

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
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TestAmerica Job ID: 320-45876-1
Client Project/Site: 2018 PFAS Phase 2

For:
Shannon & Wilson, Inc
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Fairbanks, Alaska 99709-5244

Attn: Sheila Hinkley



Authorized for release by:
12/27/2018 9:09:46 AM

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

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

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Qualifiers

LCMS

| Qualifier | Qualifier Description |
|-----------|--|
| J | Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value. |
| B | Compound was found in the blank and sample. |

Glossary

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

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Job ID: 320-45876-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-45876-1

Receipt

The samples were received on 12/5/2018 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.6° C.

LCMS

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

Organic Prep

Method(s) 3535: Insufficient sample volume was available to perform a matrix spike (MS) associated with preparation batch 320-263953.

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



Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre** **Lab Sample ID: 320-45876-1**

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|--------------------------------------|--------|-----------|-----|------|------|---------|---|----------------|-----------|
| Perfluorohexanoic acid (PFHxA) | 6.8 | | 1.8 | 0.51 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluoroheptanoic acid (PFHpA) | 4.9 | | 1.8 | 0.22 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorooctanoic acid (PFOA) | 6.2 | | 1.8 | 0.75 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorononanoic acid (PFNA) | 13 | | 1.8 | 0.24 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorobutanesulfonic acid (PFBS) | 1.4 | J | 1.8 | 0.18 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorohexanesulfonic acid (PFHxS) | 8.0 | B | 1.8 | 0.15 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorooctanesulfonic acid (PFOS) | 7.5 | | 1.8 | 0.48 | ng/L | 1 | | 537 (modified) | Total/NA |

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Post** **Lab Sample ID: 320-45876-2**

| Analyte | Result | Qualifier | RL | MDL | Unit | Dil Fac | D | Method | Prep Type |
|--------------------------------------|--------|-----------|-----|------|------|---------|---|----------------|-----------|
| Perfluorotetradecanoic acid (PFTeA) | 0.26 | J | 1.7 | 0.24 | ng/L | 1 | | 537 (modified) | Total/NA |
| Perfluorohexanesulfonic acid (PFHxS) | 0.27 | J B | 1.7 | 0.14 | ng/L | 1 | | 537 (modified) | Total/NA |

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre** **Lab Sample ID: 320-45876-1**
Date Collected: 11/28/18 11:00 **Matrix: Water**
Date Received: 12/05/18 11:00

Method: 537 (modified) - Fluorinated Alkyl Substances

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------------------------------|-----------|-----------|----------|------|------|---|----------------|----------------|---------|
| Perfluorohexanoic acid (PFHxA) | 6.8 | | 1.8 | 0.51 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluoroheptanoic acid (PFHpA) | 4.9 | | 1.8 | 0.22 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorooctanoic acid (PFOA) | 6.2 | | 1.8 | 0.75 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorononanoic acid (PFNA) | 13 | | 1.8 | 0.24 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorodecanoic acid (PFDA) | ND | | 1.8 | 0.27 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 1.8 | 0.98 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorododecanoic acid (PFDoA) | ND | | 1.8 | 0.49 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorotridecanoic acid (PFTriA) | ND | | 1.8 | 1.2 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 1.8 | 0.26 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | 1.4 | J | 1.8 | 0.18 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 8.0 | B | 1.8 | 0.15 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Perfluorooctanesulfonic acid (PFOS) | 7.5 | | 1.8 | 0.48 | ng/L | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| Isotope Dilution | %Recovery | Qualifier | Limits | | | | Prepared | Analyzed | Dil Fac |
| 13C5 PFPeA | 89 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C2 PFHxA | 84 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C4 PFHpA | 99 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C4 PFOA | 105 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C5 PFNA | 103 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C2 PFDA | 104 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C2 PFUnA | 100 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C2 PFDoA | 101 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C2 PFTeDA | 96 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C3 PFBS | 98 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 18O2 PFHxS | 104 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |
| 13C4 PFOS | 114 | | 25 - 150 | | | | 12/08/18 08:37 | 12/13/18 08:21 | 1 |

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Post**

Lab Sample ID: 320-45876-2

Date Collected: 11/28/18 10:58

Matrix: Water

Date Received: 12/05/18 11:00

Method: 537 (modified) - Fluorinated Alkyl Substances

| Analyte | Result | Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|---|-------------|------------|-----|------|------|---|----------------|----------------|---------|
| Perfluorohexanoic acid (PFHxA) | ND | | 1.7 | 0.48 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 1.7 | 0.21 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorooctanoic acid (PFOA) | ND | | 1.7 | 0.71 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorononanoic acid (PFNA) | ND | | 1.7 | 0.22 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorodecanoic acid (PFDA) | ND | | 1.7 | 0.26 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 1.7 | 0.92 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorododecanoic acid (PFDoA) | ND | | 1.7 | 0.46 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorotridecanoic acid (PFTriA) | ND | | 1.7 | 1.1 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorotetradecanoic acid (PFTeA) | 0.26 | J | 1.7 | 0.24 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | ND | | 1.7 | 0.17 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 0.27 | J B | 1.7 | 0.14 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| Perfluorooctanesulfonic acid (PFOS) | ND | | 1.7 | 0.45 | ng/L | | 12/08/18 08:37 | 12/13/18 08:29 | 1 |

| Isotope Dilution | %Recovery | Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|------------------|-----------|-----------|----------|----------------|----------------|---------|
| 13C5 PFPeA | 105 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C2 PFHxA | 102 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C4 PFHpA | 99 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C4 PFOA | 104 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C5 PFNA | 102 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C2 PFDA | 102 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C2 PFUnA | 96 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C2 PFDoA | 98 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C2 PFTeDA | 106 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C3 PFBS | 101 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 18O2 PFHxS | 103 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |
| 13C4 PFOS | 107 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 08:29 | 1 |

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | PFPeA (25-150) | PFHxA (25-150) | PFHpA (25-150) | PFOA (25-150) | PFNA (25-150) | PFDA (25-150) | PFUnA (25-150) | PFDoA (25-150) |
|---------------------|------------------------------------|-------------------|-------------------|-------------------|------------------|------------------|------------------|-------------------|-------------------|
| 320-45876-1 | [REDACTED]-2018 Pf | 89 | 84 | 99 | 105 | 103 | 104 | 100 | 101 |
| 320-45876-2 | [REDACTED]n-2018 | 105 | 102 | 99 | 104 | 102 | 102 | 96 | 98 |
| LCS 320-263953/2-A | PFAS-P2 Post Lab Control Sample | 103 | 99 | 96 | 96 | 99 | 94 | 90 | 94 |
| LCSD 320-263953/3-A | Lab Control Sample Dup | 95 | 98 | 99 | 98 | 95 | 98 | 92 | 94 |
| MB 320-263953/1-A | Method Blank | 99 | 97 | 93 | 100 | 95 | 93 | 90 | 96 |

Percent Isotope Dilution Recovery (Acceptance Limits)

| Lab Sample ID | Client Sample ID | PFTDA (25-150) | 3C3-PFB: (25-150) | PFHxS (25-150) | PFOS (25-150) |
|---------------------|------------------------------------|-------------------|----------------------|-------------------|------------------|
| 320-45876-1 | [REDACTED]-2018 Pf | 96 | 98 | 104 | 114 |
| 320-45876-2 | [REDACTED]-2018 | 106 | 101 | 103 | 107 |
| LCS 320-263953/2-A | PFAS-P2 Post Lab Control Sample | 98 | 96 | 95 | 103 |
| LCSD 320-263953/3-A | Lab Control Sample Dup | 95 | 97 | 95 | 100 |
| MB 320-263953/1-A | Method Blank | 106 | 95 | 94 | 104 |

Surrogate Legend

- PFPeA = 13C5 PFPeA
- PFHxA = 13C2 PFHxA
- PFHpA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- 13C3-PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-263953/1-A

Matrix: Water

Analysis Batch: 264917

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 263953

| Analyte | MB Result | MB Qualifier | RL | MDL | Unit | D | Prepared | Analyzed | Dil Fac |
|--------------------------------------|-----------|--------------|-----|------|------|---|----------------|----------------|---------|
| Perfluorohexanoic acid (PFHxA) | ND | | 2.0 | 0.58 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluoroheptanoic acid (PFHpA) | ND | | 2.0 | 0.25 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorooctanoic acid (PFOA) | ND | | 2.0 | 0.85 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorononanoic acid (PFNA) | ND | | 2.0 | 0.27 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorodecanoic acid (PFDA) | ND | | 2.0 | 0.31 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluoroundecanoic acid (PFUnA) | ND | | 2.0 | 1.1 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorododecanoic acid (PFDoA) | ND | | 2.0 | 0.55 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorotridecanoic acid (PFTriA) | ND | | 2.0 | 1.3 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorotetradecanoic acid (PFTeA) | ND | | 2.0 | 0.29 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorobutanesulfonic acid (PFBS) | ND | | 2.0 | 0.20 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorohexanesulfonic acid (PFHxS) | 0.295 | J | 2.0 | 0.17 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| Perfluorooctanesulfonic acid (PFOS) | ND | | 2.0 | 0.54 | ng/L | | 12/08/18 08:37 | 12/13/18 06:51 | 1 |

| Isotope Dilution | MB %Recovery | MB Qualifier | Limits | Prepared | Analyzed | Dil Fac |
|------------------|--------------|--------------|----------|----------------|----------------|---------|
| 13C5 PFPeA | 99 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C2 PFHxA | 97 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C4 PFHpA | 93 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C4 PFOA | 100 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C5 PFNA | 95 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C2 PFDA | 93 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C2 PFUnA | 90 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C2 PFDoA | 96 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C2 PFTeDA | 106 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C3 PFBS | 95 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 18O2 PFHxS | 94 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |
| 13C4 PFOS | 104 | | 25 - 150 | 12/08/18 08:37 | 12/13/18 06:51 | 1 |

Lab Sample ID: LCS 320-263953/2-A

Matrix: Water

Analysis Batch: 264917

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 263953

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | Limits |
|--------------------------------------|-------------|------------|---------------|------|---|------|----------|
| Perfluorohexanoic acid (PFHxA) | 40.0 | 40.0 | | ng/L | | 100 | 66 - 126 |
| Perfluoroheptanoic acid (PFHpA) | 40.0 | 41.2 | | ng/L | | 103 | 66 - 126 |
| Perfluorooctanoic acid (PFOA) | 40.0 | 44.7 | | ng/L | | 112 | 64 - 124 |
| Perfluorononanoic acid (PFNA) | 40.0 | 41.3 | | ng/L | | 103 | 68 - 128 |
| Perfluorodecanoic acid (PFDA) | 40.0 | 41.3 | | ng/L | | 103 | 69 - 129 |
| Perfluoroundecanoic acid (PFUnA) | 40.0 | 38.7 | | ng/L | | 97 | 60 - 120 |
| Perfluorododecanoic acid (PFDoA) | 40.0 | 38.5 | | ng/L | | 96 | 71 - 131 |
| Perfluorotridecanoic acid (PFTriA) | 40.0 | 41.3 | | ng/L | | 103 | 72 - 132 |
| Perfluorotetradecanoic acid (PFTeA) | 40.0 | 38.3 | | ng/L | | 96 | 68 - 128 |
| Perfluorobutanesulfonic acid (PFBS) | 35.4 | 37.8 | | ng/L | | 107 | 73 - 133 |
| Perfluorohexanesulfonic acid (PFHxS) | 36.4 | 36.2 | | ng/L | | 99 | 63 - 123 |

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-263953/2-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 263953

| Analyte | Spike Added | LCS Result | LCS Qualifier | Unit | D | %Rec | %Rec. Limits |
|-------------------------------------|----------------------|----------------------|---------------|------|---|------|--------------|
| Perfluorooctanesulfonic acid (PFOS) | 37.1 | 35.5 | | ng/L | | 96 | 67 - 127 |
| Isotope Dilution | | | | | | | |
| | LCS %Recovery | LCS Qualifier | Limits | | | | |
| 13C5 PFPeA | 103 | | 25 - 150 | | | | |
| 13C2 PFHxA | 99 | | 25 - 150 | | | | |
| 13C4 PFHpA | 96 | | 25 - 150 | | | | |
| 13C4 PFOA | 96 | | 25 - 150 | | | | |
| 13C5 PFNA | 99 | | 25 - 150 | | | | |
| 13C2 PFDA | 94 | | 25 - 150 | | | | |
| 13C2 PFUnA | 90 | | 25 - 150 | | | | |
| 13C2 PFDoA | 94 | | 25 - 150 | | | | |
| 13C2 PFTeDA | 98 | | 25 - 150 | | | | |
| 13C3 PFBS | 96 | | 25 - 150 | | | | |
| 18O2 PFHxS | 95 | | 25 - 150 | | | | |
| 13C4 PFOS | 103 | | 25 - 150 | | | | |

Lab Sample ID: LCSD 320-263953/3-A
Matrix: Water
Analysis Batch: 264917

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 263953

| Analyte | Spike Added | LCSD Result | LCSD Qualifier | Unit | D | %Rec | %Rec. Limits | RPD | RPD Limit |
|--------------------------------------|-----------------------|-----------------------|----------------|------|---|------|--------------|-----|-----------|
| Perfluorohexanoic acid (PFHxA) | 40.0 | 42.2 | | ng/L | | 106 | 66 - 126 | 5 | 30 |
| Perfluoroheptanoic acid (PFHpA) | 40.0 | 38.7 | | ng/L | | 97 | 66 - 126 | 6 | 30 |
| Perfluorooctanoic acid (PFOA) | 40.0 | 42.1 | | ng/L | | 105 | 64 - 124 | 6 | 30 |
| Perfluorononanoic acid (PFNA) | 40.0 | 41.1 | | ng/L | | 103 | 68 - 128 | 0 | 30 |
| Perfluorodecanoic acid (PFDA) | 40.0 | 39.5 | | ng/L | | 99 | 69 - 129 | 4 | 30 |
| Perfluoroundecanoic acid (PFUnA) | 40.0 | 39.9 | | ng/L | | 100 | 60 - 120 | 3 | 30 |
| Perfluorododecanoic acid (PFDoA) | 40.0 | 37.2 | | ng/L | | 93 | 71 - 131 | 4 | 30 |
| Perfluorotridecanoic acid (PFTriA) | 40.0 | 42.2 | | ng/L | | 106 | 72 - 132 | 2 | 30 |
| Perfluorotetradecanoic acid (PFTeA) | 40.0 | 37.7 | | ng/L | | 94 | 68 - 128 | 1 | 30 |
| Perfluorobutanesulfonic acid (PFBS) | 35.4 | 34.7 | | ng/L | | 98 | 73 - 133 | 9 | 30 |
| Perfluorohexanesulfonic acid (PFHxS) | 36.4 | 37.9 | | ng/L | | 104 | 63 - 123 | 5 | 30 |
| Perfluorooctanesulfonic acid (PFOS) | 37.1 | 35.7 | | ng/L | | 96 | 67 - 127 | 1 | 30 |
| Isotope Dilution | | | | | | | | | |
| | LCSD %Recovery | LCSD Qualifier | Limits | | | | | | |
| 13C5 PFPeA | 95 | | 25 - 150 | | | | | | |
| 13C2 PFHxA | 98 | | 25 - 150 | | | | | | |
| 13C4 PFHpA | 99 | | 25 - 150 | | | | | | |
| 13C4 PFOA | 98 | | 25 - 150 | | | | | | |
| 13C5 PFNA | 95 | | 25 - 150 | | | | | | |
| 13C2 PFDA | 98 | | 25 - 150 | | | | | | |
| 13C2 PFUnA | 92 | | 25 - 150 | | | | | | |

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-263953/3-A

Matrix: Water

Analysis Batch: 264917

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 263953

| <i>Isotope Dilution</i> | <i>LCSD LCSD</i> | | <i>Limits</i> |
|-------------------------|------------------|------------------|---------------|
| | <i>%Recovery</i> | <i>Qualifier</i> | |
| 13C2 PFDoA | 94 | | 25 - 150 |
| 13C2 PFTeDA | 95 | | 25 - 150 |
| 13C3 PFBS | 97 | | 25 - 150 |
| 18O2 PFHxS | 95 | | 25 - 150 |
| 13C4 PFOS | 100 | | 25 - 150 |

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

LCMS

Prep Batch: 263953

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch |
|---------------------|------------------------|-------------------|----------|--------|------------|
| 320-45876-1 | [REDACTED] | -2018 PFAS-P2 Pre | Total/NA | Water | 3535 |
| 320-45876-2 | [REDACTED] | 2018 PFAS-P2 Post | Total/NA | Water | 3535 |
| MB 320-263953/1-A | Method Blank | Total/NA | Water | 3535 | |
| LCS 320-263953/2-A | Lab Control Sample | Total/NA | Water | 3535 | |
| LCSD 320-263953/3-A | Lab Control Sample Dup | Total/NA | Water | 3535 | |

Analysis Batch: 264917

| Lab Sample ID | Client Sample ID | Prep Type | Matrix | Method | Prep Batch | |
|---------------------|------------------------|--------------------|----------|----------------|----------------|--------|
| 320-45876-1 | [REDACTED] | -2018 PFAS-P2 Pre | Total/NA | Water | 537 (modified) | 263953 |
| 320-45876-2 | [REDACTED] | -2018 PFAS-P2 Post | Total/NA | Water | 537 (modified) | 263953 |
| MB 320-263953/1-A | Method Blank | Total/NA | Water | 537 (modified) | 263953 | |
| LCS 320-263953/2-A | Lab Control Sample | Total/NA | Water | 537 (modified) | 263953 | |
| LCSD 320-263953/3-A | Lab Control Sample Dup | Total/NA | Water | 537 (modified) | 263953 | |

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Pre**

Lab Sample ID: 320-45876-1

Date Collected: 11/28/18 11:00

Matrix: Water

Date Received: 12/05/18 11:00

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|----------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 3535 | | | 282 mL | 10.00 mL | 263953 | 12/08/18 08:37 | MYV | TAL SAC |
| Total/NA | Analysis | 537 (modified) | | 1 | | | 264917 | 12/13/18 08:21 | S1M | TAL SAC |

Client Sample ID: [REDACTED] **-2018 PFAS-P2 Post**

Lab Sample ID: 320-45876-2

Date Collected: 11/28/18 10:58

Matrix: Water

Date Received: 12/05/18 11:00

| Prep Type | Batch Type | Batch Method | Run | Dil Factor | Initial Amount | Final Amount | Batch Number | Prepared or Analyzed | Analyst | Lab |
|-----------|------------|----------------|-----|------------|----------------|--------------|--------------|----------------------|---------|---------|
| Total/NA | Prep | 3535 | | | 300.2 mL | 10.00 mL | 263953 | 12/08/18 08:37 | MYV | TAL SAC |
| Total/NA | Analysis | 537 (modified) | | 1 | | | 264917 | 12/13/18 08:29 | S1M | TAL SAC |

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

Laboratory: TestAmerica Sacramento

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

| Authority | Program | EPA Region | Identification Number | Expiration Date |
|--------------------|---------------|------------|-----------------------|-----------------|
| Alaska (UST) | State Program | 10 | 17-020 | 01-20-21 |
| ANAB | DoD ELAP | | L2468 | 01-20-21 |
| Arizona | State Program | 9 | AZ0708 | 08-11-19 |
| Arkansas DEQ | State Program | 6 | 88-0691 | 06-17-19 |
| California | State Program | 9 | 2897 | 01-31-19 |
| Colorado | State Program | 8 | CA00044 | 08-31-19 |
| Connecticut | State Program | 1 | PH-0691 | 06-30-19 |
| Florida | NELAP | 4 | E87570 | 06-30-19 |
| Georgia | State Program | 4 | N/A | 01-28-19 |
| Hawaii | State Program | 9 | N/A | 01-29-19 |
| Illinois | NELAP | 5 | 200060 | 03-17-19 |
| Louisiana | NELAP | 6 | 30612 | 06-30-19 |
| Maine | State Program | 1 | CA0004 | 04-14-20 |
| Michigan | State Program | 5 | 9947 | 01-31-20 |
| Nevada | State Program | 9 | CA00044 | 07-31-19 |
| New Hampshire | NELAP | 1 | 2997 | 04-18-19 |
| New Jersey | NELAP | 2 | CA005 | 06-30-19 |
| New York | NELAP | 2 | 11666 | 03-31-19 |
| Oregon | NELAP | 10 | 4040 | 01-29-19 |
| Pennsylvania | NELAP | 3 | 68-01272 | 03-31-19 |
| Texas | NELAP | 6 | T104704399 | 05-31-19 |
| US Fish & Wildlife | Federal | | LE148388-0 | 07-31-19 |
| USDA | Federal | | P330-18-00239 | 01-17-21 |
| USEPA UCMR | Federal | 1 | CA00044 | 12-31-20 |
| Utah | NELAP | 8 | CA00044 | 02-28-19 |
| Vermont | State Program | 1 | VT-4040 | 04-30-19 |
| Virginia | NELAP | 3 | 460278 | 03-14-19 |
| Washington | State Program | 10 | C581 | 05-05-19 |
| West Virginia (DW) | State Program | 3 | 9930C | 12-31-18 |
| Wyoming | State Program | 8 | 8TMS-L | 01-28-19 |

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

| Method | Method Description | Protocol | Laboratory |
|----------------|------------------------------|----------|------------|
| 537 (modified) | Fluorinated Alkyl Substances | EPA | TAL SAC |
| 3535 | Solid-Phase Extraction (SPE) | SW846 | TAL SAC |

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

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



Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: 2018 PFAS Phase 2

TestAmerica Job ID: 320-45876-1

| Lab Sample ID | Client Sample ID | Matrix | Collected | Received |
|---------------|------------------|-----------------------------|----------------|----------------|
| 320-45876-1 | [REDACTED] | -2018 PFAS-P2 Pre Water | 11/28/18 11:00 | 12/05/18 11:00 |
| 320-45876-2 | [REDACTED] | -2018 PFAS-P2 Post Water | 11/28/18 10:58 | 12/05/18 11:00 |

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

CHAIN-OF-CUSTODY RECORD

Analytical Methods (include preservative if used)

Turn Around Time:
 Normal Rush
 Please Specify

Quote No:

J-Flags: Yes No

| Sample Identity | Lab No. | Time | Date Sampled | Analytical Methods (include preservative if used) | | | | Total Number of Containers | Remarks/Matrix Composition/Grab? Sample Containers |
|-----------------|-------------------|------|--------------|---|--|--|--|----------------------------|--|
| [Redacted] | 2018 PFAS-P2 Pre | 1100 | 11/23/18 | PFAS EPA 537 12-Analytes | | | | 2 | GW |
| [Redacted] | 2018 PFAS-P2 Post | 1058 | 11/23/18 | | | | | 2 | GW |
| | | | | | | | | | |
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Project Information
 Number: 101965-002
 Name: 2018 PFAS Phase 2
 Contact: SMH
 Ongoing Project? Yes No
 Sampler: SMH

Sample Receipt
 Total No. of Containers: 4
 COC Seals/Intact? Y/N/NA
 Received Good Cond./Cold
 Temp:
 Delivery Method: Goldstrike

Relinquished By: 1.
 Signature: [Signature] Time: 1400
 Printed Name: Sheila Hinkley Date: 12/4/18
 Company: Shannon & Wilson, Inc.

Relinquished By: 2.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Relinquished By: 3.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Notes:
Bill to SWI

Received By: 1.
 Signature: [Signature] Time: 1100
 Printed Name: David Date: 12/5/18
 Company: TA Sol

Received By: 2.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Received By: 3.
 Signature: _____ Time: _____
 Printed Name: _____ Date: _____
 Company: _____

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - job file

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-45876-1

Login Number: 45876

List Source: TestAmerica Sacramento

List Number: 1

Creator: Horner, Nathaniel A

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