQ | <LOQ | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | N.D. | 83<br>23 |
| 0.94<br>0.03 | 0.81<br>0.06 | 1.31<br>0.06 | <LOQ | 1.87<br>0.12 | N.D. | N.D. | 1.22<br>0.13 | N.D. | 0.40<br>0.05 | 56<br>20 |
| 2.59<br>0.30 | <LOQ | 0.80<br>0.12 | N.D. | <LOQ | N.D. | N.D. | N.D. | N.D. | N.D. | 38<br>3 |
| 0.20 | 0.25 | 0.30 | 0.10 | 0.35 | 0.15 | 0.15 | 0.15 | 0.15 | 0.15 | |
| 0.40 | 0.50 | 0.60 | 0.20 | 0.60 | 0.30 | 0.30 | 0.30 | 0.30 | 0.30 | |

ed before extraction to assess extraction efficiency
on due to low sample amounts

**SAFs) & Grass/Organic-Matter (GOMAFs) Accumulation Factors from Analytical Concentrations (ng/g)**

| s on 1) | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | S8 | Percent Recovery (2) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | <LOQ | 14 | 84 | 83 | 419 | 126 | 186 | 36 | 34 | 203 | 68 |
| 8 | | 205 | 1242 | 1227 | 6167 | 1857 | 2740 | 526 | 499 | 2981 | |
| | 22.9 | 10.4 | 23.2 | 8.9 | 48.9 | 22.9 | 43.5 | 3.5 | 2.5 | 16.8 | 103 |
| | | 0.75 | 0.27 | 0.11 | 0.12 | 0.18 | 0.23 | 0.097 | 0.073 | 0.083 | |
| | | 0.051 | 0.019 | 0.0072 | 0.0079 | 0.012 | 0.016 | 0.0066 | 0.0050 | 0.0056 | |
| | 35 | 80 | 312 | 118 | 528 | 126 | 179 | 27 | 32 | 203 | 98 |
| 8 | 298 | 689 | 2672 | 1011 | 4520 | 1076 | 1533 | 230 | 277 | 1742 | |
| | 182.2 | 165.1 | 202.7 | 27.4 | 81.1 | 15.1 | 17.1 | 1.2 | 1.2 | 13.1 | 112 |
| | 5.2 | 2.1 | 0.65 | 0.23 | 0.15 | 0.12 | 0.10 | 0.045 | 0.037 | 0.064 | |
| | 0.61 | 0.24 | 0.076 | 0.027 | 0.018 | 0.014 | 0.011 | 0.0053 | 0.0043 | 0.0075 | |
| | <LOQ | 16 | 105 | 34 | 132 | 21 | 30 | <LOQ | <LOQ | 35 | 102 |
| 4 | | 263 | 1761 | 577 | 2220 | 360 | 511 | | | 587 | |
| | 30.2 | 12.5 | 9.9 | 1.5 | 3.3 | 0.5 | 0.5 | 0.0 | 0.1 | 1.2 | 96 |
| | | 0.80 | 0.094 | 0.045 | 0.025 | 0.024 | 0.016 | | | 0.034 | |
| | | 0.048 | 0.0056 | 0.0026 | 0.0015 | 0.0014 | 0.0010 | | | 0.0020 | |
| | 23 | 45 | 230 | 111 | 835 | 216 | 461 | 73 | 92 | 158 | 92 |
| 4 | 236 | 470 | 2383 | 1155 | 8665 | 2239 | 4783 | 756 | 953 | 1641 | |
| | 36.7 | 19.4 | 27.6 | 16.8 | 168.8 | 45.6 | 62.5 | 4.2 | 1.8 | 20.4 | 109 |
| | 1.6 | 0.43 | 0.12 | 0.15 | 0.20 | 0.21 | 0.14 | 0.058 | 0.020 | 0.13 | |
| | 0.16 | 0.041 | 0.012 | 0.015 | 0.019 | 0.020 | 0.013 | 0.0056 | 0.0019 | 0.012 | |
| | <LOQ | 17 | 94 | 58 | 353 | 139 | 215 | 37 | 49 | 118 | 86 |
| 8 | | 181 | 979 | 610 | 3682 | 1447 | 2244 | 390 | 514 | 1229 | |
| | 26.3 | 8.2 | 12.1 | 2.9 | 9.8 | 3.3 | 4.3 | 0.5 | 0.3 | 4.1 | 98 |
| | | 0.47 | 0.13 | 0.049 | 0.028 | 0.024 | 0.020 | 0.014 | 0.0061 | 0.035 | |
| | | 0.045 | 0.012 | 0.0047 | 0.0027 | 0.0023 | 0.0019 | 0.0013 | 0.00058 | 0.0034 | |
| | | | | | | | | | | | |
| | 3.4 | 0.90 | 0.25 | 0.12 | 0.10 | 0.11 | 0.10 | 0.05 | 0.03 | 0.07 | |
| | 2.6 | 0.66 | 0.23 | 0.08 | 0.08 | 0.09 | 0.09 | 0.03 | 0.03 | 0.04 | |
| | 0.75 | 0.74 | 0.92 | 0.67 | 0.74 | 0.77 | 0.90 | 0.65 | 0.85 | 0.57 | |
| | 0.38 | 0.085 | 0.025 | 0.011 | 0.010 | 0.010 | 0.009 | 0.005 | 0.003 | 0.006 | |
| | 0.32 | 0.087 | 0.029 | 0.010 | 0.008 | 0.008 | 0.007 | 0.002 | 0.002 | 0.004 | |
| | 0.84 | 1.02 | 1.17 | 0.88 | 0.85 | 0.80 | 0.79 | 0.50 | 0.70 | 0.66 | |

dry-mass basis, by mass loss on ignition; 2) $^{13}C_8$-PFOA was spiked before extraction to assess extraction efficiency; 3) et al., 2010; 4) Soil organic matter concentration calculated as soil concentration/mass fraction organic matter; 5) Grass Grass/soil accumulation factor, i.e., grass concentration/soil concentration; 7) Grass/organic-matter accumulation factor, l organic-matter concentration.

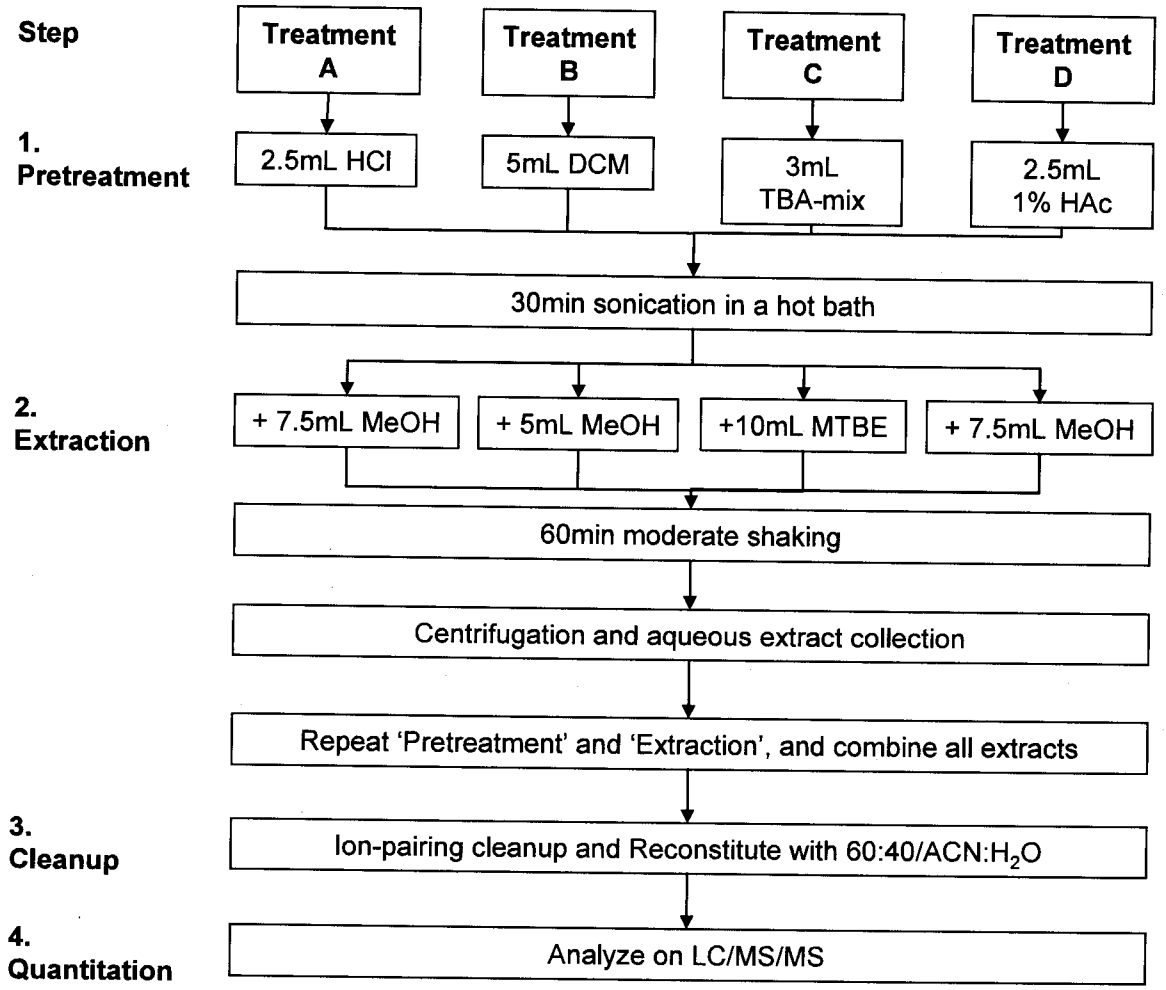


**FIGURE SI1. A Schematic Diagram for Extraction Method Development for PFCs in Plant Samples**

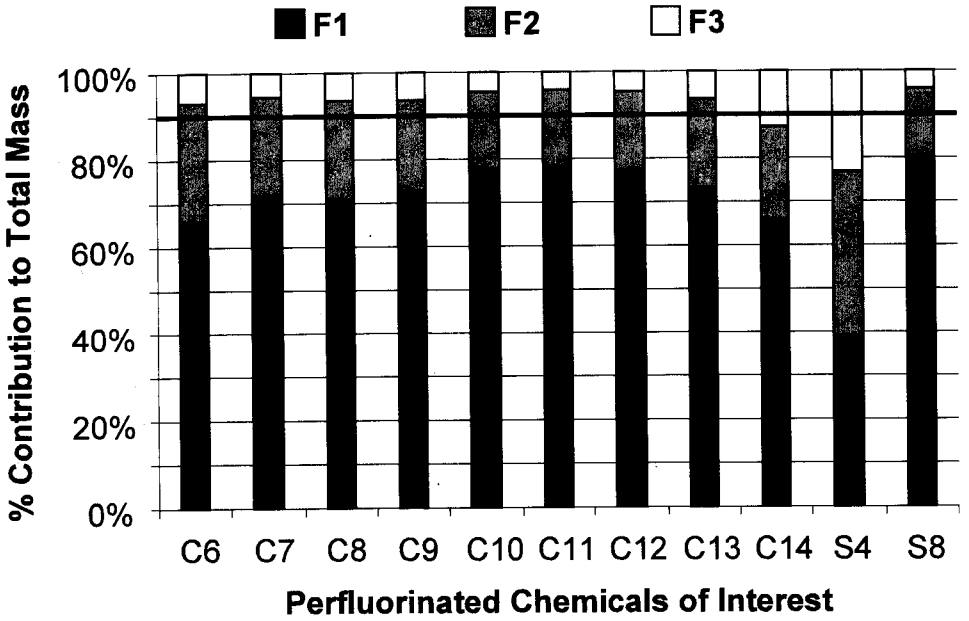


**FIGURE SI2. Determination of Extraction Rounds required for PFCs in Plant Material. A binary solvent of 50:50/DCM:MeOH (*v/v*) was used to extract plant sample three times (F1, F2, and F3). Recovery of a $^{13}C_8$-PFOA fortified before extraction was 109±6%.**

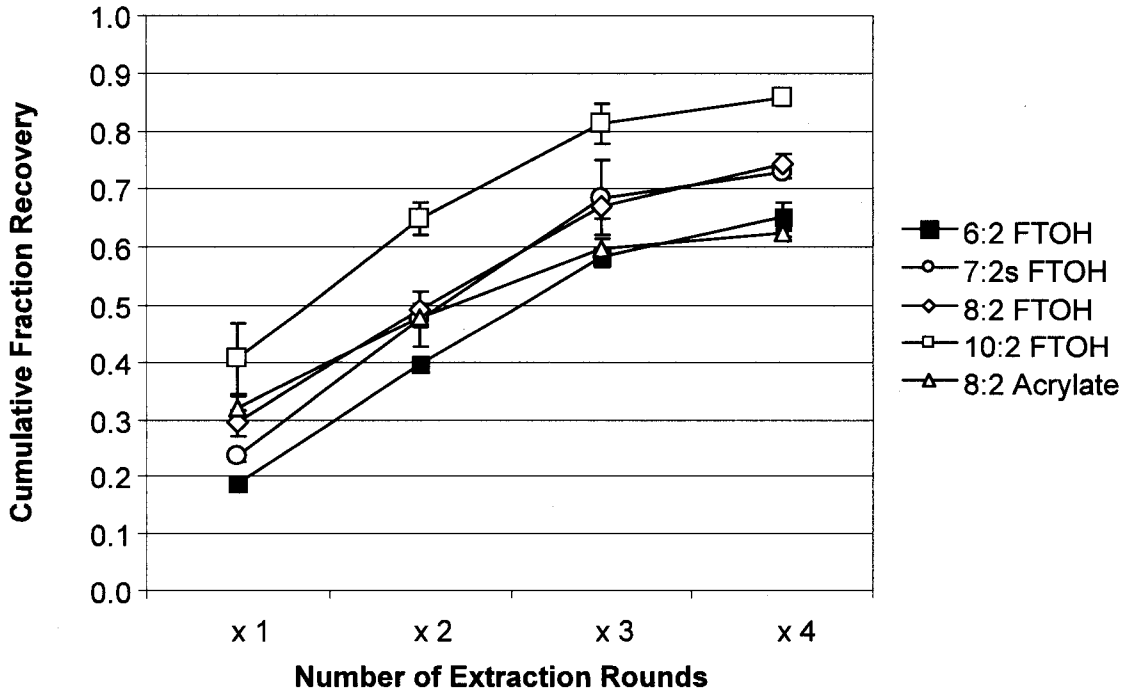


**FIGURE SI3. Determination of Extraction Rounds required for FTOHs in Plant Material**

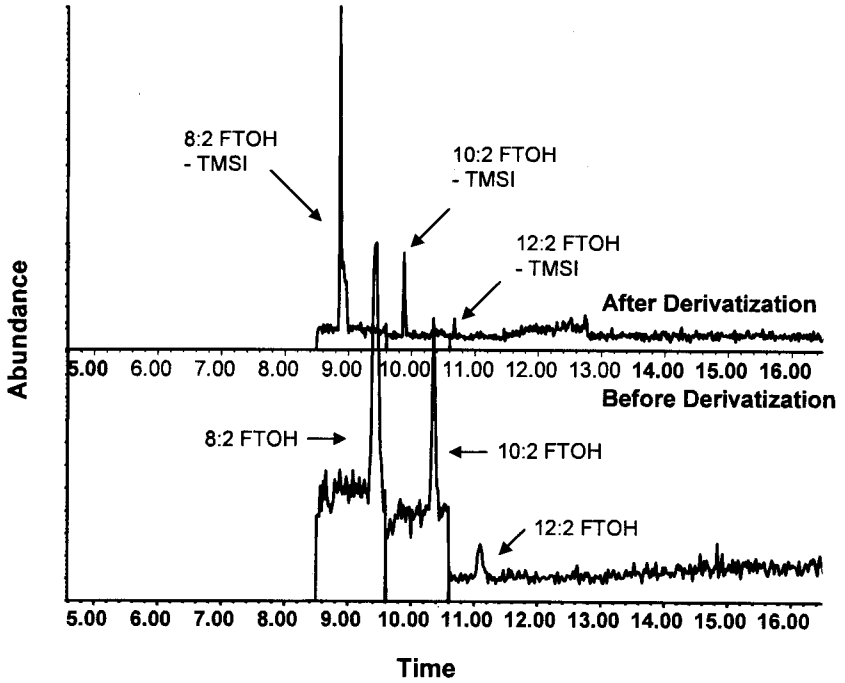


**FIGURE SI4. Confirmation of FTOH Peaks in Plant Extracts with a TMSI-Derivatization**

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Environmental Toxicology and Chemistry, Vol. 30, No. 10, pp. 2194–2201, 2011
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Printed in the USA
DOI: 10.1002/etc.622

# PERFLUORINATED CHEMICALS IN SURFACE WATERS AND SEDIMENTS FROM NORTHWEST GEORGIA, USA, AND THEIR BIOACCUMULATION IN *LUMBRICULUS VARIEGATUS*

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(*Submitted* 7 *March* 2011; *Returned for Revision* 22 *April* 2011; *Accepted* 23 *June* 2011)

**Abstract**—Concentrations of perfluorinated chemicals (PFCs) were measured in surface waters and sediments from the Coosa River watershed in northwest Georgia, USA, to examine their distribution downstream of a suspected source. Samples from eight sites were analyzed using liquid chromatography-tandem mass spectrometry. Sediments were also used in 28-d exposures with the aquatic oligochaete, *Lumbriculus variegatus*, to assess PFC bioaccumulation. Concentrations of PFCs in surface waters and sediments increased significantly below a land-application site (LAS) of municipal/industrial wastewater and were further elevated by unknown sources downstream. Perfluorinated carboxylic acids (PFCAs) with eight or fewer carbons were the most prominent in surface waters. Those with 10 or more carbons predominated sediment and tissue samples. Perfluorooctane sulfonate (PFOS) was the major homolog in contaminated sediments and tissues. This pattern among sediment PFC concentrations was consistent among sites and reflected homolog concentrations emanating from the LAS. Concentrations of PFCs in oligochaete tissues revealed patterns similar to those observed in the respective sediments. The tendency to bioaccumulate increased with PFCA chain length and the presence of the sulfonate moiety. Biota-sediment accumulation factors indicated that short-chain PFCAs with fewer than seven carbons may be environmentally benign alternatives in aquatic ecosystems; however, sulfonates with four to seven carbons may be as likely to bioaccumulate as PFOS. Environ. Toxicol. Chem. 2011;30:2194–2201. © 2011 SETAC

**Keywords**—Perfluorinated chemicals  Surface water  Sediment  *Lumbriculus variegatus*  Bioaccumulation

## INTRODUCTION

Perfluorinated chemicals (PFCs) are a class of compounds that have been widely used in commercial and industrial applications for more than 50 years because their properties include water, soil, and oil repellency. They are hydrophobic and lipophobic molecules [1] that are increasingly attracted to organic carbon as the number of carbon-fluorine ($CF_2$) groups in the molecule increases [2]. A variety of PFC homologs have been used that are differentiated by the number of $CF_2$ groups and by either a carboxylate (perfluorinated carboxylic acid, PFCA) or a sulfonate (perfluorinated sulfonic acid, PFSA) moiety attached to one end. The most common homologs found in environmental samples contain eight carbons, perfluorooctane sulfonate (PFOS, $S_8$) and perfluorooctanoate (PFOA, $C_8$), and also tend to be the most effective surfactants [3]. In the United States, use and production of PFOS was substantially reduced after 2002, when research indicated an increasing occurrence in human tissues (http://www.epa.gov/oppt/existingchemicals/pubs/pfcs_action_plan1230_09.pdf), and its largest manufacturer, 3M Company, voluntarily ceased production. Perfluorinated chemicals such as PFCAs and PFSAs are slow to decompose, persisting in the environment and biomagnifying through the food chain [4–7]. However, other commonly used fluorinated chemicals, such as fluorotelomer acids and sulfonamides, are precursors to PFCAs and PFSAs that are subject to biodegradation in the environment [8,9]. Contamination of remote regions occurs by atmospheric and oceanic transport [10]. Occurrences of significant localized contamination have been the result of chemical spills [11], emissions and discharges from PFC-production facilities [12,13], and surface runoff from fields amended with waste-treatment sludge [14]. Manufacturing facilities producing steel, electronics, paper, and carpet discharge effluents containing relatively high concentrations of various PFC homologs [15], and waste-treatment facilities can be significant sources of PFCs to surface waters [16]. The integration of PFCs into aquatic food webs can occur in systems containing fairly low PFC concentrations [6], but little is known about the potential environmental effects associated with continual inputs of relatively high PFC concentrations. Bioaccumulation of six PFCs has been documented in exposures to natural sediments with low concentrations [17], but no information is available concerning the bioaccumulation of a wide range of PFCs from highly contaminated natural sediments.

The carpet industry, which is prevalent in northwest Georgia, is suspected of producing wastewaters containing PFCs and PFC-precursor chemicals. The manufacture of carpet-protection products uses a significant amount of PFCs [18]. Effluents from multiple carpet manufacturers in the Dalton, Georgia, area are processed through a municipal wastewater-treatment plant, which in turn sprays the treated effluent onto a land-application site (LAS) bordering the Conasauga River (GA, USA). A recent analysis of surface water samples collected immediately above and below the site revealed high concentrations of selected PFCs downstream of the LAS [19]. Analyses of sediment samples collected in 2006 from the downstream site of that

All Supplemental Data may be found in the online version of this article.

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Published online 15 July 2011 in Wiley Online Library (wileyonlinelibrary.com).

study (CR4) also indicated significant PFC contamination (>4 ng/g PFOA). However, like many surveys of PFCs in water and sediment samples, concentrations of relatively few homologs in addition to PFOS and PFOA were determined. The present study examined the concentrations of 15 PFCs in surface waters and sediments upstream and downstream of the LAS and demonstrated their bioaccumulation from sediments into the freshwater oligochaete, *Lumbriculus variegatus*.

## MATERIALS AND METHODS

### *Sampling*

Surface waters and sediments from the Coosa River watershed were sampled during the summer of 2008. Eight sites were selected heading downstream through the Conasauga, Oostanaula, and Coosa Rivers based on river confluences, major tributaries, potential sources of PFCs, and access (Fig. 1, Supplemental Data, Table S1). Two sites were located above the LAS and were considered reference sites. The most upstream location (site 1) was in the Conasauga River just downstream of the Cherokee National Forest in Tennessee. Site 2 was located above the LAS but below the local airport and a major tributary. Two additional sites (3 and 4) were located in the Conasauga River below the LAS. Site 4 was also downstream of a manufacturing facility that produces latex and polyurethane backing material for the local carpet industry. Three sites were established on the Oostanaula River below the cities of Resaca and Calhoun and upstream from Rome. The most downstream location (site 8) was west of Rome after the Oostanaula River joins the larger Etowah River to form the Coosa River.

Three replicate sediment and surface water samples were collected along the shorelines of each site, with the exception of sites 7 and 8; two from one side of the river (10–20 m apart) and one from the other side. The channel at sites 7 and 8 was deeply incised on one side of the river, necessitating the collection of all three sediment replicates from the other side. Sediments were collected to a depth of 2 cm from depositional areas with a stainless steel garden trowel, composited in a stainless steel mixing bowl, and placed in 4-L high-density polyethylene containers. Water samples were collected within a 5-h period progressing from downstream to upstream. Grab samples were collected in flowing water 25 to 30 cm below the surface in 2-L high-density polyethylene containers by lowering the empty container to the appropriate depth, removing the lid and then replacing it underwater. A separate water sample was collected in a 250-ml high-density polyethylene container for routine water-quality analyses that included conductivity, dissolved oxygen, pH, alkalinity, hardness, and total ammonia (Table S2). All samples were transported on ice to the laboratory, where they were refrigerated at 5°C pending analyses.

### *Oligochaete Exposures*

Bioaccumulation from sediment exposures was determined using established procedures [20] with *Lumbriculus variegatus* obtained from in-house cultures. Approximately 1 L of each sediment sample was transferred to a 3-L polycarbonate exposure chamber and covered with 2 L overlying water. A water-renewal system [21] using moderately hard reconstituted laboratory water [22] was employed to exchange 50% of the overlying water automatically in each chamber three times per day to maintain adequate water quality. With the exception

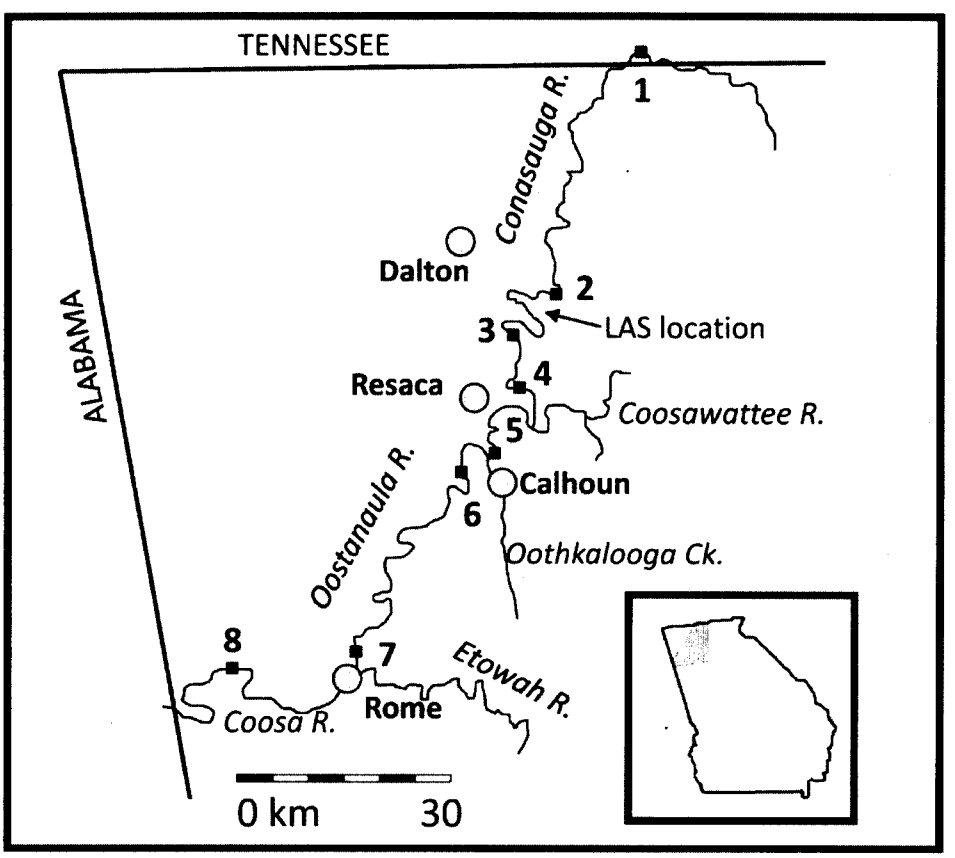


Fig. 1. Collection sites for surface waters and sediments in the Coosa River (northwest Georgia, USA).

of site 1, which had low hardness and alkalinity, this water formulation was similar to the collected surface water samples. Small oligochaetes (1–2 cm) were selected to stock the exposure chambers to minimize asexual fragmentation during the exposure period and the variation in contaminant uptake that it may cause [23]. The mass of *L. variegatus* stocked into each chamber was based on the organic carbon (OC) content of the sediment [20] with a minimum ratio between carbon and worm mass of 50:1 (dry wt). Exposures lasted for 28 d and were conducted at 23°C with a 16:8 h light:dark photoperiod. Test organisms were not fed during exposures. Concentrations of dissolved oxygen in the overlying waters of the exposure chambers exceeded 2.5 mg/L, with conductivities between 360 and 460 μS/cm, alkalinities between 75 and 125 mg/L, and total ammonia between 0 and 2.6 mg/L. The measured hardness in the overlying waters ranged from 100 to 150 mg/L as $CaCO_3$, although hardness could not be determined in most of the samples from sediments collected below the LAS because of a chemical interference with the titration. At the end of the exposure period, oligochaetes were allowed to purge their gut contents in clean water for 8 to 9 h to avoid including undigested sediment particles in tissue analyses. The composited animals from each exposure chamber were then placed into separate methanol-rinsed and preweighed polycarbonate tubes, which were sealed and frozen at −20°C. Two samples of oligochaetes were composited from the initial pool of animals used in the sediment exposures to provide blank tissue samples.

*Sample preparation and analysis*

Water samples were prepared for PFC analysis by adding approximately a 1% spike, by mass, of matrix internal standards. Detailed information concerning analytical methodologies and quality controls is provided in the Supplemental Data. Sediment samples used for PFC analyses were moist-sieved through a 2-mm stainless steel sieve and extracted four times with 60:40 acetonitrile:water (v:v) using a modification of the method of Washington et al. [24]. Nonsieved sediments were characterized by determining particle-size distribution, total organic material, carbon and nitrogen contents, and concentrations of metals including amorphous iron, hereafter referred to as FeOH (Tables S3, S4). Oligochaete tissue was extracted with an ion-pairing procedure using a modification of the method of Henderson et al. [25]. Ultra-high-pressure liquid chromatography (Waters ACQUITY UPLC®) with tandem mass-spectrometry (Waters Quattro Premier™) in negative-electrospray-ionization mode was employed to determine PFC concentrations in the prepared water, sediment, and tissue samples (Tables S5, S6). Concentrations of 15 PFC homologs (Table 1) were determined in surface waters, sediments, or tissues. In addition, concentrations of fluorotelomer acids were determined in surface waters and sediments using the method of Ellington et al. [26]. Method detection limits (MDLs) for individual PFC homologs were low, ranging from 0.005 to 0.028 ng/g for surface waters, 0.023 to 0.297 ng/g (dry wt) for sediments, and 0.023 to 0.174 ng/g (wet wt) for tissues, and recoveries of internal standards for sediments (71–92%) and tissues (65–124%) were satisfactory (Table S7). Concentrations of all homologs were below their MDLs in all blank water, sediment, and tissue samples.

*Data analysis*

Assessments of differences among sites and relationships among variables were facilitated with procedures provided by SAS software (SAS Institute). Statistical comparisons of PFC concentrations and other measured variables among sites were conducted using Dunnett's one-tailed means-comparison test [27]. Comparisons were made between sites 3 through 8 and sites 1 and 2 using concentrations measured in replicated samples ($n = 3$). When measured concentrations were below the MDL, half of the MDL was used [28]. Discharge rates from U.S. Geological Survey monitoring stations in the study area were used to facilitate comparisons among sites and previously collected samples (http://waterdata.usgs.gov/nwis). Correlation analyses were used to investigate relationships among physical and chemical variables and the influence of sediment variables on the bioaccumulation of PFCs, using samples from the contaminated sites (3 through 8, $n = 18$).

Table 1. Perfluorinated carboxylates and sulfonates measured in surface waters, sediments, and/or oligochaete tissues

| Homolog | Acronym | Moiety[a]/number of carbons |
|---|---|---|
| Perfluorobutanoate | PFBA | $C_4$ |
| Perfluoropentanoate | PFPA | $C_5$ |
| Perfluorohexanoate | PFHxA | $C_6$ |
| Perfluorheptanoate | PFHpA | $C_7$ |
| Perfluorooctanoate | PFOA | $C_8$ |
| Perfluorononanoate | PFNA | $C_9$ |
| Perfluorodecanoate | PFDA | $C_{10}$ |
| Perfluoroundecanoate | PFUnDA | $C_{11}$ |
| Perfluorododecanoate | PFDoDA | $C_{12}$ |
| Perfluorotridecanoate | PFTrDA | $C_{13}$ |
| Perfluorotetradecanoate | PFTeDA | $C_{14}$ |
| Perflourobutane sulfonate | PFBS | $S_4$ |
| Perfluorohexane sulfonate | PFHxS | $S_6$ |
| Perfluoroheptane sulfonate | PFHpS | $S_7$ |
| Perfluorooctane sulfonate | PFOS | $S_8$ |

[a] C = carboxylate moiety; S = sulfonate moiety.

## RESULTS AND DISCUSSION

*Surface waters*

Several surface water samples contained total PFC concentrations over 1 μg/L, and a comparison among sites demonstrated a significant contamination of the Conasauga River downstream of the LAS, with subsequent additions and dilutions further downstream (Fig. 2, Table S8). Concentrations increased significantly ($\alpha \leq 0.05$) downstream of the LAS at site 3 and then increased again by roughly 10% at site 4 after receiving inputs from several tributaries and wastewater from a carpet-backing plant. Downstream of the confluence of the Conasauga and Coosawattee Rivers (Oostanaula River), concentrations were halved by dilution, indicating low PFC contamination emanating from the Coosawattee watershed. Total PFCA concentrations in surface waters were greater than total PFSA concentrations at each site, but perfluorooctane sulfonate (PFOS) and perfluorobutane sulfonate (PFBS) were generally present in the greatest concentrations, followed by perfluorocanoate (PFOA). The predominant PFCAs were homologs with four to eight carbons. Despite increasing discharge, concentrations of PFCAs and PFBS increased, and PFOS concentrations remained steady as the river passed the cities of Resaca and Calhoun, indicating sources of PFC contamination from this area as well. Most of the homolog concentrations decreased slightly at site 7 after passing through approximately 50 km agricultural and forested land; although PFOS increased slightly, possibly because of the degradation of precursor chemicals such as sulfonamides (methylperfluorooctanesulfonamide and ethylperfluorooctanesulfonamide) that are also used

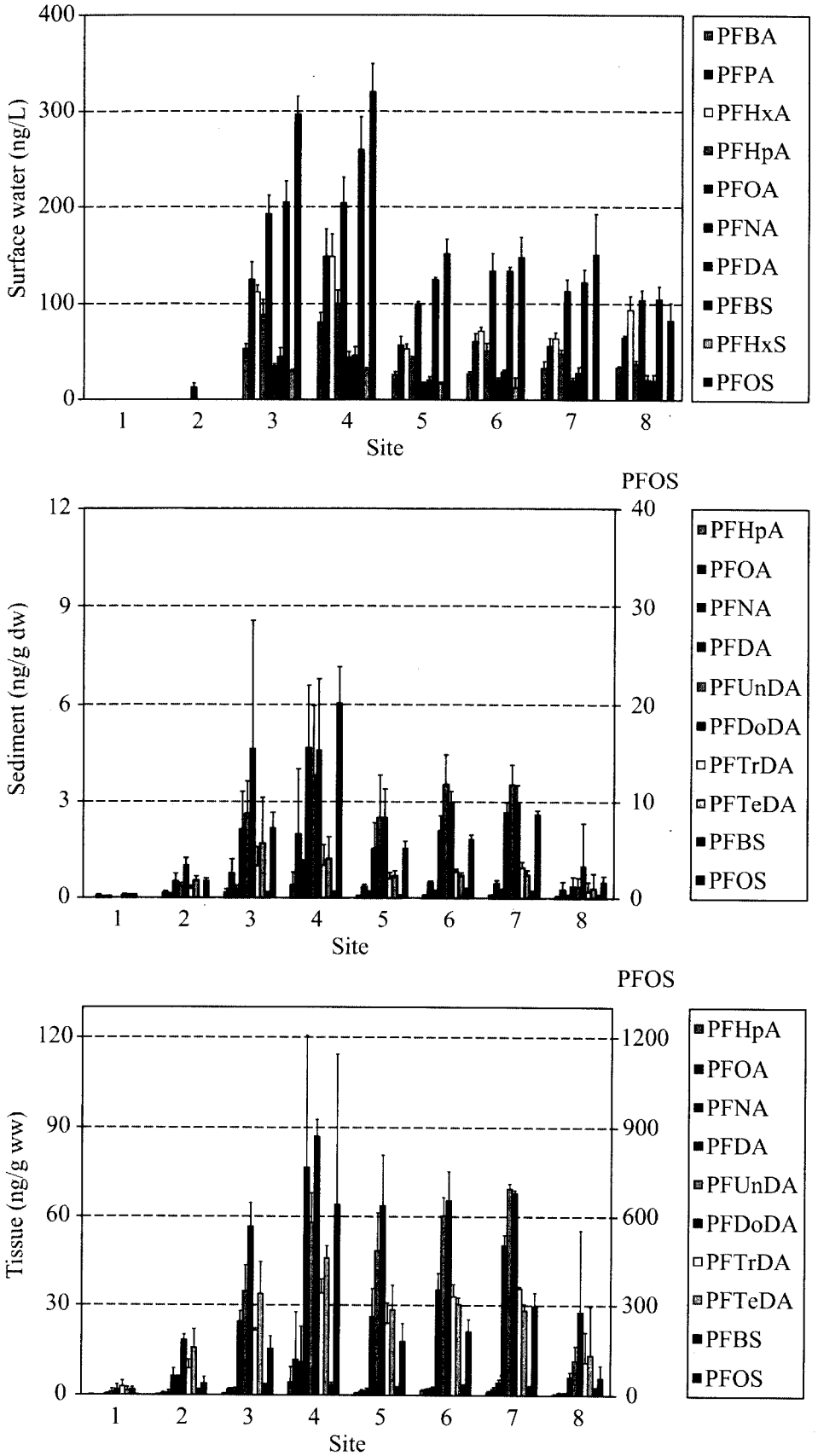


Fig. 2. Mean concentrations of perfluorinated chemicals (plus 1 standard deviation, $n = 3$) in surface waters and sediments collected from eight sites heading downstream in the Conasauga, Oostanaula, and Coosa Rivers (northwest Georgia, USA), and in *Lumbriculus variegatus* tissues exposed to the collected sediments for 28 d. Sediment and tissue concentrations of perfluorooctane sulfonate (PFOS) are represented on the right axis. PFBA = perfluorobutanoate; PFPA = perfluoropentanoate; PFHxA = perfluorohexanoate; PFHpA = perfluoroheptanoate; PFOA = perfluorooctanoate; PFNA = perfluorononanoate; PFDA = perfluorodecanoate; PFUnDA = perfluoroundecanoate; PFDoDA = perfluorododecanoate; PFTrDA = perfluorotridecanoate; PFTeDA = perfluorotetradecanoate; PFBS = perfluorobutane sulfonate; PFHxS = perfluorohexane sulfonate.

in the carpet industry [8]. Sulfonamides were not measured in the present study, but they have been a substantial component in effluents processed by the Dalton waste-treatment facility (www.epa.gov/region4/water/PFCdaltonindex.html). Samples collected at site 8 increased in concentrations of perfluorobutaboate, perfluoropentanoate, and perfluorhexanoate (PFHxA). However, this site was located 2 km below a paper-manufacturing plant that may discharge wastewaters containing these homologs [15]. Levels of the remaining PFCs decreased slightly at site 8, but not to the extent expected by the dilution provided by the Etowah River, which contributes 56% of the Coosa River's discharge. Additional inputs of PFCs could be originating in the Etowah watershed or from sources in the Rome area between sites 7 and 8. Comparisons among sites where river discharge was available (sites 3, 5, 7, 8) indicated mass loadings of all PFCs increased in surface waters heading downstream. Discharges (kg/d) at these sites of PFOA (0.08, 0.13, 0.20, 0.40, respectively) and PFOS (0.13, 0.20, 0.27, 0.32, respectively) confirmed the presence of additional PFC sources in the watershed below the LAS. Concentrations of long-chain PFCAs ($C_{11\text{-}14}$) were below detection limits in all water samples, agreeing with results from a water-stability experiment (Supplemental Data) that demonstrated an increasing hydrophobicity of PFCs as the number of $CF_2$ groups increased (Table S9). Concentrations of fluorotelomer acids were also low. The 6:2 telomer acid was detected above the MDL in samples from two sites (site 2 at 86 ng/L and site 7 at 35 ng/L), but the 8:2 telomer acid was not detected above the MDL in any samples.

Concentrations of PFCs in surface waters from sites 3 through 8 were relatively high compared with other surveys [6,13,14,29–31]. The U.S. Environmental Protection Agency established provisional health advisories for PFOS and PFOA in drinking waters of 200 ng/L and 400 ng/L, respectively [32]. Concentrations of PFOS in surface waters at sites 3 and 4 exceeded this limit, and one sample from site 7 contained 199 ng/L, but PFOA concentrations were well below the 400-ng/L advisory level. The amount of PFCs emanating from the LAS may have recently decreased to a lower level. Water collected for analyses from site 3 by Konwick et al. [19] and on behalf of the United Steel Workers union (http://media.timesfreepress.com/docs/2008/03/3_18%20_DALTON%20EPA%20LETTER-%20Final.pdf) generally contained greater concentrations of selected PFCs than samples collected for the present study. Samples collected at that site in 2009 for Dalton Utilities contained similar PFC concentrations to those reported here (www.epa.gov/region4/water/PFCdaltonindex.html).

*Sediments*

Sediments were generally sandy (21–93% sand, 7–61% silt, 1–13% clay), with proportions of OC ranging from 0.4 to 2.6% (Table S3). Metal concentrations were fairly consistent among sites; although sediments from site 8 contained substantially greater amounts of Na and Ca than the rest (Table S4). Perfluorinated carboxylic acids were generally present in greater mass than PFSAs, but PFOS was the predominant compound, with concentrations roughly 1.5 to 4 times that of the highest occurring PFCA (Fig. 2, Table S10). Six PFCs (PFOA, perfluorononanoate [PFNA], perfluorodecanoate [PFDA], perfluorotridecanoate [PFTrDA], perfluorotetradecanoate [PFTeDA], PFBS) were detected at low concentrations in sediments from site 1, with increasing concentrations at site 2. Although upstream of the LAS, site 2 is downstream of the confluence with Coahulla Creek, which is subject to contamination from northeast Dalton. The comparatively low concentrations of several PFCs measured in sediments sampled at site 1 may have resulted from deposition of volatile PFC precursors from the Dalton area. Airborne deposition of PFCs has been documented near a facility that manufactures PFC polymers [12].

Reflecting surface water concentrations, a substantial increase in sediment PFC levels occurred at sites 3 and 4. Concentrations of most homologs in sediments from site 4 were significantly greater ($\alpha \leq 0.05$) than those measured in sediments from site 1 or sites 1 and 2, and five homologs (PFDA, perfluoroundecanoate [PFUnDA], perfluorododecanoate [PFDoDA], PFTrDA, and PFTeDA) were present in sediments from site 3 at significantly greater concentrations than upstream of the LAS as well (Table S10). As with the surface waters, PFC concentrations in sediments decreased below the confluence of the Conasauga and Coosawattee Rivers. They subsequently increased downstream of Resaca and Calhoun and then increased slightly before reaching the city of Rome. Sediment concentrations of PFOS increased more than other PFCs (>30%) in the lower, agricultural segment downstream of site 6, again implicating the degradation of PFOS precursor chemicals [8], which are components of effluents permitted for discharge upstream. Sediment PFC concentrations were substantially lower at site 8 below Rome and the confluence with the Etowah River, suggesting that most long-chain PFCAs ($C_{\geq 10}$) were emanating from the Conasauga and Oostanaula Rivers. Concentrations of PFHxA and perfluorohexane sulfonate (PFHxS) were above the MDL in sediments from two sites (3 and 4); one sample (site 4) contained Perfluoroheptane sulfonate (PFHpS) above its MDL; no sediments contained concentrations of the 8:2 and 10:2 fluorotelomer acids above the MDLs.

The sediment profiles of PFCAs were dominated by long-chain homologs ($C_{\geq 10}$), despite their low to nondetectable concentrations in water samples. This pattern suggests that these analytes drop out of the water column relatively quickly and are transported downstream as part of the sediment load; this is consistent with the tendencies of PFCAs to become more hydrophobic (Table S9) and to increase in their sorption to OC [2] as the number of $CF_2$ groups increase. Ahrens et al. [33] also observed long-chain PFCAs ($C_{\geq 11}$) exclusively in sediments and attributed the phenomena to the increased sorption of these homologs to the OC associated with suspended particulate material and sediments.

Partition coefficients format throughout ($K_d$) were calculated for homologs detected in water and sediment from the same sites using the equation: $K_d = C_{sed}$ (ng/kg, dry wt)/$C_{wat}$ (ng/L). Mean log $K_d$ values ($n = 18$) increased with chain length (0.3, 0.2, 0.5, 0.9, 1.7 for $C_{6\text{-}10}$, respectively, and 0, 0.6, 1.5 for $S_{4,6,8}$, respectively), but were generally lower than $K_d$ values determined for less-contaminated sediments [34,35]. However, partition coefficients normalized to OC ($K_{OC} = [(C_{sed}/foc)/C_{wat}]$) may represent PFC partitioning more accurately [33]. Mean log $K_{OC}$ values, which also increased with chain length (2.2, 2.1, 2.4, 2.8, 3.6 for $C_{6\text{-}10}$, respectively, and 1.8, 2.4, 3.4 for $S_{4,6,8}$, respectively), were similar to previously reported values [33,34], further supporting the importance of OC in the partitioning of PFCs between water and sediment.

Concentrations of PFCAs in sediments from all eight sites indicated the same general pattern among homologs where PFDA, PFUnDA, and PFDoDA were most prominent, followed by PFTrDA and PFTeDA (Fig. 2). This pattern is similar to those determined in sludge and compost produced at the Dalton waste-treatment facility when the homologs that are

less hydrophobic ($C_{\leq 9}$) are excluded. Sludge and compost samples were dominated by PFDA, PFOA, PFBS, PFUnDA, PFDoDA, PFOS, and PFNA, with significant amounts of PFCAs with seven or fewer carbons and PFTrDA (www.epa.gov/region4/water/PFCdaltonindex.html). Assuming that PFCAs with fewer than 10 carbons and PFBSs tend to stay in solution, the sediment profile resulting from LAS runoff should reflect an accumulation of long-chain PFCAs ($C_{\geq 10}$) and PFOSs. Sediment concentrations of PFTeDA appear to be far greater than expected based on sludge and compost concentrations, indicating a higher propensity than the other homologs to associate with sediments.

Patterns of PFC concentrations in these sediments support previous research that suggests an increasing attraction to OC in sediments with increasing number of $CF_2$ groups and the addition of the sulfonate moiety [2]. However, results from the present study also indicate a more complex situation. Homologs with 10, 11, or 12 carbons were more prevalent in sediment than those with fewer than 10 carbons, but concentrations of PFTrDA and PFTeDA were lower than those of PFDA, PFUnDA, PFDoDA, presumably because of lower levels of input. Of the measured sediment characteristics, OC generally displayed the strongest correlation (positive) to sediment concentrations of PFCs (Table S11), but only correlations with PFDA, PFUnDA, PFDoDA, PFTrDA, and PFOS were significant ($\alpha < 0.05$), suggesting a stronger attraction between OC and these homologs. Correlations between sediment PFTeDA concentrations and sediment concentrations of OC, total Fe, FeOH, and clay were not significant, indicating that these variables are not instrumental to its accumulation in sediments. The limited numbers of sediment samples containing detectable amounts of PFHxA, PFHxS, and PFHpS precluded their use in correlation analyses.

Concentrations of PFCs in sediments collected for the present study were relatively high compared with other sediments in which PFCs were measured. Sediment concentrations of long-chain PFCAs ($C_{9\text{-}14}$) and PFOSs were generally much greater (sites 3, 4) or equal (sites 6, 7, 8) to the most contaminated samples in surveys of sediment PFCs from California, Maryland, and Oregon [35] and Japan [30], and they demonstrate the relative severity of the contamination and the extent of affected watershed. However, sediment concentrations of PFCs emanating from the LAS may be decreasing. Sediments collected from site 3 for a pilot survey (November 2006) contained concentrations of PFHxA, perfluoroheptanoate (PFHpA), PFOA, PFNA, and PFDA that were 80 to 90% greater than measured in these sediments collected 18 months later (Table S12).

### *Oligochaete tissues*

Exposures of oligochaetes met behavioral (active burrowing) and water-quality requirements [20], but a loss of worm mass occurred in all but four samples, including two of three replicates from site 1. In these 20 of the 24 samples, the mean recovery of *L. variegatus* mass was 70% ($CV = 52$). However, this loss was not considered abnormal and was comparable to losses in unfed treatments of similar *L. variegatus* exposures to uncontaminated sediments [36]. Masses retrieved from test sediments varied between 0.7 and 3.6 g (wet weight). No significant differences were found among sites with regard to the change in mass, and correlation analyses indicated none of the measured physical or chemical variables was statistically associated with it.

Sediments from all sites were contaminated to some degree with PFCs. Homologues that were below detection limits in sediments collected from sites 1 and 2 (PFHpA, PFBS, PFHxS, PFHpS, PFOS) were accumulated by the oligochaetes to concentrations above detection limits, confirming their presence in the sediments (Figure 2). In addition, measurable amounts PFHxS and PFHpS were found in all tissue samples despite non-detectable concentrations in most sediments and surface waters. As with the surface waters and sediments, PFC concentrations in tissues were significantly greater ($\alpha \leq 0.05$) in samples representing sites below the LAS with the greatest concentrations (total PFCs > 1,000 ng/g, wet wt) observed in samples from site 4 (Table S13). With the exception of samples from site 1, PFOS was present at the greatest concentration in the exposed oligochaetes followed by long-chain PFCAs ($C_{\geq 10}$), a pattern that reflected sediment concentrations, but also demonstrated the influence of chain length in bioaccumulation (Fig. 2).

### *Bioaccumulation*

Correlations between sediment and tissue concentrations of PFCAs and PFOS were highly significant, but coefficients for the PFCAs indicated more variability in the association as the number of $CF_2$ groups increased (Table S14). This increasing variability, in part, may be attributable to the stronger sorption to sediment OC with increasing $CF_2$ groups that was demonstrated in correlations between PFCA concentrations and sediment characteristics (Table S11). Sediment concentrations of PFOS were significantly correlated to sediment OC as well as being highly correlated to tissue PFOS concentration, suggesting a more effective process of accumulation within *L. variegatus* tissues or a lower rate of elimination. Higgins et al. [17] found PFOS to have one of the lowest elimination rates of the PFCs they examined. With the exception of PFBS, correlations were strongest between the homolog concentrations in tissue and their unmodified concentration in sediment and were weakened by the normalization of sediment PFC concentrations using sediment fractions of OC, total Fe, FeOH, and clay (Table S14). The lack of improvement in correlations because of normalization with these sediment characteristics suggests that they have little influence in the bioaccumulation of PFCs. Sediment concentrations of PFBS were not significantly related to any measured sediment variables (Table S11). However, the presence of FeOH in sediment may promote the accumulation of PFBSs in oligochaete tissues. The correlation between sediment and tissue PFBS concentrations was strongest ($\alpha \leq 0.003$) when the sediment concentration was normalized to its FeOH concentration.

The tendency for bioaccumulation of persistent organic pollutants into aquatic biota has been predicted using a biota-sediment accumulation factor (BSAF) that incorporates sediment concentrations of the contaminant and OC along with tissue concentrations of the contaminant and lipids [28]. In an evaluation of PFC bioaccumulation, Higgins et al. [17] modified the BSAF wet weight ($BSAF^{ww}$) by excluding the lipid normalization because of the lipophobic nature of PFCs. Excluding PFHxA, PFHxS, and PFHpS, $BSAF^{ww}$ values for individual homologs in the present study were fairly consistent among samples (Fig. 3), and no significant differences in values were found when compared among sites. The pattern among homolog $BSAF^{ww}$ values also supports research indicating a strong relationship between increasing number of $CF_2$ groups, the sulfonate moiety, and increasing bioaccumulation [37]. An exception to this pattern was the mean $BSAF^{ww}$ for PFHpA

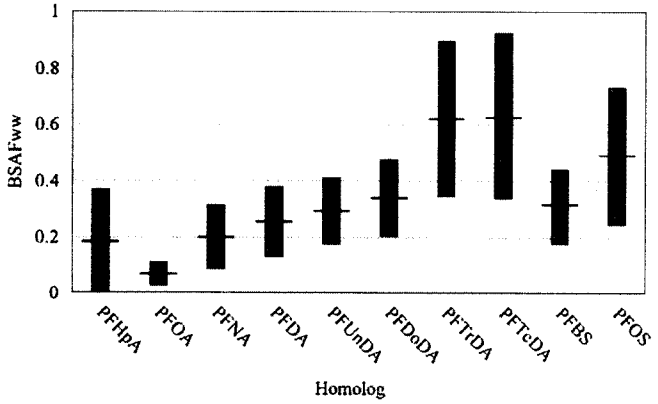


Fig. 3. Mean modified biota-sediment accumulation factors ($BSAF^{ww}$) ± 1 standard deviation ($n = 18$) based on concentrations of perfluorinated chemicals in sediments and exposed oligochaetes. See Figure 2 for definitions of acronyms.

(0.18, $CV = 101$), which exceeded that of PFOA (0.07, $CV = 65$) despite containing one less carbon. A comparison of mean $BSAF^{ww}$ values for PFNA (0.20, $CV = 57$), and PFOS (0.49, $CV = 50$) verified an increase in the tendency to bioaccumulate when the sulfonate moiety is present. The mean $BSAF^{ww}$ value for the four-carbon sulfonate, PFBS, (0.31, $CV = 42$) was less than those of PFDoDA (0.34, $CV = 40$), PFTrDA (0.62, $CV = 44$), and PFTeDA (0.63, $CV = 47$) but exceeded those of PFOA, PFNA, PFDA (0.25, $CV = 49$), and PFUnDA (0.29, $CV = 40$). Perfluorohexanoate (measured in sediments from sites 3 and 4) had mean $BSAF^{ww}$s of 0.03 and 0.06, respectively, indicating low potential to bioaccumulate. Perfluorohexane sulfonate was also measured in sediments from sites 3 and 4, but its mean $BSAF^{ww}$ values were considerably greater (0.48 and 1.61, respectively). Perfluoroheptane sulfonate was measured in one sediment sample from site 4 (0.37 ng/g dry wt with 1.99% OC), which corresponded to the greatest tissue concentration of PFHpS (48.68 ng/g wet wt) and produced the highest $BSAF^{ww}$ (2.6). Although limited in number, these observations indicate that PFHxA has little potential to bioaccumulate or biomagnify in oligochaetes, but PFHxS and PFHpS appear to be as prone to bioaccumulation as PFOS.

Higgins et al. [17] also used *L. variegatus* to evaluate PFC bioaccumulation from sediments and also found PFOS to have a greater mean $BSAF^{ww}$ than most PFCAs, although in the present study it was lower than those determined for PFTrDA and PFTeDA. However, the $BSAF^{ww}$ values they calculated for PFOA, PFNA, PFDA, PFUnDA, PFDoDA, and PFOS were 1.2 to 10.5 times greater than mean values determined in the present study. In addition, the trend among PFCA $BSAF^{ww}$ values they determined suggests lower bioaccumulation with increasing number of $CF_2$ groups, which is contrary to the findings of the present study. Notably, the bioaccumulation tendency for PFTrDA and PFTeDA, which we report but Higgins et al. [17] did not, appears to be particularly pronounced relative to the other PFCAs (Fig. 3). However, the most striking difference between the studies is the mean $BSAF^{ww}$ for PFOA, which is one of the highest determined by Higgins et al. [17] and one of the lowest determined in the present study (0.63 vs 0.07). These discrepancies indicate that other factors influence PFC bioaccumulation in addition to homolog concentration.

Differences in sediment handling, sediment characteristics, and exposure procedures may have contributed to these inconsistencies. An obvious divergence was in the way sediments were handled before exposures. Sediments assessed in the present study were held at 5°C before use, but those evaluated by Higgins et al. [17] were frozen (−80°C). Freezing sediments can lead to the release of soluble OC and associated contaminants on thawing [38], and bioaccumulation procedures explicitly state that sediments used for exposures should not be frozen [20]. Exposures were begun with small test organisms in the present study, whereas large oligochaetes were used by Higgins et al. [17]. Two nonspiked sediments with detectable PFCs and low OC (0.5 and 0.3%) were assessed by Higgins et al. [17], and 24 sediments (18 with much greater PFC concentrations) ranging in OC from 0.4 to 2.6% were evaluated for the present study. Masses and volumes used in the exposures for the two studies were also substantially different, but both met minimum requirements for the worm:OC ratio, chemical parameters of the overlying waters, and time allowed for oligochaetes to purge their gut contents. Standard 28-d exposures were used in the present study, but 56-d exposures with periodic sampling were conducted by Higgins et al. [17]. Although they noted little change between day 28 and day 56 with respect to PFC concentrations in worms, sediments, and overlying waters, the trends observed in $BSAF^{ww}$ values represented 56-d results.

Accumulation of PFCs at the low trophic level represented by aquatic oligochaetes appeared to be primarily related to sediment PFC concentrations. Patterns among PFC concentrations were virtually the same for sediments and tissues representing the contaminated sites (Fig. 2), and, with the exception of PFBS, positive correlations between sediment and tissue concentrations were highly significant (Table S14). For each site downstream of the LAS, a ranking of the seven highest mean sediment and tissue homolog concentrations showed almost perfect symmetry among sediment and tissue homologs, with the exception of PFOA. PFOA was one of the top seven homologs in each of these sediments but only occurred in the top seven tissue concentrations in samples from site 4, which had the greatest PFOA sediment concentration. When PFC tissue concentrations are calculated from sediment concentrations and $BSAF^{ww}$ values reported by Higgins et al. [17], the ranks of homolog concentrations in sediments and tissues were also very similar.

## CONCLUSIONS

The LAS associated with the Dalton municipal waste treatment facility has contributed significant amounts of PFCs to the Conasauga River, and additional sources of PFCs are apparent downstream. Concentrations of PFCs measured in samples from the Conasauga, Oostanaula, and Coosa Rivers were generally well above those determined at other PFC-contaminated sites reported in the literature. Despite reductions in PFOS production and use, it was the dominant PFC measured in samples collected in the present study, and it continues to pose a potential risk to biota in the watershed. Perfluorooctane sulfonate concentrations may continue to be elevated because of biodegradation of PFOS-precursor chemicals that continue to be discharged to the system. Low to nondetectable concentrations of fluorotelomer acids were observed in these samples, indicating that the PFCAs present were most likely original components of wastewater discharges. Concentrations of PFCs emanating from the LAS may be decreasing based on comparisons with past surveys of surface waters and sediments, but periodic monitoring will be required to determine long-term trends. After sediment exposures, PFOS and long-chain PFCAs ($C_{\geq 10}$) were present in the greatest concentrations in oligochaete tissues. Bioaccumulation of PFSAs and PFCAs by *L. variegatus* appeared to be primarily related to sediment

concentrations, but the tendency among PFCs to bioaccumulate increased with chain length and the presence of the sulfonate moiety. Short-chain PFCAs ($C_{\leq 6}$) may be viable alternatives to long-chain PFCAs ($C_{\geq 7}$), but short-chain PFSAs ($S_{4,6,7}$) were similar to PFOS with respect to bioaccumulation.

## SUPPLEMENTAL DATA

**Tables S1–S14.**(171 KB PDF).

*Acknowledgement*—The U.S. Geological Survey and the U.S. Environmental Protection Agency, through its Office of Research and Development, funded the present study. This manuscript has been subjected to the Agencies' administrative reviews and approved for publication. Use of trade, product, or firm names does not imply endorsement by the U.S. Government.

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# Supplemental Data

## Perfluorinated Compounds in Surface Waters and Sediments in Northwest Georgia, USA, and Their Bioaccumulation in *Lumbriculus variegatus*

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Table S1: Locations of surface water and sediment collections.

| Location | Latitude | Longitude |
|---|---|---|
| Hwy 411, TN | 35° 00' 60"N | 84° 44' 04"W |
| Brown Bridge Rd, GA | 34° 42' 52"N | 84° 51' 84"W |
| Tilton Bridge Rd, GA | 34° 40' 02"N | 84° 55' 72"W |
| Hwy 136, GA | 34° 35' 58"N | 84° 56' 04"W |
| Sugar Valley Rd, GA | 34° 30' 58"N | 84° 57' 45"W |
| Hwy 156, GA | 34° 29' 49"N | 85° 00' 86"W |
| Veterans Memorial Hwy, GA | 34° 17' 22"N | 85° 09' 97"W |
| Hwy 100, GA | 34° 14' 90"N | 85° 21' 34"W |

Table S2: Water quality characteristics[1] of surface waters collected from eight sites along the Conasauga, Oostanaula and Coosa Rivers, Georgia.

| Site | Conductivity (μS/cm) | Dissolved oxygen (% saturation) | pH | Alkalinity (mg/L as $CaCO_3$) | Hardness (mg/L as $CaCO_3$) |
|---|---|---|---|---|---|
| 1 | 38 | 95 | 8.1 | 30 | 36 |
| 2 | 185 | 93 | 7.9 | 100 | 104 |
| 3 | 196 | 88 | 7.9 | 100 | 96 |
| 4 | 201 | 83 | 7.9 | 96 | 100 |
| 5 | 125 | 94 | 8.1 | 62 | 56 |
| 6 | 142 | 82 | 7.9 | 64 | 60 |
| 7 | 149 | 88 | 7.9 | 70 | 72 |
| 8 | 227 | 86 | 7.9 | 78 | 84 |

[1]Conductivity - Orion™ model 1214000; pH - Orion™ model 720A with Triode electrode; dissolved oxygen - Orion™ model 1113000; alkalinity and hardness by titration (American Public Health Association, 1992).

Table S3: Physical characteristics[1] of sediment samples collected from eight sites along the Conasauga, Oostanaula and Coosa Rivers, Georgia.

| Site | Replicate | Organic material (%) | Organic carbon (%) | Total nitrogen (%) | Sand (%) | Silt (%) | Clay (%) |
|---|---|---|---|---|---|---|---|
| 1 | 1* | 4.8 | 2.5 | 0.12 | 87.8 | 10.0 | 2.3 |
| | 2* | 1.1 | 0.4 | 0.03 | 92.8 | 6.6 | 0.5 |
| | 3 | 3.9 | 1.3 | 0.07 | 90.8 | 7.2 | 2.0 |
| 2 | 1* | 2.6 | 1.1 | 0.08 | 71.7 | 20.4 | 7.9 |
| | 2* | 1.7 | 0.8 | 0.07 | 80.9 | 14.2 | 4.9 |
| | 3 | 4.5 | 1.7 | 0.14 | 42.4 | 45.6 | 12.0 |
| 3 | 1 | 4.4 | 1.7 | 0.12 | 47.7 | 39.6 | 12.7 |
| | 2* | 2.7 | 1.0 | 0.08 | 77.2 | 16.2 | 6.6 |
| | 3* | 1.5 | 0.4 | 0.04 | 83.5 | 12.1 | 4.4 |
| 4 | 1* | 2.3 | 1.0 | 0.06 | 82.5 | 12.6 | 4.9 |
| | 2* | 4.1 | 2.0 | 0.14 | 79.2 | 11.1 | 9.6 |
| | 3 | 6.2 | 2.4 | 0.22 | 20.7 | 60.8 | 18.6 |
| 5 | 1 | 3.8 | 1.4 | 0.08 | 66.9 | 23.7 | 9.4 |
| | 2* | 3.7 | 1.4 | 0.10 | 74.4 | 18.4 | 7.1 |
| | 3* | 4.1 | 1.8 | 0.11 | 58.8 | 31.5 | 9.7 |
| 6 | 1 | 1.9 | 0.7 | 0.06 | 86.4 | 11.4 | 2.2 |
| | 2* | 6.6 | 2.5 | 0.21 | 41.7 | 44.8 | 13.5 |
| | 3* | 6.0 | 2.6 | 0.22 | 31.4 | 55.2 | 13.4 |
| 7 | 1* | 4.7 | 2.0 | 0.14 | 53.1 | 34.5 | 12.4 |
| | 2* | 5.4 | 1.9 | 0.16 | 42.5 | 44.1 | 13.4 |
| | 3* | 5.1 | 2.1 | 0.14 | 50.0 | 36.6 | 13.4 |
| 8 | 1* | 1.6 | 0.5 | 0.04 | 71.2 | 20.0 | 8.8 |
| | 2* | 1.8 | 0.5 | 0.04 | 66.4 | 23.9 | 9.6 |
| | 3* | 3.7 | 1.4 | 0.10 | 68.3 | 24.3 | 7.4 |

[1] Organic material - Davies et al., 1974; organic carbon and total nitrogen - Leco CNS-2000 Analyzer; particle-size distribution - Miller and Miller, 1987.

* collected from the same side of the river.

Table S4: Metal concentrations (mg/kg dw)[1] in sediments collected from eight sites along the Conasauga, Oostanaula and Coosa Rivers, Georgia.

| Site | Replicate | Na | Mg | K | Ca | Mn | Fe | FeOH | Cr | Cu | Ni | Pb | Zn |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1 | 2885 | 1909 | 1003 | 4722 | 275 | 16268 | 96 | 26 | 11 | 11 | 12 | 51 |
| | 2 | 2939 | 1698 | 930 | 2521 | 86 | 11342 | 24 | 23 | 5 | 7 | 6 | 32 |
| | 3 | 3420 | 2309 | 1105 | 4070 | 267 | 15870 | 134 | 27 | 8 | 11 | 13 | 45 |
| 2 | 1 | 3579 | 2893 | 968 | 4506 | 1044 | 19682 | 87 | 34 | 13 | 14 | 18 | 50 |
| | 2 | 2658 | 3811 | 1036 | 6677 | 1482 | 21170 | 107 | 35 | 11 | 16 | 16 | 39 |
| | 3 | 3558 | 3690 | 1196 | 4777 | 1288 | 22536 | 154 | 46 | 17 | 21 | 20 | 74 |
| 3 | 1 | 2982 | 3885 | 1255 | 3918 | 1647 | 26097 | 202 | 54 | 18 | 22 | 28 | 143 |
| | 2 | 2680 | 2224 | 898 | 3712 | 810 | 13128 | 45 | 24 | 9 | 10 | 12 | 38 |
| | 3 | 1869 | 1479 | 886 | 2573 | 402 | 8370 | 71 | 16 | 4 | 7 | 8 | 15 |
| 4 | 1 | 2465 | 2382 | 934 | 4654 | 817 | 13997 | 66 | 25 | 9 | 11 | 12 | 48 |
| | 2 | 2393 | 2279 | 1055 | 3908 | 694 | 32042 | 122 | 35 | 13 | 18 | 21 | 82 |
| | 3 | 3573 | 5966 | 1736 | 5797 | 2370 | 31178 | 217 | 57 | 22 | 28 | 26 | 123 |
| 5 | 1 | 2865 | 3666 | 1340 | 3926 | 1012 | 22128 | 186 | 34 | 21 | 16 | 16 | 73 |
| | 2 | 3046 | 3729 | 1373 | 4817 | 947 | 22404 | 90 | 35 | 15 | 15 | 19 | 59 |
| | 3 | 2989 | 3864 | 1387 | 3633 | 1126 | 22160 | 141 | 35 | 15 | 16 | 17 | 61 |
| 6 | 1 | 2002 | 2099 | 1001 | 3284 | 559 | 14797 | 78 | 23 | 9 | 9 | 12 | 32 |
| | 2 | 3391 | 5250 | 1839 | 5054 | 1598 | 31434 | 215 | 51 | 23 | 25 | 30 | 112 |
| | 3 | 3082 | 4493 | 1558 | 4892 | 1301 | 25826 | 503 | 43 | 20 | 21 | 26 | 90 |
| 7 | 1 | 2758 | 3941 | 1501 | 4499 | 1094 | 24399 | 212 | 41 | 17 | 19 | 24 | 88 |
| | 2 | 2537 | 3938 | 1452 | 4339 | 1208 | 23396 | 147 | 39 | 16 | 18 | 23 | 81 |
| | 3 | 2988 | 4527 | 1626 | 4762 | 1254 | 25954 | 435 | 43 | 18 | 20 | 26 | 95 |
| 8 | 1 | 6326 | 4050 | 1412 | 6761 | 773 | 23161 | 116 | 37 | 13 | 15 | 25 | 53 |
| | 2 | 4956 | 3382 | 1129 | 5258 | 633 | 17180 | 126 | 35 | 22 | 22 | 15 | 52 |
| | 3 | 5476 | 3853 | 1271 | 6591 | 690 | 25215 | 137 | 34 | 18 | 17 | 27 | 85 |

[1] Metals - USEPA; FeOH - Jenne and Crecelius, 1988.

Chemicals.

Except as noted below, all chemicals used in this study were of the highest purity offered by the suppliers, uniformly ≥97% purity. Perfluoro-n-hexanoic acid, perfluoro-n-octanoic acid, perfluoro-n-nonanoic acid, perfluoro-n-decanoic acid, perfluoro-n-[1,2-$^{13}$C]hexanoic acid, perfluoro-n-[1,2,3,4-$^{13}$C]octanoic acid, perfluoro-n-[1,2,3,4,5-$^{13}$C]nonanoic acid, perfluoro-n-[1,2-$^{13}$C]decanoic acid all were purchased as certified standards from Wellington Laboratories through TerraChem (Shawnee Mission, KS, USA). Formulae for these perfluorocarboxylic acids (PFCAs) and the acronyms used herein for these compounds, are summarized in Table S5. Tetrabutylammonium hydrogen sulfate (TBAHS) and sodium carbonate, were purchased from Aldrich Chemical (Milwaukee, WI, USA). Acetonitrile (ACN), glacial acetic acid, methanol (MeOH) and methyl *tert*-butyl ether (MTBE) were purchased from Fisher Chemical (Fairlawn, NJ, USA). Oasis HLB solid-phase extraction (SPE) cartridges, 35-cm$^3$ capacity, were purchased from Waters (Milford, MA, USA).

Sampling preparation, methods, detection limits, and QA/QC for analyses of perfluorinated chemicals.

Prior to field collections, all sampling utensils and sample containers were washed in soap and water, rinsed thoroughly with deionized water and allowed to dry and then rinsed three separate times with Optima-grade methanol. Once cleaned, sampling utensils were wrapped in plastic wrap (Saran Wrap®) for transport to the field. Field blanks were collected at each site for sediment and water samples. A sample of clean sand was transported to the field in a 250-mL HDPE bottle, poured over all utensils used to collect and homogenize sediments at that site and then returned to its bottle for processing identical to the collected sediment samples. Blank water samples consisted of an aliquot of polished water transported to the field, exposed to air during sample collection and returned to the laboratory for analyses.

Preparation of Water Samples for Analysis. A 9.88 ml aliquot of water sample was transferred to an HDPE vial. This aliquot was spiked with ~0.138 g of 96%/4% acetonitrile/water containing mass-labeled matrix internal standards at 6.1 ng/g. This treatment yielded samples consisting of about 99% water and 1% acetonitrile, by mass, containing 84 pg/g of matrix internal standards, the same concentration that the calibration standards contain. Mass-labeled matrix internal standards included (M+4)perfluorobutanoic acid, (M+2)perfluorohexanoic acid, (M+4)PFOA, (M+5)perfluorononanoic acid, (M+2)perfluorodecanoic acid (PFDA or C10), (M+2)perfluoroundecanoic acid, (M+2)perfluorododecanoic acid, (M+2)6:2-fluorotelomer unsaturated carboxylic acid (FTUCA), (M+2)8:2-FTUCA, and (M+2)10:2-FTUCA. Spiked samples were transferred to polypropylene autosampler vials. All samples were analyzed by ultra-performance liquid chromatography, tandem mass spectrometry operated in negative electrospray-ionization mode as described below. Analytes included perfluorocarboxylic acids C4 through C14, FTUCAs 6:2, 8:2 and 10:2 (not reported here), and

perfluorosulfonates C4 (PFBS), C6, C7 and C8 (PFOS). Water samples were collected from the laboratory tap for comparison to the sampled systems. Deionized (18 MΩ) water was polished by elution through an SPE cartridge to represent zero concentration of the analytes.

Extraction of Sediment Samples. For the sediment samples, 1-g aliquots were transferred from each of three replicate field samples collected at each of the eight sampling locations to 16-mL polypropylene copolymer (PPCO) centrifuge tubes that were sealed with PPCO press-on caps. For these sediment samples, we used a modification of an ACN/$H_2O$ extraction we reported upon earlier (Washington et al., 2008) by extracting each sample four times with 60/40 ACN/$H_2O$ and mixing during extraction on a Labquake rotisserie, as opposed to a shaker table, but otherwise following our published method. Although we modified our extractions as described above to accommodate their PFA-contaminated nature, we retained all other practices from our published methods (Washington et al, 2008) including: i) spiking samples prior to extraction with $^{13}C_8$-PFOA as a recovery internal standard; ii) subjecting extracts to ion-pairing cleanup to decrease analytical noise from natural organic matter that normally is concentrated in surface soils; iii) reconstituting extracts in 60/40 ACN/H2O with a suite of mass-labeled PFAs present (Table SI5) at 84 pg/g as matrix internal standards; and iv) running procedural blanks in which the extraction process was carried out on otherwise-empty extraction tubes.

Extraction of Oligochaetes. Oligochaete samples, consisting of a composite of approximately 100 to 350 individuals (0.9-3.6 g ww), were frozen in pre-weighed 16-mL polypropylene copolymer (PPCO) centrifuge tubes that were sealed with a PPCO press-on caps until extraction. Composites weighing more than 2 g were split into separate samples for analysis. These samples were extracted using a method modified from Henderson et al. (2007) by adding 0.5-1 mL of 18 MΩ $H_2O$ to the thawed sample then vortexing to homogenize. To this homogenate, 100 μL of 10 ng/g $^{13}C_8$-PFOA was added as a recovery internal standard, vortexed and reweighed. Then 4.0 mL of 0.25 M tetrabutylammonium hydrogen sulfate was added followed by the addition of 5.0 mL of methyl tert-butyl ether (MTBE). Tubes then were placed on a Labquake rotisserie, rotated for 15 to 24 hrs, centrifuged at 650 G and 18 to 22 °C for 5 min., the aqueous phase frozen and the MTBE transferred to a capped, preweighed 12-mL vial that was stored in the freezer. The sample was rethawed, 3 mL of MTBE added, rotisseried for 15 to 24 hr, centrifuged, frozen and the MTBE transferred to the previously dosed vial which was returned to the freezer. The sample then was extracted a third time with 3 mL of MTBE identically to the second extraction and the third MTBE extraction was added to the previous two. The combined MTBE extracts were evaporated to dryness in an SPE assembly, using nylon syringe filters to filter the air, under a 5-psi vacuum. The samples then were reconstituted in 60:40 ACN:$H_2O$ containing a suite of mass-labeled PFAs present (Table SI5) at 84 pg/g as matrix internal standards.

Liquid Chromatograph, Tandem Mass-Spectrometer Analyses. Acetonitrile/water extracts were analyzed on a Waters Acquity ultra-performance liquid chromatograph (UPLC) interfaced with a Waters Quattro Premier XE tandem mass spectrometer operated in negative electrospray-ionization mode. We integrated peaks by setting software integration parameters so that integrations closely approximated the integration rules described in detail in Washington et al. (2007). All software-integrated peaks were checked and, if needed, adjusted manually according to these same integration rules. Efforts were made to reduce background noise in the system for PFOA by modifying the UPLC plumbing. Modifications included installation of polyaryletheretherketone (PEEK) tubing, removal of the degasser, installation of a C18 trap column (100mm × 2.1mm × 3.5μm) in the water eluent line immediately upgradient of the solvent mixer, and use of manually-degassed 18 MΩ water "polished" by passing through a Waters HLB solid-phase extraction cartridge (Washington et al., 2008).

All system operations were controlled by Waters MassLynx 4.1 and QuanLynx 4.1. Twenty microliters of extract were introduced to a Waters BEH C18 guard cartridge followed by a Waters BEH C18 analytical column, 100mm × 2.1mm × 2.1μm, maintained at 35 °C. The UPLC was operated using ACN and water eluents adjusted to pH 4 with glacial acetic acid. Pumping at a constant total flow of 0.5 mL/min, runs were started with 35% ACN, and then linearly ramped to 90% ACN over 5 min, held for 6 min, linearly ramped back to 35% ACN at 11.1 min, from which time the composition was held constant until the end of analysis at 13 min.

After UPLC elution, extracts were introduced to the mass spectrometer operated in negative electrospray ionization (ESI(-)) mode with the capillary potential set at -600 V, the extractor potential at -2 V and the radio-frequency (RF) lens potential at 0.3 V. The source temperature was maintained at 140 °C. The $N_2$ generator desolvation gas was maintained at 350 °C and 800 L/h flow. The cone gas flow, also supplied by the $N_2$ generator, was set to 25 L/h. Analyte-specific instrumental parameters, including monitored transitions, were optimized for PFCs analysis (Table S5). The low- and high-mass resolutions in the first quadrupole both were set to 13.0 (unitless ratio of direct to RF current voltages) and the ion energy was set to 0.7 eV. In the collision cell, a traveling-wave ion guide (TWIG), the entrance was set to -3 V, the interior set to -16 V and the exit set to -1 V. The Ar collision gas was set to flow at 0.45 mL/m. Low- and high-mass resolutions in the second quadrupole both were set to 12.0 and the ion energy was set to 1.0 eV. The detector was operated in multiple-reaction-monitoring (MRM) mode, with the detector multiplier set to -700 V and the dwell time was set to 70 ms with the objective of achieving at least 15 scans per peak.

## Table S5: Liquid Chromatographic and Mass Spectrometric Settings

| Compound | Nominal Retention Time: Apex RT (min) | Front RT (min) | Tail RT (min) | Delta T from prev Apex (min) | Number of transitions | Number of transitions per function | Parent Anion mass (m/z) | Cone potential (V) | Quan Ion mass (m/z) | Quan Ion collision energy (eV) | Primary Qual Ion mass (m/z) | Primary Qual Ion collision energy (eV) | 2nd Qual Ion mass (m/z) | 2nd Qual Ion collision energy (eV) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Function 1 Time Interval 0 to 1.1 Min** | | | | | | | | | | | | | | |
| Perfluoroprionoic acid (C3) | 0.65 | 0.4 | 0.9 | | 2 | 5 | 162.80 | 14 | 118.80 | 11 | 69.80 | 25 | | |
| Perfluorobutanoic acid (C4; PFBA) | 0.70 | 0.4 | 1.0 | 0.05 | 1 | | 212.85 | 13 | 168.80 | 10 | Irregular response | | | |
| $^{13}C_4$-Perfluorobutanoic acid ((M+4)C4;MPFBA | 0.70 | 0.4 | 1.0 | 0.05 | 1 | | 216.90 | 14 | 171.80 | 10 | Irregular response | | | |
| Perfluoro pentanoic acid (C5;PFPA) | 0.95 | 0.6 | 1.3 | 0.25 | 1 | | 262.80 | 13 | 218.85 | 10 | Irregular response | | | |
| **Function 2 Time Interval 0.9 to 2.1 Min** | | | | | | | | | | | | | | |
| Perfluorohexanoic acid (C6; PFHxA) | 1.35 | 1.0 | 1.7 | 0.40 | 2 | 7 | 312.80 | 13 | 268.85 | 10 | 118.80 | 20 | | |
| $^{13}C_2$-Perfluorohexanoic acid ((M+2)C6; MPFHxA) | 1.35 | 1.0 | 1.7 | 0.40 | 1 | | 314.80 | 14 | 269.85 | 10 | 119.30 | 20 | | |
| Perfluorobutane sulfonate (S4; PFBS) | 1.50 | 1.2 | 1.8 | 0.15 | 2 | | 298.90 | 40 | 79.85 | 30 | 98.85 | 40 | | |
| Perfluoroheptanoic acid (C7; PFHpA) | 1.80 | 1.5 | 2.1 | 0.30 | 2 | | 362.70 | 13 | 318.80 | 10 | 168.85 | 18 | | |
| **Function 3 Time Interval 1.8 to 3.2 Min** | | | | | | | | | | | | | | |
| Perfluorooctanoic acid (C8; PFOA) | 2.30 | 1.9 | 2.7 | 0.50 | 2 | 11 | 412.70 | 14 | 368.75 | 10 | 168.85 | 18 | | |
| $^{13}C_4$-Perfluorooctanoic acid ((M+4)C8; M4PFOA | 2.30 | 1.9 | 2.7 | 0.50 | 1 | | 416.70 | 14 | 371.70 | 10 | 171.85 | 18 | | |
| $^{13}C_8$-Perfluorooctanoic acid ((M+8)C8; M8PFOA | 2.30 | 1.9 | 2.7 | 0.50 | 1 | | 420.70 | 13 | 375.70 | 11 | 171.85 | 20 | | |
| Perfluorohexane sulfonate (S6; PFHxS) | 2.50 | 2.1 | 2.9 | 0.20 | 2 | | 398.90 | 50 | 79.85 | 40 | 98.85 | 40 | | |
| Perfluorononanoic acid (C9; PFNA) | 2.75 | 2.4 | 3.1 | 0.15 | 2 | | 462.70 | 15 | 418.70 | 11 | 218.85 | 18 | | |
| $^{13}C_5$-Perfluorononanoic acid ((M+5)C9; MPFNA | 2.75 | 2.4 | 3.1 | 0.15 | 1 | | 467.70 | 15 | 422.70 | 12 | 222.90 | 18 | 218.9 | 18 |
| **Function 4 Time Interval 2.4 to 3.4 Min** | | | | | | | | | | | | | | |
| Perfluoroheptane sulfonate (S7; PFHpS) | 2.95 | 2.6 | 3.3 | 0.20 | 2 | 2 | 448.90 | 50 | 79.90 | 40 | 98.90 | 40 | | |
| **Function 5 Time Interval 2.9 to 4.4 Min** | | | | | | | | | | | | | | |
| Perfluorodecanoic acid (C10; PFDA) | 3.35 | 3.0 | 3.7 | 0.40 | 2 | 11 | 512.90 | 15 | 468.70 | 11 | 218.85 | 20 | | |
| $^{13}C_2$-Perfluorodecanoic acid ((M+2)C10; MPFDA) | 3.35 | 3.0 | 3.7 | 0.40 | 1 | | 514.90 | 15 | 470.00 | 12 | | | | |
| Perfluorooctane sulfonate (S8; PFOS) | 3.55 | 3.2 | 3.9 | 0.20 | 2 | | 498.90 | 60 | 79.85 | 50 | 98.85 | 40 | | |
| 8:2 Fluorotelomer unsaturated acid (8:2FTUCA) | 3.65 | 3.3 | 4.0 | 0.10 | 2 | | 456.70 | 16 | 392.70 | 18 | 342.70 | 40 | | |
| $^{13}C_2$- 8:2 Fluorotelomer unsaturated acid ((M+2)8:2FTUCA) | 3.65 | 3.3 | 4.0 | 0.00 | 1 | | 458.70 | 16 | 393.70 | 16 | 343.70 | 40 | | |
| Perfluoroundecanoic acid (C11; PFUnDA) | 3.90 | 3.6 | 4.2 | 0.25 | 2 | | 562.70 | 15 | 518.70 | 12 | 218.85 | 20 | | |
| $^{13}C_2$-Perfluoroundecanoic acid ((M+2)C11; MPFUnDA) | 3.90 | 3.6 | 4.2 | 0.25 | 1 | | 564.90 | 15 | 520.00 | 13 | | | | |
| **Function 6 Time Interval 4.0 to 15.0 Min** | | | | | | | | | | | | | | |
| Perfluorododecanoic acid (C12 PFDoDA) | 4.50 | 4.2 | 4.8 | 0.60 | 2 | 10 | 612.70 | 16 | 568.70 | 13 | 318.70 | 20 | | |
| $^{13}C_2$-Perfluoro dodecanoic acid ((M+2)C12; MPFDoDA) | 4.50 | 4.2 | 4.8 | 0.60 | 1 | | 614.90 | 16 | 570.00 | 13 | | | | |
| 10:2 Fluorotelomer unsaturated acid (10:2FTUCA) | 4.65 | 4.4 | 4.9 | 0.15 | 2 | | 557.00 | 16 | 493.00 | 17 | 443.00 | 38 | | |
| $^{13}C_2$-10:2 Fluorotelomer unsaturated acid ((M+2)10:2FTUCA) | 4.65 | 4.4 | 4.9 | 0.15 | 1 | | 559.00 | 16 | 494.00 | 17 | | | | |
| Perfluorotridecanoic acid (C13; PFTrDA) | 5.15 | 4.9 | 5.4 | 0.50 | 2 | | 662.75 | 16 | 618.70 | 13 | 318.70 | 22 | | |
| Perfluorotetradecanoic acid (C14; PFTeDA) | 5.80 | 5.5 | 6.1 | 0.65 | 2 | | 712.75 | 18 | 668.70 | 14 | 318.70 | 24 | | |

Raw Data Optimization & Quantitation: Chromatograms were smoothed using a second-order Savitsky-Golay algorithm and two five-point smoothes with a few exceptions to accommodate monitoring the high number of transitions in the method (Table S6). Quantitation was performed using mass-labeled matrix internal standards. Quantitation for C4, C6, C8, C9, C10, C11, and C12, analytes was accomplished using isotopic dilution since isotopically labeled standards were available. C5 was quantitated using the mass-labeled C6 ($^{13}C_2$-PFHxA), and C7 and PFOS were quantitated using the mass-labeled C8 ($^{13}C_4$-PFOA) and C10 ($^{13}C_2$-PFDA) matrix internal standards, respectively. Calibrations were constructed with linear regressions of untransformed data, and plots of peak area/internal standard area versus calibration standard concentration/ internal standard area; 1/X weighting was applied for regression. Standards injected on the instrument ranged from 0.9 to 4800 pg/g. The lowest standard concentrations that were used to generate the calibration curves were those levels for which the calibration lines maintained a central tendency for repeated measures of the standards. Final calibration curves consisted of 11-14 standard concentrations of the targeted species spanning from 5 to 4800 pg/g. Standards were interspersed with sample extracts and blanks throughout the sample-analysis runs. Sample extracts were diluted as needed to get their concentrations to fall within the instrument calibration range using 60:40 ACN:$H_2O$ spiked with appropriate concentrations of all matrix internal standards.

Table S6: Typical Integration and Optimization Parameters

| Compound | Savitzky Golay Smoothing # points; # smooths | Quantitative Qualitative ratio & tolerance (%) | Internal standard |
|---|---|---|---|
| **Function 1 Time Interval 0 to 1.1 Min** | | | |
| Perfluoroprionoic acid (C3) | 5; 2 | | |
| Perfluorobutanoic acid (C4; PFBA) | 5; 2 | | |
| $^{13}C_4$-Perfluorobutanoic acid ((M+4)C4;MPFBA | 5; 2 | | |
| Perfluoro pentanoic acid (C5;PFPA) | 0; 0 | | |
| **Function 2 Time Interval 0.9 to 2.1 Min** | | | |
| Perfluorohexanoic acid (C6; PFHxA) | 5; 2 | 21.0 ± 44% | (M+2)C6 |
| $^{13}C_2$-Perfluorohexanoic acid ((M+2)C6; MPFHxA) | 5; 2 | | |
| Perfluorobutane sulfonate (S4; PFBS) | 5; 2 | 4.8± 44% | (M+2)C6 |
| Perfluoroheptanoic acid (C7; PFHpA) | 0; 0 | 3.1± 44% | (M+4)C8 |
| **Function 3 Time Interval 1.8 to 3.2 Min** | | | |
| Perfluorooctanoic acid (C8; PFOA) | 5; 2 | 3.31± 44% | (M+4)C8 |
| $^{13}C_4$-Perfluorooctanoic acid ((M+4)C8; M4PFOA | 5; 2 | | |
| $^{13}C_8$-Perfluorooctanoic acid ((M+8)C8; M8PFOA | 5; 2 | | (M+4)C8 |
| Perfluorohexane sulfonate (S6; PFHxS) | 5; 2 | 2.0± 44% | (M+4)C8 |
| Perfluorononanoic acid (C9; PFNA) | 5; 2 | 4.3± 44% | (M+5)C9 |
| $^{13}C_5$-Perfluorononanoic acid ((M+5)C9; MPFNA | 5; 2 | | |
| **Function 4 Time Interval 2.4 to 3.4 Min** | | | |
| Perfluoroheptane sulfonate (S7; PFHpS) | 5; 2 | 1.5± 44% | (M+5)C9 |
| **Function 5 Time Interval 2.9 to 4.4 Min** | | | |
| Perfluorodecanoic acid (C10; PFDA) | 5; 2 | 6.8± 44% | (M+2)C10 |
| $^{13}C_2$-Perfluorodecanoic acid ((M+2)C10; MPFDA) | 5; 2 | | |
| Perfluorooctane sulfonate (S8; PFOS) | 5; 2 | 1.32± 44% | (M+2)C10 |
| 8:2 Fluorotelomer unsaturated acid (8:2FTUCA) | 5; 2 | | (M+2)8:2FTUCA |
| $^{13}C_2$- 8:2 Fluorotelomer unsaturated acid ((M+2)8:2FTUCA) | 5; 2 | | |
| Perfluoroundecanoic acid (C11; PFUnDA) | 5; 2 | 8.8± 44% | (M+2)C11 |
| $^{13}C_2$-Perfluoroundecanoic acid ((M+2)C11; MPFUnDA) | 5; 2 | | |
| **Function 6 Time Interval 4.0 to 15.0 Min** | | | |
| Perfluorododecanoic acid (C12 PFDoDA) | 5; 2 | 10.8± 44% | (M+2)C12 |
| $^{13}C_2$-Perfluoro dodecanoic acid ((M+2)C12; MPFDoDA) | 5; 2 | | |
| 10:2 Fluorotelomer unsaturated acid (10:2FTUCA) | 5; 2 | | (M+2)10:2FTUCA |
| $^{13}C_2$-10:2 Fluorotelomer unsaturated acid ((M+2)10:2FTUCA) | 5; 2 | | |
| Perfluorotridecanoic acid (C13; PFTrDA) | 5; 2 | 12.9± 44% | (M+2)C12 |
| Perfluorotetradecanoic acid (C14; PFTeDA) | 5; 2 | 16.9± 44% | (M+2)C12 |

Method detection limits (MDL) and limits of quantitation (LOQ). MDL and LOQ were calculated using four repeated measures of the 18 pg/g standard. MDL was calculated with Students t test by t times standard deviation of the four repeated measures of the 18 pg/g standard where $t_{0.01} = 4.451$ for n=4. LOQ was defined as 10 times the standard deviation.

Table S7: Method detection limits (MDL) and limits of quantitation (LoQ)

| | Surface water (ng/g) | | Sediment (ng/g dw) | | Tissue (ng/g ww) | |
|---|---|---|---|---|---|---|
| Homologue | MDL | LoQ | MDL | LoQ | MDL | LoQ |
| PFBA | 0.012 | 0.028 | | | | |
| PFPA | 0.017 | 0.038 | | | | |
| PFHxA | 0.011 | 0.024 | 0.131 | 0.349 | 0.174 | 0.383 |
| PFHpA | 0.009 | 0.019 | 0.036 | 0.095 | 0.105 | 0.232 |
| PFOA | 0.007 | 0.016 | 0.036 | 0.095 | 0.023 | 0.051 |
| PFNA | 0.005 | 0.010 | 0.032 | 0.084 | 0.133 | 0.294 |
| PFDA | 0.011 | 0.023 | 0.023 | 0.060 | 0.066 | 0.146 |
| PFUnDA | | | 0.121 | 0.322 | 0.132 | 0.291 |
| PFDoDA | | | 0.126 | 0.337 | 0.096 | 0.211 |
| PFTrDA | | | 0.082 | 0.220 | 0.124 | 0.274 |
| PFTeDA | | | 0.039 | 0.104 | 0.083 | 0.182 |
| PFBS | 0.020 | 0.044 | 0.054 | 0.144 | 0.077 | 0.169 |
| PFHxS | 0.014 | 0.031 | 0.074 | 0.197 | 0.102 | 0.225 |
| PFHpS | 0.028 | 0.061 | 0.297 | 0.794 | 0.097 | 0.214 |
| PFOS | 0.009 | 0.019 | 0.149 | 0.398 | 0.160 | 0.353 |

Results.

Method detection limits could not be calculated for PFUnDA, PFDoDA, PFTrDA, and PFTeDA in surface-water samples due to the lack of any observable peak for these homologues; safe to say MDL was at least as low as the most insensitive PFCA, C3 MDL = 0.028 ng/g; C3 LoQ = 0.062 ng/g. Method detection limits could not be calculated for PFBA and PFPA in sediment and tissue due to excessive noise in the extracts. Blank samples of water, sediment, and tissues were below the mdl for all homologues. Mean recoveries of the M8C8 internal reference were 83% (CV = 8) and 92% (CV = 12) for the sediment and tissue analyses, respectively.

Within-site variability in PFC concentrations was greatest in tissue samples (mean CV = 86%, for 11 homologues), followed by sediment samples (mean CV = 46%, for 11 homologues), and lowest among water samples (mean CV = 10% for 7 homologues). Variability among analyte concentrations in split oligochaete samples was low. Mean CVs for samples exceeding analyte MDL were as follows: PFHxA 31%, n=5; PFHpA 25%, n = 10, PFOA 18%, n = 11; PFNA 11%, n = 9; PFDA 5%, n = 11; PFUnDA 4%, n = 11; PFDoDA 3%, n = 11; PFTrDA 4%, n = 11; PFTeDA 4%, n = 11; PFBS 26%, n = 11; PFHxS 26%, n = 11; PFHpS 18%, n = 9; PFOS 6%, n = 11.

Table S8. Mean concentrations (ng/L) of perfluorinated chemicals (with coefficient of variation, $n = 3$) in surface waters collected from sites along the Conasauga, Oostanaula and Coosa Rivers.

| | Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Homologue | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| PFBA | < MDL | < MDL | 53* (9) | 81* (12) | 26* (12) | 27* (6) | 33* (21) | 34* (2) |
| PFPA | < MDL | < MDL | 125* (15) | 149* (18) | 57* (15) | 61* (12) | 56* (14) | 65* (2) |
| PFHxA | < MDL | < MDL | 112* (6) | 149* (16) | 53* (8) | 72* (5) | 64* (10) | 94* (14) |
| PFHpA | < MDL | < MDL | 89* (16) | 100* (14) | 43* (4) | 51* (15) | 48* (8) | 38* (8) |
| PFOA | < MDL | 13 (28) | 193* (10) | 204* (13) | 100* (2) | 134* (14) | 113* (10) | 104* (9) |
| PFNA | < MDL | < MDL | 35* (5) | 44* (14) | 17* (3) | 21* (8) | 20* (16) | 21* (22) |
| PFDA | < MDL | < MDL | 45* (20) | 46* (19) | 21* (16) | 29* (5) | 28* (20) | 20* (28) |
| PFBS | < MDL | < MDL | 205* (11) | 260* (7) | 125* (1) | 134* (3) | 122* (10) | 105* (12) |
| PFHxS | < MDL | < MDL | 30* (4) | 31* (7) | 17* (7) | 13* (45) | < MDL | <MDL |
| PFHpS | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL |
| PFOS | < MDL | < MDL | 297* (6) | 321* (9) | 152* (10) | 148* (14) | 151* (28) | 83* (22) |

*Concentration is significantly greater than those measured at sites 1 and 2 (Dunnett's one-tailed test, $\alpha \leq 0.05$).

**Stability of Mixed Perfluoroalkylates in Water.**

A mixture containing 5000 ng each of the perfluoroalkylates (PFCAs) C4 – C14 and the perfluorosulfonates (PFSAs) S4 and S6-S8, was prepared from 650 ng/g stock solutions in 60/40 Acetonitrile/Polished 18 MΩ Water (ACN/$H_2O$). The mixture was prepared in a 250 mL Nalgene wide mouth bottle, rinsed 3X with HPLC grade methanol prior to use. The resulting mixture was subjected to house vacuum overnight and then diluted to 250 mL with polished 18 MΩ Water. The intent of placing this mixture under vacuum was to

accelerate preferential evaporation of ACN from the ACN/$H_2O$ solution, a phenomenon we had observed in past practice with ACN/$H_2O$ solutions. Residual ACN content was not determined. The average PFAA concentration in this stock mixture was 18 ng/g.

Two 125 mL aqueous solutions were prepared from this stock mixture, both diluted to an average theoretical concentration of 93 pg/g with polished 18 MΩ Water. These final aqueous test solutions contained less than 0.14% ACN on a mass basis using the highly conservative assumption that no ACN was lost during the earlier evaporation step. One of these solutions was kept at room temperature, about 22 °C; the other was refrigerated at 7.5 °C. All solution transfers were made with an Eppendorf pipetter; the pipette tip was submerged at least one-half inch below the surface for aliquot removal. All dilution quantitations are based upon gravimetric measurements.

For LC/MS/MS analysis, 400 μL of each solution was mixed with 600 μL of a mixture of mass-labeled quantitation standards in 60/40 ACN/polished 18 MΩ water. The concentration of each standard in the mass-labeled quantitation standards stock solution was 177 pg/g, giving a concentration in the autosampler vial of about 95 pg/g. The resulting concentration of ACN in the autosampler vial is sufficient to prevent adsorption of analytes to the glass vial. One sample vial was prepared from the room-temperature solution and one from the refrigerated solution per sampling event; only for $T_0$ were both samples at collected from room-temperature solutions. Sampling events were staged daily for eight days, including $T_0$ = 30 minutes after mixing the 93 pg/g solutions. Each sample vial was subjected to three repeated measures on the LC/MS/MS.

One day and later after making the aqueous test solutions, no analytes varied with time with statistical significance, except for the room temperature PFBA which trended downward from day 1 through day 7. Mean recoveries and standard deviations for day 1 through day 7 data are tabulated in Table 1. Each mean in Table 1 represents the mean of seven samples, day 1 through day 7, with each sample represented by three repeated measures for a total of 21 data points for each mean. Non-detects for C13 and C14 were entered as zeros for statistical purposes.

Table S9: Recoveries from water-stability study.

| | Percent recovery ($n$ = 21) | | | |
|---|---|---|---|---|
| Homologue | Refrigerated (7.5 °C) | | Room temperature | |
| | Mean (n = 3) | Standard deviation | Mean (n = 3) | Standard deviation |
| PFBA | 114 | 11 | 97 | 16 |
| PFPA | 87 | 7 | 82 | 4 |
| PFHxA | 96 | 6 | 90 | 5 |
| PFHpA | 82 | 4 | 80 | 7 |
| PFOA | 87 | 5 | 83 | 6 |
| PFNA | 82 | 10 | 80 | 8 |
| PFDA | 80 | 7 | 78 | 9 |
| PFUnDA | 69 | 6 | 62 | 3 |
| PFDoDA | 26 | 5 | 20 | 3 |
| PFTrDA | 3 | 4 | 3 | 1 |
| PFTeDA | 0 | 2 | 0 | 1 |
| PFBS | 93 | 5 | 88 | 5 |
| PFHxS | 90 | 5 | 88 | 4 |
| PFHpS | 95 | 17 | 94 | 20 |
| PFOS | 66 | 8 | 65 | 5 |

There was a slight and consistent, increase in recovery for refrigerated storage vs. room temperature storage when the compounds were evaluated individually; this small difference does not seem to be attributable to differences in density based on calculations of density for pure water at 7.5 and 22 °C (representing room temperature). Only C4 at 7.5 °C was recovered at 100% and time-invariant; as noted above, room temperature C4 had a statistically significant downward trend over day 1 to day 7. Recoveries for C5-C10 are in the 78% - 96% range, as are the three lower molecular weight PFSAs. Beginning with C11 and S8, recovery drops to less than 70%, while C12 drops to 20 to 26%, and C13 and C14 recovery approaches zero.

Table S10. Mean concentrations (ng/g, dw) of perfluorinated chemicals (with coefficient of variation, $n = 3$) in sediments collected from sites along the Conasauga, Oostanaula and Coosa Rivers.

| | Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Homologue | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| PFHxA | < MDL | < MDL | 0.15 (100) | 0.40 (128) | < MDL | < MDL | < MDL | < MDL |
| PFHpA | < MDL | < MDL | 0.16 (70) | 0.39[b] (100) | 0.07 (18) | 0.08 (18) | 0.09 (27) | 0.04 (101) |
| PFOA | 0.06 (82) | 0.15 (43) | 0.74 (59) | 1.97[b] (104) | 0.33 (26) | 0.47 (12) | 0.45 (20) | 0.26 (95) |
| PFNA | 0.03 (62) | 0.08 (76) | 0.25 (50) | 0.68[b] (69) | 0.14 (53) | 0.21 (12) | 0.27 (8) | 0.07 (75) |
| PFDA | 0.03 (100) | 0.50 (46) | 2.12[a] (56) | 4.66[b] (42) | 1.51 (55) | 2.09[a] (22) | 2.67[b] (12) | 0.35 (82) |
| PFUnDA | < MDL | 0.36 (26) | 2.63[b] (38) | 3.80[b] (58) | 2.50[a] (53) | 3.53[b] (26) | 3.53[b] (17) | 0.33 (87) |
| PFDoDA | < MDL | 1.00 (22) | 4.64[b] (84) | 4.60[b] (48) | 2.52 (35) | 2.97 (12) | 3.00 (17) | 0.98 (138) |
| PFTrDA | 0.07 (75) | 0.30 (22) | 0.98[a] (59) | 0.99[a] (65) | 0.59 (31) | 0.80[a] (10) | 0.93[a] (19) | 0.21 (139) |
| PFTeDA | 0.05 (102) | 0.52 (26) | 1.67[a] (87) | 1.19 (58) | 0.66 (25) | 0.68 (13) | 0.70 (20) | 0.30 (148) |
| PFBS | 0.05 (87) | < MDL | .11 (73) | 0.17[b] (16) | 0.09 (14) | 0.22[b] (38) | 0.20[b] (15) | 0.10 (16) |
| PFHxS | < MDL | < MDL | 0.07 (83) | 0.17[b] (92) | < MDL | < MDL | < MDL | < MDL |
| PFHpS | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL | < MDL |
| PFOS | < MDL | 1.73 (39) | 7.24 (67) | 20.18[b] (54) | 5.10 (42) | 6.05 (24) | 8.70 (14) | 1.66 (103) |

[a] Concentration is significantly greater than measured at site 1; [b] Concentration is significantly greater than measured at sites 1 and 2 (Dunnett's one-tailed test, $\alpha \leq 0.05$). MDL = method detection limit.

Table S11: Pearson correlation coefficients (r) with alpha values ($n$ = 18) for relationships between concentrations of PFC homologues in sediment and sediment concentrations of organic carbon, total iron, amorphous iron, or clay.

| Homologue | Organic C | Total Fe | FeOH | Clay |
|---|---|---|---|---|
| PFHpA | 0.25 | 0.40 | -0.07 | 0.10 |
| | 0.3094 | 0.0975 | 0.7853 | 0.7007 |
| PFOA | 0.26 | 0.42 | -0.06 | 0.10 |
| | 0.2977 | 0.0862 | 0.8077 | 0.6932 |
| PFNA | 0.46 | 0.53 | 0.06 | 0.35 |
| | 0.0562 | 0.0251 | 0.8058 | 0.1550 |
| PFDA | 0.66 | 0.58 | 0.23 | 0.57 |
| | 0.0030 | 0.0124 | 0.3552 | 0.0133 |
| PFUnDA | 0.74 | 0.42 | 0.37 | 0.62 |
| | 0.0005 | 0.0862 | 0.1353 | 0.0066 |
| PFDoDA | 0.48 | 0.35 | 0.17 | 0.47 |
| | 0.0455 | 0.1488 | 0.5008 | 0.0473 |
| PFTrDA | 0.60 | 0.35 | 0.32 | 0.55 |
| | 0.0082 | 0.1508 | 0.2016 | 0.0178 |
| PFTeDA | 0.33 | 0.27 | 0.10 | 0.39 |
| | 0.1807 | 0.2784 | 0.6825 | 0.1095 |
| PFBS | 0.39 | 0.31 | 0.28 | 0.21 |
| | 0.1072 | 0.2079 | 0.2656 | 0.4130 |
| PFOS | 0.52 | 0.66 | 0.11 | 0.41 |
| | 0.0253 | 0.0148 | 0.6581 | 0.0885 |

Table S12: Mean concentrations (ng/g,dw) of perfluorinated chemicals (with coefficients of variation, $n = 3$) in sediments collected from site 3 in November, 2006 and in June, 2008.

| Homologue | 2006 | 2008 |
|---|---|---|
| PFHxA | 1.12 (18) | 0.15 (100)* |
| PFHpA | 0.81 (12) | 0.16 (70) |
| PFOA | 4.56 (19) | 0.74 (59) |
| PFNA | 2.32 (26) | 0.25 (50) |
| PFDA | 10.15 (24) | 2.12 (56) |

*Mean includes samples with concentrations below the method detection limit.

Table S13. Mean concentrations (ng/g, ww) of perfluorinated chemicals (with coefficient of variation, $n = 3$) in tissues of *Lumbriculus variegatus* exposed to sediments collected from sites along the Conasauga, Oostanaula and Coosa Rivers.

| | Site | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Homologue | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| PFHxA | < MDL | < MDL | 0.37 (14) | 1.31 (125) | 0.26 (34) | 0.19 (74) | 0.30 (34) | 0.29 (63) |
| PFHpA | 0.16 (59) | 0.30 (19) | 0.52 (31) | 4.29[b] (120) | 0.75 (27) | 1.58 (26) | 0.95 (55) | 0.32 (74) |
| PFOA | 0.10 (69) | 0.60 (67) | 2.06 (11) | 11.80 (136) | 1.35 (39) | 2.11 (13) | 2.19 (30) | 0.95 (13) |
| PFNA | < MDL | 0.82 (103) | 2.28 (7) | 11.04[b] (108) | 1.68 (44) | 2.61 (12) | 4.29 (24) | 0.90 (15) |
| PFDA | 0.35 (82) | 6.36 (40) | 24.71 (14) | 76.58[b] (58) | 26.28 (36) | 35.28[a] (16) | 50.44[b] (7) | 6.10 (27) |
| PFUnDA | 1.13 (85) | 5.79 (12) | 34.87[b] (25) | 58.09[b] (17) | 48.65[b] (26) | 60.34[b] (10) | 69.42[b] (2) | 11.50 (42) |
| PFDoDA | 2.00 (80) | 18.47 (9) | 56.77[b] (14) | 87.02[b] (7) | 63.62[b] (27) | 65.48[b] (15) | 67.92[b] (1) | 27.78 (100) |
| PFTrDA | 2.90 (67) | 8.90 (32) | 21.52[b] (4) | 34.15[b] (14) | 24.10[b] (28) | 33.04[b] (12) | 35.81[b] (1) | 10.98 (92) |
| PFTeDA | 1.55 (81) | 15.74 (40) | 33.86[b] (32) | 46.06[b] (9) | 28.49[a] (29) | 30.40[a] (7) | 28.34[a] (7) | 13.30 (122) |
| PFBS | 1.91 (37) | 1.66 (28) | 3.30[b] (15) | 3.52[b] (25) | 2.61 (11) | 3.03[a] (22) | 2.63 (22) | 2.36 (17) |
| PFHxS | 5.01 (63) | 4.16 (44) | 2.89 (33) | 12.21[c] (43) | 9.72 (21) | 13.87[b] (43) | 8.30 (50) | 5.34 (69) |
| PFHpS | 0.15 (117) | 0.29 (145) | 2.39 (8) | 19.31[b] (132) | 1.95 (35) | 2.66 (8) | 3.30 (38) | 1.04 (130) |
| PFOS | 1.61 (91) | 39.15 (56) | 154.18 (28) | 640.55[b] (79) | 179.89 (33) | 212.54 (19) | 297.29 (15) | 57.36 (73) |

[a] Concentration is significantly greater than measured at site 1; [b] Concentration is significantly greater than measured at sites 1 and 2; [c] Concentration is significantly greater than measured at site 2 (Dunnett's one-tailed test, $\alpha \leq 0.05$).

Table S14. Pearson correlation coefficients (r) with alpha values ($n$ = 18) for relationships between concentrations of PFCs in oligochaete tissue and sediment concentrations of PFCs (unmodified or normalized to sediment concentrations of organic carbon, total iron, iron oxides, or clay).

| | | Normalization | | | |
|---|---|---|---|---|---|
| Homologue | Unmodified | Organic C | Total Fe | Fe oxides | Clay |
| PFHpA | 0.93 | 0.78 | 0.82 | 0.87 | 0.80 |
| | <0.0001 | 0.0001 | <0.0001 | <0.0001 | <0.0001 |
| PFOA | 0.97 | 0.85 | 0.89 | 0.93 | 0.83 |
| | <0.0001 | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| PFNA | 0.93 | 0.74 | 0.81 | 0.88 | 0.74 |
| | <0.0001 | 0.0005 | <0.0001 | <0.0001 | 0.0005 |
| PFDA | 0.86 | 0.59 | 0.69 | 0.65 | 0.53 |
| | <0.0001 | 0.0107 | 0.0014 | 0.0033 | 0.0252 |
| PFUnDA | 0.80 | 0.43 | 0.67 | 0.38 | 0.39 |
| | <0.0001 | 0.0721 | 0.0022 | 0.1190 | 0.1126 |
| PFDoDA | 0.60 | 0.47 | 0.58 | 0.47 | 0.53 |
| | 0.0081 | 0.0466 | 0.0111 | 0.0478 | 0.0243 |
| PFTrDA | 0.64 | 0.39 | 0.52 | 0.25 | 0.48 |
| | 0.0045 | 0.1088 | 0.0270 | 0.3209 | 0.0462 |
| PFTeDA | 0.68 | 0.56 | 0.62 | 0.47 | 0.57 |
| | 0.0018 | 0.0159 | 0.0059 | 0.0514 | 0.0145 |
| PFBS | 0.29 | 0.31 | 0.49 | 0.66 | 0.43 |
| | 0.2504 | 0.2149 | 0.0381 | 0.0034 | 0.0783 |
| PFOS | 0.93 | 0.78 | 0.82 | 0.83 | 0.77 |
| | <0.0001 | 0.0001 | <0.0001 | <0.0001 | 0.0002 |

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Name

110119-PF

LasierEtAl2

LasierEtAl2

PFCposter

YooEtAl20

# Supplemental Data

## Perfluorinated Compounds in Surface Waters and Sediments in Northwest Georgia, USA, and Their Bioaccumulation in *Lumbriculus variegatus*

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Tables: 14



Table S1: Locations of surface water and sediment collections.

| Location | Latitude | Longitude |
|---|---|---|
| Hwy 411, TN | 35° 00' 60"N | 84° 44' 04"W |
| Brown Bridge Rd, GA | 34° 42' 52"N | 84° 51' 84"W |
| Tilton Bridge Rd, GA | 34° 40' 02"N | 84° 55' 72"W |
| Hwy 136, GA | 34° 35' 58"N | 84° 56' 04"W |

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ARTICLE

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# Quantitative Determination of Perfluorochemicals and Fluorotelomer Alcohols in Plants from Biosolid-Amended Fields using LC/MS/MS and GC/MS

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Supporting Information

ABSTRACT: Analytical methods for determining perfluorochemicals (PFCs) and fluorotelomer alcohols (FTOHs) in plants using liquid chromatography/tandem mass spectrometry (LC/MS/MS) and gas chromatography/mass spectrometry (GC/MS) were developed, and applied to quantify a suite of analytes in plants from biosolid-amended fields. Dichloromethane−methanol and ethylacetate were chosen as extracting solutions for PFCs and FTOHs, respectively. Nine perfluorocarboxylic acids (PFCAs), three perfluorosulfonic acids (PFSAs), and ten FTOHs were monitored. Most PFCAs and perfluorooctanesulfonate (PFOS) were quantifiable in plants grown in contaminated soils, whereas PFCs went undetected in plants from two background fields. Perfluorooctanoic acid (PFOA) was a major homologue (~10−200 ng/g dry wt), followed by perfluorodecanoic acid (~3−170 ng/g). [PFOS] in plants (1−20 ng/g) generally was less than or equal to most [PFCAs]. The site-specific grass/soil accumulation factor (GSAF = $[PFC]_{Grass}/[PFC]_{Soil}$) was calculated to assess transfer potentials from soils. Perfluorohexanoic acid had the highest GSAF (= 3.8), but the GSAF decreased considerably with increasing PFCA chain length. Log-transformed GSAF was significantly correlated with the PFCA carbon-length ($p < 0.05$). Of the measured alcohols, 8:2*n*FTOH was the dominant species (≤1.5 ng/g), but generally was present at ≥10× lower concentrations than PFOA.

## INTRODUCTION

Over the course of the past decade, perfluorochemicals (PFCs) and their precursors (e.g., fluorotelomer alcohols; FTOHs) have generated serious concern within the public sector, government, and the scientific community alike.[1−3] These concerns have grown as new findings have accumulated regarding PFC environmental persistence, trophic-transfer potential, and toxicity to animals.[4−7] Given that PFC precursors, including polymers, are being used in a wide range of consumer products every day, recent findings that these chemicals can degrade to form PFCs[8,9] has provoked still more concern. In response to these findings, in January 2006 the U.S. Environmental Protection Agency (EPA) initiated the 2010/15 PFOA Stewardship Program with eight major fluorochemical companies to work toward elimination of select PFC emissions and content in products by 2015. This voluntary initiative action is expected to reduce environmental levels of PFCs over the coming years. Beyond addressing possible sources related to manufacturing, however, quantitative knowledge regarding the PFC source-to-exposure continuum largely remains lacking.

In a general sense, the migration of organic contaminants (OCs) from soil and water to plants and their subsequent consumption by animals is a likely pathway for OCs to enter the human food chain.[10] Many studies have shown that absorption by roots is not a significant pathway for lipophilic OCs (typically $K_{ow} > 104$) into plant tissues; instead, for these compounds, accumulation via aerial transport (gaseous phase for higher vapor-pressure and particulate phase for lower vapor-pressure OCs) is the dominant route.[11−13] In contrast, other studies have shown that plants can uptake certain halogenated OCs.[14−16] Plant OC-uptake studies of long-chain OCs with fluorine as the halogen, however, remain rare. In perhaps the only existing peer-reviewed study on plant uptake of PFCs, Stahl et al.[17] found that perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were translocated from spiked soils into various agricultural crops in a dose-dependent manner.

An essential component of risk assessment is the establishment of reliable analytical measurements of environmental samples. While there are a number of peer-reviewed publications reporting analytical methods for PFCs in air, water, and animal-tissue matrices, methodological studies remain sparse for PFCs in plant material. In this paper, we report on the development of analytical methods to quantify PFCs and FTOHs in plant samples. This effort follows recent publications,[18,19] wherein we reported elevated levels of a wide array of organic fluorochemicals in the

Special Issue: Perfluoroalkyl Acid

Received: August 30, 2010
Accepted: December 22, 2010
Revised: December 21, 2010
Published: January 19, 2011

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**Table 1. Year 2009 Plant Samples Collected from near Decatur, AL [a]**

| field/sample | common name | field description |
|---|---|---|
| 09Bgdp | tall fescue | background field, no biosolids |
| 09Hp | barley | one biosolid application historically |
| 09F1p | tall fescue | biosolid-applied field |
| 09D1p | tall fescue | biosolid-applied field |
| 09G1p | bermuda grass | biosolid-applied field |
| 09E1p | tall fescue | biosolid-applied field |
| 09C1p | Kentucky bluegrass | biosolid-applied field |

[a] These sample numbers are consistent with the system used for our earlier papers reporting upon PFCs and FTOHs in the soils[18,19] from which these plant samples were harvested; the "p" used for these samples designates "plant sample".

sludge-applied agricultural soils from which we collected the plants reported here. Integrating these new plant results with the earlier soil results, we also report site-specific PFC plant/soil accumulation factors. To our knowledge, this is the first peer-reviewed report on the enrichment of PFCs in plants grown in contaminated fields and serves as a starting point for assessing the potential contribution of biosolid soil applications to environmental and human food chains.

## ■ EXPERIMENTAL SECTION

**Sample Collection/Preparation.** Grass samples (Table 1) from fields near Decatur, AL that had received applications of sludge were collected by EPA regional personnel simultaneously with, and immediately above, soil samples that we reported upon in earlier papers[18,19] including (1) two sludge-applied fields in September 2007, and (2) six sludge-applied fields and one background field in March 2009, several months (the winter season) to more than a year subsequent to the last sludge application. The above-ground portion of grasses was collected by cutting the plants immediately above the ground surface with stainless-steel scissors that had been washed three times in Optima-grade methanol and then storing the samples in certified-clean, plastic bags, which we had spot checked to ensure they were not contaminated with our analytes. Upon return to the laboratory, samples were inspected for dust, dirt, or stains on the plant exteriors with the intent of discarding contaminated material if found; no exterior contamination was found. The plants were not washed for fear of contamination with FTOHs by sorption from laboratory air.[20] The plant samples then were homogenized by grinding using a methanol-washed mortar and pestle while adding liquid nitrogen. Homogenized samples were stored in 40-mL glass vials in a freezer until chemical extraction.

**Extraction Methods.** All chemicals used were of the highest purity offered by the suppliers, uniformly ≥97% purity; they are identified in the Supporting Information (SI1.1).

*LC/MS/MS Analytes.* In the absence of a peer-reviewed comparison of solvent efficacies for extracting PFCs from plants, we tested four general schemes for extracting PFCs from plants (Figure SI1), each consisting of a chemical-pretreatment step (HCl, dichloromethane (DCM), or 1% acetic acid (HAc)) in a hot bath with sonication for 30 min followed by an extraction step (methanol (MeOH) or methyl *tert*-butyl ether (MTBE)) with moderate shaking for 1 h. The following "pretreatment + extractant" combinations were evaluated: (1) 2.5 mL of 1 M HCl + 7.5 mL of MeOH; (2) 5 mL of DCM + 5 mL of MeOH, previously used for organochlorines in plant tissue;[13] (3) 3 mL of tetrabutylammonium mixture (TBA-mix; SI1.1) + 10 mL of MTBE, previously used for PFCs in biological matrices;[21] and (4) 2.5 mL of 1% HAc + 7.5 mL of MeOH, previously used for PFCs in sludge.[22] For each treatment, we prepared four approximately 1-g samples in 16-mL polypropylene carbonate (PPCO) centrifuge tubes which we spiked with 5 ng of $^{13}C_8$-PFOA as a recovery internal standard. Upon completion of solid−liquid extraction, solvents were separated using a Sorvall RCSC centrifuge at 10,000*g* for 30 min and transferred to preweighed 12-mL glass vials. Informed by exploratory efforts (Figure SI2), this two-step extraction was repeated once and the extracts (~20 mL) were combined for further analysis. For the 2.5 mL/HCl + 7.5 mL/MeOH treatment, equimoles of NaOH were added to neutralize the HCl. Test extracts were cleaned up using an ion-pairing method [23] and prepared for LC/MS/MS analysis (SI1.2).

*GC/MS Analytes.* Three solvents (MTBE, ethyl acetate (EtOAc), and DCM) were compared for extracting FTOHs from plants (SI1.3). Based on recovery results, an extractant was selected (EtOAc) and used for extraction to analyze plants. In brief, 1 g of homogenized plant sample in a centrifuge tube received 5 ng of $^{2}H_4$,$^{13}C_2$-8:2*n* FTOH in MTBE as a recovery internal standard which was allowed to dry for 1 min. Five milliliters of polished 18-MΩ water (SI1.1) and 2 mL of EtOAc were added sequentially. The prepared plant-water-extractant mixture was rotated overnight on a Labquake rotisserie (Barnstead International, Dubuque, IA). The centrifuged EtOAc fraction was recovered with a disposable glass Pasteur pipet and transferred to a preweighed 12-mL glass vial. Informed by exploratory efforts evaluating cumulative recoveries (Figure SI3), this extraction step was repeated twice and the extracts were combined for each sample. Informed by exploratory efforts showing satisfactory recoveries upon blow-down ranging from 92% to 103% (Table SI6), combined extracts (5−6 mL) were blown down to 1 mL under a gentle stream of $N_2$ gas and were stored at −20 °C until analysis. Immediately prior to injection on GC/MS, 1 mL of extract was pipetted into a GC vial and 1 ng of $^{2}H_4$,$^{13}C_2$-10:2*n*FTOH was added as a matrix internal standard.

*Extraction QA/QC.* As part of our method development, supplementary tests were performed to ensure analytical performance. Extraction recovery statistics were determined using the chosen extractants, i.e., DCM + MeOH for PFCs and EtOAc for FTOHs. We inspected two common ion-transitions to evaluate potential effects of unknown coeluting components for PFCs quantitation (Table SI1). Both quantitation and qualification ion-transitions were used to construct calibration curves and measure the sample concentration. For FTOHs, we confirmed target peaks in plant extracts (SI1.7; Figure SI4) using derivatization with trimethylsilylimidazole (TMSI) and authentic FTOH standards (Table SI2).[20] Also, qualification ions were monitored. The effect of sample blow-off (5−6 mL to 1 mL extract) on potential losses of volatile analytes was evaluated as well (SI1.4).

**Instrumental Analysis.** PFCs in the extracts were separated and analyzed on a Waters Acquity ultraperformance liquid chromatograph (UPLC) interfaced with a Waters Quattro Premier XE tandem mass spectrometer that had been modified to optimize PFC analytical capabilities (SI1.5). FTOHs in plant extracts were separated and quantified on an Agilent Technologies 6890N GC system equipped with a 5973N mass-selective detector (MSD). Detailed information on the instrumental conditions and quantitation is provided in the Supporting Information.

Table 2. Results of Extractant Selection for PFC analysis in Plants ($n$ = 4 using sample 09F1p; ng/g, wet wt)

| treatment | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | S4 | S8 | % rec[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | (1) 25:75 1 M HCl−MeOH (v/v) | | | | | | | |
| mean | 7.2 | 3.0 | 4.7 | 3.0 | 22.8 | 6.1 | 8.8 | 0.6 | 0.4 | 3.6 | 3.2 | 71 |
| CV (%)[b] | 6.3 | 3.8 | 3.4 | 5.4 | 4.3 | 5.5 | 4.0 | 2.1 | 5.3 | 33.3 | 3.5 | 6 |
| | | | | | (2) 50:50 DCM−MeOH (v/v) | | | | | | | |
| mean | 9.2 | 4.9 | 6.9 | 4.2 | 42.4 | 11.5 | 15.7 | 1.1 | 0.5 | 3.1 | 5.1 | 109 |
| CV (%) | 7.7 | 6.7 | 6.2 | 8.8 | 6.0 | 3.5 | 10.7 | 13.4 | 14.8 | 24.0 | 16.2 | 6 |
| | | | | | (3) MTBE ion-pairing | | | | | | | |
| mean | 10.1 | 4.2 | 4.9 | 3.0 | 23.6 | 6.8 | 10.7 | 0.7 | 0.5 | 2.4 | 2.3 | 78 |
| CV (%) | 4.9 | 6.1 | 8.5 | 16.5 | 12.8 | 15.6 | 22.0 | 16.5 | 10.8 | 28.1 | 12.9 | 10 |
| | | | | | (4) 25:75 1% acetic acid−MeOH (v/v) | | | | | | | |
| mean | 8.9 | 4.2 | 6.0 | 3.7 | 32.6 | 9.0 | 13.4 | 0.9 | 0.5 | 3.1 | 3.7 | 97 |
| CV (%) | 12.9 | 8.2 | 10.6 | 5.4 | 4.9 | 7.1 | 10.0 | 4.9 | 8.8 | 40.3 | 2.7 | 3 |

[a] $^{13}C_8$-PFOA was spiked before extraction to assess extraction efficiency. [b] Coefficient of variation (%).

Method-detection limits (MDLs) were defined as the concentration corresponding to the mean peak area plus three standard deviations ($x + 3 \times \sigma$) [24] of extract from the plant sample from the uncontaminated site. The limit of quantitation (LOQ) was defined as the $x + 10 \times \sigma$ [24] for the uncontaminated-plant extract. Mean sample concentrations less than the calculated MDLs were reported as <MDL. For the calculation of mean values and modeling work, <MDL was treated as zero and <LOQ values were assigned 1/2LOQ. The LOQs for PFCs ranged from 0.2 to 1.0 ng/g dry weight (dw) except PFBS (26.0 ng/g). The LOQs for FTOHs ranged from 0.5 to 1.0 ng/g dw.

## ■ RESULTS

**Selection of Extractant for Target Analytes.** Table 2 summarizes the results for each extraction scheme including (1) 1 M HCl−MeOH and (2) 1% HAc−MeOH, (3) DCM−MeOH, and (4) a conventional ion-pairing extractant (MTBE). Extraction recoveries of $^{13}C_8$-PFOA were 71 ± 6% for HCl−MeOH, 109 ± 6% for DCM−MeOH, 78 ± 10% for MTBE−IP, and 97 ± 3% for HAc−MeOH treatment. At a glance, the binary combination of less-polar DCM and polar MeOH appeared to generate the greatest PFC yields among the test extractants. More rigorously, the extractability of DCM−MeOH also was statistically more effective than other extractant schemes for most PFCAs (C7 − C12), but not so for PFSAs (Table SI3). The acetic-acid and MTBE extractions followed the DCM−MeOH treatment in efficacy, while the HCl treatment resulted in the lowest extractions for PFCs in plant material (Table SI3).

As demonstrated in Table SI4, the EtOAc extraction generated greatest yields of target FTOHs in plants among extractants tested. In previous studies for air samples,[25,26] the EtOAc extraction method was developed to determine volatile polyfluorinated chemicals including FTOHs. The DCM extraction method also showed a comparable extractability for some analytes, but withdrawing DCM after centrifugation was difficult due to its high density relative to water. Additionally, we observed mild fatiguing of the test tube and loss of DCM at the end of overnight extraction. Given all the above considerations, we chose the EtOAc extraction for FTOHs analysis in plant samples. Further results of extraction QA/QC including number of repeated extractions, compound identification, and sample blow-down, are presented in Supporting Information (SI1.7).

**Concentrations of PFCs and FTOHs in Vegetation.** Concentrations of nine PFCAs and three PFSAs are summarized in Table 3. These are the only data in the peer-reviewed literature reporting PFC concentrations in field-grown plants of which we are aware. Sample 09Bgdp is from the background field, which received no sludge application, and 09Hp is from a dairy field that received only one sludge application in the distant past. In these fields, levels of all analytes were <LOQs; generally less than 1 ng/g dw except PFBS. Extraction efficiencies for all plant analysis were acceptable based on recoveries (96−112%) of $^{13}C_8$-PFOA spiked prior to extraction and the small standard deviations of replicated extractions. Most PFCA analytes were detected quantitatively in plants from the five fields that received multiple sludge applications (09C1p, 09D1p, 09E1p, 09F1p, and 09G1p),[18] while only PFOS exceeded its LOQ among PFSAs (Table 3). Sample 09D1p was the most contaminated with short- to midlength PFCAs (C6−C9). In contrast, longer chain PFCAs (≥C10) and PFOS occurred in the greatest concentrations in sample 09F1p. The highest PFOA contamination was found in sample 09D1p at almost 10-fold greater concentrations than other samples. Following PFOA, PFDA was the second-most loaded PFC in this study (168.8 ng/g in 09F1p). In general, plants collected in 2007 had PFC concentrations comparing closely with 2009-study samples 09E1p and 09G1p.

Concentrations of PFOS in plants ranged from 1.2 (09E1p) to 20.4 ng/g (09F1p). It is noteworthy that these PFOS levels were relatively less than PFOA and other PFCAs because in animal samples of blood and liver PFOS levels typically are high relative to PFCA levels.[5,6,27] The salient pharmacokinetic differences in animals are well-known for PFOA and PFOS; whereas both compounds are readily absorbed, PFOA has much faster depuration rates from the body than does PFOS, commonly resulting in much greater PFOS residue.[7,28] In contrast, the virtually nonvolatile nature of PFCs would seem to exclude depuration as a significant loss mechanism except perhaps by seasonal leaf fall in deciduous plants.

In contrast to acids, FTOHs were quantifiable in only a few plant samples and only at very low concentrations compared to their PFC degradation products (Table SI7). Of the alcohols, 8:2$n$FTOH generally was the dominant species, but it was

Table 3. Concentrations of PFCs in Plants ($n$ = 3) from near Decatur, AL (ng/g dw)

| sample ID | | C6 | C7 | C8 | C9 | C10 | C11 | C12 | C13 | C14 | S4 | S6 | S8 | % rec[a] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 09Bgdp (background) | mean | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | 0.8 | <MDL | 104 |
| | SD | | | | | | | | | | | | | 4 |
| 09C1p | mean | 22.9 | 10.4 | 23.2 | 8.9 | 48.9 | 22.9 | 43.5 | 3.5 | 2.5 | <MDL | <LOQ | 16.8 | 103 |
| | SD | 1.5 | 0.4 | 1.1 | 0.6 | 5.0 | 0.9 | 0.9 | 0.1 | 0.2 | | | 2.3 | 5 |
| 09D1p | mean | 182.2 | 165.1 | 202.7 | 27.4 | 81.1 | 15.1 | 17.1 | 1.2 | 1.2 | <MDL | 2.9 | 13.1 | 112 |
| | SD | 4.2 | 15.6 | 16.2 | 1.8 | 3.5 | 1.1 | 0.4 | 0.1 | 0.1 | | | 0.5 | 10 |
| 09E1p | mean | 30.2 | 12.5 | 9.9 | 1.5 | 3.3 | 0.5 | 0.5 | <LOQ | <LOQ | <MDL | 0.9 | 1.2 | 96 |
| | SD | 1.8 | 0.1 | 0.3 | 0.3 | 0.6 | 0.0 | 0.1 | | | | | 0.2 | 4 |
| 09F1p | mean | 36.7 | 19.4 | 27.6 | 16.8 | 168.8 | 45.6 | 62.5 | 4.2 | 1.8 | 13.0 | <MDL | 20.4 | 109 |
| | SD | 2.8 | 1.3 | 1.7 | 1.5 | 10.1 | 1.6 | 6.7 | 0.6 | 0.3 | | | 3.3 | 6 |
| 09G1p | mean | 26.3 | 8.2 | 12.1 | 2.9 | 9.8 | 3.3 | 4.3 | 0.5 | 0.3 | ND | 1.3 | 4.1 | 98 |
| | SD | 2.7 | 0.5 | 0.5 | 0.9 | 2.1 | 0.7 | 0.3 | 0.0 | 0.0 | | | 0.6 | 7 |
| 09Hp (single app.) | mean | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | <MDL | 109 |
| | SD | | | | | | | | | | | | | 3 |
| 07Ap | mean | 38.1 | 8.9 | 21.1 | 6.1 | 19.9 | 3.6 | 3.7 | 0.4 | 0.8 | <MDL | <MDL | 11.2 | 104 |
| | SD | 3.0 | 1.0 | 1.8 | 0.6 | 1.6 | 0.2 | 0.3 | 0.0 | 0.0 | | | 2.1 | 7 |
| 07Bp | mean | 181.7 | 17.3 | 11.7 | 1.3 | 1.9 | 0.4 | 0.7 | <MDL | <LOQ | <MDL | 0.7 | 2.5 | 97 |
| | SD | 9.7 | 0.3 | 0.9 | 0.3 | 0.3 | 0.1 | 0.1 | | | | 0.0 | 0.6 | 8 |
| MDL | | 0.4 | 0.3 | 0.8 | 0.3 | 0.3 | 0.1 | 0.2 | 0.1 | 0.1 | 17.0 | 0.4 | 0.4 | |
| LOQ | | 1.0 | 0.5 | 1.4 | 0.5 | 0.5 | 0.2 | 0.3 | 0.2 | 0.2 | 36.0 | 0.6 | 0.8 | |

[a] $^{13}C_8$-PFOA was spiked before extraction to assess extraction efficiency.

present at about 10-fold lower concentrations than PFOA, ≤1.5 ng/g (Table SI7).

## DISCUSSION

**Inferences Regarding Possible Modes of Accumulation in Plants.** Literature studies of PFCs uptake by plants remain sparse with only a single peer-reviewed paper describing a laboratory study of PFOA and PFOS uptake (Stahl et al.)[17] In this study, the investigators found that each of the five plant species they studied (i.e., wheat, oats, corn, ryegrass, and potatoes) accumulated PFOA and PFOS via uptake from the soil through the roots. These researchers found (1) the plant PFC concentrations were directly proportional to the PFC concentration of the irrigation water; (2) PFOA tended to accumulate at higher concentrations than did PFOS; and (3) the PFCs tended to accumulate more in the plant stalks and leaves than in the seed and potato vegetative bodies. The results of Stahl et al.[17] strongly suggest that at least some of the plant PFCs we observed in this study are from soil via transpiration of soil-water through the roots. However, it is important to acknowledge other possible mechanisms for PFC accumulation for the plants of our study as well. One possible alternative accumulation pathway is via aerial transport of volatile PFCA precursors[29] (e.g., FTOHs) with subsequent oxidation of the plant-bound FTOHs to form PFCAs. While the partitioning behavior of FTOHs might allow for this possibility,[30,31] our observation of nondetectable to very-low concentrations of FTOHs in the plants (Table SI7) is not strongly supportive of this pathway. Another alternative PFC pathway to grass tissue is contact transfer of sludge-based PFCs to the plants. In our study, however, all plant samples were collected several months to years after the last sludge application. Furthermore, we excluded any plant tissue with visible nonplant material from our analytical samples, so this pathway does not seem highly likely either. Given that our results are for plants from fields having no laboratory-type controls, and that only a single laboratory study has been published,[17] further laboratory controlled studies are appropriate to improve our understanding of PFC soil-to-plant transfer mechanisms.

**Grass/Soil Accumulation Factor.** Accumulation factors commonly are used to assess the bioavailability and bioconcentration of chemicals from media such as water, soil, and sediment. Because the grasses reported upon herein were collected immediately above the soils we have reported upon previously,[18] we can calculate grass/soil accumulation factors (GSAFs), i.e., the ratio of PFC concentrations (dw) in grasses to that in the soils from which they grew. These GSAFs are tabulated in Table SI8 and plotted against carbon chain-length in Figure 1A. In surface soils, PFCs likely are concentrated in organic matter;[32] implicitly assuming our measured soil PFCs all are present in the soil organic matter, we calculate grass/organic-matter accumulation factors (GOMAFs) in Table SI8 as well to facilitate comparison with, or use in, other studies.

The shortest PFCA in this study, C6, had the highest GSAF values (mean = 3.8) and accumulation potentials decreased considerably over the homologue range of C6 to C9 with a mean decrease of 32-fold. In contrast, for C9−C14, GSAFs decreased only about 2-fold. With log-transformation, the GSAFs are linearly correlated with chain length (Figure 1B), indicating lower transfer potential from soil to plants for long-chain PFCAs. GSAF values did not vary much among grass species in our study (Table SI8). For example, GSAFs for C7 were 0.75 for Kentucky blue grass, 0.47 for Bermuda grass, and ranged from 0.43 to 2.1 for tall fescue.

**Comparison to Other PFC Accumulation Factors.** Stahl et al.[17] did not report accumulation factors, but they provided the data needed to calculate GSAFs for corn, oat, and wheat. Taking the straw values of Stahl et al. as comparable to our above-ground grass samples, our PFOA GSAF (0.25 ± 0.23; Table SI8) equates to the corn GSAF (0.25 ± 0.08), and is

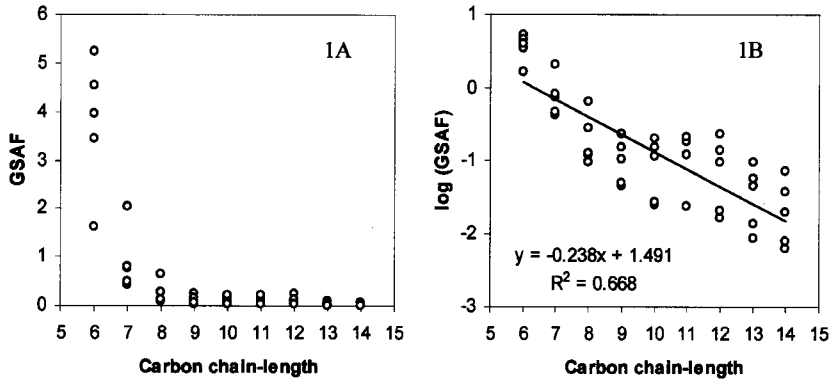


**Figure 1.** Relationship between GSAF and chain-length of PFCA. Rapid decrease of GSAF was found from PFHxA to PFNA (A). Log-transformed GSAF (B) was significantly correlated with number of carbons for PFCAs ($p < 0.05$).

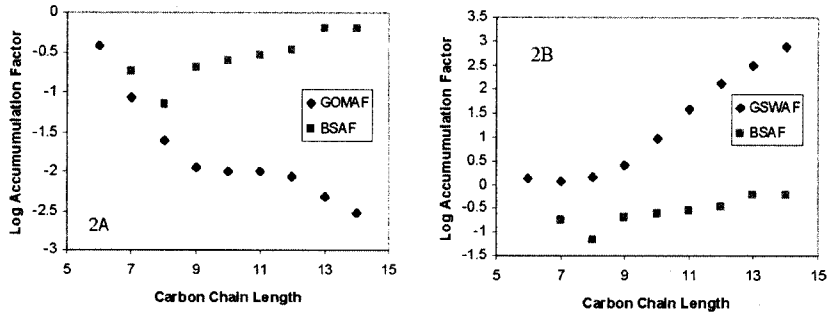


**Figure 2.** (A) Accumulation factor vs carbon chain-length in oligochaetes (BSAF)[33] and grasses (GOMAF; data from this study) normalized to sediment organic matter. When the grass accumulation factor is normalized to estimated soil-water (B; GSWAF), accumulation factors for both oligochaetes and grasses plot against chain length with positive slopes. See text for discussion.

less than that for oat (1.95 ± 1.90) and wheat (3.99 ± 1.81). Our PFOS GSAF (0.07 ± 0.04; Table SI8), falls a little below the range we calculate for Stahl et al. of 0.16 ± 0.04 for corn to 0.77 ± 0.55 for wheat.

Lasier et al.[33] recently reported PFC concentrations for aquatic worms (*Lumbriculus variegatus*) grown in contaminated sediments. Using these data, the researchers calculated biota/sediment accumulation factors (BSAFs) which they defined as PFC concentrations in the worms divided by the sediment PFC concentration normalized to the sediment organic matter. As such, the BSAF of Lasier et al.[33] is analogous to the GOMAF of our study in that both statistics are defined as the ratio of PFC concentrations in the organism (above-ground fraction for the plants) to the sediment (soil) concentration normalized to the organic-matter fraction. These accumulation factors are plotted against carbon-chain length in Figure 2. PFC accumulation from organic matter is greater in the worms (BSAF) than the grasses (GOMAF) for all homologues (Figure 2), possibly owing partly to PFC accumulation in fatty tissue present in worms that is absent in grasses. In addition, the grasses and worms exhibit opposing habits in accumulation of PFC homologues from organic matter; whereas the worm accumulation factor increases with lengthening chains, the grasses accumulate in short chains preferentially over long chains (Figure 2). These opposing trends for worms and grasses might reflect that PFCs accumulate in the worms by direct ingestion of PFC-laden organic matter, whereas plants presumably uptake the PFCs with soil-water into which PFCs have dissolved from the organic-matter reservoir. If this is correct, then the grasses might be expected to exhibit higher accumulation factors for the long-chained PFCs when normalized to soil-water concentration, i.e., concentration in the plant divided by concentration in the soil-water. Estimating water concentrations using $K_{ow}$ values[34] as proxy for $K_{oc}$, we can estimate grass/soil-water accumulation factors (GSWAFs). When GSWAFs are plotted against homologue length they exhibit a positive slope with increasing chain length, consistent with the accumulation factors for the worms (Figure 2) supporting the idea that sorption to organic matter is the reason for the negative relationship between GOMAFs and chain-length. Regardless of the cause for the opposing slopes between the grass/and worm/organic-matter accumulation factors when plotted against chain length, a possible consequence of this is that food chains based on direct ingestion of sediments contaminated with PFCs might tend to accumulate long-chained PFCs more so than food-chains in which rooted plants serve as the basal trophic level and vice versa for the short chains.

## ■ ASSOCIATED CONTENT

**Ⓢ Supporting Information.** Text, tables, and figures referred to in this article with the designation SI. This information is available free of charge via the Internet at http://pubs.acs.org/.

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## ■ ACKNOWLEDGMENT

The United States Environmental Protection Agency (USEPA), through its Office of Research and Development, managed and partially funded the work described here. The USEPA Office of Pollution Prevention and Toxics and Region IV shared in funding of this work as well. The work has been subjected to the Agency's administrative review and approved for publication. We thank Mike Neill for plant sampling, Dennis Hancock, Department of Crop and Soil Science, University of Georgia, for plant identification/confirmation, and Cathy Fehrenbacher, Laurence Libelo, Jack Jones, and Eric Weber for helpful reviews.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D9K130498**

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**January 14, 2010**

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# Case Narrative
## D9K130498

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

This report shall not be reproduced except in full, without the written approval of the laboratory.

**Sample Arrival and Receipt**
The following report contains the analytical results for four samples received at TestAmerica Denver on November 13, 2009, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 2.3°C.

The samples were received after the laboratory prescribed holding time had expired for PFC and FOSA analyses. The client was notified on November 13, 2009.

The sample collection times were listed as 12-12 on the chain-of-custody. The client informed the laboratory on November 16, 2009, the samples are composites that were collected from 12 AM to 12 AM on the respective days. Due to a limitation in the LIM system, the times had to be entered as 12:01 AM.

No other anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

**Analytical Comments**

The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to all four samples to obtain a pH of 14 instead of the SOP required <2. The basic pH is generating better internal standard recoveries for MeFOSA.

The organic preparation chemist noted two cartridges were required to extract samples I-3, I-4, and E-4 for FOSA.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interference, all four samples had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required. Please note the samples were dark brown or dark orange in color and cloudy.

All four samples were received at the laboratory after the laboratory prescribed holding time had expired. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

Samples I-3, I-4, and E-4 exhibited internal standard recoveries outside the QC control limits. These anomalies are due to matrix interferences; therefore, corrective action is deemed unnecessary.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batch 9320505 reported the percent recoveries for two PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

| Compound | Low-Level LCS Actual Recovery | Control Limits | Low-Level LCS Actual Result | MDL |
|---|---|---|---|---|
| PFTriA | 71% | 44-164% | 0.0142 ug/L | 0.01772 ug/L |
| PFTeA | 67% | 47-172% | 0.0134 ug/L | 0.01456 ug/L |

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%.

The mid-level LCS/LCSD and low-level LCS associated with QC batch 9320512 exhibited percent recoveries above the QC control limits for Perfluorooctane sulfonamide (FOSA). This is an indicator that data may be biased high. As no detectable concentrations are present in the associated samples, corrective action is deemed unnecessary.

The method required MS/MSD could not be performed for QC batches 9320505 and 9320512, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

The closing Continuing Calibration Verification (CCV) standard associated with samples in QC batch 9320512, exhibited a %D value out of range, biased high, for Perfluorooctane sulfonamide (FOSA). This is an indicator that data may be biased high. As no detectable concentrations are present in the associated samples, corrective action is deemed unnecessary.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

D9K130498

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **I-3 11/05/09 00:01 001** | | | | |
| Perfluorooctanesulfonate | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.15 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.095 J | 0.20 | ug/L | DEN -LC-0012 |
| **E-3 11/05/09 00:01 002** | | | | |
| Perfluorooctanoic Acid | 0.27 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.34 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.19 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.56 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.37 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.17 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.29 | 0.20 | ug/L | DEN -LC-0012 |
| **I-4 11/05/09 00:01 003** | | | | |
| Perfluorooctanesulfonate | 0.27 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.11 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.59 | 0.20 | ug/L | DEN -LC-0012 |
| **E-4 11/05/09 00:01 004** | | | | |
| Perfluorooctanoic Acid | 0.13 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.22 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.24 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.41 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.30 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.95 | 0.20 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

**D9K130498**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

**D9K130498**

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Jacqueline Bonnett | 003601 |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

**D9K130498**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LPE7X | 001 | I-3 | 11/05/09 | 00:01 |
| LPE72 | 002 | E-3 | 11/05/09 | 00:01 |
| LPE73 | 003 | I-4 | 11/05/09 | 00:01 |
| LPE74 | 004 | E-4 | 11/05/09 | 00:01 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-001 | **Work Order #...:** | LPE7X1AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/05/09 | | |
| **Prep Batch #...:** | 9320505 | **Analysis Time..:** | 01:28 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| **Perfluorooctanesulfonate** | **0.22** | **0.20** | **ug/L** | **0.13** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 114 | (60 - 155) |
| 13C4 PFOS | 102 | (45 - 130) |

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D9K130498-001 **Work Order #...:** LPE7X2AA **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/23/09
**Prep Batch #...:** 9320505 **Analysis Time..:** 22:12
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.30 | ug/L | 0.11 |
| **Perfluorohexanoic acid (PFHxA)** | **0.15 J** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.095 J** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 186 * | (60 - 155) |
| 13C4 PFOS | 142 * | (45 - 130) |
| 13C4 PFBA | 146 * | (36 - 130) |
| 13C2 PFHxA | 130 | (55 - 135) |
| 18O2 PFHxS | 135 * | (61 - 130) |
| 13C5 PFNA | 147 * | (54 - 132) |
| 13C2 PFDA | 176 * | (53 - 130) |
| 13C2 PFUnA | 180 * | (37 - 130) |
| 13C2 PFDoA | 190 * | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-001 | **Work Order #...:** | LPE7X1AD | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/01/09 | | |
| **Prep Batch #...:** | 9320512 | **Analysis Time..:** | 18:03 | | |
| **Dilution Factor:** | 500 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 25 | ug/L | 2.9 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 89 | (37 - 130) |

Dalton Utilities

Client Sample ID: E-3

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-002 | **Work Order #...:** | LPE721AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/05/09 | | |
| **Prep Batch #...:** | 9320505 | **Analysis Time..:** | 01:33 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.27** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.34** | **0.20** | **ug/L** | **0.13** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (60 - 155) |
| 13C4 PFOS | 92 | (45 - 130) |

Dalton Utilities

Client Sample ID: E-3

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-002 | **Work Order #...:** | LPE722AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/23/09 | | |
| **Prep Batch #...:** | 9320505 | **Analysis Time..:** | 22:27 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorobutanoic acid (PFBA)** | **0.19 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.56** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.37** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| **Perfluorodecanoic acid (PFDA)** | **0.17 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.29** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 133 | (60 - 155) |
| 13C4 PFOS | 111 | (45 - 130) |
| 13C4 PFBA | 107 | (36 - 130) |
| 13C2 PFHxA | 118 | (55 - 135) |
| 18O2 PFHxS | 113 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 118 | (53 - 130) |
| 13C2 PFUnA | 113 | (37 - 130) |
| 13C2 PFDoA | 100 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D9K130498-002 **Work Order #...:** LPE721AC **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/01/09
**Prep Batch #...:** 9320512 **Analysis Time..:** 18:08
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 90 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-003 | **Work Order #...:** | LPE731AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/05/09 | | |
| **Prep Batch #...:** | 9320505 | **Analysis Time..:** | 01:38 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |
| **Perfluorooctanesulfonate** | **0.27** | **0.20** | **ug/L** | **0.13** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 104 | (60 - 155) |
| 13C4 PFOS | 95 | (45 - 130) |

Dalton Utilities

Client Sample ID: I-4

HPLC

**Lot-Sample #...:** D9K130498-003 **Work Order #...:** LPE732AA **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/23/09
**Prep Batch #...:** 9320505 **Analysis Time..:** 22:42
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| Perfluoropentanoic acid (PFPA) | ND | 0.30 | ug/L | 0.11 |
| **Perfluorohexanoic acid (PFHxA)** | **0.11 J** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.59** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 165 * | (60 - 155) |
| 13C4 PFOS | 115 | (45 - 130) |
| 13C4 PFBA | 129 | (36 - 130) |
| 13C2 PFHxA | 119 | (55 - 135) |
| 18O2 PFHxS | 116 | (61 - 130) |
| 13C5 PFNA | 127 | (54 - 132) |
| 13C2 PFDA | 145 * | (53 - 130) |
| 13C2 PFUnA | 159 * | (37 - 130) |
| 13C2 PFDoA | 165 * | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: I-4

HPLC

**Lot-Sample #...:** D9K130498-003 **Work Order #...:** LPE731AC **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/01/09
**Prep Batch #...:** 9320512 **Analysis Time..:** 18:13
**Dilution Factor:** 500

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 25 | ug/L | 2.9 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 85 | (37 - 130) |

Dalton Utilities

Client Sample ID: E-4

HPLC

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9K130498-004 | **Work Order #...:** | LPE741AA | **Matrix.....:** | WATER |
| **Date Sampled...:** | 11/05/09 00:01 | **Date Received..:** | 11/13/09 | | |
| **Prep Date.....:** | 11/16/09 | **Analysis Date..:** | 12/05/09 | | |
| **Prep Batch #...:** | 9320505 | **Analysis Time..:** | 01:43 | | |
| **Dilution Factor:** | 10 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.13 J** | **0.20** | **ug/L** | **0.098** |
| **Perfluorooctanesulfonate** | **0.22** | **0.20** | **ug/L** | **0.13** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 115 | (60 - 155) |
| 13C4 PFOS | 98 | (45 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: E-4

HPLC

**Lot-Sample #...:** D9K130498-004 **Work Order #...:** LPE742AA **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/23/09
**Prep Batch #...:** 9320505 **Analysis Time..:** 22:57
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorobutanoic acid (PFBA)** | **0.24** | **0.20** | **ug/L** | **0.098** |
| **Perfluoropentanoic acid (PFPA)** | **0.41** | **0.30** | **ug/L** | **0.11** |
| **Perfluorohexanoic acid (PFHxA)** | **0.30** | **0.20** | **ug/L** | **0.029** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.20 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.20 | ug/L | 0.17 |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.20 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.20 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.20 | ug/L | 0.15 |
| **Perfluorobutane sulfonate (PFBS)** | **0.95** | **0.20** | **ug/L** | **0.082** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 138 | (60 - 155) |
| 13C4 PFOS | 115 | (45 - 130) |
| 13C4 PFBA | 112 | (36 - 130) |
| 13C2 PFHxA | 124 | (55 - 135) |
| 18O2 PFHxS | 114 | (61 - 130) |
| 13C5 PFNA | 116 | (54 - 132) |
| 13C2 PFDA | 133 * | (53 - 130) |
| 13C2 PFUnA | 124 | (37 - 130) |
| 13C2 PFDoA | 114 | (26 - 130) |

**NOTE(S):**

* Surrogate recovery is outside stated control limits.

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

**Lot-Sample #...:** D9K130498-004 **Work Order #...:** LPE741AC **Matrix.....:** WATER
**Date Sampled...:** 11/05/09 00:01 **Date Received..:** 11/13/09
**Prep Date.....:** 11/16/09 **Analysis Date..:** 12/01/09
**Prep Batch #...:** 9320512 **Analysis Time..:** 18:18
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 94 | (37 - 130) |

2

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D9L080425**

**Dena Haverland**

**Dalton Utilities**
**1200 V.D. Parrot Jr. Parkway**
**Dalton, GA 30721**

**Michelle A. Johnston**
**Project Manager**

**January 15, 2010**

# Case Narrative
## D9L080425

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Sample Arrival and Receipt**
The following report contains the analytical results for four samples received at TestAmerica Denver on December 4, 2009, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 2.1°C.

The sample collection times were listed as 12-12 on the chain-of-custody, which means the samples were collected over 24 hours. Due to a limitation in the LIM system, the times had to be entered as 12:01 AM.

No other anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments.

**Analytical Comments**

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interferences, all four samples had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required. Please note samples STP3 INF and STP4 INF were black in color and samples STP3 EFF and STP4 EFF were dark orange in color.

Please note the laboratory had to use two cartridges to extract all four samples for FOSA.

Due to low percent recoveries in the low-level LCS associated with batch 9342427, all four samples were re-extracted out of the laboratory prescribed hold time and reanalyzed. Both batches have been included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

Due to a limitation in the LIMS system, the low-level LCS associated with QC batch 0005270 reported the percent recoveries for several PFCs as 0.0%. These compounds were recovered within the control limits, as outlined below.

| Compound | Low-Level LCS Actual Recovery | Control Limits | Low-Level LCS Actual Result | MDL |
|---|---|---|---|---|
| PFDA | 46% | 60-154% | 0..00921 ug/kg | 0.755 ug/kg |
| PFTriA | 27% | 44-164% | 0.00544 ug/kg | 1.15 ug/kg |
| PFTeA | 44% | 47-172% | 0.00875 ug/kg | 1.45 ug/kg |

As the compounds were detected below the Method Detection Limits (MDL), the system reports the percent recoveries as 0.0%.

The low-level LCS associated with QC batch 9342427 exhibited percent recoveries and internal standard recoveries below the QC control limits for several compounds. Upon re-extraction and reanalysis in QC batch 0005270; the percent recovery outliers were still present, demonstrating this anomaly is most likely due to matrix interference. Both the original and reanalysis data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

The method required MS/MSD could not be performed for QC batches 9342427, 9342428, and 0005270, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and mid-level LCS/LCSD analyses data.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is

diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

D9L080425

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **STP3 INF 12/02/09 00:01 001** | | | | |
| Perfluorohexanoic acid (PFHxA) | 0.074 J | 0.40 | ug/L | DEN -LC-0012 |
| **STP3 EFF 12/02/09 00:01 002** | | | | |
| Perfluorohexanoic acid (PFHxA) | 0.36 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.1 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.54 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.23 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.5 | 0.40 | ug/L | DEN -LC-0012 |
| **STP4 INF 12/02/09 00:01 003** | | | | |
| Perfluorobutane sulfonate (PFB | 1.8 J | 2.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.22 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 0.53 J | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.26 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.6 | 0.40 | ug/L | DEN -LC-0012 |
| **STP4 EFF 12/02/09 00:01 004** | | | | |
| Perfluoropentanoic acid (PFPA) | 0.90 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.46 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 3.0 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.37 J | 0.40 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.0 | 0.60 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.40 | 0.40 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 4.4 | 0.40 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

**D9L080425**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

D9L080425

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Jacqueline Bonnett | 003601 |
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN Severn Trent Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

D9L080425

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LQNLF | 001 | STP3 INF | 12/02/09 | 00:01 |
| LQNLM | 002 | STP3 EFF | 12/02/09 | 00:01 |
| LQNLQ | 003 | STP4 INF | 12/02/09 | 00:01 |
| LQNLR | 004 | STP4 EFF | 12/02/09 | 00:01 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: STP3 INF**

**HPLC**

**Lot-Sample #...:** D9L080425-001 **Work Order #...:** LQNLF1AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 12/08/09 **Analysis Date..:** 12/29/09
**Prep Batch #...:** 9342427 **Analysis Time..:** 08:47
**Dilution Factor:** 100

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 2.0 | ug/L | 0.98 |
| Perfluorooctanesulfonate | ND | 2.0 | ug/L | 1.3 |
| Perfluorobutanoic acid (PFBA) | ND | 2.0 | ug/L | 0.98 |
| Perfluoropentanoic acid (PFPA) | ND | 3.0 | ug/L | 1.1 |
| Perfluorohexanoic acid (PFHxA) | ND | 2.0 | ug/L | 0.29 |
| Perfluoroheptanoic acid (PFHpA) | ND | 2.0 | ug/L | 1.3 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 1.7 |
| Perfluorodecanoic acid (PFDA) | ND | 2.0 | ug/L | 0.78 |
| Perfluoroundecanoic acid (PFUnA) | ND | 2.0 | ug/L | 0.69 |
| Perfluorododecanoic acid (PFDoA) | ND | 2.0 | ug/L | 1.5 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 1.8 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 2.0 | ug/L | 1.5 |
| Perfluorobutane sulfonate (PFBS) | ND | 2.0 | ug/L | 0.82 |
| Perfluorohexane sulfonate (PFHxS) | ND | 3.0 | ug/L | 0.70 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 99 | (60 - 155) |
| 13C4 PFOS | 112 | (45 - 130) |
| 13C4 PFBA | 105 | (36 - 130) |
| 13C2 PFHxA | 95 | (55 - 135) |
| 18O2 PFHxS | 107 | (61 - 130) |
| 13C5 PFNA | 117 | (54 - 132) |
| 13C2 PFDA | 107 | (53 - 130) |
| 13C2 PFUnA | 110 | (37 - 130) |
| 13C2 PFDoA | 115 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: STP3 INF**

**HPLC**

**Lot-Sample #...:** D9L080425-001 **Work Order #...:** LQNLF1AC **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 12/08/09 **Analysis Date..:** 12/30/09
**Prep Batch #...:** 9342428 **Analysis Time..:** 16:52
**Dilution Factor:** 100

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 5.0 | ug/L | 0.57 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 77 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: STP3 INF**

**HPLC**

**Lot-Sample #...:** D9L080425-001 **Work Order #...:** LQNLF2AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 01/05/10 **Analysis Date..:** 01/08/10
**Prep Batch #...:** 0005270 **Analysis Time..:** 23:11
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.40 | ug/L | 0.20 |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| Perfluorobutanoic acid (PFBA) | ND | 0.40 | ug/L | 0.20 |
| Perfluoropentanoic acid (PFPA) | ND | 0.60 | ug/L | 0.22 |
| **Perfluorohexanoic acid (PFHxA)** | **0.074 J** | **0.40** | **ug/L** | **0.058** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.40 | ug/L | 0.16 |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 104 | (60 - 155) |
| 13C4 PFOS | 90 | (45 - 130) |
| 13C4 PFBA | 100 | (36 - 130) |
| 13C2 PFHxA | 92 | (55 - 135) |
| 18O2 PFHxS | 91 | (61 - 130) |
| 13C5 PFNA | 102 | (54 - 132) |
| 13C2 PFDA | 104 | (53 - 130) |
| 13C2 PFUnA | 108 | (37 - 130) |
| 13C2 PFDoA | 121 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP3 EFF**

**HPLC**

**Lot-Sample #...:** D9L080425-002 **Work Order #...:** LQNLM1AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 12/08/09 **Analysis Date..:** 12/29/09
**Prep Batch #...:** 9342427 **Analysis Time..:** 09:02
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |
| Perfluorooctanesulfonate | ND | 1.0 | ug/L | 0.67 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| Perfluoropentanoic acid (PFPA) | ND | 1.5 | ug/L | 0.55 |
| **Perfluorohexanoic acid (PFHxA)** | **0.36 J** | **1.0** | **ug/L** | **0.15** |
| Perfluoroheptanoic acid (PFHpA) | ND | 1.0 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| **Perfluorobutane sulfonate (PFBS)** | **1.1** | **1.0** | **ug/L** | **0.41** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 114 | (60 - 155) |
| 13C4 PFOS | 112 | (45 - 130) |
| 13C4 PFBA | 104 | (36 - 130) |
| 13C2 PFHxA | 100 | (55 - 135) |
| 18O2 PFHxS | 101 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 101 | (53 - 130) |
| 13C2 PFUnA | 103 | (37 - 130) |
| 13C2 PFDoA | 97 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP3 EFF**

**HPLC**

**Lot-Sample #...:** D9L080425-002 **Work Order #...:** LQNLM1AC **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 12/08/09 **Analysis Date..:** 12/30/09
**Prep Batch #...:** 9342428 **Analysis Time..:** 16:57
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 2.5 | ug/L | 0.29 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 80 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: STP3 EFF**

**HPLC**

**Lot-Sample #...:** D9L080425-002 **Work Order #...:** LQNLM2AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 01/05/10 **Analysis Date..:** 01/08/10
**Prep Batch #...:** 0005270 **Analysis Time..:** 23:26
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.40 | ug/L | 0.20 |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| Perfluorobutanoic acid (PFBA) | ND | 0.40 | ug/L | 0.20 |
| **Perfluoropentanoic acid (PFPA)** | **0.54 J** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **0.23 J** | **0.40** | **ug/L** | **0.058** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **1.5** | **0.40** | **ug/L** | **0.16** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 105 | (60 - 155) |
| 13C4 PFOS | 87 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 93 | (55 - 135) |
| 18O2 PFHxS | 92 | (61 - 130) |
| 13C5 PFNA | 97 | (54 - 132) |
| 13C2 PFDA | 95 | (53 - 130) |
| 13C2 PFUnA | 106 | (37 - 130) |
| 13C2 PFDoA | 97 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP4 INF

HPLC

Lot-Sample #...: D9L080425-003 Work Order #...: LQNLQ1AA Matrix.....: WATER
Date Sampled...: 12/02/09 00:01 Date Received..: 12/04/09
Prep Date.....: 12/08/09 Analysis Date..: 12/29/09
Prep Batch #...: 9342427 Analysis Time..: 09:17
Dilution Factor: 100

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 2.0 | ug/L | 0.98 |
| Perfluorooctanesulfonate | ND | 2.0 | ug/L | 1.3 |
| Perfluorobutanoic acid (PFBA) | ND | 2.0 | ug/L | 0.98 |
| Perfluoropentanoic acid (PFPA) | ND | 3.0 | ug/L | 1.1 |
| Perfluorohexanoic acid (PFHxA) | ND | 2.0 | ug/L | 0.29 |
| Perfluoroheptanoic acid (PFHpA) | ND | 2.0 | ug/L | 1.3 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 1.7 |
| Perfluorodecanoic acid (PFDA) | ND | 2.0 | ug/L | 0.78 |
| Perfluoroundecanoic acid (PFUnA) | ND | 2.0 | ug/L | 0.69 |
| Perfluorododecanoic acid (PFDoA) | ND | 2.0 | ug/L | 1.5 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 1.8 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 2.0 | ug/L | 1.5 |
| **Perfluorobutane sulfonate (PFBS)** | **1.8 J** | **2.0** | **ug/L** | **0.82** |
| Perfluorohexane sulfonate (PFHxS) | ND | 3.0 | ug/L | 0.70 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 114 | (60 - 155) |
| 13C4 PFOS | 111 | (45 - 130) |
| 13C4 PFBA | 100 | (36 - 130) |
| 13C2 PFHxA | 98 | (55 - 135) |
| 18O2 PFHxS | 100 | (61 - 130) |
| 13C5 PFNA | 109 | (54 - 132) |
| 13C2 PFDA | 106 | (53 - 130) |
| 13C2 PFUnA | 112 | (37 - 130) |
| 13C2 PFDoA | 109 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

Dalton Utilities

Client Sample ID: STP4 INF

HPLC

Lot-Sample #...: D9L080425-003 Work Order #...: LQNLQ1AC Matrix.....: WATER
Date Sampled...: 12/02/09 00:01 Date Received..: 12/04/09
Prep Date.....: 12/08/09 Analysis Date..: 12/30/09
Prep Batch #...: 9342428 Analysis Time..: 17:02
Dilution Factor: 132

Method.....: DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 6.6 | ug/L | 0.75 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 103 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: STP4 INF**

**HPLC**

**Lot-Sample #...:** D9L080425-003 **Work Order #...:** LQNLQ2AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 01/05/10 **Analysis Date..:** 01/08/10
**Prep Batch #...:** 0005270 **Analysis Time..:** 23:41
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluorooctanoic Acid** | **0.22 J** | **0.40** | **ug/L** | **0.20** |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| Perfluorobutanoic acid (PFBA) | ND | 0.40 | ug/L | 0.20 |
| **Perfluoropentanoic acid (PFPA)** | **0.53 J** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **0.26 J** | **0.40** | **ug/L** | **0.058** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **2.6** | **0.40** | **ug/L** | **0.16** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (60 - 155) |
| 13C4 PFOS | 94 | (45 - 130) |
| 13C4 PFBA | 98 | (36 - 130) |
| 13C2 PFHxA | 94 | (55 - 135) |
| 18O2 PFHxS | 96 | (61 - 130) |
| 13C5 PFNA | 102 | (54 - 132) |
| 13C2 PFDA | 100 | (53 - 130) |
| 13C2 PFUnA | 101 | (37 - 130) |
| 13C2 PFDoA | 122 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP4 EFF**

**HPLC**

**Lot-Sample #...:** D9L080425-004 **Work Order #...:** LQNLR1AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 12/08/09 **Analysis Date..:** 12/29/09
**Prep Batch #...:** 9342427 **Analysis Time..:** 09:32
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |
| Perfluorooctanesulfonate | ND | 1.0 | ug/L | 0.67 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| **Perfluoropentanoic acid (PFPA)** | **0.90 J** | **1.5** | **ug/L** | **0.55** |
| **Perfluorohexanoic acid (PFHxA)** | **0.46 J** | **1.0** | **ug/L** | **0.15** |
| Perfluoroheptanoic acid (PFHpA) | ND | 1.0 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 1.0 | ug/L | 0.87 |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.0 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 1.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.0 | ug/L | 0.73 |
| **Perfluorobutane sulfonate (PFBS)** | **3.0** | **1.0** | **ug/L** | **0.41** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 102 | (60 - 155) |
| 13C4 PFOS | 110 | (45 - 130) |
| 13C4 PFBA | 104 | (36 - 130) |
| 13C2 PFHxA | 102 | (55 - 135) |
| 18O2 PFHxS | 99 | (61 - 130) |
| 13C5 PFNA | 112 | (54 - 132) |
| 13C2 PFDA | 105 | (53 - 130) |
| 13C2 PFUnA | 107 | (37 - 130) |
| 13C2 PFDoA | 100 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: STP4 EFF**

**HPLC**

| | | | | | |
|---|---|---|---|---|---|
| **Lot-Sample #...:** | D9L080425-004 | **Work Order #...:** | LQNLR1AC | **Matrix.....:** | WATER |
| **Date Sampled...:** | 12/02/09 00:01 | **Date Received..:** | 12/04/09 | | |
| **Prep Date.....:** | 12/08/09 | **Analysis Date..:** | 12/30/09 | | |
| **Prep Batch #...:** | 9342428 | **Analysis Time..:** | 17:07 | | |
| **Dilution Factor:** | 50 | | | | |
| | | **Method.....:** | DEN -LC-0012 | | |

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 2.5 | ug/L | 0.29 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 83 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: STP4 EFF**

**HPLC**

**Lot-Sample #...:** D9L080425-004 **Work Order #...:** LQNLR2AA **Matrix.....:** WATER
**Date Sampled...:** 12/02/09 00:01 **Date Received..:** 12/04/09
**Prep Date.....:** 01/05/10 **Analysis Date..:** 01/08/10
**Prep Batch #...:** 0005270 **Analysis Time..:** 23:56
**Dilution Factor:** 20

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctanoic Acid | ND | 0.40 | ug/L | 0.20 |
| Perfluorooctanesulfonate | ND | 0.40 | ug/L | 0.27 |
| **Perfluorobutanoic acid (PFBA)** | **0.37 J** | **0.40** | **ug/L** | **0.20** |
| **Perfluoropentanoic acid (PFPA)** | **1.0** | **0.60** | **ug/L** | **0.22** |
| **Perfluorohexanoic acid (PFHxA)** | **0.40** | **0.40** | **ug/L** | **0.058** |
| Perfluoroheptanoic acid (PFHpA) | ND | 0.40 | ug/L | 0.26 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorodecanoic acid (PFDA) | ND | 0.40 | ug/L | 0.16 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.40 | ug/L | 0.14 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.40 | ug/L | 0.30 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.35 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.40 | ug/L | 0.29 |
| **Perfluorobutane sulfonate (PFBS)** | **4.4** | **0.40** | **ug/L** | **0.16** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.60 | ug/L | 0.14 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 129 | (60 - 155) |
| 13C4 PFOS | 109 | (45 - 130) |
| 13C4 PFBA | 117 | (36 - 130) |
| 13C2 PFHxA | 110 | (55 - 135) |
| 18O2 PFHxS | 109 | (61 - 130) |
| 13C5 PFNA | 115 | (54 - 132) |
| 13C2 PFDA | 114 | (53 - 130) |
| 13C2 PFUnA | 124 | (37 - 130) |
| 13C2 PFDoA | 125 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

4

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D0B100546**

**Dena Haverland**

**Dalton Utilities**
**1200 V.D. Parrot Jr. Parkway**
**Dalton, GA 30721**

**Michelle A. Johnston**
**Project Manager**

**February 23, 2010**

# Case Narrative
## D0B100546

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

This report shall not be reproduced except in full, without the written approval of the laboratory.

**Sample Arrival and Receipt**
The following report contains the analytical results for four samples received at TestAmerica Denver on February 10, 2010, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 4.8°C. No anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with a mid level Laboratory Control Sample (LCS). The LCS recoveries were within established control limits, with the exception of the items noted in section Analytical Comments. The low-level LCS requirement changed on January 26, 2010.

**Analytical Comments**
Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interference, all four samples had to be analyzed at dilutions. The reporting limits have been adjusted relative to the dilutions required. Samples I-3 and I-4 were

black in color and samples E-3 and E-4 were orange in color. The laboratory noted analysis at less diluted concentrations would jeopardize the integrity of the instrument.

The organic preparation chemist had to use two cartridges to extract all four samples as the samples contained suspended solids and sediment.

The LCS/LCSD associated with QC batch 0042140 exhibited percent recoveries above the QC limits for Perfluorooctane sulfonamide (FOSA). This is an indicator that data may be biased high. As no detectable concentrations are present in the associated samples, corrective action is deemed unnecessary.

The method required MS/MSD could not be performed for QC batches 0042140 and 0042141, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable mid-level LCS/LCSD analyses data.

The closing Continuing Calibration Verification (CCV) standard associated with samples in QC batch 0042141 exhibited %D values out of range, biased high, for Perfluorotridecanoic acid (PFTriA) and Perfluorotetradecanoic acid (PFTeA). This is an indicator that data may be biased high. As no detectable concentrations of PFTriA and PFTeA are present in the associated samples, corrective action is deemed unnecessary.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

D0B100546

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **I-3 02/06/10 001** | | | | |
| Perfluoropentanoic acid (PFPA) | 1.9 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.3 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.77 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.77 J | 1.0 | ug/L | DEN -LC-0012 |
| **E-3 02/06/10 002** | | | | |
| Perfluoropentanoic acid (PFPA) | 0.12 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.074 J | 0.20 | ug/L | DEN -LC-0012 |
| **I-4 02/06/10 003** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.74 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 2.6 | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.89 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 1.5 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 8.9 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorooctanesulfonate | 0.82 J | 1.5 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 1.1 | 1.0 | ug/L | DEN -LC-0012 |
| **E-4 02/06/10 004** | | | | |
| Perfluoropentanoic acid (PFPA) | 0.12 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.069 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 0.35 | 0.20 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

**D0B100546**

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

**D0B100546**

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

**D0B100546**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LVH5J | 001 | I-3 | 02/06/10 | |
| LVH5L | 002 | E-3 | 02/06/10 | |
| LVH5M | 003 | I-4 | 02/06/10 | |
| LVH5N | 004 | E-4 | 02/06/10 | |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D0B100546-001 **Work Order #...:** LVH5J1AA **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042141 **Analysis Time..:** 17:44
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 1.5 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **1.9** | **1.5** | **ug/L** | **0.55** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| **Perfluorohexanoic acid (PFHxA)** | **1.3** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **1.3** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **0.77 J** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **0.77 J** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 108 | (60 - 155) |
| 13C4 PFOS | 99 | (45 - 130) |
| 13C4 PFBA | 108 | (36 - 130) |
| 13C2 PFHxA | 107 | (55 - 135) |
| 18O2 PFHxS | 108 | (61 - 130) |
| 13C5 PFNA | 107 | (54 - 132) |
| 13C2 PFDA | 108 | (53 - 130) |
| 13C2 PFUnA | 107 | (37 - 130) |
| 13C2 PFDoA | 109 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D0B100546-001 **Work Order #...:** LVH5J1AC **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042140 **Analysis Time..:** 20:04
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 2.5 | ug/L | 0.29 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 66 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D0B100546-002 **Work Order #...:** LVH5L1AA **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042141 **Analysis Time..:** 17:59
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.30 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.12 J** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| **Perfluorohexanoic acid (PFHxA)** | **0.074 J** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| Perfluorobutane sulfonate (PFBS) | ND | 0.20 | ug/L | 0.082 |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 101 | (60 - 155) |
| 13C4 PFOS | 95 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 100 | (55 - 135) |
| 18O2 PFHxS | 97 | (61 - 130) |
| 13C5 PFNA | 99 | (54 - 132) |
| 13C2 PFDA | 98 | (53 - 130) |
| 13C2 PFUnA | 103 | (37 - 130) |
| 13C2 PFDoA | 95 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D0B100546-002 **Work Order #...:** LVH5L1AC **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042140 **Analysis Time..:** 20:09
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 85 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

**Lot-Sample #...:** D0B100546-003 **Work Order #...:** LVH5M1AA **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042141 **Analysis Time..:** 18:14
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.74 J** | **1.5** | **ug/L** | **0.66** |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| **Perfluoropentanoic acid (PFPA)** | **2.6** | **1.5** | **ug/L** | **0.55** |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| **Perfluorobutanoic acid (PFBA)** | **0.89 J** | **1.0** | **ug/L** | **0.49** |
| **Perfluorohexanoic acid (PFHxA)** | **1.5** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **8.9** | **1.0** | **ug/L** | **0.41** |
| **Perfluorooctanesulfonate** | **0.82 J** | **1.5** | **ug/L** | **0.67** |
| **Perfluorooctanoic Acid** | **1.1** | **1.0** | **ug/L** | **0.49** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 85 | (60 - 155) |
| 13C4 PFOS | 73 | (45 - 130) |
| 13C4 PFBA | 81 | (36 - 130) |
| 13C2 PFHxA | 82 | (55 - 135) |
| 18O2 PFHxS | 84 | (61 - 130) |
| 13C5 PFNA | 79 | (54 - 132) |
| 13C2 PFDA | 80 | (53 - 130) |
| 13C2 PFUnA | 84 | (37 - 130) |
| 13C2 PFDoA | 76 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

**Lot-Sample #...:** D0B100546-003
**Date Sampled...:** 02/06/10
**Prep Date.....:** 02/11/10
**Prep Batch #...:** 0042140
**Dilution Factor:** 50

**Work Order #...:** LVH5M1AC
**Date Received..:** 02/10/10
**Analysis Date..:** 02/21/10
**Analysis Time..:** 20:14

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 2.5 | ug/L | 0.29 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 69 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

**Lot-Sample #...:** D0B100546-004 **Work Order #...:** LVH5N1AA **Matrix.....:** WATER
**Date Sampled...:** 02/06/10 **Date Received..:** 02/10/10
**Prep Date.....:** 02/11/10 **Analysis Date..:** 02/21/10
**Prep Batch #...:** 0042141 **Analysis Time..:** 18:29
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 0.30 | ug/L | 0.13 |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **0.12 J** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| Perfluorobutanoic acid (PFBA) | ND | 0.20 | ug/L | 0.098 |
| **Perfluorohexanoic acid (PFHxA)** | **0.069 J** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **0.35** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| Perfluorooctanoic Acid | ND | 0.20 | ug/L | 0.098 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 104 | (60 - 155) |
| 13C4 PFOS | 92 | (45 - 130) |
| 13C4 PFBA | 96 | (36 - 130) |
| 13C2 PFHxA | 95 | (55 - 135) |
| 18O2 PFHxS | 97 | (61 - 130) |
| 13C5 PFNA | 94 | (54 - 132) |
| 13C2 PFDA | 95 | (53 - 130) |
| 13C2 PFUnA | 102 | (37 - 130) |
| 13C2 PFDoA | 101 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

**Lot-Sample #...:** D0B100546-004
**Date Sampled...:** 02/06/10
**Prep Date.....:** 02/11/10
**Prep Batch #...:** 0042140
**Dilution Factor:** 10

**Work Order #...:** LVH5N1AC
**Date Received..:** 02/10/10
**Analysis Date..:** 02/21/10
**Analysis Time..:** 20:19

**Matrix.....:** WATER

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (F OSA) | ND | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 89 | (37 - 130) |

3

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica Laboratories, Inc.

# ANALYTICAL REPORT

## Perfluorocarbon (PFC) Analysis

**Lot #: D0A150558**

**Dena Haverland**

**Dalton Utilities**
**1200 V.D. Parrot Jr. Parkway**
**Dalton, GA 30721**

**Michelle A. Johnston**
**Project Manager**

**February 10, 2010**

# Case Narrative
**D0A150558**

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Sample Arrival and Receipt**
The following report contains the analytical results for four samples received at TestAmerica Denver on January 15, 2010, according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 2.6°C. No anomalies were encountered during sample receipt.

**Standards**
Analytical standards were prepared using commercially available certified solutions containing all compounds of interest.

The mass labeled compounds 13C4 PFBA, 13C2 PFHxA, 18O2 PFHxS, 13C4 PFOA, 13C4 PFOS, 13C5 PFNA, 13C2 PFDA, 13C2 PFUnA, 13C2 PFDoA, and D3 MeFOSA were introduced at the extraction step and were used for internal standards for the quantitation of the target compounds.

**Sample Extraction and Analysis**
The samples presented in this report were extracted for the target analytes by TestAmerica Denver's Standard Operating Procedure (SOP) DV-OP-0019 and analyzed for the target analytes by TestAmerica Denver's SOP DV-LC-0012.

**Method QC Samples**
The Method Blank is processed reagent water spiked with internal standard and prepared with each batch of 20 samples of the same matrix. The method blanks were non-detect at the reporting limits for the target analytes.

Each batch is prepared with low and mid level Laboratory Control Samples (LCS). The LCS recoveries for both levels were within established control limits, with the exception of the items noted in section Analytical Comments. The low-level LCS requirement changed on January 26, 2010.

**Analytical Comments**
The Standard Operating Procedure (SOP) was altered slightly in the sample preparation for FOSA. Sodium hydroxide was added to all four samples to obtain a pH of >12 instead of the SOP required <2. The basic pH is generating better internal standard recoveries for MeFOSA.

Each sample is analyzed to achieve the lowest possible reporting limits within the constraints of the method. Due to matrix interference, all four samples had to be analyzed at dilutions. Please note the extracts were black, orange, or dark brown in color. The reporting limits have been adjusted relative to the dilutions required.

The organic preparation chemist had to use two cartridges to extract samples I-3, E-3, and I-4, due to the first cartridges clogging. After the second cartridges clogged, the amount of volume extracted was measured and used as the volume of the extraction constant. The surrogate concentrations were adjusted accordingly.

Due to high percent recoveries in the low-level LCS and mid-level LCS/LCSD associated with batch 0018141, all four samples were re-extracted out of the laboratory prescribed hold time and reanalyzed in QC batch 0032537. Both batches have been included in this report. There is no prescribed regulatory holding time requirement for PFCs. The scientific literature indicates PFCs are highly persistent compounds in the environment. TestAmerica Denver has conducted stability studies indicating medium- and low-level standard solutions of PFOA are stable for at least three months in glass, polystyrene, and polypropylene plastics at 4±2 °C. The 7-day/40-day and 14-day/40-day holding times listed above are based on the general EPA convention for the holding time of extractable organic compounds in water and soil. Please note the sample results should be considered estimated.

The low-level LCS and mid-level LCS/LCSD associated with QC batch 0018141 exhibited percent recoveries outside the QC control limits for several compounds. This is an indicator that data may be biased high. Upon re-extraction and reanalysis in QC batch 0032537, percent recoveries were 100% in control. Both sets of data have been provided, as re-extraction was unavoidably performed outside the laboratory recommended sample holding time.

Due to a limitation in the LIM system, the PFC low-level LCS associated with QC batch 0018141 reported the percent recovery for Perfluorotridecanoic Acid (PFTriA) as 0.0%. PFTriA was recovered within the control limits (44-164%) at 80.7%. As the compound was detected below the Method Detection Limit (MDL) of 0.01772 ug/L, the system reports the percent recovery as 0.0%.

On January 26, 2010, the extraction Standard Operating Procedure (SOP) DV-OP-0019 was revised to remove the requirement for a low-level LCS. This means re-extraction batch 0032537 only has a mid-level LCS/LCSD.

The method required MS/MSD could not be performed for QC batches 0018139, 0018141, and 0032537, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable low-level LCS and/or mid-level LCS/LCSD analyses data.

The Standard Operating Procedure (SOP) was altered slightly for these samples in the sample prep and LC conditions. The alterations are listed below.

Solvents are now the same as they were in the original SOP and run per the following gradient: From 0 to 11 minutes, the flow rate is 0.4 mL/minute and the MeOH ramps up from 25% to 100%. From 11 to 11.01 minutes, the flow rate increases to 0.7 mL/minute and this flow is diverted from the MS. At 13 minutes the flow rate decreases back down to 0.4 mL/minute and 25% MeOH. The column then equilibrates to 14 minutes.

PFTriA and PFTeA now use 13C2 PFUnA as their internal standard instead of 13C2 PFDoA.

No other anomalies were observed.

# EXECUTIVE SUMMARY - Detection Highlights

**D0A150558**

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | ANALYTICAL METHOD |
|---|---|---|---|---|
| **I-3 01/11/10 12:00 001** | | | | |
| Perfluorohexanoic acid (PFHxA) | 0.23 J | 1.0 | ug/L | DEN -LC-0012 |
| **E-3 01/11/10 12:00 002** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.22 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.26 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.53 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.23 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.15 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.20 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.46 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.1 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.18 J | 0.20 | ug/L | DEN -LC-0012 |
| **I-4 01/11/10 12:00 003** | | | | |
| Perfluorohexanoic acid (PFHxA) | 0.21 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.9 | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.20 J | 1.0 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.6 | 1.0 | ug/L | DEN -LC-0012 |
| **E-4 01/11/10 12:00 004** | | | | |
| Perfluoroheptanoic acid (PFHpA | 0.31 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.5 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.54 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.72 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorodecanoic acid (PFDA) | 0.095 J | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 2.6 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.33 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluoroheptanoic acid (PFHpA | 0.26 J | 0.30 | ug/L | DEN -LC-0012 |
| Perfluoropentanoic acid (PFPA) | 1.4 | 0.30 | ug/L | DEN -LC-0012 |
| Perfluorobutanoic acid (PFBA) | 0.47 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorohexanoic acid (PFHxA) | 0.58 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorobutane sulfonate (PFB | 1.8 | 0.20 | ug/L | DEN -LC-0012 |
| Perfluorooctanoic Acid | 0.26 | 0.20 | ug/L | DEN -LC-0012 |

# METHODS SUMMARY

D0A150558

| PARAMETER | ANALYTICAL METHOD | PREPARATION METHOD |
|---|---|---|
| LC/MS/MS PFCs | DEN -LC-0012 | SW846 FOSA spec |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

**D0A150558**

| ANALYTICAL METHOD | ANALYST | ANALYST ID |
|---|---|---|
| DEN -LC-0012 | Teresa L. Williams | 002510 |

**References:**

DEN TestAmerica Laboratores, Denver, Facility Standard Operating Procedure.

# SAMPLE SUMMARY

**D0A150558**

| WO # | SAMPLE# | CLIENT SAMPLE ID | SAMPLED DATE | SAMP TIME |
|---|---|---|---|---|
| LR9AT | 001 | I-3 | 01/11/10 | 12:00 |
| LR9AV | 002 | E-3 | 01/11/10 | 12:00 |
| LR9AX | 003 | I-4 | 01/11/10 | 12:00 |
| LR9A0 | 004 | E-4 | 01/11/10 | 12:00 |

**NOTE(S):**

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D0A150558-001 **Work Order #...:** LR9AT1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 19:27
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 1.5 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| Perfluoropentanoic acid (PFPA) | ND | 1.5 | ug/L | 0.55 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| Perfluorohexanoic acid (PFHxA) | ND | 1.0 | ug/L | 0.15 |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorobutane sulfonate (PFBS) | ND | 1.0 | ug/L | 0.41 |
| Perfluorooctanesulfonate | ND | 1.5 | ug/L | 0.67 |
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 116 | (60 - 155) |
| 13C4 PFOS | 108 | (45 - 130) |
| 13C4 PFBA | 94 | (36 - 130) |
| 13C2 PFHxA | 121 | (55 - 135) |
| 18O2 PFHxS | 107 | (61 - 130) |
| 13C5 PFNA | 127 | (54 - 132) |
| 13C2 PFDA | 117 | (53 - 130) |
| 13C2 PFUnA | 125 | (37 - 130) |
| 13C2 PFDoA | 126 | (26 - 130) |

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D0A150558-001 **Work Order #...:** LR9AT1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/21/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 11:17
**Dilution Factor:** 105

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 5.2 | ug/L | 0.60 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 109 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: I-3**

**HPLC**

**Lot-Sample #...:** D0A150558-001 **Work Order #...:** LR9AT2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 02/01/10 **Analysis Date..:** 02/05/10
**Prep Batch #...:** 0032537 **Analysis Time..:** 14:03
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 1.5 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| Perfluoropentanoic acid (PFPA) | ND | 1.5 | ug/L | 0.55 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| **Perfluorohexanoic acid (PFHxA)** | **0.23 J** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| Perfluorobutane sulfonate (PFBS) | ND | 1.0 | ug/L | 0.41 |
| Perfluorooctanesulfonate | ND | 1.5 | ug/L | 0.67 |
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 85 | (60 - 155) |
| 13C4 PFOS | 82 | (45 - 130) |
| 13C4 PFBA | 85 | (36 - 130) |
| 13C2 PFHxA | 78 | (55 - 135) |
| 18O2 PFHxS | 81 | (61 - 130) |
| 13C5 PFNA | 90 | (54 - 132) |
| 13C2 PFDA | 87 | (53 - 130) |
| 13C2 PFUnA | 90 | (37 - 130) |
| 13C2 PFDoA | 98 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D0A150558-002 **Work Order #...:** LR9AV1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 19:42
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.22 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.26** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.53** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.6** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.23** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 93 | (60 - 155) |
| 13C4 PFOS | 83 | (45 - 130) |
| 13C4 PFBA | 94 | (36 - 130) |
| 13C2 PFHxA | 95 | (55 - 135) |
| 18O2 PFHxS | 83 | (61 - 130) |
| 13C5 PFNA | 91 | (54 - 132) |
| 13C2 PFDA | 85 | (53 - 130) |
| 13C2 PFUnA | 94 | (37 - 130) |
| 13C2 PFDoA | 93 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D0A150558-002 **Work Order #...:** LR9AV1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/21/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 11:22
**Dilution Factor:** 12.5

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.62 | ug/L | 0.071 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 111 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: E-3**

**HPLC**

**Lot-Sample #...:** D0A150558-002 **Work Order #...:** LR9AV2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 02/01/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0032537 **Analysis Time..:** 23:07
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.15 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.20** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.46** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.1** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.18 J** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 115 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 114 | (36 - 130) |
| 13C2 PFHxA | 101 | (55 - 135) |
| 18O2 PFHxS | 109 | (61 - 130) |
| 13C5 PFNA | 109 | (54 - 132) |
| 13C2 PFDA | 109 | (53 - 130) |
| 13C2 PFUnA | 113 | (37 - 130) |
| 13C2 PFDoA | 113 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

**Lot-Sample #...:** D0A150558-003 **Work Order #...:** LR9AX1AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 19:57
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 1.5 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| Perfluoropentanoic acid (PFPA) | ND | 1.5 | ug/L | 0.55 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| **Perfluorohexanoic acid (PFHxA)** | **0.21 J** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **1.9** | **1.0** | **ug/L** | **0.41** |
| Perfluorooctanesulfonate | ND | 1.5 | ug/L | 0.67 |
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 96 | (60 - 155) |
| 13C4 PFOS | 91 | (45 - 130) |
| 13C4 PFBA | 95 | (36 - 130) |
| 13C2 PFHxA | 100 | (55 - 135) |
| 18O2 PFHxS | 88 | (61 - 130) |
| 13C5 PFNA | 93 | (54 - 132) |
| 13C2 PFDA | 94 | (53 - 130) |
| 13C2 PFUnA | 96 | (37 - 130) |
| 13C2 PFDoA | 101 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: I-4**

**HPLC**

**Lot-Sample #...:** D0A150558-003 **Work Order #...:** LR9AX1AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/21/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 11:28
**Dilution Factor:** 125

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 6.2 | ug/L | 0.71 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 98 | (37 - 130) |

Dalton Utilities

Client Sample ID: I-4

HPLC

**Lot-Sample #...:** D0A150558-003 **Work Order #...:** LR9AX2AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 02/01/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0032537 **Analysis Time..:** 23:22
**Dilution Factor:** 50

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluoroheptanoic acid (PFHpA) | ND | 1.5 | ug/L | 0.66 |
| Perfluorononanoic acid (PFNA) | ND | 2.0 | ug/L | 0.87 |
| Perfluorododecanoic acid (PFDoA) | ND | 1.5 | ug/L | 0.75 |
| Perfluorotridecanoic acid (PFTriA) | ND | 2.0 | ug/L | 0.89 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 1.5 | ug/L | 0.73 |
| Perfluoropentanoic acid (PFPA) | ND | 1.5 | ug/L | 0.55 |
| Perfluorohexane sulfonate (PFHxS) | ND | 1.5 | ug/L | 0.35 |
| Perfluorobutanoic acid (PFBA) | ND | 1.0 | ug/L | 0.49 |
| **Perfluorohexanoic acid (PFHxA)** | **0.20 J** | **1.0** | **ug/L** | **0.15** |
| Perfluorodecanoic acid (PFDA) | ND | 1.0 | ug/L | 0.39 |
| Perfluoroundecanoic acid (PFUnA) | ND | 1.0 | ug/L | 0.34 |
| **Perfluorobutane sulfonate (PFBS)** | **1.6** | **1.0** | **ug/L** | **0.41** |
| Perfluorooctanesulfonate | ND | 1.5 | ug/L | 0.67 |
| Perfluorooctanoic Acid | ND | 1.0 | ug/L | 0.49 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 107 | (60 - 155) |
| 13C4 PFOS | 113 | (45 - 130) |
| 13C4 PFBA | 108 | (36 - 130) |
| 13C2 PFHxA | 97 | (55 - 135) |
| 18O2 PFHxS | 106 | (61 - 130) |
| 13C5 PFNA | 109 | (54 - 132) |
| 13C2 PFDA | 110 | (53 - 130) |
| 13C2 PFUnA | 110 | (37 - 130) |
| 13C2 PFDoA | 111 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-4**

HPLC

**Lot-Sample #...:** D0A150558-004 **Work Order #...:** LR9A01AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/30/10
**Prep Batch #...:** 0018141 **Analysis Time..:** 20:12
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.31** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.5** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.54** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.72** | **0.20** | **ug/L** | **0.029** |
| **Perfluorodecanoic acid (PFDA)** | **0.095 J** | **0.20** | **ug/L** | **0.078** |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **2.6** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.33** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 91 | (60 - 155) |
| 13C4 PFOS | 88 | (45 - 130) |
| 13C4 PFBA | 99 | (36 - 130) |
| 13C2 PFHxA | 99 | (55 - 135) |
| 18O2 PFHxS | 83 | (61 - 130) |
| 13C5 PFNA | 93 | (54 - 132) |
| 13C2 PFDA | 86 | (53 - 130) |
| 13C2 PFUnA | 88 | (37 - 130) |
| 13C2 PFDoA | 91 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

**Lot-Sample #...:** D0A150558-004 **Work Order #...:** LR9A01AC **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 01/18/10 **Analysis Date..:** 01/21/10
**Prep Batch #...:** 0018139 **Analysis Time..:** 11:33
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| Perfluorooctane sulfonamide (FOSA) | ND | 0.50 | ug/L | 0.057 |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| MeFOSA | 99 | (37 - 130) |

**Dalton Utilities**

**Client Sample ID: E-4**

**HPLC**

**Lot-Sample #...:** D0A150558-004 **Work Order #...:** LR9A02AA **Matrix.....:** WATER
**Date Sampled...:** 01/11/10 12:00 **Date Received..:** 01/15/10
**Prep Date.....:** 02/01/10 **Analysis Date..:** 02/02/10
**Prep Batch #...:** 0032537 **Analysis Time..:** 23:37
**Dilution Factor:** 10

**Method.....:** DEN -LC-0012

| PARAMETER | RESULT | REPORTING LIMIT | UNITS | MDL |
|---|---|---|---|---|
| **Perfluoroheptanoic acid (PFHpA)** | **0.26 J** | **0.30** | **ug/L** | **0.13** |
| Perfluorononanoic acid (PFNA) | ND | 0.40 | ug/L | 0.17 |
| Perfluorododecanoic acid (PFDoA) | ND | 0.30 | ug/L | 0.15 |
| Perfluorotridecanoic acid (PFTriA) | ND | 0.40 | ug/L | 0.18 |
| Perfluorotetradecanoic acid (PFTeA) | ND | 0.30 | ug/L | 0.15 |
| **Perfluoropentanoic acid (PFPA)** | **1.4** | **0.30** | **ug/L** | **0.11** |
| Perfluorohexane sulfonate (PFHxS) | ND | 0.30 | ug/L | 0.070 |
| **Perfluorobutanoic acid (PFBA)** | **0.47** | **0.20** | **ug/L** | **0.098** |
| **Perfluorohexanoic acid (PFHxA)** | **0.58** | **0.20** | **ug/L** | **0.029** |
| Perfluorodecanoic acid (PFDA) | ND | 0.20 | ug/L | 0.078 |
| Perfluoroundecanoic acid (PFUnA) | ND | 0.20 | ug/L | 0.069 |
| **Perfluorobutane sulfonate (PFBS)** | **1.8** | **0.20** | **ug/L** | **0.082** |
| Perfluorooctanesulfonate | ND | 0.30 | ug/L | 0.13 |
| **Perfluorooctanoic Acid** | **0.26** | **0.20** | **ug/L** | **0.098** |

| SURROGATE | PERCENT RECOVERY | RECOVERY LIMITS |
|---|---|---|
| 13C4 PFOA | 126 | (60 - 155) |
| 13C4 PFOS | 126 | (45 - 130) |
| 13C4 PFBA | 128 | (36 - 130) |
| 13C2 PFHxA | 115 | (55 - 135) |
| 18O2 PFHxS | 126 | (61 - 130) |
| 13C5 PFNA | 124 | (54 - 132) |
| 13C2 PFDA | 122 | (53 - 130) |
| 13C2 PFUnA | 128 | (37 - 130) |
| 13C2 PFDoA | 125 | (26 - 130) |

**NOTE(S):**

J Estimated result. Result is less than RL.

# QC DATA ASSOCIATION SUMMARY

**D0A150558**

Sample Preparation and Analysis Control Numbers

| SAMPLE# | MATRIX | ANALYTICAL METHOD | LEACH BATCH # | PREP BATCH # | MS RUN# |
|---|---|---|---|---|---|
| 001 | WATER | DEN -LC-0012 | | 0018139 | |
| | WATER | DEN -LC-0012 | | 0018141 | |
| | WATER | DEN -LC-0012 | | 0032537 | |
| 002 | WATER | DEN -LC-0012 | | 0018139 | |
| | WATER | DEN -LC-0012 | | 0018141 | |
| | WATER | DEN -LC-0012 | | 0032537 | |
| 003 | WATER | DEN -LC-0012 | | 0018139 | |
| | WATER | DEN -LC-0012 | | 0018141 | |
| | WATER | DEN -LC-0012 | | 0032537 | |
| 004 | WATER | DEN -LC-0012 | | 0018139 | |
| | WATER | DEN -LC-0012 | | 0018141 | |
| | WATER | DEN -LC-0012 | | 0032537 | |

5

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

# ANALYTICAL REPORT

Job Number: 280-1118-1

Job Description: PFC Analysis

For:
Dalton Utilities
1200 V.D. Parrott Jr. Parkway
Dalton, GA 30721

Attention: Ms. Dena Haverland

Approved for release.
Michelle Johnston
Project Manager I
3/19/2010 11:52 AM

Michelle Johnston
Project Manager I
michelle.johnston@testamericainc.com
03/19/2010

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

The Lab Certification ID# is E87667.

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

**TestAmerica Laboratories, Inc.**
TestAmerica Denver 4955 Yarrow Street, Arvada, CO 80002
Tel (303) 736-0100 Fax (303) 431-7171 www.testamericainc.com

ACCREDITED IN ACCORDANCE WITH

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# CASE NARRATIVE
## Client: Dalton Utilities
## Project: PFC Analysis
## Report Number: 280-1118-1

TestAmerica Denver utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the methods summary page in accordance with the methods indicated. Dilution factors and footnotes are provided on each datasheet to assist in the interpretation of the results.

The results relate only to the samples in this report and meet all requirements of NELAC. All data have been reviewed for compliance with the laboratory QA/QC plan and have found to be compliant with laboratory protocols with any exceptions noted below.

Please note that Non-Detect (ND) results have been evaluated down to the Method Detection Limit (MDL) and should be considered ND at the MDL. Unless otherwise noted, results for solids have been dry weight corrected.

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**Receipt**
The following report contains the analytical results for four water samples received at TestAmerica Denver on March 6, 2010 according to documented sample acceptance procedures. The samples were received in good condition at a temperature of 3.8°C. No anomalies were encountered during sample receipt.

**PFC**
Samples I-3 (280-1118-1), E-3 (280-1118-2), I-4 (280-1118-3) and E-4 (280-1118-4) were analyzed for PFC in accordance with SOP DV-LC-0012. The samples were prepared on 03/08/2010 and analyzed on 03/16/2010.

Due to matrix interference, samples I-3 (280-1118-1), E-3 (280-1118-2), I-4 (280-1118-3) and E-4 (280-1118-4) required dilution prior to analysis. Please note samples I-3 (280-1118-1) and I-4 (280-1118-3) were black in color and samples E-3 (280-1118-2) and E-4 (280-1118-4) were dark orange in color. The reporting limits have been adjusted accordingly. The dilutions were performed in order to protect the integrity of the instrument.

The internal standard recovery for 13C2 PFDA associated with QC batch 280-7440 was recovered above the control limits in samples I-3 (280-1118-1) and I-4 (280-1118-3). Matrix interference is suspected as the samples required large dilutions; therefore, corrective action was deemed unnecessary.

The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 280-6425 exceeded control limits for Perfluorotridecanoic acid (PFTriA). The recoveries are in control for this compound in both the LCS and LCSD. All associated samples are ND for this compound.

The method required MS/MSD analyses could not be performed on preparation batch 280-6425, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable LCS/LCSD data.

The closing Continuing Calibration Verification (CCV) standard associated with samples in analytical batch 280-6958 exhibited a %D value out of range, biased high, for Perfluorooctane Sulfonamide (FOSA). This is an indicator that data may be biased high. As no detectable concentrations of FOSA are present in the associated samples, corrective action is deemed unnecessary.

Refer to the QC report for details.

No other difficulties were encountered during the PFC analyses.

All other quality control parameters were within the acceptance limits.

**FOSA**
Samples I-3 (280-1118-1), E-3 (280-1118-2), I-4 (280-1118-3) and E-4 (280-1118-4) were analyzed for FOSA in accordance with SOP DV-LC-0012. The samples were prepared on 03/09/2010 and analyzed on 03/12/2010.

All four samples required a second cartridge during the extraction procedure as the first cartridges clogged. Once the second cartridges also clogged, the remaining sample that did not pass through the cartridges were weighed and subtracted from the initial amounts. The surrogate was adjusted accordingly.

Due to matrix interference, samples I-3 (280-1118-1), E-3 (280-1118-2), I-4 (280-1118-3) and E-4 (280-1118-4) required dilution prior to analysis. Please note samples I-3 (280-1118-1) and I-4 (280-1118-3) were black in color and samples E-3 (280-1118-2) and E-4 (280-1118-4) were dark orange in color. The reporting limits have been adjusted accordingly. The dilutions were performed in order to protect the integrity of the instrument.

The method required MS/MSD analyses could not be performed on preparation batch 280-6580, due to insufficient sample volume. Method precision and accuracy have been verified by the acceptable LCS/LCSD data.

No other difficulties were encountered during the FOSA analyses.

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver  Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3  Analysis Batch Number: 7082

Lab Sample ID: STD200 280-7082/8 IC  Client Sample ID:

S. Ortagni 3-17-10

Date Analyzed: 03/12/10 03:10  Lab File ID: PC30C11B71.d  GC Column: IonPac  ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorobutanioc acid (PFBA) | 2.17 | Baseline | williamst | 03/12/10 11:23 |
| 13C4 PFBA | 2.36 | Baseline | williamst | 03/12/10 11:23 |
| 13C4 PFBA (IS) | 2.36 | Baseline | williamst | 03/12/10 11:23 |

Lab Sample ID: ICV 280-7082/10  Client Sample ID:

Date Analyzed: 03/12/10 03:40  Lab File ID: PC30C11B73.d  GC Column: IonPac  ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| 13C4 PFBA | 2.23 | Baseline | williamst | 03/12/10 11:25 |

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3 Analysis Batch Number: 7440

Lab Sample ID: MB 280-6425/10-A Client Sample ID:

S. Castagna 3-17-10

Date Analyzed: 03/16/10 11:22 Lab File ID: PC30C1608.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.22 | Assign Peak | williamst | 03/16/10 14:46 |

Lab Sample ID: 280-1118-1 Client Sample ID: I-3

Date Analyzed: 03/16/10 12:08 Lab File ID: PC30C1611.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexanoic acid (PFHxA) | 5.09 | Assign Peak | williamst | 03/16/10 14:48 |
| Perfluorohexane Sulfonate (PFHxS) | 6.17 | Assign Peak | williamst | 03/16/10 14:48 |

Lab Sample ID: 280-1118-2 Client Sample ID: E-3

Date Analyzed: 03/16/10 12:23 Lab File ID: PC30C1612.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.20 | Baseline | williamst | 03/16/10 14:49 |
| Perfluorooctane Sulfonate (PFOS) | 7.63 | Baseline | williamst | 03/16/10 14:49 |

Lab Sample ID: 280-1118-3 Client Sample ID: I-4

Date Analyzed: 03/16/10 12:38 Lab File ID: PC30C1613.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorononanoic acid (PFNA) | 7.62 | Assign Peak | williamst | 03/16/10 14:50 |
| Perfluorooctane Sulfonate (PFOS) | 7.63 | Baseline | williamst | 03/16/10 14:50 |

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver  Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3  Analysis Batch Number: 7440

Lab Sample ID: 280-1118-4  Client Sample ID: E-4  S. Arstagni 3-17-10

Date Analyzed: 03/16/10 12:53  Lab File ID: PC30C1614.d  GC Column: IonPac  ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.20 | Baseline | williamst | 03/16/10 14:51 |
| Perfluorooctane Sulfonate (PFOS) | 7.65 | Baseline | williamst | 03/16/10 14:51 |

LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3 Analysis Batch Number: 7082

Lab Sample ID: STD200 280-7082/8 IC Client Sample ID:

Date Analyzed: 03/12/10 03:10 Lab File ID: PC30C11B71.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorobutanioc acid (PFBA) | 2.17 | Baseline | williamst | 03/12/10 11:23 |
| 13C4 PFBA | 2.36 | Baseline | williamst | 03/12/10 11:23 |
| 13C4 PFBA (IS) | 2.36 | Baseline | williamst | 03/12/10 11:23 |

Lab Sample ID: ICV 280-7082/10 Client Sample ID:

Date Analyzed: 03/12/10 03:40 Lab File ID: PC30C11B73.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| 13C4 PFBA | 2.23 | Baseline | williamst | 03/12/10 11:25 |

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3 Analysis Batch Number: 7440

Lab Sample ID: MB 280-6425/10-A Client Sample ID:

Date Analyzed: 03/16/10 11:22 Lab File ID: PC30C1608.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.22 | Assign Peak | williamst | 03/16/10 14:46 |

Lab Sample ID: 280-1118-1 Client Sample ID: I-3

Date Analyzed: 03/16/10 12:08 Lab File ID: PC30C1611.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexanoic acid (PFHxA) | 5.09 | Assign Peak | williamst | 03/16/10 14:48 |
| Perfluorohexane Sulfonate (PFHxS) | 6.17 | Assign Peak | williamst | 03/16/10 14:48 |

Lab Sample ID: 280-1118-2 Client Sample ID: E-3

Date Analyzed: 03/16/10 12:23 Lab File ID: PC30C1612.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.20 | Baseline | williamst | 03/16/10 14:49 |
| Perfluorooctane Sulfonate (PFOS) | 7.63 | Baseline | williamst | 03/16/10 14:49 |

Lab Sample ID: 280-1118-3 Client Sample ID: I-4

Date Analyzed: 03/16/10 12:38 Lab File ID: PC30C1613.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorononanoic acid (PFNA) | 7.62 | Assign Peak | williamst | 03/16/10 14:50 |
| Perfluorooctane Sulfonate (PFOS) | 7.63 | Baseline | williamst | 03/16/10 14:50 |

# LCMS MANUAL INTEGRATION SUMMARY

Lab Name: TestAmerica Denver Job No.: 280-1118-1

SDG No.:

Instrument ID: LC_LCMS3 Analysis Batch Number: 7440

Lab Sample ID: 280-1118-4 Client Sample ID: E-4

Date Analyzed: 03/16/10 12:53 Lab File ID: PC30C1614.d GC Column: IonPac ID: 2(mm)

| COMPOUND NAME | RETENTION TIME | MANUAL INTEGRATION | | |
|---|---|---|---|---|
| | | REASON | ANALYST | DATE |
| Perfluorohexane Sulfonate (PFHxS) | 6.20 | Baseline | williamst | 03/16/10 14:51 |
| Perfluorooctane Sulfonate (PFOS) | 7.65 | Baseline | williamst | 03/16/10 14:51 |

# SAMPLE SUMMARY

Client: Dalton Utilities

Job Number: 280-1118-1

| Lab Sample ID | Client Sample ID | Client Matrix | Date/Time Sampled | Date/Time Received |
|---|---|---|---|---|
| 280-1118-1 | I-3 | Water | 03/04/2010 1200 | 03/06/2010 0900 |
| 280-1118-2 | E-3 | Water | 03/04/2010 1200 | 03/06/2010 0900 |
| 280-1118-3 | I-4 | Water | 03/04/2010 1200 | 03/06/2010 0900 |
| 280-1118-4 | E-4 | Water | 03/04/2010 1200 | 03/06/2010 0900 |

# EXECUTIVE SUMMARY - Detections

Client: Dalton Utilities

Job Number: 280-1118-1

| Lab Sample ID / Analyte | Client Sample ID | Result / Qualifier | | Reporting Limit | Units | Method |
|---|---|---|---|---|---|---|
| **280-1118-2** | **E-3** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 0.53 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.17 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.75 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.18 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 2.4 | | 0.30 | ug/L | DV-LC-0012 |
| **280-1118-3** | **I-4** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 7.1 | | 1.0 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.45 | J | 1.0 | ug/L | DV-LC-0012 |
| **280-1118-4** | **E-4** | | | | | |
| Perfluorobutane Sulfonate (PFBS) | | 1.3 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorobutanioc acid (PFBA) | | 0.32 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorohexanoic acid (PFHxA) | | 0.63 | | 0.20 | ug/L | DV-LC-0012 |
| Perfluorooctanoic acid (PFOA) | | 0.16 | J | 0.20 | ug/L | DV-LC-0012 |
| Perfluoropentanoic acid (PFPA) | | 1.1 | | 0.30 | ug/L | DV-LC-0012 |

# METHOD SUMMARY

Client: Dalton Utilities

Job Number: 280-1118-1

| Description | Lab Location | Method | Preparation Method |
|---|---|---|---|
| **Matrix: Water** | | | |
| Perfluoronated Hydrocarbons | TAL DEN | TAL-DEN DV-LC-0012 | |
| Solid-Phase Extraction (SPE) | TAL DEN | | SW846 3535 |
| FOSA in Water (LC/MS/MS) | TAL DEN | TAL-DEN PFC -FOSA | |
| Solid-Phase Extraction (SPE) | TAL DEN | | SW846 3535 |

**Lab References:**

TAL DEN = TestAmerica Denver

**Method References:**

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TAL-DEN = TestAmerica Laboratories, Denver, Facility Standard Operating Procedure.

# METHOD / ANALYST SUMMARY

Client: Dalton Utilities

Job Number: 280-1118-1

| Method | Analyst | Analyst ID |
|---|---|---|
| TAL-DEN DV-LC-0012 | Williams, Teresa L | TLW |
| TAL-DEN PFC -FOSA | Williams, Teresa L | TLW |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** I-3

Lab Sample ID: 280-1118-1
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-7440 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6425 | | Lab File ID: | PC30C1611.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 03/16/2010 1208 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 03/08/2010 1130 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | ND | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.75 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.66 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | ND | | 0.15 | 1.0 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.67 | 1.5 |
| Perfluoropentanoic acid (PFPA) | ND | | 0.55 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.73 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | * | 0.89 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 120 | | 60 - 155 |
| 13C4 PFOS | 113 | | 45 - 130 |
| 13C4 PFBA | 127 | | 36 - 130 |
| 13C2 PFHxA | 109 | | 55 - 135 |
| 13C5 PFNA | 126 | | 54 - 132 |
| 13C2 PFDA | 137 | X | 53 - 130 |
| 13C2 PFUnA | 107 | | 37 - 130 |
| 13C2 PFDoA | 127 | | 26 - 130 |
| 18O2 PFHxS | 110 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** E-3

Lab Sample ID: 280-1118-2
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-7440 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6425 | | Lab File ID: | PC30C1612.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 252 mL |
| Date Analyzed: | 03/16/2010 1223 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 03/08/2010 1130 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 0.53 | | 0.082 | 0.20 |
| Perfluorobutanioc acid (PFBA) | 0.17 | J | 0.097 | 0.20 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.078 | 0.20 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.15 | 0.30 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.13 | 0.30 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.069 | 0.30 |
| Perfluorohexanoic acid (PFHxA) | 0.75 | | 0.029 | 0.20 |
| Perfluorononanoic acid (PFNA) | ND | | 0.17 | 0.40 |
| Perfluorooctanoic acid (PFOA) | 0.18 | J | 0.097 | 0.20 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.13 | 0.30 |
| Perfluoropentanoic acid (PFPA) | 2.4 | | 0.11 | 0.30 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.14 | 0.30 |
| Perfluorotridecanoic Acid (PFTriA) | ND | * | 0.18 | 0.40 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.068 | 0.20 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 130 | | 60 - 155 |
| 13C4 PFOS | 112 | | 45 - 130 |
| 13C4 PFBA | 129 | | 36 - 130 |
| 13C2 PFHxA | 116 | | 55 - 135 |
| 13C5 PFNA | 128 | | 54 - 132 |
| 13C2 PFDA | 128 | | 53 - 130 |
| 13C2 PFUnA | 127 | | 37 - 130 |
| 13C2 PFDoA | 109 | | 26 - 130 |
| 18O2 PFHxS | 113 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** I-4

Lab Sample ID: 280-1118-3
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-7440 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6425 | | Lab File ID: | PC30C1613.d |
| Dilution: | 50 | | | Initial Weight/Volume: | 251 mL |
| Date Analyzed: | 03/16/2010 1238 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 03/08/2010 1130 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 7.1 | | 0.41 | 1.0 |
| Perfluorobutanioc acid (PFBA) | ND | | 0.49 | 1.0 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.39 | 1.0 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.74 | 1.5 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.65 | 1.5 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.35 | 1.5 |
| Perfluorohexanoic acid (PFHxA) | 0.45 | J | 0.14 | 1.0 |
| Perfluorononanoic acid (PFNA) | ND | | 0.87 | 2.0 |
| Perfluorooctanoic acid (PFOA) | ND | | 0.49 | 1.0 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.66 | 1.5 |
| Perfluoropentanoic acid (PFPA) | ND | | 0.54 | 1.5 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.73 | 1.5 |
| Perfluorotridecanoic Acid (PFTriA) | ND | * | 0.88 | 2.0 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.34 | 1.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 119 | | 60 - 155 |
| 13C4 PFOS | 109 | | 45 - 130 |
| 13C4 PFBA | 127 | | 36 - 130 |
| 13C2 PFHxA | 109 | | 55 - 135 |
| 13C5 PFNA | 125 | | 54 - 132 |
| 13C2 PFDA | 134 | X | 53 - 130 |
| 13C2 PFUnA | 125 | | 37 - 130 |
| 13C2 PFDoA | 122 | | 26 - 130 |
| 18O2 PFHxS | 114 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** E-4

Lab Sample ID: 280-1118-4
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**DV-LC-0012 Perfluoronated Hydrocarbons**

| | | | | | |
|---|---|---|---|---|---|
| Method: | DV-LC-0012 | Analysis Batch: 280-7440 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6425 | | Lab File ID: | PC30C1614.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 250 mL |
| Date Analyzed: | 03/16/2010 1253 | | | Final Weight/Volume: | 5000 uL |
| Date Prepared: | 03/08/2010 1130 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorobutane Sulfonate (PFBS) | 1.3 | | 0.082 | 0.20 |
| Perfluorobutanioc acid (PFBA) | 0.32 | | 0.098 | 0.20 |
| Perfluorodecanoic acid (PFDA) | ND | | 0.078 | 0.20 |
| Perfluorododecanoic acid (PFDoA) | ND | | 0.15 | 0.30 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 0.13 | 0.30 |
| Perfluorohexane Sulfonate (PFHxS) | ND | | 0.070 | 0.30 |
| Perfluorohexanoic acid (PFHxA) | 0.63 | | 0.029 | 0.20 |
| Perfluorononanoic acid (PFNA) | ND | | 0.17 | 0.40 |
| Perfluorooctanoic acid (PFOA) | 0.16 | J | 0.098 | 0.20 |
| Perfluorooctane Sulfonate (PFOS) | ND | | 0.13 | 0.30 |
| Perfluoropentanoic acid (PFPA) | 1.1 | | 0.11 | 0.30 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 0.15 | 0.30 |
| Perfluorotridecanoic Acid (PFTriA) | ND | * | 0.18 | 0.40 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 0.069 | 0.20 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| 13C4 PFOA | 130 | | 60 - 155 |
| 13C4 PFOS | 111 | | 45 - 130 |
| 13C4 PFBA | 122 | | 36 - 130 |
| 13C2 PFHxA | 114 | | 55 - 135 |
| 13C5 PFNA | 125 | | 54 - 132 |
| 13C2 PFDA | 126 | | 53 - 130 |
| 13C2 PFUnA | 120 | | 37 - 130 |
| 13C2 PFDoA | 109 | | 26 - 130 |
| 18O2 PFHxS | 112 | | 61 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** I-3

Lab Sample ID: 280-1118-1
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-6958 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6580 | Lab File ID: | PC30C11B136.d |
| Dilution: | 50 | | Initial Weight/Volume: | 143 mL |
| Date Analyzed: | 03/12/2010 1700 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 03/09/2010 1010 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.50 | 4.4 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 62 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** **E-3**

Lab Sample ID: 280-1118-2
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | | |
|---|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-6958 | | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6580 | | Lab File ID: | PC30C11B137.d |
| Dilution: | 10 | | | Initial Weight/Volume: | 222 mL |
| Date Analyzed: | 03/12/2010 1705 | | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 03/09/2010 1010 | | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.064 | 0.56 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 100 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** I-4

Lab Sample ID: 280-1118-3
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-6958 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6580 | Lab File ID: | PC30C11B138.d |
| Dilution: | 50 | | Initial Weight/Volume: | 157 mL |
| Date Analyzed: | 03/12/2010 1710 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 03/09/2010 1010 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.45 | 4.0 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 82 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

**Client Sample ID:** **E-4**

Lab Sample ID: 280-1118-4
Client Matrix: Water

Date Sampled: 03/04/2010 1200
Date Received: 03/06/2010 0900

**PFC -FOSA FOSA in Water (LC/MS/MS)**

| | | | | |
|---|---|---|---|---|
| Method: | PFC -FOSA | Analysis Batch: 280-6958 | Instrument ID: | LC_LCMS3 |
| Preparation: | 3535 | Prep Batch: 280-6580 | Lab File ID: | PC30C11B139.d |
| Dilution: | 10 | | Initial Weight/Volume: | 234 mL |
| Date Analyzed: | 03/12/2010 1715 | | Final Weight/Volume: | 5 mL |
| Date Prepared: | 03/09/2010 1010 | | Injection Volume: | 20 uL |

| Analyte | Result (ug/L) | Qualifier | MDL | RL |
|---|---|---|---|---|
| Perfluorooctane Sulfonamide | ND | | 0.061 | 0.53 |

| Surrogate | %Rec | Qualifier | Acceptance Limits |
|---|---|---|---|
| MeFOSA (Surr) | 109 | | 37 - 130 |

Client: Dalton Utilities

Job Number: 280-1118-1

## Surrogate Recovery Report

**DV-LC-0012 Perfluoronated Hydrocarbons**

**Client Matrix: Water**

| Lab Sample ID | Client Sample ID | PFBA %Rec | PFHxA %Rec | PFHxS %Rec | PFOA %Rec | PFOS %Rec | PFNA %Rec | PFDA %Rec | PFUnA %Rec |
|---|---|---|---|---|---|---|---|---|---|
| 280-1118-1 | I-3 | 127 | 109 | 110 | 120 | 113 | 126 | 137X | 107 |
| 280-1118-2 | E-3 | 129 | 116 | 113 | 130 | 112 | 128 | 128 | 127 |
| 280-1118-3 | I-4 | 127 | 109 | 114 | 119 | 109 | 125 | 134X | 125 |
| 280-1118-4 | E-4 | 122 | 114 | 112 | 130 | 111 | 125 | 126 | 120 |
| MB 280-6425/10-A | | 122 | 114 | 107 | 130 | 104 | 124 | 100 | 57 |
| LCS 280-6425/8-A | | 112 | 104 | 105 | 115 | 92 | 115 | 101 | 76 |
| LCSD 280-6425/9-A | | 125 | 115 | 110 | 127 | 97 | 112 | 109 | 76 |

| Surrogate | Acceptance Limits |
|---|---|
| PFBA = 13C4 PFBA | 36-130 |
| PFHxA = 13C2 PFHxA | 55-135 |
| PFHxS = 18O2 PFHxS | 61-130 |
| PFOA = 13C4 PFOA | 60-155 |
| PFOS = 13C4 PFOS | 45-130 |
| PFNA = 13C5 PFNA | 54-132 |
| PFDA = 13C2 PFDA | 53-130 |
| PFUnA = 13C2 PFUnA | 37-130 |

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY**
**REGION 4**
**Science and Ecosystem Support Division**
**Enforcement and Investigations Branch**
**980 College Station Road**
**Athens, Georgia 30605-2720**

September 26, 2012

**4SESD-EIB**

**MEMORANDUM**

**SUBJECT:** GAEPD - Conasauga River PFC Study
SESD Laboratory Analytical Data
SESD Project ID - 12-0360

**FROM:** Mike Neill, Environmental Scientist
Enforcement Section

**THRU:** Mike Bowden, Chief
Enforcement Section

**TO:** Lee Thomas, Ground-Water Hydrologist
Water Protection Division

Attached is SESD's Final Analytical Report for the perfluorinated chemical (PFC) analysis conducted on the surface water samples collected by the Georgia Department of Natural Resource, Environmental Protection Division (GAEPD) personnel on July 9 and July 11, 2012. Also attached is Table 1 which summarizes SESD's Laboratory Analytical Data. If you have any questions concerning the analysis, please call me at (706) 355-8614 or email me at neill.mike@epa.gov.

Attachment

## Table 1. SESD LABORATORY ANALYTICAL DATA SUMMARY
## GAEPD - Conasauga River PFC Study

| | | Station ID | 01 | 02 | 03 | 04 | 05 | 06 | 07 |
|---|---|---|---|---|---|---|---|---|---|
| | | Sample ID | Con @ 76 | Con @ Tibbs | Coa @ Keith | Con @ Airport | Holly @ Fox | DRO @ RBEND | Con @ Tilton |
| | | GAEPD ID | Conasauga R @ Hwy 76 | Conasauga R @ Tibbs Bridge | Coahulla Cr @ Keith's Mill Rd | Conasauga R @ Airport Rd | Holly Cr @ Fox Bridge Rd | Drowning Bear Cr @ Riverbend Rd | Conasauga R @ Tilton Bridge Rd |
| | | Sample Date/Time | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/9/2012 |
| **Analyte** | **Units** | **EPA PHA** | | | | | | | |
| Perfluorooctane sulfonic acid | ug/l | 0.200 | < 0.050 U | < 0.050 U | 0.029 J,O | 0.032 J,O | 0.060 | 0.18 | 0.18 |
| Perfluorooctanoic acid | ug/l | 0.400 | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | 0.037 J,O | 0.11 | 0.18 |
| PFBS | ug/l | -- | < 0.050 U | 0.014 J,O | 0.030 J,O | 0.025 J,O | 0.024 J,O | 0.074 | 0.12 |
| PFDA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFHpA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | 0.052 | 0.051 | 0.079 |
| PFHxA | ug/l | -- | < 0.050 U | 0.018 J,O | < 0.050 U | < 0.050 U | 0.22 | 0.056 | 0.12 |
| PFHxS | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFNA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |

| | | Station ID | 08 | 09 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|
| | | Sample ID | Con @ 136 | Oos @ 3 | Coo @ 225 | Oos @ 156 | Oot @ Salem | Oot @ 53 | Oot @ 156 |
| | | GAEPD ID | Conasauga R @ Hwy 136 | Oostanaula R @ Hwy 3 | Coosawatee R @Hwy 225 | Oostanaula R @ Hwy 156 | Oothkalooga Cr @ Salem Rd | Oothkalooga Cr @ Hwy 53 | Oothkalooga Cr @ Hwy 156 |
| | | Sample Date/Time | 7/9/2012 | 7/9/2012 | 7/9/2012 | 7/11/2012 | 7/11/2012 | 7/11/2012 | 7/11/2012 |
| **Analyte** | **Units** | **EPA PHA** | | | | | | | |
| Perfluorooctane sulfonic acid | ug/l | 0.200 | **0.21** | 0.036 J,O | < 0.050 U | 0.040 J,O | < 0.050 U | 0.045 J,O | 0.053 |
| Perfluorooctanoic acid | ug/l | 0.400 | 0.17 | < 0.050 U | < 0.050 U | 0.033 J,O | < 0.050 U | < 0.050 U | 0.030 J,O |
| PFBS | ug/l | -- | 0.12 | 0.088 | 0.079 | 0.087 | 0.010 J,O | 0.029 J,O | 0.032 J,O |
| PFDA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFHpA | ug/l | -- | 0.068 | < 0.050 U | < 0.050 U | 0.017 J,O | < 0.050 U | < 0.050 U | 0.021 J,O |
| PFHxA | ug/l | -- | 0.12 | 0.029 J,O | < 0.050 U | 0.031 J,O | < 0.050 U | 0.023 J,O | 0.025 J,O |
| PFHxS | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFNA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |

## Table 1. SESD LABORATORY ANALYTICAL DATA SUMMARY
## GAEPD - Conasauga River PFC Study

| | | Station ID | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|
| | | Sample ID | Oos @ 136 | Oos @ Reeves | Oos @ 140 | Ooos @ Rside | Eto @ 53 | Coo @ Lock |
| | | GAEPD ID | Oostanaula R @ 136C | Oostanaula R @ Reeves Station Rd | Oostanaula R @ Hwy 140 | Oostanaula R @ Riverside Park | Etowah R @ Hwy 53 | Coosa R @ Lock & Dam Park |
| | | Sample Date/Time | 7/11/2012 | 7/11/2012 | 7/11/2012 | 7/11/2012 | 7/11/2012 | 7/11/2012 |
| **Analyte** | **Units** | **EPA PHA** | | | | | | |
| Perfluorooctane sulfonic acid | ug/l | 0.200 | 0.055 | 0.042 J,O | 0.051 | 0.048 J,O | < 0.050 U | 0.024 J,O |
| Perfluorooctanoic acid | ug/l | 0.400 | 0.034 J,O | < 0.050 U | 0.023 J,O | 0.023 J,O | < 0.050 U | < 0.050 U |
| PFBS | ug/l | -- | 0.088 | 0.089 | 0.090 | 0.080 | < 0.050 U | 0.042 J,O |
| PFDA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFHpA | ug/l | -- | < 0.050 U | 0.015 J,O | 0.015 J,O | < 0.050 U | < 0.050 U | < 0.050 U |
| PFHxA | ug/l | -- | 0.036 J,O | 0.039 J,O | 0.038 J,O | 0.030 J,O | < 0.050 U | 0.028 J,O |
| PFHxS | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |
| PFNA | ug/l | -- | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U | < 0.050 U |

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 12-0360
Project: 12-0360, Conasauga River PFC Study - GAEPD - Reported by Sallie Hale

**September 25, 2012**

**4SESD-ASB**

## MEMORANDUM

**SUBJECT:** FINAL Analytical Report
Project: 12-0360, Conasauga River PFC Study - GAEPD
Compliance Monitoring

**FROM:** Sallie Hale
ASB Organic Chemistry Section Chief

**THRU:** Gary Bennett, Chief
Analytical Support Branch

**TO:** Mike Neill

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and have been qualified by this laboratory if the applicable quality control criteria were not met. Verification is defined in Section 5.2 of the ASB LOQAM. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

| Analyses Included in this report: | Method Used: | Accreditations: |
|---|---|---|
| **Semi Volatile Organics (SVOA)** | | |
| PFCs | ASB 100S (Water) | None |

**Sample Disposal Policy**

Because of the laboratory's limited space for long term sample storage, our policy is to dispose of samples on a periodic schedule. Please note that within 60 days of this memo, the original samples and all sample extracts and/or sample digestates will be disposed of in accordance with applicable regulations. The 60-day sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time if you have a special project need. If you wish for the laboratory to hold samples beyond the 60-day period, please contact our Sample Control Coordinator, Debbie Colquitt, by e-mail at Colquitt.Debbie@epa.gov, and provide a reason for holding samples beyond 60 days

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 12-0360
Project: 12-0360, Conasauga River PFC Study - GAEPD - Reported by Sallie Hale

## SAMPLES INCLUDED IN THIS REPORT

### Project: 12-0360, Conasauga River PFC Study - GAEPD

| Sample ID | Laboratory ID | Matrix | Date Collected | Date Received |
|---|---|---|---|---|
| Con @ 76 | E123001-01 | Surface Water | 7/9/12 10:45 | 7/13/12 9:18 |
| Con @ Tibbs | E123001-02 | Surface Water | 7/9/12 11:20 | 7/13/12 9:18 |
| Coa @ Keith | E123001-03 | Surface Water | 7/9/12 11:44 | 7/13/12 9:18 |
| Con @ Airport | E123001-04 | Surface Water | 7/9/12 11:59 | 7/13/12 9:18 |
| Holly @ Fox | E123001-05 | Surface Water | 7/9/12 12:15 | 7/13/12 9:18 |
| DRO @ RBEND | E123001-06 | Surface Water | 7/9/12 13:35 | 7/13/12 9:18 |
| Con @ Tilton | E123001-07 | Surface Water | 7/9/12 14:02 | 7/13/12 9:18 |
| Con @ 136 | E123001-08 | Surface Water | 7/9/12 14:25 | 7/13/12 9:18 |
| Oos @ 3 | E123001-09 | Surface Water | 7/9/12 14:42 | 7/13/12 9:18 |
| Coo @ 225 | E123001-10 | Surface Water | 7/9/12 15:05 | 7/13/12 9:18 |
| Oos @ 156 | E123001-11 | Surface Water | 7/11/12 13:15 | 7/13/12 9:18 |
| Oot @ Salem | E123001-12 | Surface Water | 7/11/12 11:13 | 7/13/12 9:18 |
| Oot @ 53 | E123001-13 | Surface Water | 7/11/12 11:38 | 7/13/12 9:18 |
| Oot @ 156 | E123001-14 | Surface Water | 7/11/12 12:56 | 7/13/12 9:18 |
| Oos @ 136 | E123001-15 | Surface Water | 7/11/12 12:38 | 7/13/12 9:18 |
| Oos @ Reeves | E123001-16 | Surface Water | 7/11/12 13:35 | 7/13/12 9:18 |
| Oos @ 140 | E123001-17 | Surface Water | 7/11/12 14:04 | 7/13/12 9:18 |
| OOS @ RSIDE | E123001-18 | Surface Water | 7/11/12 14:30 | 7/13/12 9:18 |
| Eto @ 53 | E123001-19 | Surface Water | 7/11/12 15:13 | 7/13/12 9:18 |
| Coo @ Lock | E123001-20 | Surface Water | 7/11/12 15:42 | 7/13/12 9:18 |

## DATA QUALIFIER DEFINITIONS

| | |
|---|---|
| U | The analyte was not detected at or above the reporting limit. |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| O-2 | Result greater than MDL but less than MRL. |

## ACRONYMS AND ABBREVIATIONS

CAS Chemical Abstracts Service

Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www epa gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.

ISO The test, if analyzed after June 26, 2012, is accredited under the EPA Region 4 ASB's ISO/IEC 17025 accreditation issued by ANSI-ASQ National Accreditation Board/ACLASS. Refer to certificate and scope of accreditation AT-1691.

MDL Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.

MRL Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.

TIC Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700
D.A.R.T. Id: 12-0360
Project: 12-0360, Conasauga River PFC Study - GAEPD - Reported by Sallie Hale

# Semi Volatile Organics

## Project: 12-0360, Conasauga River PFC Study - GAEPD

**Sample ID:** Con @ 76 **Lab ID:** E123001-01
**Station ID:** 01 **Matrix:** Surface Water

**Date Collected:** 7/9/12 10:45

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |
| 1763-23-1 | PFOS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:13 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Con @ Tibbs **Lab ID:** E123001-02

**Station ID:** 02 **Matrix:** Surface Water

**Date Collected:** 7/9/12 11:20

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.014 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 307-24-4 | PFHxA | 0.018 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |
| 1763-23-1 | PFOS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:30 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Coa @ Keith
**Station ID:** 03
**Lab ID:** E123001-03
**Matrix:** Surface Water

**Date Collected:** 7/9/12 11:44

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.030 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |
| 1763-23-1 | PFOS | 0.029 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 16:47 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Con @ Airport **Lab ID:** E123001-04
**Station ID:** 04 **Matrix:** Surface Water

**Date Collected:** 7/9/12 11:59

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.025 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |
| 1763-23-1 | PFOS | 0.032 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:04 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Holly @ Fox
**Station ID:** 05
**Lab ID:** E123001-05
**Matrix:** Surface Water

**Date Collected:** 7/9/12 12:15

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.024 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 375-85-9 | PFHpA | 0.052 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 307-24-4 | PFHxA | 0.22 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 335-67-1 | PFOA | 0.037 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |
| 1763-23-1 | PFOS | 0.060 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:21 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** DRO @ RBEND **Lab ID:** E123001-06

**Station ID:** 06 **Matrix:** Surface Water

**Date Collected:** 7/9/12 13:35

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.074 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 375-85-9 | PFHpA | 0.051 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 307-24-4 | PFHxA | 0.056 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 335-67-1 | PFOA | 0.11 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |
| 1763-23-1 | PFOS | 0.18 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:38 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Con @ Tilton
**Station ID:** 07
**Lab ID:** E123001-07
**Matrix:** Surface Water

**Date Collected:** 7/9/12 14:02

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.12 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 375-85-9 | PFHpA | 0.079 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 307-24-4 | PFHxA | 0.12 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 335-67-1 | PFOA | 0.18 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |
| 1763-23-1 | PFOS | 0.18 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 17:55 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Con @ 136 **Lab ID:** E123001-08

**Station ID:** 08 **Matrix:** Surface Water

**Date Collected:** 7/9/12 14:25

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.12 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 375-85-9 | PFHpA | 0.068 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 307-24-4 | PFHxA | 0.12 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 335-67-1 | PFOA | 0.17 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |
| 1763-23-1 | PFOS | 0.21 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:12 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oos @ 3 **Lab ID:** E123001-09

**Station ID:** 09 **Matrix:** Surface Water

**Date Collected:** 7/9/12 14:42

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.088 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 307-24-4 | PFHxA | 0.029 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |
| 1763-23-1 | PFOS | 0.036 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:29 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Coo @ 225 **Lab ID:** E123001-10

**Station ID:** 10 **Matrix:** Surface Water

**Date Collected:** 7/9/12 15:05

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.079 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |
| 1763-23-1 | PFOS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 18:46 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oos @ 156 **Lab ID:** E123001-11
**Station ID:** 11 **Matrix:** Surface Water

**Date Collected:** 7/11/12 13:15

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.087 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 375-85-9 | PFHpA | 0.017 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 307-24-4 | PFHxA | 0.031 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 335-67-1 | PFOA | 0.033 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |
| 1763-23-1 | PFOS | 0.040 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:04 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oot @ Salem **Lab ID:** E123001-12

**Station ID:** 12 **Matrix:** Surface Water

**Date Collected:** 7/11/12 11:13

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.010 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |
| 1763-23-1 | PFOS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:21 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oot @ 53 **Lab ID:** E123001-13

**Station ID:** 13 **Matrix:** Surface Water

**Date Collected:** 7/11/12 11:38

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.029 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 307-24-4 | PFHxA | 0.023 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |
| 1763-23-1 | PFOS | 0.045 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:38 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oot @ 156 **Lab ID:** E123001-14
**Station ID:** 14 **Matrix:** Surface Water

**Date Collected: 7/11/12 12:56**

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.032 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 375-85-9 | PFHpA | 0.021 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 307-24-4 | PFHxA | 0.025 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 335-67-1 | PFOA | 0.030 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |
| 1763-23-1 | PFOS | 0.053 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 19:55 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oos @ 136 **Lab ID:** E123001-15

**Station ID:** 15 **Matrix:** Surface Water

**Date Collected:** 7/11/12 12:38

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.088 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 335-76-2 | PFDA | 0.050 U | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 U | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 307-24-4 | PFHxA | 0.036 J | Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 U | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 375-95-1 | PFNA | 0.050 U | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 335-67-1 | PFOA | 0.034 J | Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |
| 1763-23-1 | PFOS | 0.055 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:12 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oos @ Reeves **Lab ID:** E123001-16

**Station ID:** 16 **Matrix:** Surface Water

**Date Collected: 7/11/12 13:35**

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.089 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 375-85-9 | PFHpA | 0.015 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 307-24-4 | PFHxA | 0.039 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |
| 1763-23-1 | PFOS | 0.042 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:29 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Oos @ 140 **Lab ID:** E123001-17

**Station ID:** 17 **Matrix:** Surface Water

**Date Collected:** 7/11/12 14:04

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.090 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 375-85-9 | PFHpA | 0.015 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 307-24-4 | PFHxA | 0.038 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 335-67-1 | PFOA | 0.023 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |
| 1763-23-1 | PFOS | 0.051 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 20:46 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** OOS @ RSIDE **Lab ID:** E123001-18

**Station ID:** 18 **Matrix:** Surface Water

**Date Collected:** 7/11/12 14:30

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.080 | | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 307-24-4 | PFHxA | 0.030 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 335-67-1 | PFOA | 0.023 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |
| 1763-23-1 | PFOS | 0.048 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:03 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Eto @ 53 **Lab ID:** E123001-19

**Station ID:** 19 **Matrix:** Surface Water

**Date Collected:** 7/11/12 15:13

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 307-24-4 | PFHxA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |
| 1763-23-1 | PFOS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:20 | ASB 100S |

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# Semi Volatile Organics

**Project: 12-0360, Conasauga River PFC Study - GAEPD**

**Sample ID:** Coo @ Lock
**Station ID:** 20
**Lab ID:** E123001-20
**Matrix:** Surface Water

**Date Collected:** 7/11/12 15:42

| CAS Number | Analyte | Results | Qualifiers | Units | MRL | Prepared | Analyzed | Method |
|---|---|---|---|---|---|---|---|---|
| 375-73-5 | PFBS | 0.042 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 335-76-2 | PFDA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 375-85-9 | PFHpA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 307-24-4 | PFHxA | 0.028 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 355-46-4 | PFHxS | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 375-95-1 | PFNA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 335-67-1 | PFOA | 0.050 | U | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |
| 1763-23-1 | PFOS | 0.024 | J, Q-2 | ug/L | 0.050 | 7/18/12 16:09 | 9/14/12 21:37 | ASB 100S |

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## Semi Volatile Organics (SVOA) - Quality Control

## US-EPA, Region 4, SESD

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 1207116 - S PFC** | | | | | | | | | | |
| **Blank (1207116-BLK1)** | | | | Prepared & Analyzed: 09/14/12 | | | | | | |
| **ASB 100S** | | | | | | | | | | |
| *Surrogate: M8C8* | *0.907* | | *ug/L* | *0.83333* | | *109* | *60-140* | | | |
| *Surrogate: M9C9* | *0.723* | | *"* | *0.83333* | | *86.8* | *60-140* | | | |
| *Surrogate: M9C10* | *0.841* | | *"* | *0.83333* | | *101* | *60-140* | | | |
| *Surrogate: M4S6* | *0.826* | | *"* | *0.83333* | | *99.1* | *60-140* | | | |
| *Surrogate: M8S8* | *0.869* | | *"* | *0.83333* | | *104* | *60-140* | | | |
| PFHxA | U | 0.050 | " | | | | | | | U |
| PFHpA | U | 0.050 | " | | | | | | | U |
| PFOA | U | 0.050 | " | | | | | | | U |
| PFNA | U | 0.050 | " | | | | | | | U |
| PFDA | U | 0.050 | " | | | | | | | U |
| PFBS | U | 0.050 | " | | | | | | | U |
| PFHxS | U | 0.050 | " | | | | | | | U |
| PFOS | U | 0.050 | " | | | | | | | U |
| **LCS (1207116-BS1)** | | | | Prepared & Analyzed: 09/14/12 | | | | | | |
| **ASB 100S** | | | | | | | | | | |
| *Surrogate: M8C8* | *0.894* | | *ug/L* | *0.83333* | | *107* | *60-140* | | | |
| *Surrogate: M9C9* | *0.776* | | *"* | *0.83333* | | *93.2* | *60-140* | | | |
| *Surrogate: M9C10* | *0.837* | | *"* | *0.83333* | | *100* | *60-140* | | | |
| *Surrogate: M4S6* | *0.762* | | *"* | *0.83333* | | *91.4* | *60-140* | | | |
| *Surrogate: M8S8* | *0.850* | | *"* | *0.83333* | | *102* | *60-140* | | | |
| PFHxA | 0.71289 | 0.050 | " | 0.67847 | | 105 | 60-140 | | | |
| PFHpA | 0.73340 | 0.050 | " | 0.67373 | | 109 | 60-140 | | | |
| PFOA | 0.80302 | 0.050 | " | 0.66099 | | 121 | 60-140 | | | |
| PFNA | 0.67210 | 0.050 | " | 0.66788 | | 101 | 60-140 | | | |
| PFDA | 0.72245 | 0.050 | " | 0.65927 | | 110 | 60-140 | | | |
| PFBS | 0.72735 | 0.050 | " | 0.66788 | | 109 | 60-140 | | | |
| PFHxS | 0.71477 | 0.050 | " | 0.67244 | | 106 | 60-140 | | | |
| PFOS | 0.83906 | 0.050 | " | 0.65841 | | 127 | 60-140 | | | |

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## Semi Volatile Organics (SVOA) - Quality Control

## US-EPA, Region 4, SESD

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 1207116 - S PFC** | | | | | | | | | | |
| **Matrix Spike (1207116-MS1)** | | **Source: E123001-10** | | Prepared & Analyzed: 09/14/12 | | | | | | |
| **ASB 100S** | | | | | | | | | | |
| *Surrogate: M8C8* | *0.862* | | *ug/L* | *0.83333* | | *103* | *60-140* | | | |
| *Surrogate: M9C9* | *0.729* | | *"* | *0.83333* | | *87.5* | *60-140* | | | |
| *Surrogate: M9C10* | *0.783* | | *"* | *0.83333* | | *94.0* | *60-140* | | | |
| *Surrogate: M4S6* | *0.825* | | *"* | *0.83333* | | *99.0* | *60-140* | | | |
| *Surrogate: M8S8* | *0.896* | | *"* | *0.83333* | | *108* | *60-140* | | | |
| PFHxA | 0.74881 | 0.050 | " | 0.67847 | U | 110 | 60-140 | | | |
| PFHpA | 0.74019 | 0.050 | " | 0.67373 | U | 110 | 60-140 | | | |
| PFOA | 0.81965 | 0.050 | " | 0.66099 | U | 124 | 60-140 | | | |
| PFNA | 0.63453 | 0.050 | " | 0.66788 | U | 95.0 | 60-140 | | | |
| PFDA | 0.69163 | 0.050 | " | 0.65927 | U | 105 | 60-140 | | | |
| PFBS | 0.79419 | 0.050 | " | 0.66788 | 0.079304 | 107 | 60-140 | | | |
| PFHxS | 0.75051 | 0.050 | " | 0.67244 | U | 112 | 60-140 | | | |
| PFOS | 0.91967 | 0.050 | " | 0.65841 | U | 140 | 60-140 | | | |
| **Matrix Spike Dup (1207116-MSD1)** | | **Source: E123001-10** | | Prepared & Analyzed: 09/14/12 | | | | | | |
| **ASB 100S** | | | | | | | | | | |
| *Surrogate: M8C8* | *0.949* | | *ug/L* | *0.83333* | | *114* | *60-140* | | | |
| *Surrogate: M9C9* | *0.778* | | *"* | *0.83333* | | *93.4* | *60-140* | | | |
| *Surrogate: M9C10* | *0.792* | | *"* | *0.83333* | | *95.0* | *60-140* | | | |
| *Surrogate: M4S6* | *0.797* | | *"* | *0.83333* | | *95.6* | *60-140* | | | |
| *Surrogate: M8S8* | *0.895* | | *"* | *0.83333* | | *107* | *60-140* | | | |
| PFHxA | 0.71656 | 0.050 | " | 0.67847 | U | 106 | 60-140 | 4.40 | 30 | |
| PFHpA | 0.74821 | 0.050 | " | 0.67373 | U | 111 | 60-140 | 1.08 | 30 | |
| PFOA | 0.87121 | 0.050 | " | 0.66099 | U | 132 | 60-140 | 6.10 | 30 | |
| PFNA | 0.68827 | 0.050 | " | 0.66788 | U | 103 | 60-140 | 8.13 | 30 | |
| PFDA | 0.71706 | 0.050 | " | 0.65927 | U | 109 | 60-140 | 3.61 | 30 | |
| PFBS | 0.80625 | 0.050 | " | 0.66788 | 0.079304 | 109 | 60-140 | 1.51 | 30 | |
| PFHxS | 0.73741 | 0.050 | " | 0.67244 | U | 110 | 60-140 | 1.76 | 30 | |
| PFOS | 0.91628 | 0.050 | " | 0.65841 | U | 139 | 60-140 | 0.368 | 30 | |

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## Semi Volatile Organics (SVOA) - Quality Control
## US-EPA, Region 4, SESD

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch 1207116 - S PFC** | | | | | | | | | | |
| **MRL Verification (1207116-PS1)** | | | | Prepared & Analyzed: 09/14/12 | | | | | | **MRL-2** |
| **ASB 100S** | | | | | | | | | | |
| *Surrogate: M8C8* | *0.843* | | *ug/L* | *0.83333* | | *101* | *60-140* | | | |
| *Surrogate: M9C9* | *0.726* | | *"* | *0.83333* | | *87.2* | *60-140* | | | |
| *Surrogate: M9C10* | *0.785* | | *"* | *0.83333* | | *94.2* | *60-140* | | | |
| *Surrogate: M4S6* | *0.788* | | *"* | *0.83333* | | *94.5* | *60-140* | | | |
| *Surrogate: M8S8* | *0.826* | | *"* | *0.83333* | | *99.2* | *60-140* | | | |
| PFHxA | 0.059217 | 0.050 | " | 0.050338 | | 118 | 40-160 | | | |
| PFHpA | 0.058605 | 0.050 | " | 0.049987 | | 117 | 40-160 | | | |
| PFOA | 0.047388 | 0.050 | " | 0.049041 | | 96.6 | 40-160 | | | Q-2, J |
| PFNA | 0.036938 | 0.050 | " | 0.049552 | | 74.5 | 40-160 | | | Q-2, J |
| PFDA | 0.056486 | 0.050 | " | 0.048913 | | 115 | 40-160 | | | |
| PFBS | 0.060163 | 0.050 | " | 0.049552 | | 121 | 40-160 | | | |
| PFHxS | 0.048909 | 0.050 | " | 0.049891 | | 98.0 | 40-160 | | | Q-2, J |
| PFOS | 0.064442 | 0.050 | " | 0.048849 | | 132 | 40-160 | | | |

**Notes and Definitions for QC Samples**

| | |
|---|---|
| U | The analyte was not detected at or above the reporting limit |
| J | The identification of the analyte is acceptable; the reported value is an estimate. |
| MRL-2 | MRL verification for Non-Potable Water matrix |
| Q-2 | Result greater than MDL but less than MRL. |