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FINAL

SUMMARY REPORT

December 2018 to November 2019 Water Supply Sampling

GUSTAVUS, ALASKA

SHANNON & WILSON

August 2020

Shannon & Wilson No: 102599

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Submitted To: Alaska Department of Transportation & Public Facilities
2301 Peger Road
Fairbanks, Alaska 99709
Attn: Samantha Cummings

Subject: FINAL SUMMARY REPORT, DECEMBER 2018 TO NOVEMBER 2019 WATER SUPPLY SAMPLING, GUSTAVUS, ALASKA

Shannon & Wilson prepared this report as a summary of our water supply well sampling services from December 2018 to November 2019. The services were conducted on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF). Our scope of services was specified in our proposals dated February 1, 2019, May 23, 2019 and August 21, 2019 authorized on February 27, 2019, May 31, 2019 and September 17, 2019 respectively, by DOT&PF under our Professional Services Agreement Number 25-19-1-013 Per- and Polyfluoroalkyl Substance (PFAS) Related Environmental & Engineering Services.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.

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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film-forming foam
ARFF	aircraft rescue and firefighting
bgs	below ground surface
°C	degrees Celsius
COC	chain-of-custody
DEC	Alaska Department of Environmental Conservation
DOA	Department of Administration
DONA	4,8-dioxa-3H-perfluorononanoic acid
DOT&PF	Alaska Department of Transportation & Public Facilities
DRM	Alaska Department of Administration Division of Risk Management
EPA	U.S. Environmental Protection Agency
GST	Gustavus Airport Terminal
HFPO-DA	hexafluoropropylene oxide dimer acid
LDRC	Laboratory Data Review Checklist
LHA	Lifetime Health Advisory
LCS/LCSD	laboratory control spike/laboratory control spike duplicate
LOD	limits of detection
LOQ	limit of quantification
MAROS	Monitoring and Remediation Optimization System
MS/MSD	matrix spike/matrix spike duplicate
µS/cm	microsiemens per centimeter
N-EtFOSAA	N-ethyl perfluorooctane sulfonamidoacetic acid
ng/L	nanograms per liter
N-MeFOSAA	N-methyl perfluorooctane sulfonamidoacetic acid
NPS	National Park Service
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perflurohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PFTeA	perfluorotetradecanoic acid
PFTrDA	perfluorotridecanoic acid
PFUnA	perfluororoundecanoic acid
POET	point of entry treatment
QA/QC	quality assurance/quality control
RPD	relative percent difference

ACRONYMS

SGS	SGS North America, Inc.
TestAmerica	TestAmerica Labs, Inc./Eurofins
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
UCMR	unregulated contaminant monitoring rule
WO	work order
YSI	multiprobe water quality meter
6:2 FTS	6:2 fluorotelomer-sulfonate
11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid

1 INTRODUCTION

Shannon & Wilson, Inc. has prepared this report to document our well-search and water supply well sampling efforts near the Gustavus Airport Terminal (GST) in Gustavus, Alaska. This report addresses activities conducting between December 2018 to January 2020 for the ongoing project. The GST is an active, Alaska Department of Environmental Conservation (DEC) listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and surface water (File Number 1507.38.017, Hazard ID 26904).

This report was prepared for the Alaska Department of Transportation & Public Facilities (DOT&PF) in accordance with the terms and conditions of our contract, relevant DEC guidance documents, and 18 Alaska Administrative Code (AAC) 75.335.

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the potential for human exposure to PFAS-containing water in water supply wells. Our objectives were to collect quarterly or annual samples from previously sampled water supply wells that meet the monitoring criteria discussed in section 2.4; and to collect samples from previously unsampled wells in neighborhoods near the Gustavus Airport and within the well search areas. The well search areas are shown in Figure 1, Well Search Extent.

1.2 Background

The GST terminal is located at 1 Airport Way in Gustavus, Alaska. The property is owned by the DOT&PF, who also owns multiple adjacent parcels. The geographic coordinates of the GST terminal are latitude 58.4252, longitude -135.7074.

The DOT&PF Crash and Fire Rescue program used aqueous film forming foam (AFFF) for training, systems testing, and emergency response at the GST for many years. Areas of potential use are shown as AFFF sites on Figure 1. The precise timeline and locations of AFFF use at the GST are unknown.

AFFF contains PFAS, a category of persistent organic compounds considered contaminants of emerging concern. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where AFFFs were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. The U.S. Environmental Protection Agency

(EPA) published a Lifetime Health Advisory (LHA) level for PFOS and PFOA in drinking water in May 2016 of 70 nanograms per liter (ng/L) for the sum of PFOS and PFOA. The DEC Contaminated Sites Program published groundwater-cleanup levels for PFOS and PFOA in November 2016 of 400 ng/L for each compound individually. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS.

On May 4, 2018 DEC informed DOT&PF the airport terminal well and National Park Service (NPS) Water System well serving the school were at risk for PFAS contamination. On June 27, 2018, DOT&PF sampled both drinking-water supply wells for the presence of PFAS. The analytical results were received on July 30, 2018. The airport terminal well contained levels of PFAS exceeding the EPA's LHA level. The NPS well had detections of several PFAS less than the EPA's LHA level. DOT&PF and the Alaska Department of Administration's (DOA's) Division of Risk Management (DRM) contacted Shannon & Wilson regarding the Gustavus results. Shannon & Wilson began water supply well search and sampling efforts in August 2018.

On August 20, 2018, the DEC published a Technical Memorandum outlining a new action level for the sum of five PFAS (PFOS, PFOS, perfluorohexane sulfonate [PFHxS], perfluoroheptanoate [PFHpA], and perfluorononanoate [PFNA]) in drinking water. The action levels proposed in the August 2018 Technical Memorandum were submitted as proposed regulation. PFAS projects for the State of Alaska adopted the proposed regulatory action level from August 2018 to March 2019, per DEC direction. The proposed regulation has not been formally adopted to date.

Exhibit 1-1: Gustavus Airport AFFF training area.

The initial response and water supply well sampling in Gustavus referenced the sum of five PFAS action level for the purposes of assessing drinking-water well contamination. Water supply wells used for drinking and/or cooking with concentrations for the sum of five PFAS exceeding 65 ng/L were provided with an alternative drinking-water source.

On April 9, 2019 DEC issued an update to the August 20, 2018 Technical Memorandum rescinding the previous action level to align with EPA's LHA. The memo notes "In order to align state actions to the recently announced EPA plans, DEC will use the EPA LHA

(PFOS+PFOA above 0.07 µg/L) as the Action Level. Any new testing for PFAS will be for PFOS and PFOA only."

On October 2, 2019 DEC issued a second update to the August 20, 2018 Technical Memorandum stating, "Any new testing for PFAS will report the full suite of PFAS compounds analyzed by the appropriate EPA Method." EPA Method 537.1 includes the suite of 18 PFAS outlined in Section 1.4.

1.3 Geology and Hydrology

The GST sampling area lies in a glacial outwash plain. The plain is bounded by the Chilkat Mountain Range to the northeast, Glacier Bay to the northwest and Icy Strait to the south.

Our knowledge of subsurface geology and hydrology in the investigation area is based on observations Shannon & Wilson made during the 2019 site characterization drilling activities and information provided to us by a local well driller. Our investigation noted the sampling area is mostly comprised of fluvial and marine sediments. The soil profile generally consists of water-bearing, interbedded sand and silt underlain by a silty clay or clay confining layer. The confining layer was observed at varying depths ranging from approximately 13 to 45 feet below ground surface (bgs).

The depth to the water table ranged from 0.33 feet bgs to 8.75 feet bgs on the east side of the Salmon River. At the well cluster by City Hall, the water table ranged from 13.75 to 13.80 feet bgs.

1.4 Contaminants of Concern and Action Levels

Section 1.2 summarizes the progression of PFAS regulatory changes affecting the GST site. The contaminants of concern for the residential-well sampling described in this report are:

- PFOS
- PFOA
- PFHpA
- PFNA
- PFHxS
- perfluorobutanesulfonic acid (PFBS)
- perluorodecanoic acid (PFDA)
- perluorododecanoic acid (PFDoA)
- perfluorohexanoic acid (PFHxA)

- perfluorotetradecanoic acid (PFTeA)
- perfluorotridecanoic acid (PFTrDA)
- perfluoroundecanoic acid (PFUnA)
- hexafluoropropylene oxide dimer acid (HFPO-DA)
- N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)
- N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)
- 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)
- 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CL-PF3ONS)
- 4,8-dioxa-3H-perfluorononanoic acid (DONA)

Of these contaminants of concern, only PFOS and PFOA are regulated with numeric action levels or cleanup levels, as summarized in Exhibit 1-2.

Exhibit 1-2: Applicable Regulatory Action Levels

Media	Compound	Level
Drinking water	PFOS + PFOA	70 ng/L[a]
Groundwater	PFOS	400 ng/L[b]
Groundwater	PFOA	400 ng/L[b]
Soil	PFOS	3.0 µg/kg[c]
Soil	PFOA	1.7 µg/kg[c]

Notes:

a Drinking-water action level reported in DEC October 2019 Technical Memorandum.

b DEC groundwater-cleanup level reported in 18 AAC 75.345, Table C.

c DEC migration-to-groundwater soil-cleanup levels reported in 18 AAC 75.341, Table B1.

ng/L = nanograms per liter, µg/kg = micrograms per liter

1.5 Scope of Services

Our scope of services summarized in this report includes water supply well searches, four water supply well monitoring events, and public-outreach support. Our purpose was to evaluate the potential for human exposure to PFAS-containing water in water supply wells near GST. The objective was to identify water supply wells in the sampling area and collect water samples from those wells. This project is ongoing; planned future work is summarized in Section 5.3.

Our well-search activities sought to identify water supply wells and document the well use and well construction details, where available. This report includes data from water supply

well sampling events conducted in March, June and October 2019. This report also includes additional sampling conducted for Barr Engineering in June 2019 for the purposes of designing point of entry treatment (POET) systems. POET design is not discussed further in this report. Additionally, site characterization activities performed in October 2019 will not be discussed in this report; please reference our April 2020 report *Gustavus PFAS 2019 Site Characterization - Revision 1*.

This report was prepared for the exclusive use of the DOT&PF and its representatives. This work presents our professional judgment as to the conditions of the site. Information presented here is based on the sampling and analyses Shannon & Wilson performed. This report should not be used for other purposes without our approval or if any of the following occurs:

- Project details change, or new information becomes available, such as revised regulatory levels or the discovery of additional source areas.
- Conditions change due to natural forces or human activity at, under, or adjacent to the project site.
- Assumptions stated in this report have changed.
- If the site ownership or land use has changed.
- Regulations, laws, or cleanup levels change.
- If the site's regulatory status has changed.

If any of these occur, Shannon & Wilson should be retained to review the applicability of our recommendations. This report should not be used for other purposes without Shannon & Wilson's review. If a service is not specifically indicated in this report, do not assume it was performed.

1.6 Summary of Previous Water Supply Well Sampling

Since August 2018, have collected samples from a total of 113 water supply wells for PFAS analytes over several visits to Gustavus. Shannon & Wilson also collected five surface-water samples during the August 2018 and September 2018 sampling events. In addition, Shannon & Wilson held several public-outreach meetings in conjunction with State of Alaska employees to inform residents about the project.

Water supply well sample concentrations for the sum of PFOS and PFOA ranged from not-detected to 6,110 ng/L for wells associated with the GST PFAS project. Water supply well sampling areas were expanded for subsequent sampling events until PFAS concentrations in wells along the edges of the sampling areas were found to be below the applicable DEC regulatory levels. Water supply well depths are generally between 15 to 25 feet bgs based on

information provided by the residents and the former local driller who installed most of the wells. Shannon & Wilson was not able to obtain well-drilling or construction logs to confirm these depths.

2 FIELD ACTIVITIES

This section summarizes activities performed between December 2018 and November 2019.

2.1 Well Categories

For the purposes of this project, a water supply well is defined as a privately-owned water-supply well. Please note this definition of water supply well does not match the DEC Drinking Water Program regularity classification of a private water system, "a potable water system serving one single-family residence or duplex" (18 AAC 80, 2014).

Shannon & Wilson completed a Water Supply Well Inventory Survey Form for each newly identified water supply well. A copy of each completed Survey Form is included in Appendix A, Field Logs. Shannon & Wilson used this information to designate a well category based on use.

- Category 1: wells used for drinking or cooking, as reported by owners or occupants.
- Category 2: wells used for dish washing and other domestic purposes.
- Category 3: wells used for vegetable-garden irrigation and are not plumbed to indoor faucets or spigots. The well water is accessed by outdoor plumbing, but the well may be located underneath or inside the structure. These wells are considered non-drinking-water wells.
- Category 4: wells used for outdoor purposes only, such as irrigation of lawns or non-vegetable gardens or vehicle washing. These wells are considered non-drinking-water wells.
- Category 5: wells currently not in use. Wells that have been abandoned in place, are inoperable, disconnected, or intended for future use, are considered category 5 wells. These wells are considered non-drinking-water-wells.

2.2 Well Search

Shannon & Wilson made a reasonable attempt to contact each owner or occupant in the search areas to collect a well sample or verify a well is not present. During the 2019 water supply well sampling activities, efforts were made to follow up with properties where contact with an owner or occupant was unable to be made during previous events. If occupants were not present when Shannon & Wilson visited the property, a personalized

door tag with contact information was provided. Shannon & Wilson collected first-time samples from 13 properties in the defined door-to-door well search areas during the 2019 sampling events, as described in Section 2.3 below.

2.3 Water Supply Well Sampling

Shannon & Wilson conducted three water supply well sampling events between March 7, 2019 and October 15, 2019. The following Shannon & Wilson personnel collected analytical water samples for this project. These individuals are State of Alaska Qualified Samplers as defined in 18 AAC 75.333[b] and 18 AAC 78.088[b].

- Amber Masters, Environmental Scientist
- Sheila Hinckley, Environmental Scientist
- Kristen Freiburger, Chemist
- Craig Beebe, Geologist
- Adam Wyborny, Environmental Engineer
- Cherissa Dukelow, Environmental Scientist

Exhibit 2-1: Photographs of Water Supply Well Sample Locations in Gustavus, Alaska.

Shannon & Wilson sampled 48 unique water supply wells during the reporting period; some wells were sampled multiples times over several sampling events. Shannon & Wilson collected water supply well samples from a location in the structure's plumbing upstream of water-treatment systems or water softeners, where possible. Samples collected downstream of water softeners or other in-home treatment systems are listed in Section 2.10, Deviations.

For the purposes of this project Shannon & Wilson does not consider small (i.e., less than 18 inches in height) particulate filters to be treatment systems.

Shannon & Wilson purged the water supply well systems prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. Purging for approximately 20 minutes, parameters were collected using a multiprobe water quality meter (YSI). The parameters pH, temperature, and conductivity were recorded approximately once every three minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings: ±0.1 pH, ±0.5 degrees Celsius (°C) temperature, and ±3 percent conductivity (microsiemens per centimeter [µS/cm]).

Shannon & Wilson discharged purge water to an indoor sink or to the ground surface. At most residences within the GST search areas, indoor plumbing leads to a private septic system. Following parameter stabilization, Shannon & Wilson collected PFAS water samples using laboratory-supplied containers. Copies of the *Water Supply Well Sampling Logs* are included in Appendix A, Field Logs.

Shannon & Wilson are aware of the potential for cross-contamination of PFAS water samples from numerous everyday household items. Shannon & Wilson took appropriate precautions to prevent cross-contamination, including discontinuing the use of personal protective equipment and field supplies known to contain PFASs, using liner bags to contain samples before and after sample collection, hand washing, and donning a fresh pair of disposable nitrile gloves before sample collection.

2.4 Water Supply Well Monitoring

Through coordination with the DOT&PF and DEC, Shannon & Wilson established the well monitoring network criteria prior to the March 2019 sampling event. Wells were included in the March 2019 sampling event if they are active category 1 and 2 wells with:

- maximum combined PFOS, PFHpA, PFNA, PFHxS and PFOA concentration was greater than or equal to 35 ng/L during a previous sampling event; or
- within 500 lateral feet of wells with combined PFOS, PFHpA, PFNA, PFHxS and PFOA concentration was greater than or equal to 35 ng/L during a previous sampling event.

These samples were submitted for analysis of PFOS, PFOA, PFHxS, PFHpA, PFNA, and PFBS. Lateral distance was measured from the GIS points collected during the initial round of sampling.

Through coordination with DOT&PF and DEC, the well-monitoring network criteria were modified prior to the June 2019 sampling event. This is referred to as the annual sampling

event. Wells were included in the June 2019 sampling event if they are active category 1 and 2 wells with:

- maximum combined PFOS and PFOA concentration greater than or equal to 17 ng/L during a previous sampling event; or
- within 500 lateral feet of wells with a combined PFOS and PFOA concentration greater than or equal to 17 ng/L during a previous sampling event.

These samples were submitted for analysis of PFOS and PFOA only.

Prior to the October 2019 sampling event, the well monitoring network criteria was modified to no longer include wells that exceeded the LHA. Wells were included in the October 2019 sampling event if they are active category 1 and 2 wells with:

- maximum combined PFOS and PFOA concentration greater than or equal to 35 ng/L but less than the LHA during a previous sampling event; or
- within 500 lateral feet of wells with a combined PFOS and PFOA concentration greater than or equal to 35 ng/L during a previous sampling event.

These samples were submitted for the analysis of 18 PFAS analytes per EPA 537.1 (Section 1.4).

Water supply well monitoring locations are shown in light and dark blue in Figure 2.

2.5 Surface Water Sampling

At the request of DOT&PF, Shannon & Wilson sampled two surface-water bodies to determine their suitability as water sources for filling the aircraft rescue and firefighting (ARFF) truck. Both locations were sampled during the March 2019 sampling event. The first sample was taken from the pond in the southeastern gravel pit along Wilson Road. The second sample was taken from the creek along the west side of Mountain View Road at the southern leg of Spruce Lane.

2.6 Sample Custody, Storage, and Transport

Immediately after collection, the sample bottles for each location were placed in Ziploc bags and stored in a designated sample cooler maintained between 0 °C and 6 °C with ice substitute separated from the sample bottles by a liner bag. Shannon & Wilson maintained custody of the samples until submitting them to the laboratory for analysis. For shipping Shannon & Wilson packaged analytical samples and chain-of-custody (COC) forms in a hard-plastic cooler with an adequate quantity of frozen-ice substitute and packing material

to prevent bottle breakage. Shannon & Wilson applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

Shannon & Wilson shipped sample coolers to TestAmerica Laboratories, Inc./Eurofins (TestAmerica) in West Sacramento, California for analysis of PFAS using Alaska Air Cargo priority overnight service, also known as Goldstreak. Samples were generally shipped from Goldstreak in Juneau, Alaska. Water supply well samples were submitted promptly to the analytical laboratory after each well search and sampling effort. This allowed sufficient time for the laboratory to analyze the samples within holding-time requirements of the analytical method. An expedited, five-business-day turnaround time was requested for first work order only.

Shannon & Wilson also shipped sample coolers to SGS North America Inc. (SGS) in Anchorage, Alaska on June 10, 2019 to analyze samples collected for Barr Engineering POET system design; samples were shipped from Juneau, Alaska using Goldstreak.

Each laboratory report is included in Appendix B.

2.7 Notification of Results

Following a review of the analytical data, Shannon & Wilson prepared analytical-data tables for review by the rest of the project team. Shannon & Wilson then called property owners and occupants to notify them of the results of the PFAS water testing.

Shannon & Wilson also prepared letters for owners and occupants informing them of the results for the sample collected from their well. These letters were tailored to each property and analytical sample, and included the following information:

- sample name;
- analytical results for the three highest analyzed PFAS concentrations from the sampling event (March 2019 only) or concentrations of PFOS and PFOA (June and October 2019);
- comparison of analytical results to DEC's or EPA's current action levels;
- description of the project; and
- pages of the TestAmerica laboratory report that apply to the owner or occupant's water-well sample, including other PFAS results.

Where requested, Shannon & Wilson emailed results letters to owners and/or occupants.

2.8 Alternative Water Sources

The DOT&PF is exploring various options to provide affected residents with a permanent alternative water source. These may include but are not limited to POET systems, constructing a community well outside of the affected area, rain catchment systems and installing cisterns. Investigation of permanent water solutions for Gustavus is ongoing in 2020.

2.8.1 Bottled Water

On September 17, 2018, the DRM began offering and delivering bottled water to properties where the water supply well sample showed results above the proposed DEC action levels.

Exhibit 2-2: Bottled water stored for deliveries.

2.8.2 Point of Entry Treatment Systems

For the purposes of point of entry treatment system design, Shannon & Wilson collected eleven samples during our December 2018 and June 2019 sampling events. Sample testing methods are discussed in Section 3 below. For results from the December 2018 sampling event, reference our previous report titled *August 2018 to November 2018 Private Well Sampling*.

Exhibit 2-3: Installed point of entry treatment system

2.9 Public Information

The DOT&PF hosts a webpage describing the PFAS water-testing project. The webpage includes a project summary, list of contacts, simplified regional results map, and links to additional resources. The map is updated after each sampling event following the receipt of analytical data; Appendix C includes an example from July 2019.

2.10 Deviations

In general, Shannon & Wilson conducted these services in accordance with the sampling procedures noted above, and based on ongoing discussion with DRM, DEC and DOT&PF. The following are deviations from the procedures described in Section 2:

Exhibit 2-3: Sampling the future site of the Gustavus Community Center (*PW-438*)

- The following samples were collected from a location downstream of the property's water softener or other in-home treatment system during one or more sampling events: *PW-012, PW-038, PW-*040, and *PW-431*.
- Our sampling protocol includes stabilization of parameters; however, the following samples were collected from handpump wells and parameters were not measured and/or stabilized: *PW-205, PW-208, PW-209, PW-462* and *PW-464*.
- Our sampling protocol includes sampling directly from a spigot or port within the plumbing system. Sample *PW-415* was taken through a hose fused to the spigot.
- Samples *PW-205* and *PW-438* were taken with the use of a non-dedicated pump.

3 ANALYTICAL RESULTS

Shannon & Wilson submitted drinking-water samples collected in March and June 2019 to TestAmerica for determination PFAS concentrations using Method WS-LC-0025, the laboratory's in-house method. This method analyzes for the PFAS listed in the EPA Unregulated Contaminant Monitoring Rule (UCMR): PFOS, PFOA, PFHpA, PFNA, PFBS, and PFHxS. Samples collected in June 2019 were originally submitted for analysis of PFOS and PFOA only. The results are presented on Table 1 for PFOS and PFOA; the additional four analytes are presented on Table 2 for the June 2019 samples.

In October 2019, Shannon & Wilson submitted for the determination of 18 PFAS using modified Method 537.1. This method analyzes for PFOS, PFOA, PFHpA, PFNA, PFHxS, PFBS, PFDA, PFDoA, PFHxA, PFTeA, PFTrDA, PFUnA, HFPO-DA, N-EtFOSAA, N-MeFOSAA, 11CL-PF3OUdS, 9CL-PF3ONS and DONA. It is considered a modified method for groundwater samples, as the true EPA 537.1 method was developed for the analysis of municipal, chlorinated drinking-water samples.

Shannon & Wilson submitted the pre-POET design analytical water samples to SGS for determination of twenty-four PFAS and twenty-three other analytes. The analytical methods used were PFAS analysis by EPA 537M, diesel range organics by AK102, residual range organics by AK103, oil & grease total by EPA 1664B, chloride, fluoride, and sulfate by EPA 300.0, metals by EPA 200.8, total organic carbon by SM 5310B, total dissolved solids by SM21 2540C, total suspended solids by SM21 2540D, pH by SM21 4500-H B, alkalinity by SM21 2320B, hardness as calcium carbonate by SM21 2340B, conductivity by SM21 2510B, ammonia as nitrogen by SM21 4500-NH3 G, nitrate and nitrite by SM21 4500NO3-F, sulfide by SM23 4500S D and speciated arsenic by SOP BAL-4100.

The TestAmerica and SGS laboratory reports and associated DEC Laboratory Data Review Checklists (LDRCs) for each work order (WO) are listed in chronological order in Appendix B.

3.1 Water Supply Well Monitoring Samples

Table 1 summarizes the concentrations of PFOS and PFOA for initial samples collected from water supply wells sampled between June 2019 and October 2019. For the purposes of this report, Shannon & Wilson compared concentrations to the sum of PFOS and PFOA action level of 70 ng/L.

Table 2 summarizes the historical concentrations of PFAS in samples collected from previously sampled wells. With the exceptions of *PW-001, PW-002, PW-006, PW-022, PW-405, PW-406* and *PW-408* results are generally comparable to the initial sampling event. Table 2 also includes the additional analytes that were requested following the June 2019 sampling event. The laboratory was able to report additional data for PFHxS, PFHpA, PFNA, and PFBS for samples collected in June 2019 where PFOS and PFOA were originally requested.

Table 3 summarizes the concentrations of the pre-POET design samples collected in June 2019. For December 2018 concentrations of pre-POET design samples, please refer to our previously published report titled *August 2018 to December 2018 Private Well Sampling*.

3.2 Surface Water Samples

PFAS were not detected in the two surface-water locations sampled in March 2019. Results for these samples are presented on Table 4.

4 QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. Shannon & Wilson reviewed the analytical results provided by TestAmerica and SGS for laboratory QC samples and conducted our own QA assessment for this project.

By working in accordance with our proposed scope of services, Shannon & Wilson considers the samples collected to be representative of site conditions at the locations and times they were obtained. The quality of the analytical data for this project does not appear to have been compromised, and those results affected by QC anomalies were qualified with appropriate flags. Additional details regarding our QA assessment are presented in Appendix D

5 DISCUSSION AND RECOMMENDATIONS

Shannon & Wilson presents here our discussion relevant to PFASs in groundwater at and near the GST property.

5.1 Comparison to Action Levels

Two newly identified category 1 and 2 wells (PW-415 and PW-463) with combined concentrations exceeding the action level of 70 ng/L for the sum of PFOS and PFOA were reported in 2019. The new exceedances are located in the impacted area along Wilson Road in Area 3 (Figure 1).

During the reporting period, the March 2019 sample collected from locations PW-013 and PW-022 exceeded the DEC groundwater-cleanup level of 400 ng/L for PFOS. Locations that exceeded the DEC groundwater-cleanup level for PFOS are depicted with dark red halos in Figure 3. During this reporting period, combined PFOS and PFOA concentrations at PW-022 increased by approximately 190 percent between August 2018 and March 2019, then decreased by 92 percent between March and June 2019. This well is located in the northern portion of Area 1 along a drainage ditch close to the DOT&PF Crash and Fire Rescue building. The seasonal spike at this well strongly suggests the impact of surface water to offsite contamination.

Samples exceeding the EPA LHA are highlighted in Tables 1 and 2. Further assessment of concentration trends using statistical analysis is discussed below in Section 5.2.

PFOS was most frequently the highest detected PFAS in water supply wells tested to date. The wells with the highest PFOS concentrations are geographically closer to the DOT&PF Crash and Fire Rescue building than to the existing burn pit or former fire training area.

5.2 Trend Analysis

Shannon & Wilson assessed temporal data for locations included in the well-monitoring network locations using a Mann-Kendall nonparametric trend analysis and Monitoring and Remediation Optimization System (MAROS) classification (Gilbert, 1987; Aziz, et. al., 2016). The MAROS evaluation was developed by the Air Force Center for Engineering and the Environment to assess concentration trends with confidence levels below 95 percent. MAROS further discriminates between "no trend" and "stable" contaminant concentrations by evaluating the Mann-Kendall trend statistic, confidence in trend, and coefficient of variation. These tests require data from a minimum of four sampling events to assess concentration trends.

Shannon & Wilson performed these statistical tests on PFOS, PFOA, and PFOS+PFOA combined results using the EPA's Statistical Software ProUCL, version 5.1. Table 5, Water Supply Well Trends, compares the PFOS, PFOA, and LHA combined results for each monitoring location sampled greater than four times. Time series plots of water supply well trends are included in Appendix E, Time Series Plots.

Shannon & Wilson performed statistical analysis on wells with at least four samples. Of the 10 wells statistical tests were performed on, six could not be assessed due to PFOS and PFOA not being detected at those locations (PW-037, PW-038, PW-039, PW-040, PW-059, and PW-203). Samples collected from locations PW-401 showed no trend after five sampling events. Samples collected from locations PW-011, PW-012 and NPS Well showed stable trends for PFOS and LHA combined. Samples collected from location PW-012 showed a stable trend for PFOA. Samples collected from locations PW-011 and NPS Well showed decreasing trends for PFOA.

It is likely the region is heavily influenced by seasonal trends. To account for seasonal trends in a region heavily effected by seasonal variation a minimum of eight to twelve quarterly samples is recommended for further statistical analysis assessments. Given the monitoring criteria, it is likely this will be addressed using monitoring well data.

5.3 Planned Future Work

Shannon & Wilson anticipates continuing well search efforts to target properties within the existing search areas that have not yet been sampled. This work will be completed through our statewide contract with DOT&PF.

Quarterly sampling for 2020 was scheduled to take place in March 2020; however, the sampling event was postponed due to the world-wide concern regarding COVID-19. DEC, DOT&PF and Shannon & Wilson are monitoring the situation closely and will continue quarterly sampling when appropriate. Decisions regarding the monitoring criteria and frequency will be discussed with DEC prior to conducting sampling.

5.4 Recommendations

Based on our previous work, Shannon & Wilson recommends the DOT&PF continue to:

- attempt to identify wells at properties where well status is unknown;
- sample water supply wells in the well-monitoring network, as determined in coordination with DEC to determine future sampling frequency. With the addition of the monitoring-well network for assessing aquifer trends, it may be appropriate to collect water supply well samples on an annual basis for the purpose of assessing exposure;
- work with the DEC and the Alaska Department of Health and Social Services to continue educating the public regarding the potential health effects of exposure to PFAS-containing water, as new information becomes available; and
- refrain from discharging PFAS-containing AFFF to the ground, surface water bodies or groundwater from ARFF training, equipment testing, or emergency response.

Shannon & Wilson also recommends:

- expanding the residential buffer zone to account for the interpolated hydraulic gradients presented on Figure 2 (i.e., a 500 foot buffer may not be protective in different locations of the affected area). The proposed wells in this category are shown on Figure 2 as white circles ("proposed annual") and include PW-32, PW-47, PW-61, PW-74, PW-207, PW-230, PW-240, PW-241, PW-414 and PW-438; and
- expanding the monitoring-well network, specifically on airport property and near the DOT&PF building and airport terminal wells to monitor migration of contamination off site.

Our recommendations are based on:

- Groundwater conditions inferred through water supply well, monitoring-well, temporary-well-point and surface-water samples collected from August 27, 2018 to date.
- Soil conditions observed on, near and downgradient of the GST.
- The results of testing performed on soil and water samples Shannon & Wilson collected from the water supply wells, monitoring wells, temporary well points and surface water on, near, and downgradient from the GST.

- Publicly available literature and data Shannon & Wilson reviewed for this project, including United States Geological Survey, 2018.
- Our understanding of the project and information provided by the DOT&PF, DRM, and other members of the project team.
- The limitations of our approved scope described in our proposed Scope of Services dated August 23, 2019.

The information included in this report is based on limited sampling and should be considered representative of the times and locations at which the sampling occurred. Regulatory agencies may reach different conclusions than Shannon & Wilson. Shannon & Wilson have prepared and included in the *Important Information about your Environmental Report* Appendix to assist you and others in understanding the use and limitations of this report.

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Table 1 - Summary of Initial Water Supply Well Analytical Results

		Analyte	Perfluoro-octanoic acid (PFOA)	Perfluoro-octane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
		Action Level	70		70
Sample Name	PW-ID	Sample Date	ng/L	ng/L	ng/L
PW-071	PW-071	6/8/2019	0.82 J	<2.0	0.82 J‡
PW-205	PW-205	6/9/2019	0.93 J	9.0	9.9 J
PW-207	PW-207	6/7/2019	1.0 J	<2.0	1.0 J‡
PW-208	PW-208	6/7/2019	0.80 J I	8.4	9.2 J I
PW-414	PW-414	6/8/2019	<2.0	2.3	2.3 ‡
PW-415	PW-415	6/7/2019	1.6 J	67	69 J
PW-419	PW-419	6/8/2019	<2.0	14	14 ‡
PW-433	PW-433	6/9/2019	<2.0	<2.0	N/A
PW-438	PW-438	6/9/2019	<2.0	3.7	3.7 ‡
PW-441	PW-441	6/7/2019	<2.0	1.4 J	1.4 J‡
PW-462	PW-462	6/7/2019	1.8 J	48	50 J
PW-463	PW-463	6/8/2019	2.8	74	77
PW-464	PW-464	10/13/2019	<2.0	1.6 J	1.6 J‡

NOTES:

ng/L	nanograms per liter
Bold	Concentration exceeds action level of 70 ppt for the sum of PFOS and PFOA.
DUP	Field-duplicate sample
<	Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
I	The reported value represents the estimated maximum possible concentration. Flag applied by the laboratory.
J	Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
‡	Minimum concentration, the LHA Combined concentration includes one or more result that is not detected greater than the MDL.
N/A	Not applicable. The LHA concentration could not be calculated because one or more PFAS was not detected in the project sample.

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
Airport Terminal	08/27/18	31	--	5.7	<2.0	4.5	--	--	--	--	--	--	--	--	--	--	--	250	4.3	254
	03/08/19	30	--	5.9	<2.0	4.3	--	--	--	--	--	--	--	--	--	--	--	270	<3.5 B*	270 B*‡
NPS Well	08/27/18	12	--	1.8 J	<2.0	1.3 J	--	--	--	--	--	--	--	--	--	--	--	23	4.6	28
	09/25/18	11	--	1.7 J	<2.0	1.2 J	--	--	--	--	--	--	--	--	--	--	--	22	4.3	26
	03/07/19	13	--	1.9 J	<2.0	1.4 J	--	--	--	--	--	--	--	--	--	--	--	13	3.5	17
	06/08/19	14	--	1.8 J	<2.0	1.5 J	--	--	--	--	--	--	--	--	--	--	--	16	<3.4 B*	16 B*‡
	10/11/19	10	2.2	1.4 J	<1.8	1.0 J*	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	4.0 J*	19	2.9	22
	10/11/19	9.3	1.8 J	1.3 J	<1.9	0.73 J*	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9 J*	18	2.8	21
PW-001	08/28/18	350	--	13	3.0	20	--	--	--	--	--	--	--	--	--	--	--	2300	19	2319
	03/07/19	320	--	17	2.3	21	--	--	--	--	--	--	--	--	--	--	--	1200	13	1213
PW-002	08/28/18	32	--	4.4	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	160	3.0	163
	03/09/19	21	--	3.4	<2.0	1.8 J	--	--	--	--	--	--	--	--	--	--	--	72	<2.0 B*	72 B*‡
	06/08/19	20	--	1.8 J	<2.0	1.9 J	--	--	--	--	--	--	--	--	--	--	--	33	1.8 J	35 J
PW-003	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.4 J	1.4 J‡
PW-004	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-005	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	0.90 J	0.90 J‡
PW-006¥	08/28/18	7300	--	48	48	170	--	--	--	--	--	--	--	--	--	--	--	40000	240	40240
	09/26/18	110	--	1.4 J	<2.0	9.0	--	--	--	--	--	--	--	--	--	--	--	210	2.3	212
PW-007	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	5.6	1.2 J	6.8 J
PW-008	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.3 J	1.3 J‡
PW-009	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-010	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/09/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/12/19	2.5	0.97 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	2.0	<1.9	2.0 ‡
	10/12/19	2.9	1.0 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.2	<2.0	2.2 ‡

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-011	08/29/18	30	--	3.4	<2.0	2.9	--	--	--	--	--	--	--	--	--	--	--	93	3.3	96
	09/25/18	34	--	3.1	<2.0	3.2	--	--	--	--	--	--	--	--	--	--	--	80	3.1	83
	03/08/19	32	--	4.5	<2.0	2.4	--	--	--	--	--	--	--	--	--	--	--	96	<2.6 B*	96 B*‡
	06/08/19	23	--	3.5	<2.0	1.9 J	--	--	--	--	--	--	--	--	--	--	--	82	2.0	84
	06/08/19	23	--	3.4	<2.0	1.8 J	--	--	--	--	--	--	--	--	--	--	--	80	<2.2 B*	80 B*‡
PW-012	08/29/18	8.9	--	0.81 J	<2.0	1.8 J	--	--	--	--	--	--	--	--	--	--	--	7.7	0.77 J	8.5 J
	03/08/19	11	--	0.87 J	<2.0	1.5 J	--	--	--	--	--	--	--	--	--	--	--	25	<2.0 B*	25 B*‡
	06/08/19	7.0	--	<2.0	<2.0	1.1 J	--	--	--	--	--	--	--	--	--	--	--	14	0.81 J	15 J
	10/12/19	9.3	2.8	0.86 J	<1.9	0.99 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	13	0.74 J	14 J
PW-013	08/29/18	860	--	230	8.9	57	--	--	--	--	--	--	--	--	--	--	--	5500	130	5630
	03/07/19	650	--	150	18	34	--	--	--	--	--	--	--	--	--	--	--	6000	110	6110
PW-014	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-015	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-016	08/30/18	1.7 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.3 J	1.3 J‡
PW-017	08/30/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-018	08/30/18	1.2 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.5	<2.0	2.5 ‡
PW-019	08/30/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-020	08/30/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-021	08/30/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-022	08/30/18	58	--	4.8	<2.0	6.4	--	--	--	--	--	--	--	--	--	--	--	520	6.9	527
	03/07/19	230	--	20	1.7 J I	28	--	--	--	--	--	--	--	--	--	--	--	1500	25	1525
	06/07/19	19	--	1.8 J	<2.0	1.4 J	--	--	--	--	--	--	--	--	--	--	--	120	1.3 J	121 J
	06/07/19	19	--	1.9 J	<2.0	1.4 J	--	--	--	--	--	--	--	--	--	--	--	120	1.7 J	122 J
PW-031	08/27/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-032	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-033	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-034	08/28/18	1.1 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.5 J	<2.0	1.5 J‡
PW-036	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-037	08/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/07/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/11/19	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	0.89 J	<1.9	<1.9	n/a
PW-038	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/07/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/11/19	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	n/a
PW-039	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	0.79 J	0.79 J‡
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/11/19	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	<1.8	n/a
PW-040	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/11/19	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	0.66 J	<1.9	<1.9	n/a
PW-041	08/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-042	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-043	08/29/18	<2.0	--	0.94 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	6.6	7.6	14
PW-044	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.0	1.3 J	3.3 J
PW-045	08/29/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/11/19	0.48 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	0.79 J	<1.9	0.79 J‡
PW-046	08/30/18	1900	--	29	<2.0	120	--	--	--	--	--	--	--	--	--	--	--	83	82	165
	08/30/18	1700	--	27	<2.0	110	--	--	--	--	--	--	--	--	--	--	--	79	77	156
	03/08/19	320	--	6.2	<2.0	20	--	--	--	--	--	--	--	--	--	--	--	63	20 B	83 B
PW-047	08/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-048	08/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-059	08/29/18	1.2 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/07/19	0.98 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/09/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/12/19	1.1 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	n/a
PW-061	08/27/18	1.3 J	--	1.3 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.4 J	3.8	5.2 J
PW-066	12/08/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-070	08/31/18	1.4 J	--	<2.0	<2.0	1.8 J	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.0 J	1.0 J‡
PW-071	06/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	0.82 J	0.82 J‡
PW-074	09/25/18	1.1 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	09/25/18	1.1 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-075	08/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.4 J	1.4 J‡
PW-200	09/24/18	36	--	3.6	<2.0	3.2	--	--	--	--	--	--	--	--	--	--	--	89	3.1	92
	09/24/18	37	--	3.7	<2.0	3.4	--	--	--	--	--	--	--	--	--	--	--	92	3.1	95
	03/07/19	26	--	2.5	<2.0	2.7	--	--	--	--	--	--	--	--	--	--	--	76	2.8	79
PW-201	09/25/18	1.7 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.4 J	<2.0	1.4 J‡
PW-202	09/25/18	20	--	2.7	<2.0	2.1	--	--	--	--	--	--	--	--	--	--	--	68	3.1	71
	03/07/19	17	--	2.0	<2.0	2.4	--	--	--	--	--	--	--	--	--	--	--	32	3.0	35
	06/07/19	17	--	3.2	<2.0	2.9	--	--	--	--	--	--	--	--	--	--	--	38	4.2	42
PW-203	09/25/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	03/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/08/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/14/19	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	n/a
PW-204	09/25/18	3.3	--	0.93 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	5.4	<2.0	5.4 ‡
	06/07/19	2.4	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	4.7	<2.0	4.7 ‡
PW-205	06/09/19	11	--	<2.0	<2.0	2.0	--	--	--	--	--	--	--	--	--	--	--	9.0	0.93 J	9.9 J
	10/12/19	10	3.0	0.63 J	<1.9	1.4 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	10	0.76 J	11 J
PW-206	09/28/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-207	06/07/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.0 J	1.0 J‡

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-208	06/07/19	2.5	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	8.4	0.80 J I	9.2 J I
PW-209	09/26/18	26	--	3.0	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	100	3.3	103
	03/07/19	35	--	5.0	<2.0	2.7	--	--	--	--	--	--	--	--	--	--	--	120	2.7	123
	06/07/19	24	--	3.8	<2.0	1.6 J	--	--	--	--	--	--	--	--	--	--	--	120	2.5	123
PW-210	09/26/18	30	--	3.1	<2.0	2.5	--	--	--	--	--	--	--	--	--	--	--	92	2.6	95
	09/26/18	32	--	3.0	<2.0	2.7	--	--	--	--	--	--	--	--	--	--	--	95	2.8	98
	03/07/19	26	--	2.6	<2.0	2.7	--	--	--	--	--	--	--	--	--	--	--	70	2.5	73
	06/08/19	24	--	3.2	<2.0	1.9 J	--	--	--	--	--	--	--	--	--	--	--	77	2.4	79
PW-211	09/26/18	1.1 J	--	3.3	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	9.1	15	24
	10/13/19	<1.9	0.83 J	0.51 J	<1.9	1.4 J	<1.9	<1.9	<1.9	<1.9	<1.9	3.7	<1.9	<1.9	<1.9	<1.9	<1.9	1.0 J	1.0 J	2.0 J
PW-212	09/26/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/14/19	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	n/a
PW-213	11/01/18	24	--	2.2	<2.0	3.2	--	--	--	--	--	--	--	--	--	--	--	51	2.3	53
	03/07/19	24	--	2.5	<2.0	3.1	--	--	--	--	--	--	--	--	--	--	--	53	2.2	55
	06/09/19	20	--	2.1	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	44	<2.2 B*	44 B*‡
PW-214	09/27/18	0.88 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-216	09/27/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-218	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-219	09/27/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	09/27/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/14/19	<1.9	0.74 J	0.49 J	<1.9	1.2 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	0.84 J	0.84 J‡
PW-221	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	06/09/19	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/12/19	2.1	0.87 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	2.4	<1.9	2.4 ‡
PW-230	10/31/18	1.2 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.1 J	1.1 J‡
PW-231	10/31/18	2.6	--	0.96 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.1 J	1.1 J‡
PW-232	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-233	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-234	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-235	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-236	10/31/18	0.96 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/31/18	1.0 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-237	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-238	11/01/18	3.5	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.0	0.77 J	2.8 J
PW-239	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-240	11/01/18	3.3	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-241	11/01/18	5.8	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.9	0.98 J	3.9 J
	11/01/18	6.1	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.7	0.89 J	3.6 J
PW-247	11/02/18	2.7	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	1.1 J	1.1 J‡
PW-248	11/02/18	6.3	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.8 J	0.97 J	2.8 J
PW-249	11/02/18	1.5 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.4 J	<2.0	1.4 J‡
	11/02/18	1.4 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.3 J	0.84 J	2.1 J
PW-255	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-275	12/09/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	12/09/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-400	09/25/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-401	09/25/18	18	--	1.6 J	<2.0	2.4	--	--	--	--	--	--	--	--	--	--	--	40	1.4 J	41 J
	10/31/18	20	--	1.7 J	<2.0	2.3	--	--	--	--	--	--	--	--	--	--	--	36	1.6 J	38 J
	03/08/19	20	--	2.0	<2.0	1.8 J	--	--	--	--	--	--	--	--	--	--	--	31	<2.0 B*	31 B*‡
	06/09/19	15	--	1.7 J	<2.0	1.2 J	--	--	--	--	--	--	--	--	--	--	--	43	<2.0 B*	43 B*‡
	10/11/19	16	5.4	1.8 J	<1.9	1.3 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	45	1.4 J	46 J
PW-402	09/25/18	36	--	3.3	<2.0	3.7	--	--	--	--	--	--	--	--	--	--	--	72	3.4	75
	03/07/19	30	--	4.4	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	100	<2.2 B*	100 B*‡
	06/08/19	22	--	2.9	<2.0	1.7 J	--	--	--	--	--	--	--	--	--	--	--	92	1.5 J	94 J
PW-403	09/25/18	41	--	3.4	<2.0	5.7	--	--	--	--	--	--	--	--	--	--	--	83	3.3	86
	06/08/19	30	--	2.8	<2.0	3.1	--	--	--	--	--	--	--	--	--	--	--	67	<2.9 B*	67 B*‡
	06/08/19	30	--	3.1	<2.0	3.2	--	--	--	--	--	--	--	--	--	--	--	65	2.6	68

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-405	09/25/18	44	--	4.1	<2.0	3.8	--	--	--	--	--	--	--	--	--	--	--	86	3.9	90
	03/07/19	28	--	2.8	<2.0	2.8	--	--	--	--	--	--	--	--	--	--	--	78	2.7	81
	03/07/19	27	--	2.3	<2.0	2.8	--	--	--	--	--	--	--	--	--	--	--	76	2.5	79
	06/08/19	20	--	2.3	<2.0	1.7 J	--	--	--	--	--	--	--	--	--	--	--	66	<2.0 B*	66 B*‡
PW-406	09/25/18	36	--	5.2	<2.0	2.6	--	--	--	--	--	--	--	--	--	--	--	150	3.3	153
	03/07/19	28	--	4.3	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	94	5.6 J*	100 J*
	03/07/19	30	--	4.8	<2.0	2.3	--	--	--	--	--	--	--	--	--	--	--	92	8.9 J*	101 J*
	06/08/19	24	--	3.1	<2.0	2.7	--	--	--	--	--	--	--	--	--	--	--	74	<2.1 B*	74 B*‡
PW-408	09/26/18	30	--	4.8	<2.0	2.1	--	--	--	--	--	--	--	--	--	--	--	130	2.5	133
	03/07/19	22	--	3.9	<2.0	2.0	--	--	--	--	--	--	--	--	--	--	--	97	2.5	100
	06/07/19	28	--	3.0	<2.0	2.4	--	--	--	--	--	--	--	--	--	--	--	88	2.7	91
PW-413	09/27/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-414	06/08/19	2.1	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.3	<2.0	2.3 ‡
PW-415	06/07/19	19	--	2.4	<2.0	1.4 J	--	--	--	--	--	--	--	--	--	--	--	67	1.6 J	69 J
	10/11/19	27	15	6.0	<1.9	1.7 J	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	<1.9	120	2.4	122
PW-418	09/27/18	40	--	4.1	<2.0	3.9	--	--	--	--	--	--	--	--	--	--	--	74	3.4	77
	03/08/19	30	--	3.0	<2.0	2.6	--	--	--	--	--	--	--	--	--	--	--	89	<3.1 B*	89 B*‡
	06/09/19	22	--	2.0	<2.0	2.2	--	--	--	--	--	--	--	--	--	--	--	63	<2.0 B*	63 B*‡
	06/09/19	22	--	2.0	<2.0	2.1	--	--	--	--	--	--	--	--	--	--	--	66	<2.0 B*	66 B*‡
PW-419	06/08/19	7.7	--	0.81 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	14	<2.0	14 ‡
PW-430	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-431	11/02/18	5.4	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	6.1	<2.0	6.1 ‡
PW-432	10/31/18	2.5	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.0	<2.0	2.0 ‡
PW-433	06/09/19	1.3 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-434	10/31/18	4.6	--	0.82 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	2.8	0.85 J	3.7 J
PW-435	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-436	10/31/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-438	06/09/19	2.7	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	3.7	<2.0	3.7 ‡

Table 2 - Summary of Historical Water Supply Well Analytical Results

Sample Name	Sample Date	Perfluorohexansulfonic acid (PFHxS)	Perfluorohexanoic acid (PFHxA)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorobutanesulfonic acid (PFBS)	Perfluorodecanoic acid (PFDA)	Perfluoroundecanoic acid (PFUnA)	Perfluorododecanoic acid (PFDoA)	Perfluorotridecanoic acid (PFTrDA)	Perfluorotetradecanoic acid (PFTeA)	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	Hexafluoropropylene oxide dimer acid (HFPO-DA)	Perfluorooctanesulfonic acid (PFOS)	Perfluorooctanoic acid (PFOA)	LHA Combined (PFOS + PFOA)
		ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
PW-440	11/01/18	<2.0	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-441	06/07/19	3.9	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.4 J	<2.0	1.4 J‡
PW-442	12/07/18	1.1 J	--	<2.0	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-460	11/02/18	1.7 J	--	<2.0	<2.0	1.4 J	--	--	--	--	--	--	--	--	--	--	--	<2.0	<2.0	n/a
PW-461	11/02/18	1.4 J	--	1.6 J	<2.0	<2.0	--	--	--	--	--	--	--	--	--	--	--	1.3 J	1.2 J	2.5 J
PW-462	06/07/19	18	--	2.1	<2.0	1.6 J	--	--	--	--	--	--	--	--	--	--	--	48	1.8 J	50 J
PW-463	06/08/19	29	--	3.0	<2.0	2.6	--	--	--	--	--	--	--	--	--	--	--	**74**	2.8	**77**
PW-464	10/13/19	2.1	0.51 J	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	1.6 J	<2.0	1.6 J‡

ng/L	nanograms per liter
Bold	Concentration exceeds action level.
DUP	Field-duplicate sample
<	Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
I	The reported value represents the estimated maximum possible concentration. Flag applied by the laboratory.
J	Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J*	Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)
B*	Result is considered not detected due to quality control failures. Result is shown as <LOQ or detected concentration. Flag applied by Shannon & Wilson, Inc. (*)
‡	Minimum concentration, the LHA Combined concentration includes one or more result that is not detected greater than the MDL.
N/A	Not applicable. The LHA concentration could not be calculated because one or more PFAS was not detected in the project sample.
¥	PW-006 is associated with a second source area.

Table 3 - **Summary of** Onsite **POET** Pre-Design Analytical Results

Analytical Method	Analyte	Units	*Airport Terminal*	*PW-001*	*PW-013*	*PW-046*	*PW-048*
EPA 537M by ID	4:2 Fluorotelomer sulfonate	µg/L	<0.00400	<0.00400	0.00259 J	<0.00400	<0.00400
	6:2 Fluorotelomer sulfonate	µg/L	0.223	0.635 JH*	44.6 JH*	<0.00400	<0.00400
	8:2 Fluorotelomer sulfonate	µg/L	0.00228 J	<0.00400	0.0285	<0.00400	<0.00400
	N-ethyl perfluorooctane sulfonamidoacetic acid (NEtFOSAA)	µg/L	<0.00800	<0.00800	<0.00800	<0.00800	<0.00800
	N-methyl perfluorooctane sulfonamidoacetic acid (NMeFOSAA)	µg/L	<0.00800	<0.00800 J*	<0.00800	<0.00800	<0.00800
	Perfluorobutanoic acid (PFBA)	µg/L	0.0131	0.109	0.604	0.00845	0.00229 J
	Perfluorodecanesulfonic acid (PFDS)	µg/L	<0.00200	<0.00200	0.00754	<0.00200	<0.00200
	Perfluorodecanoic acid (PFDA)	µg/L	<0.00200	<0.00200	0.00288 J	<0.00200	<0.00200
	Perfluorododecanoic acid (PFDOA)	µg/L	<0.00200	<0.00200 J*	<0.00200	<0.00200	<0.00200 J*
	Perfluoroheptanesulfonic acid (PFHPS)	µg/L	0.00238 J	0.0337	0.102	0.0147	<0.00200
	Perfluoro-heptanoic acid (PFHpA)	µg/L	0.00581	0.0264	0.272	0.00827	<0.00200
	Perfluorohexanoic acid (PFHxA)	µg/L	0.0269	0.216	1.32	0.0365	<0.00200
	Perfluoro-hexansulfonic acid (PFHxS)	µg/L	0.0231	0.489	0.692	0.865	<0.00200
	Perfluorononanesulfonic acid	µg/L	<0.00200	<0.00200	0.0342	<0.00200	<0.00200
	Perfluoro-nonanoic acid (PFNA)	µg/L	<0.00200	0.0042	0.0142	0.00178 J	<0.00200
	Perfluorooctane sulfonamide (FOSA)	µg/L	<0.00200	0.00204 J	0.00942	<0.00200	<0.00200
	Perfluoro-octane sulfonate (PFOS)	µg/L	0.33	2.88	5.49	0.0683	<0.00200 J*
	Perfluoro-octanoic acid (PFOA)	µg/L	0.00285 J	0.0241	0.129	0.0306	<0.00200
	Perfluoropentanesulfonic acid	µg/L	0.00287 J	0.0695	0.0664	0.071	<0.00200
	Perfluoropentanoic acid (PFPEA)	µg/L	0.0462	0.500	3.78	0.0152	<0.00200
	Perfluorotetradecanoic acid (PFTEA)	µg/L	<0.00200	<0.00200 J*	<0.00200	<0.00200	<0.00200
	Perfluorotridecanoic acid (PFTRIA)	µg/L	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
	Perfluoroundecanoic acid (PFUNA)	µg/L	<0.00200	<0.00200 J*	<0.00200	<0.00200	<0.00200 J*
	Perluor-obutane-sulfonic acid (PFBS)	µg/L	0.00261 J	0.0252	0.0321	0.029	<0.00200
AK102	Diesel Range Organics	mg/L	<0.319	<0.323	<0.311	0.230 J	<0.325
AK103	Residual Range Organics	mg/L	<0.266	<0.269	<0.259	0.196 J	<0.271
EPA 1664B	Oil & Grease, Total	mg/L	<4.21 B*	<4.21 B*	<4.12 B*	<4.17 B*	<4.21 B*
SM 5310B	Total Organic Carbon	mg/L	1.38	2.04	1.58	2.29	1.33
SM21 2540C	Total Dissolved Solids	mg/L	1000	444	321	437	242
SM21 2540D	Total Suspended Solids	mg/L	0.673 J	11.9	3.14	1.36	1.57
SM21 4500-H B	pH	pH units	7.9	7.5	7.6	7.6	7.8
SM21 2320B	Alkalinity	mg/L	225	267	264	338	193
SM21 2340B	Hardness as CaCO3	mg/L	304	311	281	371	204
SM21 2510B	Conductivity	umhos/cm	1900	763	528	715	402
SM21 4500-NH3 G	Ammonia as N	mg/L	0.791	0.180	0.174	0.0375 J	0.0504 J
SM21 4500NO3-F	Nitrate+Nitrite	mg/L	<0.200 B*	<0.100	<0.200 B*	0.834	<0.100

Table 3 - **Summary of Onsite POET Pre-Design Analytical Results**

Analytical Method	Analyte	Units	*Airport Terminal*	*PW-001*	*PW-013*	*PW-046*	*PW-048*
SM23 4500S D	Sulfide	µg/L	<50.0	<50.0	<50.0	<50.0	40.0 J
EPA 300.0	Chloride	mg/L	427	69.3	2.13	1.92	1.52
	Fluoride	mg/L	0.0980 J	0.0510 J	<0.100	<0.100	<0.100
	Sulfate	mg/L	27.9	19.6	14.0	51.3	14.5
EPA 200.8	Aluminum	mg/L	0.00840 J	<0.0100	<0.0100	<0.0100	0.00900 J
	Antimony	mg/L	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Arsenic	mg/L	0.00388 J	0.0153	0.0119	<0.00250	0.00889
	Barium	mg/L	0.0480	0.119	0.0773	0.0898	0.0658
	Beryllium	mg/L	<0.000200	<0.000200	<0.000200	<0.000200	<0.000200
	Cadmium	mg/L	<0.000250	<0.000250	<0.000250	<0.000250	<0.000250
	Calcium	mg/L	70.9	107	99.5	125	73.9
	Chromium	mg/L	<0.00100	<0.00100	<0.00100	<0.00100	<0.00100
	Cobalt	mg/L	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200
	Copper	mg/L	0.0724	0.0299	0.0464	0.0786	0.0585
	Iron	mg/L	0.725	5.87	2.56	1.31	2.20
	Lead	mg/L	0.00301	0.000429	0.00223	0.00347	0.00418
	Magnesium	mg/L	30.9	10.6	7.82	14.5	4.80
	Manganese	mg/L	0.182	0.496	0.464	0.174	0.137
	Molybdenum	mg/L	0.00176 J	0.000746 J	<0.00100	<0.00100	0.00153 J
	Nickel	mg/L	0.00323 JH*	0.00753	0.00349 JH*	0.00541 JH*	<0.00232 B*
	Phosphorus	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100
	Potassium	mg/L	10.9	7.18	4.51	5.31	3.20
	Selenium	mg/L	<0.00250	<0.00250	<0.00250	<0.00250	<0.00250
	Silicon	mg/L	5.83	7.10	6.27	3.96	3.26
	Silver	mg/L	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Sodium	mg/L	251	29.7	2.37	2.54	1.78
	Thallium	mg/L	<0.000500	<0.000500	<0.000500	<0.000500	<0.000500
	Tin	mg/L	0.00106	<0.000500	0.00158	0.00106	0.000959 J
	Titanium	mg/L	<0.0125	<0.0125	<0.0125	<0.0125	<0.0125
	Vanadium	mg/L	<0.0100	<0.0100	<0.0100	<0.0100	<0.0100
	Zinc	mg/L	0.127	0.0867	0.267	0.241	0.446
SOP BAL-4100	AS(III)	µg/L	1.33	14.0	7.47	0.0650 J	8.64
	AS(V)	µg/L	1.21	1.82	1.04	<0.216	0.610
	Dimethylarsinic acid (DMAs)	µg/L	<0.227	<0.227	<0.227	<0.227	<0.227
	Monomethylarsonic acid (MMAs)	µg/L	<0.248	<0.248	<0.248	<0.248	<0.248

Table 3 - **Summary of Onsite POET Pre-Design Analytical Results**

Notes:

EPA	Environmental Protection Agency
mg/L	milligram per liter
µg/L	microgram per liter
umhos/cm	micromhos per centimeter
<	Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control failures.
J	Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J*	Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)
JH*	Estimated concentration, biased high due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)
B*	Result is considered not detected due to quality control failures. Result is shown as <LOQ or detected concentration. Flag applied by Shannon & Wilson, Inc. (*)

Table 4 - Summary of Surface Water Analytical Results

Analyte		Perluoro-butane sulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluoro-octanoic acid (PFOA)	Perfluoro-octane sulfonate (PFOS)
Action Level		2,000				400	400
Sample Name	Sample Date	ng/L	ng/L	ng/L	ng/L	ng/L	ng/L
SW-020	3/7/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
SW-021	3/7/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0

NOTES:

ng/L nanograms per liter

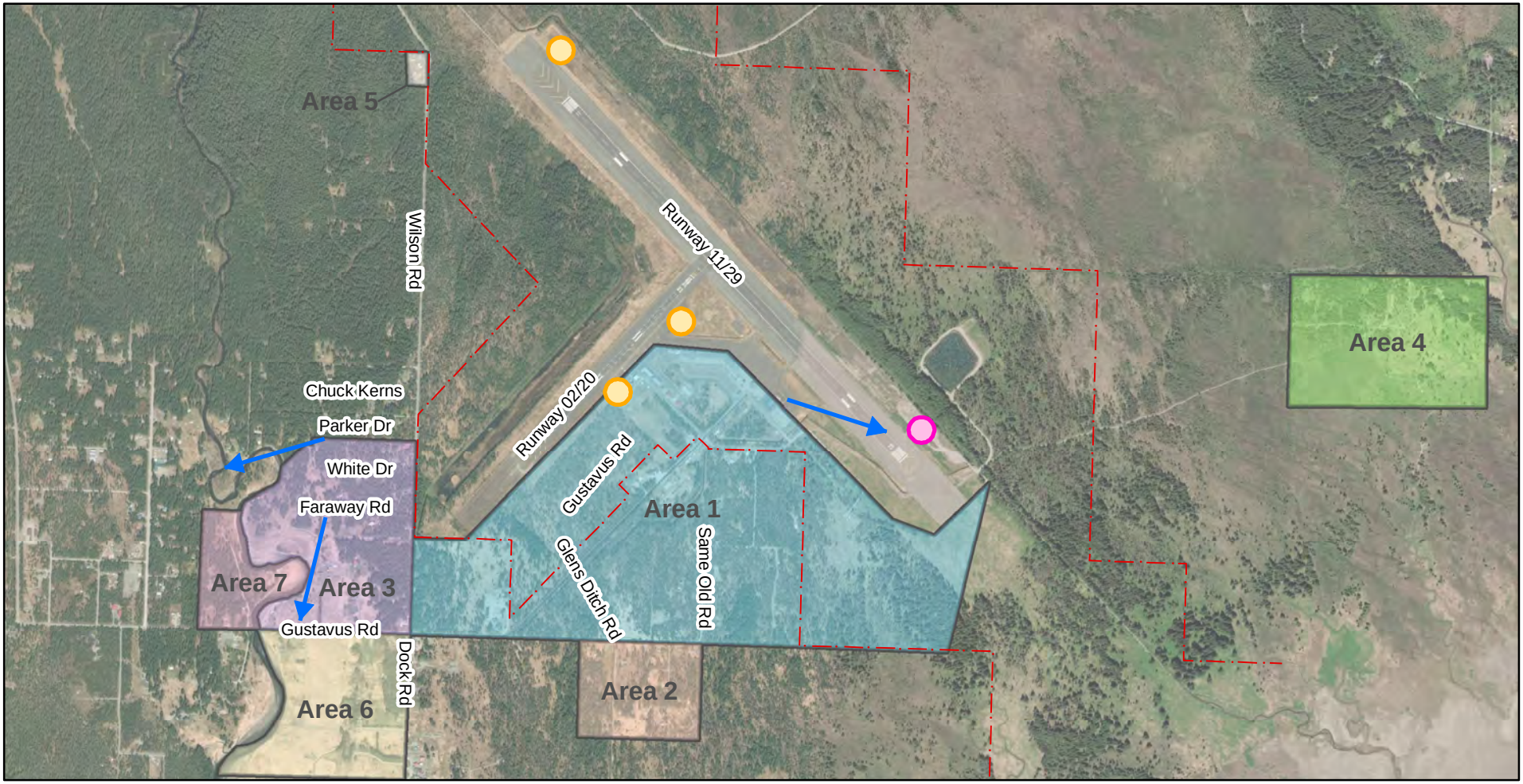
< Analyte not detected; listed as less than the reporting limit (RL).

Table 5 - Gustavus Water Supply Well Trend Analysis

Sample Name	Sample Date	Sample Location	PFOA (ng/L)	PFOS (ng/L)	LHA Combined (PFOA + PFOS)	Exceed LHA Level?[a]	Trends[b]
NPS Well	Aug-2018	NPS Well	4.6	23	28	No	Decreasing Trend for PFOA; Stable Trend for PFOS and LHA
	Sep-2018		4.3	22	26		
	Mar-2019		3.5	13	17		
	Jun-2019		<3.4 B*	16	16 B*‡		
	Oct-2019		2.9	19	22		
PW-011	Aug-2018	PW-011	3.3	**93**	**96**	Yes	Decreasing Trend for PFOA; Stable Trend for PFOS and LHA
	Sep-2018		3.1	**80**	**83**		
	Mar-2019		<2.6 B*	**96**	**96 B*‡**		
	Jun-2019		2.0	**82**	**84**		
PW-012	Aug-2018	PW-012	0.77 J	7.7	8.5 J	No	Stable Trend for PFOA, PFOS, and LHA
	Mar-2019		<2.0 B*	25	25 B*‡		
	Jun-2019		0.81 J	14	15 J		
	Oct-2019		0.74 J	13	14 J		
PW-037	Aug-2018	PW-037	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<1.9	<1.9	N/A		
PW-038	Aug-2018	PW-038	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<1.8	<1.8	N/A		
PW-039	Aug-2018	PW-039	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<1.8	<1.8	N/A		
PW-040	Aug-2018	PW-040	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<1.9	<1.9	N/A		
PW-059	Aug-2018	PW-059	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<1.9	<1.9	N/A		
PW-203	Sep-2018	PW-203	<2.0	<2.0	N/A	No	Cannot assess a trend
	Mar-2019		<2.0	<2.0	N/A		
	Jun-2019		<2.0	<2.0	N/A		
	Oct-2019		<2.0	<2.0	N/A		
PW-401	Sep-2018	PW-401	1.4 J	40	41 J	No	No Trends
	Oct-2018		1.6 J	36	38 J		
	Mar-2019		<2.0 B*	31	31 B*‡		
	Jun-2019		<2.0 B*	43	43 B*‡		
	Oct-2019		1.4 J	45	46 J		

NOTES:
The higher detected result is reported for field-duplicate samples.
Trends were only evaluated for locations with more than four results and at least one detected result.

a EPA LHA level is 70 ng/L for PFOS and PFOA combined; following DEC guidance results are compared to 65 ng/L.
b Mann-Kendall trend analysis at a 95% confidence level was calculated using the EPA statistics software ProUCL Version 5.1
Bold Concentration exceeds EPA LHA level
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control failures.
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the reporting limit (RL). Flag applied by the laboratory.
B* Result is considered not detected due to a blank detection. Result is reported as less than the RL or detected concentration. Flag applied y Shannon & Wilson,
EPA Environmental Protection Agency
LHA Lifetime Health Advisory
ng/L nanograms per liter



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- Area 1
- Area 2
- Area 3
- Area 4
- Area 5
- Area 6
- Area 7
- Well Search Areas
- AFFF Burn Pit
- AFFF Sites
- Airport Property Boundary
- EPA Calculator Hydraulic Gradient

0 0.5 Miles

N

December 2018 to November 2019
Water Supply Well Sampling
Gustavus, Alaska

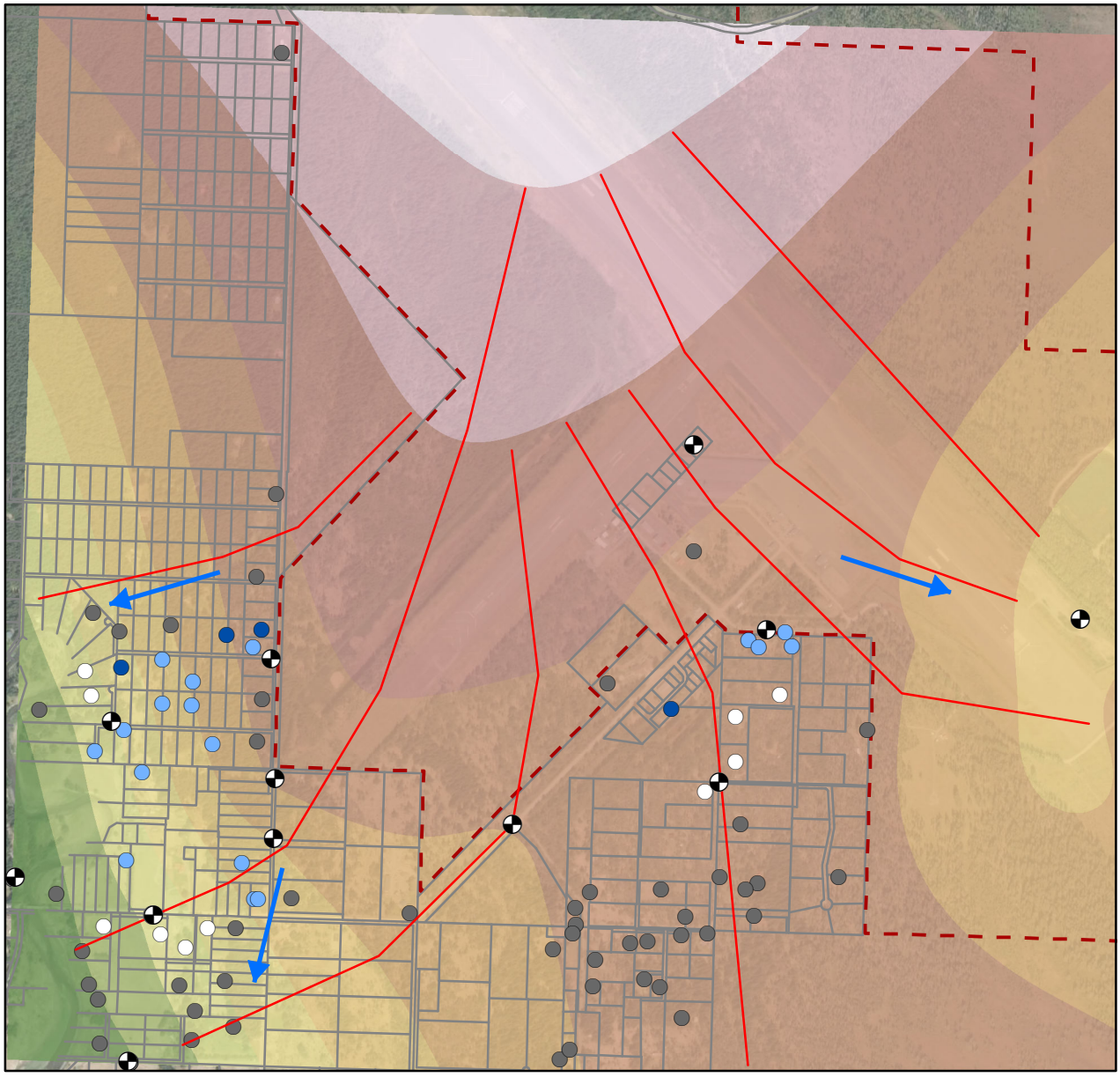
WELL SEARCH EXTENT

August 2020 102599

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Figure 1



LEGEND

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Groundwater Elevations

- 10 - 12 feet
- 12 - 14 feet
- 14 - 16 feet
- 16 - 18 feet
- 16 - 20 feet
- 20 - 22 feet
- 22 - 24 feet
- 24 - 26 feet
- 26 - 28 feet
- 28 - 30 feet

Well Monitoring Network

- Annually
- Quarterly
- Not In Network
- Proposed Annual
- Monitoring Well
- Airport Property Boundary
- Property Lines
- Interpolated Hydraulic Gradient
- EPA Calculated Hydraulic Gradient

N

0 2,000

Feet

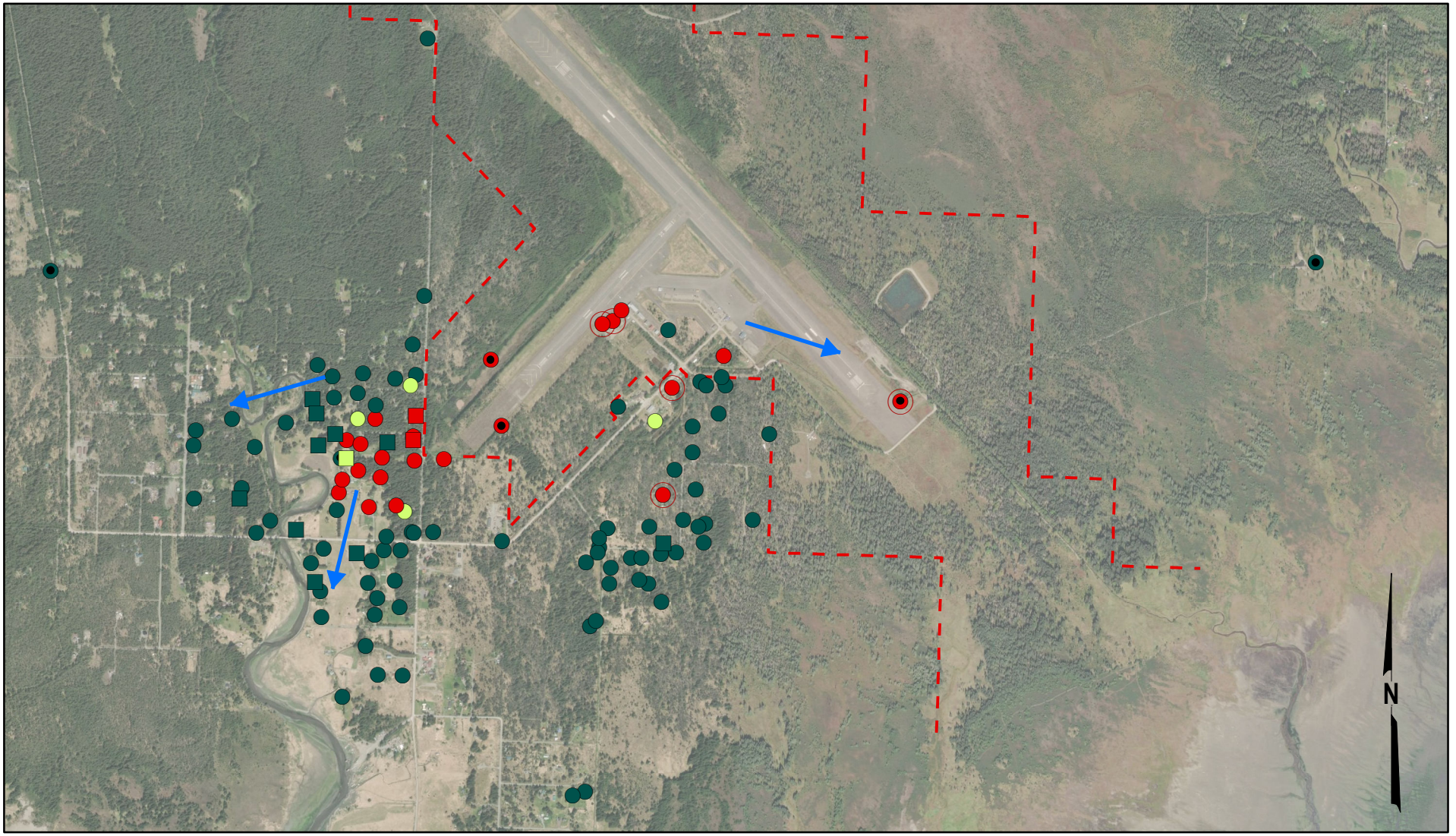
December 2018 to November 2019
Water Supply Well Sampling
Gustavus, Alaska

GROUNDWATER GRADIENT AND WELL MONITORING NETWORK

August 2020 102599

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Wells sampled before April 2019: compared to former DEC action level*

- ≤17 nanograms per liter (ng/L)
- 18 to 69 ng/L
- ≥70 ng/L (over former action level)

Wells sampled after April 2019: compared to EPA health advisory level (sum of PFOS and PFOA)

- ≤17 ng/L
- 18 to 69 ng/L
- ≥70 ng/L (over EPA advisory)

- PFOS ≥ 400 ng/L
- Surface Water Sample
- Airport Property Boundary
- EPA Calculator Hydraulic Gradient

0 0.5 1

Miles

*Sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA

December 2018 to November 2019
Water Supply Well Sampling
Gustavus, Alaska

HIGHEST REPORTED WATER SUPPLY WELL ANALYTICAL RESULTS

August 2020 102599

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3

APPENDIX A: FIELD LOGS

Appendix A

FIELD LOGS

CONTENTS

- Water Supply Well surveys
- Water Supply Well sampling logs

Water supply well field notes contain personal information.
This content has been removed for confidentiality.

APPENDIX B: LABORATORY REPORTS

Appendix B

LABORATORY REPORTS

CONTENTS

- Analytical laboratory reports

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-48268-1
Client Project/Site: Gustavus

For:
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Marcy Nadel

Authorized for release by:
3/20/2019 12:20:38 PM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

Table of Contents

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Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Glossary

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

Job ID: 320-48268-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-48268-1

Receipt
The samples were received on 3/12/2019 11:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.2º C and 5.9º C.

Receipt Exceptions

The container label sample time for the following sample did not match the information listed on the Chain-of-Custody (COC): SW-020 (320-48268-1) and SW-021 (320-48268-2). The container labels list 12:45, while the COC lists 12:25. The client was contacted, and the lab was instructed to login the sample with the sample time on the COC.

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

Organic Prep
Method(s) PFAS Prep: The following samples had small black particles floating around: SW-020 (320-48268-1) and SW-021 (320-48268-2) in preparation batch 320-282076.

Method: PFAS DI
Matrix: Water

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-282076.

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: Gustavus

TestAmerica Job ID: 320-48268-1

Client Sample ID: SW-020 — Lab Sample ID: 320-48268-1

No Detections.

Client Sample ID: SW-021 — Lab Sample ID: 320-48268-2

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Client Sample ID: SW-020
Date Collected: 03/07/19 12:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48268-1
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/15/19 16:54	03/18/19 22:39	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/15/19 16:54	03/18/19 22:39	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/15/19 16:54	03/18/19 22:39	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/15/19 16:54	03/18/19 22:39	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/15/19 16:54	03/18/19 22:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/15/19 16:54	03/18/19 22:39	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*
13C4 PFHpA	*120*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*
13C4 PFOA	*111*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*
13C4 PFOS	*110*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*
13C5 PFNA	*119*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*
13C3 PFBS	*110*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:39*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Client Sample ID: SW-021
Date Collected: 03/07/19 12:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48268-2
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/15/19 16:54	03/18/19 22:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/15/19 16:54	03/18/19 22:57	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/15/19 16:54	03/18/19 22:57	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/15/19 16:54	03/18/19 22:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/15/19 16:54	03/18/19 22:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/15/19 16:54	03/18/19 22:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*
13C4 PFHpA	*120*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*
13C4 PFOA	*119*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*
13C4 PFOS	*111*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*
13C5 PFNA	*110*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*
13C3 PFBS	*109*		*25 - 150*	*03/15/19 16:54*	*03/18/19 22:57*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)	3C3-PFBS (25-150)		
320-48268-1	SW-020	106	120	111	110	119	110		
320-48268-2	SW-021	107	120	119	111	110	109		
LCS 320-282076/2-A	Lab Control Sample	105	114	107	102	104	105		
LCSD 320-282076/3-A	Lab Control Sample Dup	111	115	111	109	108	109		
MB 320-282076/1-A	Method Blank	117	117	120	116	118	118		

Surrogate Legend

PFHxS = 18O2 PFHxS
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFOS = 13C4 PFOS
PFNA = 13C5 PFNA
13C3-PFBS = 13C3 PFBS

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-282076/1-A
Matrix: Water
Analysis Batch: 282307

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 282076

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/15/19 16:54	03/18/19 21:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/15/19 16:54	03/18/19 21:44	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/15/19 16:54	03/18/19 21:44	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/15/19 16:54	03/18/19 21:44	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/15/19 16:54	03/18/19 21:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/15/19 16:54	03/18/19 21:44	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*110*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*
13p 4 PFHAN	*110*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*
13p 4 PFON	*12-*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*
13p 4 PFOS	*11C*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*
13p 6 PFBN	*118*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*
13p 3 PF7 S	*118*		*26 516-*	*- 3/16/19 1C64*	*- 3/18/19 21:44*	*1*

Lab Sample ID: LCS 320-282076/2-A
Matrix: Water
Analysis Batch: 282307

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282076

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.5		ng/L		99	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.1		ng/L		94	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	17.4		ng/L		87	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	23.3		ng/L		117	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	17.2		ng/L		93	69 - 144
Perfluorononanoic acid (PFNA)	20.0	19.4		ng/L		97	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*1- 6*		*26 516-*
13p 4 PFHAN	*114*		*26 516-*
13p 4 PFON	*1- 0*		*26 516-*
13p 4 PFOS	*1- 2*		*26 516-*
13p 6 PFBN	*1- 4*		*26 516-*
13p 3 PF7 S	*1- 6*		*26 516-*

Lab Sample ID: LCSD 320-282076/3-A
Matrix: Water
Analysis Batch: 282307

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282076

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.1		ng/L		97	72 - 151	2	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.5		ng/L		91	73 - 157	4	30
Perfluoroheptanoic acid (PFHpA)	20.0	17.1		ng/L		85	71 - 138	2	30
Perfluorooctanoic acid (PFOA)	20.0	18.4		ng/L		92	70 - 140	24	30

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-282076/3-A
Matrix: Water
Analysis Batch: 282307

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282076

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			18.6	16.5		ng/L		89	69 - 144	4	30
Perfluorononanoic acid (PFNA)			20.0	16.7		ng/L		84	73 - 147	15	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*111*		*26 516-*
13p 4 PFHAN	*116*		*26 516-*
13p 4 PFON	*111*		*26 516-*
13p 4 PFOS	*1- 9*		*26 516-*
13p 6 PFBN	*1- 8*		*26 516-*
13p 3 PF7 S	*1- 9*		*26 516-*

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

LCMS

Prep Batch: 282076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48268-1	SW-020	Total/NA	Water	PFAS Prep	
320-48268-2	SW-021	Total/NA	Water	PFAS Prep	
MB 320-282076/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-282076/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-282076/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 282307

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48268-1	SW-020	Total/NA	Water	WS-LC-0025 At1	282076
320-48268-2	SW-021	Total/NA	Water	WS-LC-0025 At1	282076
MB 320-282076/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	282076
LCS 320-282076/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	282076
LCSD 320-282076/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	282076

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Client Sample ID: SW-020

Date Collected: 03/07/19 12:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48268-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282076	03/15/19 16:54	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 22:39	D1R	TAL SAC

Client Sample ID: SW-021

Date Collected: 03/07/19 12:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48268-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282076	03/15/19 16:54	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 22:57	D1R	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: Gustavus

TestAmerica Job ID: 320-48268-1

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 / DOE		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	01-31-20
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	01-29-20
Illinois	NELAP	5	200060	03-17-19 *
Kansas	NELAP	7	E-10375	10-31-19
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	01-29-20
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	12-31-19
Wyoming	State Program	8	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus

TestAmerica Job ID: 320-48268-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

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: Gustavus

TestAmerica Job ID: 320-48268-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-48268-1	SW-020	Water	03/07/19 12:25	03/12/19 11:05
320-48268-2	SW-021	Water	03/07/19 12:25	03/12/19 11:05

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: David Althorker

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [ ] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	WS-LC-0025 PFAS x6	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
SW-020		12:25	3/7/19	X	2	Surface water
SW-021		12:25	3/7/19	X	2	Surface Water

320-48268 Chain of Custody

Project Information	
Number:	102599-003
Name:	~~HRT~~ Gustavus
Contact:	KRF
Ongoing Project?	Yes [X] No [ ]
Sampler:	CAB

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

Notes:

Unable to deliver Samples as intended

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: [signature] Time: 900	Signature: [signature] Time: 1100	Signature: Time:
Printed Name: Craig Beebe Date: 3/10/19	Printed Name: Craig Beebe Date: 3/11/19	Printed Name: Date:
Company: Shannon & Wilson	Company: Shannon & Wilson	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1100	Signature: [signature] Time: 1105	Signature: Time:
Printed Name: Craig Beebe Date: 3/10/19	Printed Name: MARK NUWAL Date: 3/12/19	Printed Name: Date:
Company: Shannon & Wilson	Company: TA-SAC	Company:

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

(1) Both samples have time noted on label as 12:45 / 13 March 19

No. 35823

3/20/2019

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-48268-1

Login Number: 48268
List Number: 1
Creator: Her, David A

List Source: TestAmerica Sacramento

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

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

TestAmerica Job ID: 320-48266-1
Client Project/Site: Gustavus DOT

For:
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger

Authorized for release by:
3/25/2019 12:43:57 PM

David Alltucker, Project Manager I
(916)374-4383
david.alltucker@testamericainc.com

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Qualifiers

LCMS

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

Job ID: 320-48266-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-48266-1

Receipt
The samples were received on 3/12/2019 11:05 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.2º C and 5.9º C.

Receipt Exceptions

One for the following sample was received leaking: PW-022 (320-48266-13). Cap was broken leading to volume being lost. Volume is currently around 150ml. Sample bottle was marked as "do not use".

The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): PW-203 (320-48266-23). The container labels list time as 1205, while the COC lists 1140.

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

Organic Prep
Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-281969.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-282334.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-282571.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-283099.

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: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-013 — Lab Sample ID: 320-48266-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	34		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	150		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	110		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	18		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	650		200	87	ng/L	100		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	6000		200	130	ng/L	100		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-1001 — Lab Sample ID: 320-48266-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.9	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	13		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-001 — Lab Sample ID: 320-48266-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	21		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	17		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	2.3		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	320		20	8.7	ng/L	10		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1200		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-202 — Lab Sample ID: 320-48266-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	17		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	32		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-209 — Lab Sample ID: 320-48266-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	35		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.0		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-405 — Lab Sample ID: 320-48266-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	27		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	76		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-505 — Lab Sample ID: 320-48266-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.8		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	28		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	78		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-406 — Lab Sample ID: 320-48266-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.3		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.8		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	8.9		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	92		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-506 — Lab Sample ID: 320-48266-9

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-506 (Continued) — Lab Sample ID: 320-48266-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.2		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	28		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.3		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.6		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	94		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-408 — Lab Sample ID: 320-48266-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.0		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	97		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-213 — Lab Sample ID: 320-48266-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.1		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	24		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	53		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-210 — Lab Sample ID: 320-48266-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	70		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-022 — Lab Sample ID: 320-48266-13

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-022 (Continued) — Lab Sample ID: 320-48266-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	28		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	230		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	20		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	25	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.7	J I	2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	1500		20	13	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-402 — Lab Sample ID: 320-48266-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.2		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.2	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	100		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-200 — Lab Sample ID: 320-48266-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	76		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-059 — Lab Sample ID: 320-48266-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.98	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-1000 — Lab Sample ID: 320-48266-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.3		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-1000 (Continued) — Lab Sample ID: 320-48266-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	5.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.5	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	270		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-038 — Lab Sample ID: 320-48266-18

No Detections.

Client Sample ID: PW-037 — Lab Sample ID: 320-48266-19

No Detections.

Client Sample ID: PW-012 — Lab Sample ID: 320-48266-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.5	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.87	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.1	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	25		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-039 — Lab Sample ID: 320-48266-21

No Detections.

Client Sample ID: PW-139 — Lab Sample ID: 320-48266-22

No Detections.

Client Sample ID: PW-203 — Lab Sample ID: 320-48266-23

No Detections.

Client Sample ID: PW-040 — Lab Sample ID: 320-48266-24

No Detections.

Client Sample ID: PW-401 — Lab Sample ID: 320-48266-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	20		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-401 (Continued) — Lab Sample ID: 320-48266-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.6	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-418 — Lab Sample ID: 320-48266-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.6		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.0		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.1	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	89		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-011 — Lab Sample ID: 320-48266-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	32		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.6	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	96		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-046 — Lab Sample ID: 320-48266-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.2		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	20	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	63		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	320		20	8.7	ng/L	10		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-002 — Lab Sample ID: 320-48266-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	21		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-002 (Continued)

Lab Sample ID: 320-48266-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	3.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	72		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-013

Date Collected: 03/07/19 09:45
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-1

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	34		2d0	0d(2	nF/B		03/1(/1(13:0)	03/1(/1(18:34	1
Perfluoroheptanoic acid (PFHpA)	150		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(18:34	1
Perfluorooctanoic acid (PFOA)	110		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(18:34	1
Perfluorononanoic acid (PFNA)	18		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(18:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFHpA	*105*		*25 - 150*	*03/19/19 13:05*	*03/19/19 18:34*	*1*
13C4 PFOA	*88*		*25 - 150*	*03/19/19 13:05*	*03/19/19 18:34*	*1*
13C5 PFNA	*83*		*25 - 150*	*03/19/19 13:05*	*03/19/19 18:34*	*1*
13C3 PFBS	*111*		*25 - 150*	*03/19/19 13:05*	*03/19/19 18:34*	*1*

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	650		200	8N	nF/B		03/1(/1(13:0)	03/21/1(22:44	100
Perfluorooctanesulfonic acid (PFOS)	6000		200	130	nF/B		03/1(/1(13:0)	03/21/1(22:44	100

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/19/19 13:05*	*03/21/19 22:44*	*100*
13C4 PFOS	*107*		*25 - 150*	*03/19/19 13:05*	*03/21/19 22:44*	*100*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-1001
Date Collected: 03/07/19 10:18
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-2
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2d0	0d(2	nF/B		03/21/1(10:) (	03/22/1(13:04	1
Perfluorohexanesulfonic acid (PFHxS)	13		2d0	0d8N	nF/B		03/21/1(10:) (	03/22/1(13:04	1
Perfluoroheptanoic acid (PFHpA)	1.9	J	2d0	0d80	nF/B		03/21/1(10:) (	03/22/1(13:04	1
Perfluorooctanoic acid (PFOA)	3.5		2d0	0dN)	nF/B		03/21/1(10:) (	03/22/1(13:04	1
Perfluorooctanesulfonic acid (PFOS)	13		2d0	1d8	nF/B		03/21/1(10:) (	03/22/1(13:04	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/21/1(10:) (	03/22/1(13:04	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*
13C4 PFOS	*104*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*
13C5 PFNA	*90*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*
13C3 PFBS	*107*		*25 - 150*	*03/21/19 10:59*	*03/22/19 13:04*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-001
Date Collected: 03/07/19 10:41
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-3
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	21		2d0	0d(2	nF/B		03/1(/1(13:0)	03/1(/1(1(:2(	1
Perfluoroheptanoic acid (PFHpA)	17		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(1(:2(	1
Perfluorooctanoic acid (PFOA)	13		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(1(:2(	1
Perfluorononanoic acid (PFNA)	2.3		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(1(:2(	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFHpA	*111*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:29*	*1*
13C4 PFOA	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:29*	*1*
13C5 PFNA	*92*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:29*	*1*
13C3 PFBS	*113*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:29*	*1*

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	320		20	8dN	nF/B		03/1(/1(13:0)	03/21/1(23:22	10
Perfluorooctanesulfonic acid (PFOS)	1200		20	13	nF/B		03/1(/1(13:0)	03/21/1(23:22	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/19/19 13:05*	*03/21/19 23:22*	*10*
13C4 PFOS	*107*		*25 - 150*	*03/19/19 13:05*	*03/21/19 23:22*	*10*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-202
Date Collected: 03/07/19 11:15
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-4
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1
Perfluorohexanesulfonic acid (PFHxS)	17		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1
Perfluoroheptanoic acid (PFHpA)	2.0		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1
Perfluorooctanoic acid (PFOA)	3.0		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1
Perfluorooctanesulfonic acid (PFOS)	32		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(1(:4N	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*
13C4 PFHpA	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*
13C4 PFOA	*110*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*
13C4 PFOS	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*
13C3 PFBS	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 19:47*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-209
Date Collected: 03/07/19 11:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-5
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.7		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1
Perfluorohexanesulfonic acid (PFHxS)	35		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1
Perfluoroheptanoic acid (PFHpA)	5.0		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1
Perfluorooctanoic acid (PFOA)	2.7		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1
Perfluorooctanesulfonic acid (PFOS)	120		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(20:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*
13C5 PFNA	*93*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:06*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-405
Date Collected: 03/07/19 11:32
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-6
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.8		2d0	0d2	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1
Perfluorohexanesulfonic acid (PFHxS)	27		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1
Perfluoroheptanoic acid (PFHpA)	2.3		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1
Perfluorooctanoic acid (PFOA)	2.5		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1
Perfluorooctanesulfonic acid (PFOS)	76		2d0	1d3	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(20:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*
13C4 PFHpA	*120*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*
13C4 PFOA	*113*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*
13C4 PFOS	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*
13C5 PFNA	*103*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*
13C3 PFBS	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:24*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-505
Date Collected: 03/07/19 11:22
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-7
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.8		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1
Perfluorohexanesulfonic acid (PFHxS)	28		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1
Perfluoroheptanoic acid (PFHpA)	2.8		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1
Perfluorooctanoic acid (PFOA)	2.7		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1
Perfluorooctanesulfonic acid (PFOS)	78		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(20:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*112*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*
13C4 PFHpA	*120*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*
13C4 PFOA	*109*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*
13C3 PFBS	*113*		*25 - 150*	*03/19/19 13:05*	*03/19/19 20:43*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-406
Date Collected: 03/07/19 12:52
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-8
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.3		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1
Perfluoroheptanoic acid (PFHpA)	4.8		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1
Perfluorooctanoic acid (PFOA)	8.9		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1
Perfluorooctanesulfonic acid (PFOS)	92		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(21:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*
13C5 PFNA	*96*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*
13C3 PFBS	*105*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:01*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-506
Date Collected: 03/07/19 12:42
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-9
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1
Perfluorohexanesulfonic acid (PFHxS)	28		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1
Perfluoroheptanoic acid (PFHpA)	4.3		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1
Perfluorooctanoic acid (PFOA)	5.6		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1
Perfluorooctanesulfonic acid (PFOS)	94		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(21:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*113*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*
13C4 PFHpA	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*
13C4 PFOS	*107*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*
13C3 PFBS	*111*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:20*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-408
Date Collected: 03/07/19 13:36
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-10
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.0		2d0	0d2	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1
Perfluorohexanesulfonic acid (PFHxS)	22		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1
Perfluoroheptanoic acid (PFHpA)	3.9		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1
Perfluorooctanoic acid (PFOA)	2.5		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1
Perfluorooctanesulfonic acid (PFOS)	97		2d0	1d3	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(21:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*118*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*
13C4 PFHpA	*113*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*
13C4 PFOA	*108*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*
13C3 PFBS	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:38*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-213
Date Collected: 03/07/19 13:50
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-11
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.1		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1
Perfluorohexanesulfonic acid (PFHxS)	24		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1
Perfluoroheptanoic acid (PFHpA)	2.5		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1
Perfluorooctanoic acid (PFOA)	2.2		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1
Perfluorooctanesulfonic acid (PFOS)	53		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(21:) 6	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*109*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*
13C4 PFHpA	*114*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*
13C4 PFOA	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*
13C4 PFOS	*106*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*
13C5 PFNA	*98*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*
13C3 PFBS	*111*		*25 - 150*	*03/19/19 13:05*	*03/19/19 21:56*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-210
Date Collected: 03/07/19 14:27
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-12
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.7		2d0	0d[2	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1
Perfluorohexanesulfonic acid (PFHxS)	26		2d0	0d8N	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1
Perfluoroheptanoic acid (PFHpA)	2.6		2d0	0d80	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1
Perfluorooctanoic acid (PFOA)	2.5		2d0	0dN)	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1
Perfluorooctanesulfonic acid (PFOS)	70		2d0	1d8	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1(/1(13:0)	03/1(/1(22:1)	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*
13C4 PFHpA	*115*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*
13C4 PFOA	*116*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*
13C5 PFNA	*95*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*
13C3 PFBS	*109*		*25 - 150*	*03/19/19 13:05*	*03/19/19 22:15*	*1*

Client Sample ID: PW-022
Date Collected: 03/07/19 15:15
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-13
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	28		2d0	0d(2	nF/B		03/1) /1(13:))	03/16/1(18:24	1
Perfluorohexanesulfonic acid (PFHxS)	230		2d0	0d8N	nF/B		03/1) /1(13:))	03/16/1(18:24	1
Perfluoroheptanoic acid (PFHpA)	20		2d0	0d80	nF/B		03/1) /1(13:))	03/16/1(18:24	1
Perfluorooctanoic acid (PFOA)	25	B	2d0	0dN)	nF/B		03/1) /1(13:))	03/16/1(18:24	1
Perfluorononanoic acid (PFNA)	1.7	J I	2d0	0d6)	nF/B		03/1) /1(13:))	03/16/1(18:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*113*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:24*	*1*
13C4 PFHpA	*113*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:24*	*1*
13C4 PFOA	*115*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:24*	*1*
13C5 PFNA	*87*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:24*	*1*
13C3 PFBS	*107*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:24*	*1*

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	1500		20	13	nF/B		03/1) /1(13:))	03/1(/1(12:14	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOS	*97*		*25 - 150*	*03/15/19 13:55*	*03/19/19 12:14*	*10*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-402
Date Collected: 03/07/19 15:40
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-14
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2		2d0	0d(2	nF/B		03/1) /1(13:))	03/16/1(18:42	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d0	0d8N	nF/B		03/1) /1(13:))	03/16/1(18:42	1
Perfluoroheptanoic acid (PFHpA)	4.4		2d0	0d80	nF/B		03/1) /1(13:))	03/16/1(18:42	1
Perfluorooctanoic acid (PFOA)	2.2	B	2d0	0dN)	nF/B		03/1) /1(13:))	03/16/1(18:42	1
Perfluorooctanesulfonic acid (PFOS)	100		2d0	1d8	nF/B		03/1) /1(13:))	03/16/1(18:42	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/16/1(18:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*
13C5 PFNA	*100*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/15/19 13:55*	*03/16/19 18:42*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-200
Date Collected: 03/07/19 15:50
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-15
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.7		2d0	0d(2	nF/B		03/18/1(13:48	03/1(/1(01:44	1
Perfluorohexanesulfonic acid (PFHxS)	26		2d0	0d8N	nF/B		03/18/1(13:48	03/1(/1(01:44	1
Perfluoroheptanoic acid (PFHpA)	2.5		2d0	0d80	nF/B		03/18/1(13:48	03/1(/1(01:44	1
Perfluorooctanoic acid (PFOA)	2.8		2d0	0dN)	nF/B		03/18/1(13:48	03/1(/1(01:44	1
Perfluorooctanesulfonic acid (PFOS)	76		2d0	1d8	nF/B		03/18/1(13:48	03/1(/1(01:44	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/18/1(13:48	03/1(/1(01:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*
13C4 PFOS	*94*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*
13C5 PFNA	*92*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*
13C3 PFBS	*96*		*25 - 150*	*03/18/19 13:48*	*03/19/19 01:44*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-059
Date Collected: 03/07/19 16:20
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-16
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(14:02	1
Perfluorohexanesulfonic acid (PFHxS)	**0.98**	**J**	2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(14:02	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(14:02	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(14:02	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d3	nF/B		03/1) /1(13:))	03/18/1(14:02	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(14:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*115*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*
13C4 PFHpA	*125*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*
13C4 PFOA	*123*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*
13C4 PFOS	*111*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*
13C5 PFNA	*119*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*
13C3 PFBS	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:02*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-1000
Date Collected: 03/08/19 09:50
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-17
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.3		2d0	0d(2	nF/B		03/1) /1(13:))	03/18/1(14:21	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(14:21	1
Perfluoroheptanoic acid (PFHpA)	5.9		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(14:21	1
Perfluorooctanoic acid (PFOA)	3.5	B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(14:21	1
Perfluorooctanesulfonic acid (PFOS)	270		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(14:21	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(14:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*
13C4 PFHpA	*121*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*
13C4 PFOA	*124*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*
13C4 PFOS	*110*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*
13C5 PFNA	*107*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*
13C3 PFBS	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:21*	*1*

Client Sample ID: PW-038
Date Collected: 03/08/19 10:35
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-18
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(14:3(	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(14:3(	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(14:3(	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(14:3(	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(14:3(	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(14:3(	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*114*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*
13C4 PFHpA	*123*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*
13C4 PFOA	*126*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*
13C4 PFOS	*111*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*
13C5 PFNA	*119*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*
13C3 PFBS	*117*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:39*	*1*

Client Sample ID: PW-037

Date Collected: 03/08/19 10:43
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-19

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(14:) N	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(14:) N	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(14:) N	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(14:) N	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(14:) N	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(14:) N	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*
13C4 PFOA	*104*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*
13C5 PFNA	*96*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/15/19 13:55*	*03/18/19 14:57*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-012
Date Collected: 03/08/19 11:20
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-20
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.5	J	2d0	0d2	nF/B		03/1) /1(13:))	03/18/1(1) :34	1
Perfluorohexanesulfonic acid (PFHxS)	11		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(1) :34	1
Perfluoroheptanoic acid (PFHpA)	0.87	J	2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(1) :34	1
Perfluorooctanoic acid (PFOA)	1.1	J B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(1) :34	1
Perfluorooctanesulfonic acid (PFOS)	25		2d0	1d3	nF/B		03/1) /1(13:))	03/18/1(1) :34	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(1) :34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*
13C4 PFHpA	*128*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*
13C4 PFOA	*123*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*
13C4 PFOS	*117*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*
13C3 PFBS	*121*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:34*	*1*

Client Sample ID: PW-039

Date Collected: 03/08/19 11:12
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-21

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(1) :) 3	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*
13C4 PFHpA	*112*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*
13C4 PFOA	*106*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*
13C4 PFOS	*102*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/15/19 13:55*	*03/18/19 15:53*	*1*

Client Sample ID: PW-139
Date Collected: 03/08/19 11:02
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-22
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(16:11	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(16:11	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(16:11	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(16:11	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(16:11	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(16:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*
13C4 PFHpA	*122*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*
13C4 PFOA	*122*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*
13C5 PFNA	*114*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*
13C3 PFBS	*113*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:11*	*1*

Client Sample ID: PW-203

Date Collected: 03/08/19 12:05
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-23

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(16:30	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(16:30	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(16:30	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(16:30	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(16:30	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(16:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*
13C4 PFHpA	*117*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*
13C4 PFOA	*121*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*
13C4 PFOS	*113*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*
13C5 PFNA	*118*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*
13C3 PFBS	*110*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:30*	*1*

Client Sample ID: PW-040
Date Collected: 03/08/19 11:44
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-24
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorobutanesul.onic aci9 gPLx S7	5 D		2d0	0d[2	nF/B		03/1) /1(13:))	03/18/1(16:48	1
Per.luoroheCanesul.onic aci9 gPLp OS7	5 D		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(16:48	1
Per.luoroheHtanoic aci9 gPLp HA7	5 D		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(16:48	1
Per.luorooctanoic aci9 gPLf A7	5 D		2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(16:48	1
Per.luorooctanesul.onic aci9 gPLf S7	5 D		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(16:48	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(16:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*114*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*
13C4 PFHpA	*117*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*
13C4 PFOA	*120*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*
13C5 PFNA	*114*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*
13C3 PFBS	*109*		*25 - 150*	*03/15/19 13:55*	*03/18/19 16:48*	*1*

Client Sample ID: PW-401
Date Collected: 03/08/19 13:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-25
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2d0	0d(2	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1
Perfluorohexanesulfonic acid (PFHxS)	20		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1
Perfluoroheptanoic acid (PFHpA)	2.0		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1
Perfluorooctanoic acid (PFOA)	1.6	J B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1
Perfluorooctanesulfonic acid (PFOS)	31		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(1N:0N	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*96*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*
13C4 PFHpA	*104*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*
13C5 PFNA	*95*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:07*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-418
Date Collected: 03/08/19 13:28
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-26
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.6		2d0	0d(2	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1
Perfluoroheptanoic acid (PFHpA)	3.0		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1
Perfluorooctanoic acid (PFOA)	3.1	B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1
Perfluorooctanesulfonic acid (PFOS)	89		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(1N:2)	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*93*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*
13C4 PFOS	*94*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*
13C5 PFNA	*96*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:25*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-011
Date Collected: 03/08/19 14:25
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-27
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		2d0	0d2	nF/B		03/1) /1(13:))	03/18/1(1N:44	1
Perfluorohexanesulfonic acid (PFHxS)	32		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(1N:44	1
Perfluoroheptanoic acid (PFHpA)	4.5		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(1N:44	1
Perfluorooctanoic acid (PFOA)	2.6	B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(1N:44	1
Perfluorooctanesulfonic acid (PFOS)	96		2d0	1d3	nF/B		03/1) /1(13:))	03/18/1(1N:44	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(1N:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*
13C4 PFHpA	*116*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*
13C4 PFOA	*117*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*
13C4 PFOS	*114*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*
13C5 PFNA	*109*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*
13C3 PFBS	*112*		*25 - 150*	*03/15/19 13:55*	*03/18/19 17:44*	*1*

Client Sample ID: PW-046

Date Collected: 03/08/19 15:30
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-28

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20		2d0	0d2	nF/B		03/1)/1(13:))	03/18/1(18:02	1
Perfluoroheptanoic acid (PFHpA)	6.2		2d0	0d80	nF/B		03/1)/1(13:))	03/18/1(18:02	1
Perfluorooctanoic acid (PFOA)	20	B	2d0	0dN)	nF/B		03/1)/1(13:))	03/18/1(18:02	1
Perfluorooctanesulfonic acid (PFOS)	63		2d0	1d8	nF/B		03/1)/1(13:))	03/18/1(18:02	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1)/1(13:))	03/18/1(18:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFHpA	*98*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:02*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:02*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:02*	*1*
13C5 PFNA	*91*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:02*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:02*	*1*

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	320		20	8dN	nF/B		03/1)/1(13:))	03/1(/1(12:32	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*113*		*25 - 150*	*03/15/19 13:55*	*03/19/19 12:32*	*10*

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Df T

TestAmerica Job ID: 320-48266-1

Client Sample ID: PW-002
Date Collected: 03/09/19 11:20
Date Received: 03/12/19 11:05

Lab Sample ID: 320-48266-29
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2d0	0d(2	nF/B		03/1) /1(13:))	03/18/1(18:20	1
Perfluorohexanesulfonic acid (PFHxS)	21		2d0	0d8N	nF/B		03/1) /1(13:))	03/18/1(18:20	1
Perfluoroheptanoic acid (PFHpA)	3.4		2d0	0d80	nF/B		03/1) /1(13:))	03/18/1(18:20	1
Perfluorooctanoic acid (PFOA)	1.6	J B	2d0	0dN)	nF/B		03/1) /1(13:))	03/18/1(18:20	1
Perfluorooctanesulfonic acid (PFOS)	72		2d0	1d8	nF/B		03/1) /1(13:))	03/18/1(18:20	1
Per.luorononanoic aci9 gPL5 A7	5 D		2d0	0d6)	nF/B		03/1) /1(13:))	03/18/1(18:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*113*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*
13C4 PFHpA	*124*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*
13C4 PFOA	*113*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*
13C4 PFOS	*108*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*
13C5 PFNA	*119*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*
13C3 PFBS	*111*		*25 - 150*	*03/15/19 13:55*	*03/18/19 18:20*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus D9 T

TestAmerica Job ID: 320-48266-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water **Prep Type: Total/NA**

		Percent Isotope Dilution Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)	3C3-PFBS (25-150)
320-48266-1	PW-013		107	88		83	111
320-48266-1 - DL	PW-013	102			105		
320-48266-2	PW-1001	105	105	pp	104	p0	105
320-48266-3	PW-001		111	117		p2	113
320-48266-3 - DL	PW-001	108			105		
320-48266-4	PW-202	117	114	110	114	107	117
320-48266-7	PW-20p	103	103	102	100	p3	101
320-48266-6	PW-407	116	120	113	114	103	114
320-48266-5	PW-707	112	120	10p	108	106	113
320-48266-8	PW-406	104	106	103	108	p6	107
320-48266-p	PW-706	113	117	103	105	101	111
320-48266-10	PW-408	118	113	108	108	106	114
320-48266-11	PW-213	10p	114	117	106	p8	111
320-48266-12	PW-210	111	117	116	108	p7	10p
320-48266-13	PW-022	113	113	117		85	105
320-48266-13 - DL	PW-022				p5		
320-48266-14	PW-402	103	106	105	107	100	102
320-48266-17	PW-200	p5	101	p5	p4	p2	p6
320-48266-16	PW-07p	117	127	123	111	11p	116
320-48266-15	PW-1000	116	121	124	110	105	116
320-48266-18	PW-038	114	123	126	111	11p	115
320-48266-1p	PW-035	pp	108	104	p7	p6	p8
320-48266-20	PW-012	116	128	123	115	106	121
320-48266-21	PW-03p	pp	112	106	102	pp	pp
320-48266-22	PW-13p	116	122	122	108	114	113
320-48266-23	PW-203	106	115	121	113	118	110
320-48266-24	PW-040	114	115	120	107	114	10p
320-48266-27	PW-401	p6	104	102	p6	p7	p5
320-48266-26	PW-418	p3	103	103	p4	p6	p7
320-48266-25	PW-011	111	116	115	114	10p	112
320-48266-28	PW-046		p8	p8	p1	p1	p4
320-48266-28 - DL	PW-046	113					
320-48266-2p	PW-002	113	124	113	108	11p	111
LCS 320-281p6p/2-A	Lab Control SamMe	110	114	122	116	pp	107
LCS 320-282334/2-A	Lab Control SamMe	p8	p8	p8	p1	p5	p3
LCS 320-282751/2-A	Lab Control SamMe	113	113	10p	102	106	10p
LCS 320-2830pp/2-A	Lab Control SamMe	112	110	108	115	pp	10p
LCSD 320-281p6p/3-A	Lab Control SamMe DuM	114	112	105	10p	103	106
LCSD 320-282334/3-A	Lab Control SamMe DuM	10p	117	110	106	110	112
LCSD 320-282751/3-A	Lab Control SamMe DuM	11p	118	113	111	106	114
LCSD 320-2830pp/3-A	Lab Control SamMe DuM	116	113	110	113	103	111
Bd 320-281p6p/1-A	Bethok dlanF	111	11p	115	105	113	10p
Bd 320-282334/1-A	Bethok dlanF	pp	106	104	p3	p5	pp
Bd 320-282751/1-A	Bethok dlanF	117	124	115	111	107	114
Bd 320-2830pp/1-A	Bethok dlanF	115	111	110	114	107	117

Surrogate Legend

PHx =S O189 2 PHx =S
PHx MA O13C4 PHx MA

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus D9 T

TestAmerica Job ID: 320-48266-1

PH9 A O13C4 PH9 A
PH9 S O13C4 PH9 S
PHNA O13C7 PHNA
13C3-PHdS O13C3 PHdS

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-281969/1-A
Matrix: Water
Analysis Batch: 282183

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 281969

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perduorobutanesuldonic aci(FPB) SN	. D		290	09g2	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1
PerduoroheHanesuldonic aci(FPBp HSN	. D		290	098x	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1
PerduoroheCtanoic aci(FPBp OAN	. D		290	0980	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1
Perduorooctanoic aci(FPBf AN	1916	J	290	09x7	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1
Perduorooctanesuldonic aci(FPBf SN	. D		290	193	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1
Perduorononanoic aci(FPB. AN	. D		290	0967	nL/5		03/17/1g 13:77	03/16/1g 1x:28	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*
1-Cp PFHAN	*119*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*
1-Cp PFON	*11:*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*
1-Cp PFOS	*15:*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*
1-C0 PFBN	*11-*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*
1-C- PF7S	*159*		*20 6105*	*5-3103191-400*	*5-31/319 1:428*	*1*

Lab Sample ID: LCS 320-281969/2-A
Matrix: Water
Analysis Batch: 282183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 281969

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perduorobutanesuldonic aci(FPB) SN	1x9x	1892		nL/5		103	x2 - 171
PerduoroheHanesuldonic aci(FPBp HSN	1892	1x96		nL/5		gx	x3 - 17x
PerduoroheCtanoic aci(FPBp OAN	2090	1891		nL/5		g1	x1 - 138
Perduorooctanoic aci(FPBf AN	2090	2091		nL/5		101	x0 - 140
Perduorooctanesuldonic aci(FPBf SN	1896	169x		nL/5		g0	6g - 144
Perduorononanoic aci(FPB. AN	2090	1892		nL/5		g1	x3 - 14x

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*115*		*20 6105*
1-Cp PFHAN	*11p*		*20 6105*
1-Cp PFON	*122*		*20 6105*
1-Cp PFOS	*11/*		*20 6105*
1-C0 PFBN	*99*		*20 6105*
1-C- PF7S	*150*		*20 6105*

Lab Sample ID: LCSD 320-281969/3-A
Matrix: Water
Analysis Batch: 282183

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 281969

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perduorobutanesuldonic aci(FPB) SN	1x9x	169g		nL/5		g6	x2 - 171	x	30
PerduoroheHanesuldonic aci(FPBp HSN	1892	1693		nL/5		g0	x3 - 17x	8	30
PerduoroheCtanoic aci(FPBp OAN	2090	169x		nL/5		84	x1 - 138	8	30
Perduorooctanoic aci(FPBf AN	2090	1891		nL/5		g1	x0 - 140	10	30

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-281969/3-A
Matrix: Water
Analysis Batch: 282183

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 281969

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perduorooctanesuldonic aci(FPBf SN			1896	1x97		nL/5		g4	6g - 144	7	30
Perduorononanoic aci(FPB. AN			2090	1698		nL/5		84	x3 - 14x	8	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	11p		20 6105
1- Cp PFHAN	112		20 6105
1- Cp PFON	15:		20 6105
1- Cp PFOS	159		20 6105
1- C0 PFBN	15-		20 6105
1- C- PF7 S	15/		20 6105

Lab Sample ID: MB 320-282334/1-A
Matrix: Water
Analysis Batch: 282435

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 282334

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perduorobutanesuldonic aci(FPB) SN	. D		290	09g2	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1
PerduoroheHanesuldonic aci(FPBp HSN	. D		290	098x	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1
PerduoroheCtanoic aci(FPBp OAN	. D		290	0980	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1
Perduorooctanoic aci(FPBf AN	. D		290	09x7	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1
Perduorooctanesuldonic aci(FPBf SN	. D		290	198	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1
Perduorononanoic aci(FPB. AN	. D		290	0967	nL/5		03/18/1g 13:48	03/1g/1g 00:48	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	99		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1
1- Cp PFHAN	15/		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1
1- Cp PFON	15p		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1
1- Cp PFOS	9-		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1
1- C0 PFBN	9:		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1
1- C- PF7 S	99		20 6105	5- 3183/19 1- 4p8	5- 3193/19 554p8	1

Lab Sample ID: LCS 320-282334/2-A
Matrix: Water
Analysis Batch: 282435

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282334

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perduorobutanesuldonic aci(FPB) SN			1x9x	1g94		nL/5		110	x2 - 171
PerduoroheHanesuldonic aci(FPBp HSN			1892	1896		nL/5		102	x3 - 17x
PerduoroheCtanoic aci(FPBp OAN			2090	2097		nL/5		103	x1 - 138
Perduorooctanoic aci(FPBf AN			2090	2197		nL/5		108	x0 - 140
Perduorooctanesuldonic aci(FPBf SN			1896	1898		nL/5		101	6g - 144
Perduorononanoic aci(FPB. AN			2090	1g9x		nL/5		gg	x3 - 14x

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	98		20 6105
1- Cp PFHAN	98		20 6105

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-282334/2-A
Matrix: Water
Analysis Batch: 282435

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282334

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
1- Cp PFON	98		20 6105
1- Cp PFOS	91		20 6105
1- C0 PFBN	9:		20 6105
1- C- PF7S	9-		20 6105

Lab Sample ID: LCSD 320-282334/3-A
Matrix: Water
Analysis Batch: 282435

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282334

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perduorobutanesuldonic aci(FPB) SN			1x9x	189x		nL/5		106	x2 - 171	3	30
PerduoroheHanesuldonic aci(FPBp HSN			1892	1x9x		nL/5		gx	x3 - 17x	7	30
PerduoroheCtanoic aci(FPBp OAN			2090	1g9x		nL/5		gg	x1 - 138	4	30
Perduorooctanoic aci(FPBf AN			2090	2292		nL/5		111	x0 - 140	3	30
Perduorooctanesuldonic aci(FPBf SN			1896	1890		nL/5		gx	6g - 144	4	30
Perduorononanoic aci(FPB. AN			2090	1896		nL/5		g3	x3 - 14x	6	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	159		20 6105
1- Cp PFHAN	110		20 6105
1- Cp PFON	115		20 6105
1- Cp PFOS	15/		20 6105
1- C0 PFBN	115		20 6105
1- C- PF7S	112		20 6105

Lab Sample ID: MB 320-282571/1-A
Matrix: Water
Analysis Batch: 282637

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 282571

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perduorobutanesuldonic aci(FPB) SN	. D		290	09g2	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1
PerduoroheHanesuldonic aci(FPBp HSN	. D		290	098x	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1
PerduoroheCtanoic aci(FPBp OAN	. D		290	0980	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1
Perduorooctanoic aci(FPBf AN	. D		290	09x7	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1
Perduorooctanesuldonic aci(FPBf SN	. D		290	198	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1
Perduorononanoic aci(FPB. AN	. D		290	0967	nL/5		03/1g/1g 13:07	03/1g/1g 16:06	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1
1- Cp PFHAN	12p		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1
1- Cp PFON	11:		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1
1- Cp PFOS	111		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1
1- C0 PFBN	150		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1
1- C- PF7S	11p		20 6105	5- 3193/9 1- 450	5- 3193/9 1/ 45/	1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-282571/2-A
Matrix: Water
Analysis Batch: 282637

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 282571

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perduorobutanesuldonic aci(FPB) SN			1x9x	1x9l		nL/5		g6	x2 - 171		
PerduoroheHanesuldonic aci(FPBp HSN			1892	169x		nL/5		g2	x3 - 17x		
PerduoroheCtanoic aci(FPBp OAN			2090	189l		nL/5		g0	x1 - 138		
Perduorooctanoic aci(FPBf AN			2090	1x9g		nL/5		8g	x0 - 140		
Perduorooctanesuldonic aci(FPBf SN			1896	1894		nL/5		gg	6g - 144		
Perduorononanoic aci(FPB. AN			2090	1x97		nL/5		8x	x3 - 14x		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*11-*		*20 6105*
1- Cp PFHAN	*11-*		*20 6105*
1- Cp PFON	*159*		*20 6105*
1- Cp PFOS	*152*		*20 6105*
1- C0 PFBN	*15/*		*20 6105*
1- C- PF7S	*159*		*20 6105*

Lab Sample ID: LCSD 320-282571/3-A
Matrix: Water
Analysis Batch: 282637

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 282571

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perduorobutanesuldonic aci(FPB) SN			1x9x	169x		nL/5		g7	x2 - 171	2	30
PerduoroheHanesuldonic aci(FPBp HSN			1892	1798		nL/5		8x	x3 - 17x	6	30
PerduoroheCtanoic aci(FPBp OAN			2090	1x90		nL/5		87	x1 - 138	x	30
Perduorooctanoic aci(FPBf AN			2090	209x		nL/5		104	x0 - 140	17	30
Perduorooctanesuldonic aci(FPBf SN			1896	1698		nL/5		g1	6g - 144	g	30
Perduorononanoic aci(FPB. AN			2090	189l		nL/5		g0	x3 - 14x	4	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*119*		*20 6105*
1- Cp PFHAN	*118*		*20 6105*
1- Cp PFON	*11-*		*20 6105*
1- Cp PFOS	*111*		*20 6105*
1- C0 PFBN	*15/*		*20 6105*
1- C- PF7S	*11p*		*20 6105*

Lab Sample ID: MB 320-283099/1-A
Matrix: Water
Analysis Batch: 283163

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 283099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perduorobutanesuldonic aci(FPB) SN	. D		290	09g2	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1
PerduoroheHanesuldonic aci(FPBp HSN	. D		290	098x	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1
PerduoroheCtanoic aci(FPBp OAN	. D		290	0980	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1
Perduorooctanoic aci(FPBf AN	. D		290	09x7	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: MB 320-283099/1-A
Matrix: Water
Analysis Batch: 283163

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 283099

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perduorooctanesuldonic aci(FPBf SN	. D		290	193	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1
Perduorononanoic aci(FPB. AN	. D		290	0967	nL/5		03/21/1g 10:7g	03/22/1g 12:08	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*11:*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*
1- Cp PFHAN	*111*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*
1- Cp PFON	*115*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*
1- Cp PFOS	*11p*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*
1- C0 PFBN	*150*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*
1- C- PF7S	*110*		*20 6105*	*5- 3213/9 1540/*	*5- 3223/9 1245/*	*1*

Lab Sample ID: LCS 320-283099/2-A
Matrix: Water
Analysis Batch: 283163

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 283099

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perduorobutanesuldonic aci(FPB) SN	1x9x	169g		nL/5		g7	x2 - 171
PerduoroheHanesuldonic aci(FPBp HSN	1892	1694		nL/5		g0	x3 - 17x
PerduoroheCtanoic aci(FPBp OAN	2090	1698		nL/5		84	x1 - 138
Perduorooctanoic aci(FPBf AN	2090	1893		nL/5		g2	x0 - 140
Perduorooctanesuldonic aci(FPBf SN	1896	1797		nL/5		84	6g - 144
Perduorononanoic aci(FPB. AN	2090	1693		nL/5		81	x3 - 14x

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*112*		*20 6105*
1- Cp PFHAN	*115*		*20 6105*
1- Cp PFON	*158*		*20 6105*
1- Cp PFOS	*11:*		*20 6105*
1- C0 PFBN	*99*		*20 6105*
1- C- PF7S	*159*		*20 6105*

Lab Sample ID: LCSD 320-283099/3-A
Matrix: Water
Analysis Batch: 283163

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 283099

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perduorobutanesuldonic aci(FPB) SN	1x9x	1794		nL/5		8x	x2 - 171	g	30
PerduoroheHanesuldonic aci(FPBp HSN	1892	1797		nL/5		87	x3 - 17x	6	30
PerduoroheCtanoic aci(FPBp OAN	2090	1690		nL/5		80	x1 - 138	7	30
Perduorooctanoic aci(FPBf AN	2090	189x		nL/5		g3	x0 - 140	2	30
Perduorooctanesuldonic aci(FPBf SN	1896	1691		nL/5		8x	6g - 144	4	30
Perduorononanoic aci(FPB. AN	2090	169g		nL/5		87	x3 - 14x	4	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	11/		20 6105
1- Cp PFHAN	11-		20 6105
1- Cp PFON	115		20 6105
1- Cp PFOS	11-		20 6105
1- C0 PFBN	15-		20 6105
1- C- PF7S	111		20 6105

LCMS

Prep Batch: 281969

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-13 - DL	PW-022	Total/NA	Water	PFAS Prep	
320-48266-13	PW-022	Total/NA	Water	PFAS Prep	
320-48266-14	PW-402	Total/NA	Water	PFAS Prep	
320-48266-16	PW-059	Total/NA	Water	PFAS Prep	
320-48266-17	PW-1000	Total/NA	Water	PFAS Prep	
320-48266-18	PW-038	Total/NA	Water	PFAS Prep	
320-48266-19	PW-037	Total/NA	Water	PFAS Prep	
320-48266-20	PW-012	Total/NA	Water	PFAS Prep	
320-48266-21	PW-039	Total/NA	Water	PFAS Prep	
320-48266-22	PW-139	Total/NA	Water	PFAS Prep	
320-48266-23	PW-203	Total/NA	Water	PFAS Prep	
320-48266-24	PW-040	Total/NA	Water	PFAS Prep	
320-48266-25	PW-401	Total/NA	Water	PFAS Prep	
320-48266-26	PW-418	Total/NA	Water	PFAS Prep	
320-48266-27	PW-011	Total/NA	Water	PFAS Prep	
320-48266-28 - DL	PW-046	Total/NA	Water	PFAS Prep	
320-48266-28	PW-046	Total/NA	Water	PFAS Prep	
320-48266-29	PW-002	Total/NA	Water	PFAS Prep	
MB 320-281969/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-281969/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-281969/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 282183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-13	PW-022	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-14	PW-402	Total/NA	Water	WS-LC-0025 At1	281969
MB 320-281969/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	281969
LCS 320-281969/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	281969
LCSD 320-281969/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	281969

Analysis Batch: 282307

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-16	PW-059	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-17	PW-1000	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-18	PW-038	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-19	PW-037	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-20	PW-012	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-21	PW-039	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-22	PW-139	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-23	PW-203	Total/NA	Water	WS-LC-0025 At1	281969

LCMS (Continued)

Analysis Batch: 282307 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-24	PW-040	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-25	PW-401	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-26	PW-418	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-27	PW-011	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-28	PW-046	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-29	PW-002	Total/NA	Water	WS-LC-0025 At1	281969

Prep Batch: 282334

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-15	PW-200	Total/NA	Water	PFAS Prep	
MB 320-282334/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-282334/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-282334/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 282435

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-15	PW-200	Total/NA	Water	WS-LC-0025 At1	282334
MB 320-282334/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	282334
LCS 320-282334/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	282334
LCSD 320-282334/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	282334

Analysis Batch: 282513

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-13 - DL	PW-022	Total/NA	Water	WS-LC-0025 At1	281969
320-48266-28 - DL	PW-046	Total/NA	Water	WS-LC-0025 At1	281969

Prep Batch: 282571

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-1 - DL	PW-013	Total/NA	Water	PFAS Prep	
320-48266-1	PW-013	Total/NA	Water	PFAS Prep	
320-48266-3 - DL	PW-001	Total/NA	Water	PFAS Prep	
320-48266-3	PW-001	Total/NA	Water	PFAS Prep	
320-48266-4	PW-202	Total/NA	Water	PFAS Prep	
320-48266-5	PW-209	Total/NA	Water	PFAS Prep	
320-48266-6	PW-405	Total/NA	Water	PFAS Prep	
320-48266-7	PW-505	Total/NA	Water	PFAS Prep	
320-48266-8	PW-406	Total/NA	Water	PFAS Prep	
320-48266-9	PW-506	Total/NA	Water	PFAS Prep	
320-48266-10	PW-408	Total/NA	Water	PFAS Prep	
320-48266-11	PW-213	Total/NA	Water	PFAS Prep	
320-48266-12	PW-210	Total/NA	Water	PFAS Prep	
MB 320-282571/1-A	Method Blank	Total/NA	Water	PFAS Prep	

LCMS (Continued)

Prep Batch: 282571 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-282571/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-282571/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 282637

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-1	PW-013	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-3	PW-001	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-4	PW-202	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-5	PW-209	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-6	PW-405	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-7	PW-505	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-8	PW-406	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-9	PW-506	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-10	PW-408	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-11	PW-213	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-12	PW-210	Total/NA	Water	WS-LC-0025 At1	282571
MB 320-282571/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	282571
LCS 320-282571/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	282571
LCSD 320-282571/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	282571

Prep Batch: 283099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-2	PW-1001	Total/NA	Water	PFAS Prep	
MB 320-283099/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-283099/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-283099/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 283163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48266-1 - DL	PW-013	Total/NA	Water	WS-LC-0025 At1	282571
320-48266-2	PW-1001	Total/NA	Water	WS-LC-0025 At1	283099
320-48266-3 - DL	PW-001	Total/NA	Water	WS-LC-0025 At1	282571
MB 320-283099/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	283099
LCS 320-283099/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	283099
LCSD 320-283099/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	283099

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Client Sample ID: W- 0234
Date Collecte/ : 24729735 25:6R
Date v eceiTe/ : 24738735 33:2R

Lab Sample ID: 4820618MM03
x atrid: - ater

Wep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 18:34	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	100			283163	03/21/19 22:44	D1R	TAL SAC

Client Sample ID: W- 03223
Date Collecte/ : 24729735 32:31
Date v eceiTe/ : 24738735 33:2R

Lab Sample ID: 4820618MM08
x atrid: - ater

Wep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	283099	03/21/19 10:59	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			283163	03/22/19 13:04	D1R	TAL SAC

Client Sample ID: W- 0223
Date Collecte/ : 24729735 32:63
Date v eceiTe/ : 24738735 33:2R

Lab Sample ID: 4820618MM04
x atrid: - ater

Wep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 19:29	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			283163	03/21/19 23:22	D1R	TAL SAC

Client Sample ID: W- 0828
Date Collecte/ : 24729735 33:3R
Date v eceiTe/ : 24738735 33:2R

Lab Sample ID: 4820618MM06
x atrid: - ater

Wep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 19:47	D1R	TAL SAC

Client Sample ID: W- 0825
Date Collecte/ : 24729735 33:8R
Date v eceiTe/ : 24738735 33:2R

Lab Sample ID: 4820618MM0R
x atrid: - ater

Wep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 20:06	D1R	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Client Sample ID: W- 062R
Date Collecte/ : 247297 35 33:48
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM01V
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 20:24	D1R	TAL SAC

Client Sample ID: W- 0R2R
Date Collecte/ : 247297 35 33:88
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM09
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 20:43	D1R	TAL SAC

Client Sample ID: W- 062M
Date Collecte/ : 247297 35 38:R8
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM01
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 21:01	D1R	TAL SAC

Client Sample ID: W- 0R2M
Date Collecte/ : 247297 35 38:68
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM05
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 21:20	D1R	TAL SAC

Client Sample ID: W- 0621
Date Collecte/ : 247297 35 34:4M
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM032
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 21:38	D1R	TAL SAC

Client Sample ID: W- 0834
Date Collecte/ : 247297 35 34:R2
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM033
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 21:56	D1R	TAL SAC

Client Sample ID: W- 0832
Date Collecte/ : 247297 35 36:89
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM038
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282571	03/19/19 13:05	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282637	03/19/19 22:15	D1R	TAL SAC

Client Sample ID: W- 0288
Date Collecte/ : 247297 35 3R:3R
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM034
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282183	03/16/19 18:24	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			282513	03/19/19 12:14	D1R	TAL SAC

Client Sample ID: W- 0628
Date Collecte/ : 247297 35 3R:62
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM036
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282183	03/16/19 18:42	D1R	TAL SAC

Client Sample ID: W- 0822
Date Collecte/ : 247297 35 3R:R2
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM03R
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	282334	03/18/19 13:48	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282435	03/19/19 01:44	D1R	TAL SAC

Client Sample ID: W- 02R5
Date Collecte/ : 247297 35 3M82
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM03M
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 14:02	D1R	TAL SAC

Client Sample ID: W- 03222
Date Collecte/ : 247217 35 25:R2
Date v eceiTe/ : 247387 35 33:2R

Lab Sample ID: 4820618MM039
x atrid: - ater

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC

Client Sample ID: W- 03222 — **Lab Sample ID: 4820618MM039**
Date Collecte/ : 247217 35 25:R2 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 14:21	D1R	TAL SAC

Client Sample ID: W- 0241 — **Lab Sample ID: 4820618MM031**
Date Collecte/ : 247217 35 32:4R — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 14:39	D1R	TAL SAC

Client Sample ID: W- 0249 — **Lab Sample ID: 4820618MM035**
Date Collecte/ : 247217 35 32:64 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 14:57	D1R	TAL SAC

Client Sample ID: W- 0238 — **Lab Sample ID: 4820618MM032**
Date Collecte/ : 247217 35 33:82 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 15:34	D1R	TAL SAC

Client Sample ID: W- 0245 — **Lab Sample ID: 4820618MM033**
Date Collecte/ : 247217 35 33:38 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 15:53	D1R	TAL SAC

Client Sample ID: W- 0345 — **Lab Sample ID: 4820618MM038**
Date Collecte/ : 247217 35 33:28 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 16:11	D1R	TAL SAC

Client Sample ID: W- 0824 — **Lab Sample ID: 4820618MM084**
Date Collecte/ : 247217 35 38:2R — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 16:30	D1R	TAL SAC

Client Sample ID: W- 0262 — **Lab Sample ID: 4820618MM086**
Date Collecte/ : 247217 35 33:66 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 16:48	D1R	TAL SAC

Client Sample ID: W- 0623 — **Lab Sample ID: 4820618MM08R**
Date Collecte/ : 247217 35 34:8R — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 17:07	D1R	TAL SAC

Client Sample ID: W- 0631 — **Lab Sample ID: 4820618MM08M**
Date Collecte/ : 247217 35 34:81 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 17:25	D1R	TAL SAC

Client Sample ID: W- 0233 — **Lab Sample ID: 4820618MM089**
Date Collecte/ : 247217 35 36:8R — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 17:44	D1R	TAL SAC

Client Sample ID: W- 026M — **Lab Sample ID: 4820618MM081**
Date Collecte/ : 247217 35 3R:42 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 18:02	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Client Sample ID: W- 026M — **Lab Sample ID: 4820618MM031**
Date Collecte/ : 247217 35 3R:42 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Analysis	WS-LC-0025 At1	DL	10			282513	03/19/19 12:32	D1R	TAL SAC

Client Sample ID: W- 0228 — **Lab Sample ID: 4820618MM035**
Date Collecte/ : 247257 35 33:82 — **x atrid: - ater**
Date v eceiTe/ : 247387 35 33:2R

Wrep yBpe	Patch yBpe	Patch x etho/	v un	Dil Factor	Initial Amount	Final Amount	Patch Number	Wrepare/ or AnalBze/	AnalBst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	281969	03/15/19 13:55	CJU	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			282307	03/18/19 18:20	D1R	TAL SAC

LaboratorB v eferences:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus Dd T

TestAmerica Job ID: 320-48266-1

Laboratory: TestAmerica Sacramento

All accref itations/certiyications helf b. this laborator. are listef N p ot all accref itations/certiyications are akklicable to this rekortN

Authority	Program	EPA Region	Identification Number	Expiration Date
Alas(a U) ST7	State ProBram	10	1g-020	01-20-21
Ap AO	DoD / Dd E		L2468	01-20-21
Arizona	State ProBram	9	AZ0g08	08-11-19
Ar(ansas DEQ	State ProBram	6	88-0691	06-1g-19
Caliyornia	State ProBram	9	289g	01-31-20
Coloraf o	State ProBram	8	CA00044	08-31-19
Connecticut	State ProBram	1	PH-0691	06-30-19
Florif a	p ELAP	4	E8g5g0	06-30-19
GeorBia	State ProBram	4	p /A	01-28-19 *
Hawaii	State ProBram	9	p /A	01-29-20
Illinois	p ELAP	5	200060	03-1g-19 *
Kansas	p ELAP	g	E-103g5	10-31-19
Louisiana	p ELAP	6	30612	06-30-19
Maine	State ProBram	1	CA0004	04-14-20
MichiBan	State ProBram	5	994g	01-31-20
p evaf a	State ProBram	9	CA00044	0g-31-19
p ew Hamkshire	p ELAP	1	299g	04-18-19
p ew Jerse.	p ELAP	2	CA005	06-30-19
p ew Yor(	p ELAP	2	11666	03-31-19 *
d reBon	p ELAP	10	4040	01-29-20
Penns. lvania	p ELAP	3	68-012g2	03-31-19 *
Texas	p ELAP	6	T104g04399	05-31-19
) S Fish & Wilf liye	Fef eral		LE148388-0	0g-31-19
) SDA	Fef eral		P330-18-00239	01-1g-21
) SEPA) CMR	Fef eral	1	CA00044	12-31-20
) tah	p ELAP	8	CA00044	02-28-19 *
Vermont	State ProBram	1	VT-4040	04-30-19
VirBinia	p ELAP	3	4602g8	03-14-19 *
WashinBton	State ProBram	10	C581	05-05-19
West VirBinia UDW7	State ProBram	3	9930C	12-31-19
W. ominB	State ProBram	8	8TMS-L	01-28-19 *

* Accref itation/Certiyication renewal kenf inB - accref itation/certiyication consif eref valif N

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DL T

TestAmerica Job ID: 320-48266-1

Method	Method Description	Protocol	Laboratory
WS-5C-002F At1	dluorinatek Alypl Substances	TA5-SAC	TA5 SAC
PdAS Pre=	Pre=aration, Direct Inject PdAS	TA5-SAC	TA5 SAC

Protocol References:

TA5-SAC OTestAmerica 5aboratories, West Sacramento, dacilitp Stankark L =erating Procekure.

Laboratory References:

TA5 SAC OTestAmerica Sacramento, 880 Riversike Parywap, West Sacramento, CA 9F60F, TE5 (916)373-F600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustavus DOT

TestAmerica Job ID: 320-48266-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-48266-1	PW-013	Water	03/07/19 09:45	03/12/19 11:05
320-48266-2	PW-1001	Water	03/07/19 10:18	03/12/19 11:05
320-48266-3	PW-001	Water	03/07/19 10:41	03/12/19 11:05
320-48266-4	PW-202	Water	03/07/19 11:15	03/12/19 11:05
320-48266-5	PW-209	Water	03/07/19 11:25	03/12/19 11:05
320-48266-6	PW-405	Water	03/07/19 11:32	03/12/19 11:05
320-48266-7	PW-505	Water	03/07/19 11:22	03/12/19 11:05
320-48266-8	PW-406	Water	03/07/19 12:52	03/12/19 11:05
320-48266-9	PW-506	Water	03/07/19 12:42	03/12/19 11:05
320-48266-10	PW-408	Water	03/07/19 13:36	03/12/19 11:05
320-48266-11	PW-213	Water	03/07/19 13:50	03/12/19 11:05
320-48266-12	PW-210	Water	03/07/19 14:27	03/12/19 11:05
320-48266-13	PW-022	Water	03/07/19 15:15	03/12/19 11:05
320-48266-14	PW-402	Water	03/07/19 15:40	03/12/19 11:05
320-48266-15	PW-200	Water	03/07/19 15:50	03/12/19 11:05
320-48266-16	PW-059	Water	03/07/19 16:20	03/12/19 11:05
320-48266-17	PW-1000	Water	03/08/19 09:50	03/12/19 11:05
320-48266-18	PW-038	Water	03/08/19 10:35	03/12/19 11:05
320-48266-19	PW-037	Water	03/08/19 10:43	03/12/19 11:05
320-48266-20	PW-012	Water	03/08/19 11:20	03/12/19 11:05
320-48266-21	PW-039	Water	03/08/19 11:12	03/12/19 11:05
320-48266-22	PW-139	Water	03/08/19 11:02	03/12/19 11:05
320-48266-23	PW-203	Water	03/08/19 12:05	03/12/19 11:05
320-48266-24	PW-040	Water	03/08/19 11:44	03/12/19 11:05
320-48266-25	PW-401	Water	03/08/19 13:25	03/12/19 11:05
320-48266-26	PW-418	Water	03/08/19 13:28	03/12/19 11:05
320-48266-27	PW-011	Water	03/08/19 14:25	03/12/19 11:05
320-48266-28	PW-046	Water	03/08/19 15:30	03/12/19 11:05
320-48266-29	PW-002	Water	03/09/19 11:20	03/12/19 11:05

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Page 1 of 3
Laboratory: Test America
Attn: David Alltucker

Turn Around Time: ☑ Normal ☐ Rush
Please Specify

Quote No:
J-Flags: ☐ Yes ☐ No

Analytical Methods (include preservative if used): PFAS ×6 WS-LC0025 (AB) EPA 537

320-48266 Chain of Custody

Sample Identity	Lab No.	Time	Date Sampled	PFAS ×6 WS-LC0025 (AB) EPA 537							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-013		9:45	3/7/19	X							2	Groundwater
PW-1001		10:18	↓	X							2	↓
PW-001		10:41	↓	X							2	↓
PW-202		11:15	↓	X							2	↓
PW-209		11:25	↓	X							2	↓
PW-405		11:32	↓	X							2	↓
PW-505		11:22	↓	X							2	↓
PW-406		12:52	↓	X							2	↓
PW-506		12:42	↓	X							2	↓
PW-408		13:36	↓	X							2	↓

Project Information

Number: 102599
Name: Gustavus DOT
Contact: KRF
Ongoing Project? Yes ☑ No ☐
Sampler: CAB, APW

Sample Receipt

Total No. of Containers:	58
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	
Delivery Method:	

Notes:

Unable to deliver samples as intended →

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: [signature] Time: 9:00	Signature: [signature] Time: 11:00	Signature: Time:
Printed Name: Craig Beebe Date: 3/10/19	Printed Name: Craig Beebe Date: 3/11/19	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: Shannon & Wilson	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 11:00	Signature: [signature] Time: 11:05	Signature: Time:
Printed Name: Craig Beebe Date: 3/10/19	Printed Name: MARK NUWAL Date: 3/12/19	Printed Name: Date:
Company: Shannon & Wilson	Company: TA-SAC	Company:

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

5.9°C 5.2°C

No. 35799

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

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory TestAmerica
Attn: David Alltucker

Turn Around Time:	Quote No:
☑ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS X6 EPA 537	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-213		13:50	3/7/19	X	2	Groundwater
PW-210		14:27		X	2	
PW-022		15:15		X	2	
PW-402		15:40		X	2	
PW-200		15:50		X	2	
PW-059		16:20		X	2	
PW-1000		09:50	3/8/19	X	2	
PW-038		10:35		X	2	
PW-037		10:43		X	2	
PW-012		11:20		X	2	

(1)

Project Information		Sample Receipt	
Number:	102599	Total No. of Containers:	58
Name:	Gustavus DOT	COC Seals/Intact? Y/N/NA	
Contact:	KRF	Received Good Cond./Cold	
Ongoing Project?	Yes ☑ No ☐	Temp:	
Sampler:	CAB, APW	Delivery Method:	

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 900	Signature: Time: 11:05	Signature: Time:
Printed Name: Craig Bleebe Date: 3/9/19	Printed Name: MARK NUVAL Date: 3/12/19	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: TA-SAC	Company:

Notes:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Company:

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

(2) one of two samples received had lid not sealed, 13 March 19
Volume lost, now volume is 150 ml

5.9°c 5.2°c

No. 35824

3/25/2019

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory TestAmerica
Attn: David Althacker

Turn Around Time:	Quote No:
☑ Normal ☐ Rush	J-Flags: ☐ Yes ☐ No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x6 EPA 537	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-039		11:12	3/8/19	X	2	Ground water
PW-139		11:02		X	2	
PW-203		11:40		X	2	
PW-040		11:44		X	2	
PW-401		13:25		X	2	
PW-418		13:28		X	2	
PW-011		14:25		X	2	
PW-046		15:30		X	2	
PW-002		11:20	3/9/19	X	2	

Project Information		Sample Receipt	
Number:	102599	Total No. of Containers:	58
Name:	Gustavus DOT	COC Seals/Intact? Y/N/NA	
Contact:	KRF	Received Good Cond./Cold	
Ongoing Project?	Yes ☑ No ☐	Temp:	
Sampler:	CAB, APW	Delivery Method:	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: [signature] Time: ~~12:40~~	Signature: [signature] Time: 11:05	Signature: Time:
Printed Name: Craig Beebe Date: 3/10/19	Printed Name: MARK NUNAR Date: 3/12/19	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: TA-SAC	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Company:

Notes:

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

(1) Both samples have time 12:05 / 13 March 19

5.9°C 5.2°C

No. 35825

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-48266-1

Login Number: 48266
List Number: 1
Creator: Her, David A

List Source: TestAmerica Sacramento

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

Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks
2355 Hill Rd.
Fairbanks, AK 99701
(907)479-0600

Report Number: **1199419**

Client Project: **102599-005 Pre Design POET**

Dear Kristen Freiburger,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jennifer at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Jennifer Dawkins Date
Project Manager
Jennifer.Dawkins@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: Shannon & Wilson-Fairbanks

SGS Project: 1199419

Project Name/Site: 102599-005 Pre Design POET

Refer to sample receipt form for information on sample condition.

PW-001 **1199419001 PS**
PFAS by EPA 537 24 compounds were analyzed by SGS of Orlando, FL.
As Speciation was analyzed by Brooks Applied of Bothell, WA..

XXX/41597 **1513210 LCS**
AK102/103 - Surrogate recoveries in the LCS for n-triacontane does not meet QC criteria; however, the surrogate recoveries in the samples are within criteria.

WTI/5208] **1513224 MB**
2510B - Conductivity - Conducitivity of the MB was detected above the LOQ. Associated samples are greater than 10X the MB conductivity.

* QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to the associated field samples.

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry (DW Chemistry (Provisionally Certified as of 6/20/19 for Turbidity by SM 2130B, and Copper by EPA 200.8) & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020A, 7470A, 7471B, 8015C, 8021B, 8082A, 8260C, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
PW-001	1199419001	06/07/2019	06/11/2019	Water (Surface, Eff., Ground)
PW-013	1199419002	06/08/2019	06/11/2019	Water (Surface, Eff., Ground)
Airport terminal	1199419003	06/08/2019	06/11/2019	Water (Surface, Eff., Ground)
PW-048	1199419004	06/09/2019	06/11/2019	Water (Surface, Eff., Ground)
PW-046	1199419005	06/09/2019	06/13/2019	Water (Surface, Eff., Ground)

Method	Method Description
SM21 2320B	Alkalinity as CaCO3 QC
SM21 4500-NH3 G	Ammonia-N (W) SM21 4500-NH3 G
SM21 2510B	Conductivity SM2510B
AK102	Diesel/Residual Range Organics Water
AK103	Diesel/Residual Range Organics Water
SM21 2340B	Hardness as CaCO3 by ICP-MS
EPA 300.0	Ion Chromatographic Analysis (W)
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 4500NO3-F	Nitrate/Nitrite Flow injection Pres.
EPA 1664B	Oil & Grease HEM by EPA 1664
SM21 4500-H B	pH Analysis
SM23 4500S D	Sulfide by Colorimetric
SM21 2540C	Total Dissolved Solids SM18 2540C
SM 5310B	Total Organic Carbon
SM21 2540D	Total Suspended Solids SM20 2540D

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Detectable Results Summary

Client Sample ID: **PW-001**
Lab Sample ID: 1199419001

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	15.3	ug/L
	Barium	119	ug/L
	Calcium	107000	ug/L
	Copper	29.9	ug/L
	Hardness as CaCO3	311000	ug/L
	Iron	5870	ug/L
	Lead	0.429	ug/L
	Magnesium	10600	ug/L
	Manganese	496	ug/L
	Molybdenum	0.746J	ug/L
	Nickel	7.53	ug/L
	Potassium	7180	ug/L
	Silicon	7100	ug/L
	Sodium	29700	ug/L
	Zinc	86.7	ug/L
Waters Department	Alkalinity	267000	ug/L
	Ammonia-N	0.180	mg/L
	Chloride	69300	ug/L
	Conductivity	763	umhos/cm
	Fluoride	51.0J	ug/L
	Oil & Grease HEM	1260J	ug/L
	pH	7.5	pH units
	Sulfate	19600	ug/L
	Total Dissolved Solids	444000	ug/L
	Total Organic Carbon	2040	ug/L
	Total Suspended Solids	11900	ug/L

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Detectable Results Summary

Client Sample ID: **PW-013**
Lab Sample ID: 1199419002

	Parameter	Result	Units
Metals by ICP/MS	Arsenic	11.9	ug/L
	Barium	77.3	ug/L
	Calcium	99500	ug/L
	Copper	46.4	ug/L
	Hardness as CaCO3	281000	ug/L
	Iron	2560	ug/L
	Lead	2.23	ug/L
	Magnesium	7820	ug/L
	Manganese	464	ug/L
	Nickel	3.49	ug/L
	Potassium	4510	ug/L
	Silicon	6270	ug/L
	Sodium	2370	ug/L
	Tin	1.58	ug/L
	Zinc	267	ug/L
Waters Department	Alkalinity	264000	ug/L
	Ammonia-N	0.174	mg/L
	Chloride	2130	ug/L
	Conductivity	528	umhos/cm
	Oil & Grease HEM	2160J	ug/L
	pH	7.6	pH units
	Sulfate	14000	ug/L
	Total Dissolved Solids	321000	ug/L
	Total Nitrate/Nitrite-N	56.6J	ug/L
	Total Organic Carbon	1580	ug/L
	Total Suspended Solids	3140	ug/L

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Detectable Results Summary

Client Sample ID: **Airport terminal**
Lab Sample ID: 1199419003

	Parameter	Result	Units
Metals by ICP/MS	Aluminum	8.40J	ug/L
	Arsenic	3.88J	ug/L
	Barium	48.0	ug/L
	Calcium	70900	ug/L
	Copper	72.4	ug/L
	Hardness as CaCO3	304000	ug/L
	Iron	725	ug/L
	Lead	3.01	ug/L
	Magnesium	30900	ug/L
	Manganese	182	ug/L
	Molybdenum	1.76J	ug/L
	Nickel	3.23	ug/L
	Potassium	10900	ug/L
	Silicon	5830	ug/L
	Sodium	251000	ug/L
	Tin	1.06	ug/L
	Zinc	127	ug/L
Waters Department	Alkalinity	225000	ug/L
	Ammonia-N	0.791	mg/L
	Chloride	427000	ug/L
	Conductivity	1900	umhos/cm
	Fluoride	98.0J	ug/L
	Oil & Grease HEM	2420J	ug/L
	pH	7.9	pH units
	Sulfate	27900	ug/L
	Total Dissolved Solids	1000000	ug/L
	Total Nitrate/Nitrite-N	51.0J	ug/L
	Total Organic Carbon	1380	ug/L
	Total Suspended Solids	673J	ug/L

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Detectable Results Summary

Client Sample ID: **PW-048**
Lab Sample ID: 1199419004

	Parameter	Result	Units
Metals by ICP/MS	Aluminum	9.00J	ug/L
	Arsenic	8.89	ug/L
	Barium	65.8	ug/L
	Calcium	73900	ug/L
	Copper	58.5	ug/L
	Hardness as CaCO3	204000	ug/L
	Iron	2200	ug/L
	Lead	4.18	ug/L
	Magnesium	4800	ug/L
	Manganese	137	ug/L
	Molybdenum	1.53J	ug/L
	Nickel	2.32	ug/L
	Potassium	3200	ug/L
	Silicon	3260	ug/L
	Sodium	1780	ug/L
	Tin	0.959J	ug/L
	Zinc	446	ug/L
Waters Department	Alkalinity	193000	ug/L
	Ammonia-N	0.0504J	mg/L
	Chloride	1520	ug/L
	Conductivity	402	umhos/cm
	Oil & Grease HEM	2740J	ug/L
	pH	7.8	pH units
	Sulfate	14500	ug/L
	Sulfide	40.0J	ug/L
	Total Dissolved Solids	242000	ug/L
	Total Organic Carbon	1330	ug/L
	Total Suspended Solids	1570	ug/L

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Detectable Results Summary

Client Sample ID: **PW-046**
Lab Sample ID: 1199419005

	Parameter	Result	Units
Metals by ICP/MS	Barium	89.8	ug/L
	Calcium	125000	ug/L
	Copper	78.6	ug/L
	Hardness as CaCO3	371000	ug/L
	Iron	1310	ug/L
	Lead	3.47	ug/L
	Magnesium	14500	ug/L
	Manganese	174	ug/L
	Nickel	5.41	ug/L
	Potassium	5310	ug/L
	Silicon	3960	ug/L
	Sodium	2540	ug/L
	Tin	1.06	ug/L
	Zinc	241	ug/L
Semivolatile Organic Fuels	Diesel Range Organics	0.230J	mg/L
	Residual Range Organics	0.196J	mg/L
Waters Department	Alkalinity	338000	ug/L
	Ammonia-N	0.0375J	mg/L
	Chloride	1920	ug/L
	Conductivity	715	umhos/cm
	Oil & Grease HEM	2080J	ug/L
	pH	7.6	pH units
	Sulfate	51300	ug/L
	Total Dissolved Solids	437000	ug/L
	Total Nitrate/Nitrite-N	834	ug/L
	Total Organic Carbon	2290	ug/L
	Total Suspended Solids	1360	ug/L

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Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aluminum	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:04
Antimony	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:04
Arsenic	15.3		5.00	1.50	ug/L	1		06/19/19 22:04
Barium	119		3.00	0.940	ug/L	1		06/19/19 22:04
Beryllium	0.200	U	0.400	0.130	ug/L	1		06/19/19 22:04
Cadmium	0.250	U	0.500	0.150	ug/L	1		06/19/19 22:04
Calcium	107000		500	150	ug/L	1		06/19/19 22:04
Chromium	1.00	U	2.00	0.800	ug/L	1		06/19/19 22:04
Cobalt	2.00	U	4.00	1.20	ug/L	1		06/19/19 22:04
Copper	29.9		1.00	0.310	ug/L	1		06/19/19 22:04
Iron	5870		250	78.0	ug/L	1		06/19/19 22:04
Lead	0.429		0.200	0.0700	ug/L	1		06/19/19 22:04
Magnesium	10600		50.0	15.0	ug/L	1		06/19/19 22:04
Manganese	496		1.00	0.350	ug/L	1		06/19/19 22:04
Molybdenum	0.746	J	2.00	0.620	ug/L	1		06/19/19 22:04
Nickel	7.53		2.00	0.620	ug/L	1		06/19/19 22:04
Phosphorus	100	U	200	62.0	ug/L	1		06/19/19 22:04
Potassium	7180		500	150	ug/L	1		06/19/19 22:04
Selenium	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:04
Silicon	7100		1000	310	ug/L	1		06/19/19 22:04
Silver	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:04
Sodium	29700		500	150	ug/L	1		06/21/19 11:03
Thallium	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:04
Tin	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:04
Titanium	12.5	U	25.0	7.75	ug/L	1		06/19/19 22:04
Vanadium	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:04
Zinc	86.7		10.0	3.10	ug/L	1		06/19/19 22:04

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Batch Information

Analytical Batch: MMS10541
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/21/19 11:03
Container ID: 1199419001-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Analytical Batch: MMS10539
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/19/19 22:04
Container ID: 1199419001-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Hardness as CaCO3	311000		5000	5000	ug/L	1		06/19/19 22:04

Batch Information

Analytical Batch: MMS10539
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 06/19/19 22:04
Container ID: 1199419001-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 07/08/2019 4:18:32PM

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Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.323	U	0.645	0.194	mg/L	1		06/21/19 09:24
Surrogates								
5a Androstane (surr)	87.1		50-150		%	1		06/21/19 09:24

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Analyst: VDL
Analytical Date/Time: 06/21/19 09:24
Container ID: 1199419001-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 930 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.269	U	0.538	0.161	mg/L	1		06/21/19 09:24
Surrogates								
n-Triacontane-d62 (surr)	106		50-150		%	1		06/21/19 09:24

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK103
Analyst: VDL
Analytical Date/Time: 06/21/19 09:24
Container ID: 1199419001-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 930 mL
Prep Extract Vol: 1 mL

Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Oil & Grease HEM	1260	J	4210	1050	ug/L	1		06/20/19 09:08

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Analyst: EWW
Analytical Date/Time: 06/20/19 09:08
Container ID: 1199419001-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloride	69300		2000	500	ug/L	10		06/26/19 12:41
Fluoride	51.0	J	200	50.0	ug/L	1		06/26/19 12:22
Sulfate	19600		200	50.0	ug/L	1		06/26/19 12:22

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 12:22
Container ID: 1199419001-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 12:41
Container ID: 1199419001-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	2040		1000	400	ug/L	1		06/17/19 16:48

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Analyst: BMZ
Analytical Date/Time: 06/17/19 16:48
Container ID: 1199419001-E

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Alkalinity	267000		10000	2500	ug/L	1		06/14/19 11:43

Batch Information

Analytical Batch: WTI5209
Analytical Method: SM21 2320B
Analyst: EWW
Analytical Date/Time: 06/14/19 11:43
Container ID: 1199419001-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Conductivity	763		1.00	0.477	umhos/cm	1		06/14/19 11:43

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Analyst: EWW
Analytical Date/Time: 06/14/19 11:43
Container ID: 1199419001-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Dissolved Solids	444000		10000	3100	ug/L	1		06/14/19 16:16

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Analyst: EWW
Analytical Date/Time: 06/14/19 16:16
Container ID: 1199419001-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Suspended Solids	11900		980	304	ug/L	1		06/14/19 17:36

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 06/14/19 17:36
Container ID: 1199419001-C

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	7.5		0.100	0.100	pH units	1		06/14/19 11:43

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Analyst: EWW
Analytical Date/Time: 06/14/19 11:43
Container ID: 1199419001-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.180		0.100	0.0310	mg/L	1		06/25/19 12:31

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Analyst: DMM
Analytical Date/Time: 06/25/19 12:31
Container ID: 1199419001-G

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 06/25/19 10:30
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	100 U		200	50.0	ug/L	2		06/17/19 15:58

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Analyst: EWW
Analytical Date/Time: 06/17/19 15:58
Container ID: 1199419001-G

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-001**

Client Sample ID: **PW-001**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419001
Lab Project ID: 1199419

Collection Date: 06/07/19 10:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0	U	100	31.0	ug/L	1		06/14/19 11:39

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Analyst: EWW
Analytical Date/Time: 06/14/19 11:39
Container ID: 1199419001-H

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Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aluminum	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:10
Antimony	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:10
Arsenic	11.9		5.00	1.50	ug/L	1		06/19/19 22:10
Barium	77.3		3.00	0.940	ug/L	1		06/19/19 22:10
Beryllium	0.200	U	0.400	0.130	ug/L	1		06/19/19 22:10
Cadmium	0.250	U	0.500	0.150	ug/L	1		06/19/19 22:10
Calcium	99500		500	150	ug/L	1		06/19/19 22:10
Chromium	1.00	U	2.00	0.800	ug/L	1		06/19/19 22:10
Cobalt	2.00	U	4.00	1.20	ug/L	1		06/19/19 22:10
Copper	46.4		1.00	0.310	ug/L	1		06/19/19 22:10
Iron	2560		250	78.0	ug/L	1		06/19/19 22:10
Lead	2.23		0.200	0.0700	ug/L	1		06/19/19 22:10
Magnesium	7820		50.0	15.0	ug/L	1		06/19/19 22:10
Manganese	464		1.00	0.350	ug/L	1		06/19/19 22:10
Molybdenum	1.00	U	2.00	0.620	ug/L	1		06/19/19 22:10
Nickel	3.49		2.00	0.620	ug/L	1		06/19/19 22:10
Phosphorus	100	U	200	62.0	ug/L	1		06/19/19 22:10
Potassium	4510		500	150	ug/L	1		06/19/19 22:10
Selenium	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:10
Silicon	6270		1000	310	ug/L	1		06/19/19 22:10
Silver	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:10
Sodium	2370		500	150	ug/L	1		06/21/19 11:06
Thallium	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:10
Tin	1.58		1.00	0.310	ug/L	1		06/19/19 22:10
Titanium	12.5	U	25.0	7.75	ug/L	1		06/19/19 22:10
Vanadium	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:10
Zinc	267		10.0	3.10	ug/L	1		06/19/19 22:10

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J flagging is activated

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Batch Information

Analytical Batch: MMS10541
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/21/19 11:06
Container ID: 1199419002-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Analytical Batch: MMS10539
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/19/19 22:10
Container ID: 1199419002-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Hardness as CaCO3	281000		5000	5000	ug/L	1		06/19/19 22:10

Batch Information

Analytical Batch: MMS10539
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 06/19/19 22:10
Container ID: 1199419002-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.311	U	0.622	0.187	mg/L	1		06/21/19 09:34
Surrogates								
5a Androstane (surr)	94.3		50-150		%	1		06/21/19 09:34

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Analyst: VDL
Analytical Date/Time: 06/21/19 09:34
Container ID: 1199419002-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 965 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.259	U	0.518	0.155	mg/L	1		06/21/19 09:34
Surrogates								
n-Triacontane-d62 (surr)	115		50-150		%	1		06/21/19 09:34

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK103
Analyst: VDL
Analytical Date/Time: 06/21/19 09:34
Container ID: 1199419002-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 965 mL
Prep Extract Vol: 1 mL

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Oil & Grease HEM	2160	J	4120	1030	ug/L	1		06/20/19 09:08

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Analyst: EWW
Analytical Date/Time: 06/20/19 09:08
Container ID: 1199419002-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloride	2130		200	50.0	ug/L	1		06/26/19 13:38
Fluoride	100	U	200	50.0	ug/L	1		06/26/19 13:38
Sulfate	14000		200	50.0	ug/L	1		06/26/19 13:38

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 13:38
Container ID: 1199419002-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	1580		1000	400	ug/L	1		06/17/19 17:36

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Analyst: BMZ
Analytical Date/Time: 06/17/19 17:36
Container ID: 1199419002-E

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Alkalinity	264000		10000	2500	ug/L	1		06/14/19 12:04

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J flagging is activated

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WTI5209
Analytical Method: SM21 2320B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:04
Container ID: 1199419002-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Conductivity	528		1.00	0.477	umhos/cm	1		06/14/19 12:04

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:04
Container ID: 1199419002-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Dissolved Solids	321000		10000	3100	ug/L	1		06/14/19 16:16

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Analyst: EWW
Analytical Date/Time: 06/14/19 16:16
Container ID: 1199419002-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Suspended Solids	3140		980	304	ug/L	1		06/14/19 17:36

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 06/14/19 17:36
Container ID: 1199419002-C

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	7.6		0.100	0.100	pH units	1		06/14/19 12:04

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:04
Container ID: 1199419002-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.174		0.100	0.0310	mg/L	1		06/25/19 12:33

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Analyst: DMM
Analytical Date/Time: 06/25/19 12:33
Container ID: 1199419002-G

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 06/25/19 10:30
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	56.6	J	200	50.0	ug/L	2		06/17/19 16:00

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Analyst: EWW
Analytical Date/Time: 06/17/19 16:00
Container ID: 1199419002-G

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0	U	100	31.0	ug/L	1		06/14/19 11:39

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-013**

Client Sample ID: **PW-013**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419002
Lab Project ID: 1199419

Collection Date: 06/08/19 11:14
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Analyst: EWW
Analytical Date/Time: 06/14/19 11:39
Container ID: 1199419002-H

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aluminum	8.40	J	20.0	6.20	ug/L	1		06/19/19 22:07
Antimony	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:07
Arsenic	3.88	J	5.00	1.50	ug/L	1		06/19/19 22:07
Barium	48.0		3.00	0.940	ug/L	1		06/19/19 22:07
Beryllium	0.200	U	0.400	0.130	ug/L	1		06/19/19 22:07
Cadmium	0.250	U	0.500	0.150	ug/L	1		06/19/19 22:07
Calcium	70900		500	150	ug/L	1		06/19/19 22:07
Chromium	1.00	U	2.00	0.800	ug/L	1		06/19/19 22:07
Cobalt	2.00	U	4.00	1.20	ug/L	1		06/19/19 22:07
Copper	72.4		1.00	0.310	ug/L	1		06/19/19 22:07
Iron	725		250	78.0	ug/L	1		06/19/19 22:07
Lead	3.01		0.200	0.0700	ug/L	1		06/19/19 22:07
Magnesium	30900		50.0	15.0	ug/L	1		06/19/19 22:07
Manganese	182		1.00	0.350	ug/L	1		06/19/19 22:07
Molybdenum	1.76	J	2.00	0.620	ug/L	1		06/19/19 22:07
Nickel	3.23		2.00	0.620	ug/L	1		06/19/19 22:07
Phosphorus	100	U	200	62.0	ug/L	1		06/19/19 22:07
Potassium	10900		500	150	ug/L	1		06/19/19 22:07
Selenium	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:07
Silicon	5830		1000	310	ug/L	1		06/19/19 22:07
Silver	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:07
Sodium	251000		5000	1500	ug/L	10		06/21/19 11:09
Thallium	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:07
Tin	1.06		1.00	0.310	ug/L	1		06/19/19 22:07
Titanium	12.5	U	25.0	7.75	ug/L	1		06/19/19 22:07
Vanadium	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:07
Zinc	127		10.0	3.10	ug/L	1		06/19/19 22:07

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Batch Information

Analytical Batch: MMS10541
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/21/19 11:09
Container ID: 1199419003-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Analytical Batch: MMS10539
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/19/19 22:07
Container ID: 1199419003-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Hardness as CaCO3	304000		5000	5000	ug/L	1		06/19/19 22:07

Batch Information

Analytical Batch: MMS10539
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 06/19/19 22:07
Container ID: 1199419003-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.319	U	0.638	0.191	mg/L	1		06/21/19 09:44
Surrogates								
5a Androstane (surr)	86.9		50-150		%	1		06/21/19 09:44

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Analyst: VDL
Analytical Date/Time: 06/21/19 09:44
Container ID: 1199419003-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.266	U	0.532	0.160	mg/L	1		06/21/19 09:44
Surrogates								
n-Triacontane-d62 (surr)	106		50-150		%	1		06/21/19 09:44

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK103
Analyst: VDL
Analytical Date/Time: 06/21/19 09:44
Container ID: 1199419003-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 940 mL
Prep Extract Vol: 1 mL

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Oil & Grease HEM	2420	J	4210	1050	ug/L	1		06/20/19 09:08

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Analyst: EWW
Analytical Date/Time: 06/20/19 09:08
Container ID: 1199419003-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloride	427000		20000	5000	ug/L	100		06/26/19 16:09
Fluoride	98.0	J	200	50.0	ug/L	1		06/26/19 14:16
Sulfate	27900		4000	1000	ug/L	20		06/26/19 14:35

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 14:16
Container ID: 1199419003-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 14:35
Container ID: 1199419003-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 16:09
Container ID: 1199419003-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	1380		1000	400	ug/L	1		06/17/19 17:53

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Analyst: BMZ
Analytical Date/Time: 06/17/19 17:53
Container ID: 1199419003-E

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Alkalinity	225000		10000	2500	ug/L	1		06/14/19 12:15

Batch Information

Analytical Batch: WTI5209
Analytical Method: SM21 2320B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:15
Container ID: 1199419003-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Conductivity	1900		2.00	0.954	umhos/cm	2		06/14/19 12:46

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:46
Container ID: 1199419003-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Dissolved Solids	1000000		20000	6200	ug/L	1		06/14/19 16:16

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Analyst: EWW
Analytical Date/Time: 06/14/19 16:16
Container ID: 1199419003-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Suspended Solids	673	J	962	298	ug/L	1		06/14/19 17:36

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 06/14/19 17:36
Container ID: 1199419003-C

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	7.9		0.100	0.100	pH units	1		06/14/19 12:15

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:15
Container ID: 1199419003-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.791		0.100	0.0310	mg/L	1		06/25/19 12:34

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Analyst: DMM
Analytical Date/Time: 06/25/19 12:34
Container ID: 1199419003-G

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 06/25/19 10:30
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	51.0	J	200	50.0	ug/L	2		06/17/19 16:02

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **Airport terminal**

Client Sample ID: **Airport terminal**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419003
Lab Project ID: 1199419

Collection Date: 06/08/19 12:30
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Analyst: EWW
Analytical Date/Time: 06/17/19 16:02
Container ID: 1199419003-G

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0	U	100	31.0	ug/L	1		06/14/19 11:39

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Analyst: EWW
Analytical Date/Time: 06/14/19 11:39
Container ID: 1199419003-H

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aluminum	9.00	J	20.0	6.20	ug/L	1		06/19/19 22:13
Antimony	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:13
Arsenic	8.89		5.00	1.50	ug/L	1		06/19/19 22:13
Barium	65.8		3.00	0.940	ug/L	1		06/19/19 22:13
Beryllium	0.200	U	0.400	0.130	ug/L	1		06/19/19 22:13
Cadmium	0.250	U	0.500	0.150	ug/L	1		06/19/19 22:13
Calcium	73900		500	150	ug/L	1		06/19/19 22:13
Chromium	1.00	U	2.00	0.800	ug/L	1		06/19/19 22:13
Cobalt	2.00	U	4.00	1.20	ug/L	1		06/19/19 22:13
Copper	58.5		1.00	0.310	ug/L	1		06/19/19 22:13
Iron	2200		250	78.0	ug/L	1		06/19/19 22:13
Lead	4.18		0.200	0.0700	ug/L	1		06/19/19 22:13
Magnesium	4800		50.0	15.0	ug/L	1		06/19/19 22:13
Manganese	137		1.00	0.350	ug/L	1		06/19/19 22:13
Molybdenum	1.53	J	2.00	0.620	ug/L	1		06/19/19 22:13
Nickel	2.32		2.00	0.620	ug/L	1		06/19/19 22:13
Phosphorus	100	U	200	62.0	ug/L	1		06/19/19 22:13
Potassium	3200		500	150	ug/L	1		06/19/19 22:13
Selenium	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:13
Silicon	3260		1000	310	ug/L	1		06/19/19 22:13
Silver	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:13
Sodium	1780		500	150	ug/L	1		06/21/19 11:21
Thallium	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:13
Tin	0.959	J	1.00	0.310	ug/L	1		06/19/19 22:13
Titanium	12.5	U	25.0	7.75	ug/L	1		06/19/19 22:13
Vanadium	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:13
Zinc	446		10.0	3.10	ug/L	1		06/19/19 22:13

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J flagging is activated

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Batch Information

Analytical Batch: MMS10541
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/21/19 11:21
Container ID: 1199419004-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Analytical Batch: MMS10539
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/19/19 22:13
Container ID: 1199419004-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Hardness as CaCO3	204000		5000	5000	ug/L	1		06/19/19 22:13

Batch Information

Analytical Batch: MMS10539
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 06/19/19 22:13
Container ID: 1199419004-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

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J flagging is activated

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.325	U	0.649	0.195	mg/L	1		06/21/19 09:55
Surrogates								
5a Androstane (surr)	78.6		50-150		%	1		06/21/19 09:55

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Analyst: VDL
Analytical Date/Time: 06/21/19 09:55
Container ID: 1199419004-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 925 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.271	U	0.541	0.162	mg/L	1		06/21/19 09:55
Surrogates								
n-Triacontane-d62 (surr)	100		50-150		%	1		06/21/19 09:55

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK103
Analyst: VDL
Analytical Date/Time: 06/21/19 09:55
Container ID: 1199419004-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 925 mL
Prep Extract Vol: 1 mL

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Oil & Grease HEM	2740	J	4210	1050	ug/L	1		06/20/19 09:08

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Analyst: EWW
Analytical Date/Time: 06/20/19 09:08
Container ID: 1199419004-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloride	1520		200	50.0	ug/L	1		06/26/19 14:54
Fluoride	100	U	200	50.0	ug/L	1		06/26/19 14:54
Sulfate	14500		200	50.0	ug/L	1		06/26/19 14:54

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 14:54
Container ID: 1199419004-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	1330		1000	400	ug/L	1		06/17/19 18:10

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Analyst: BMZ
Analytical Date/Time: 06/17/19 18:10
Container ID: 1199419004-E

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Alkalinity	193000		10000	2500	ug/L	1		06/14/19 12:25

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J flagging is activated

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WTI5209
Analytical Method: SM21 2320B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:25
Container ID: 1199419004-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Conductivity	402		1.00	0.477	umhos/cm	1		06/14/19 12:25

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:25
Container ID: 1199419004-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Dissolved Solids	242000		10000	3100	ug/L	1		06/14/19 16:16

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Analyst: EWW
Analytical Date/Time: 06/14/19 16:16
Container ID: 1199419004-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Suspended Solids	1570		980	304	ug/L	1		06/14/19 17:36

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 06/14/19 17:36
Container ID: 1199419004-C

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

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J flagging is activated

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	7.8		0.100	0.100	pH units	1		06/14/19 12:25

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:25
Container ID: 1199419004-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.0504 J		0.100	0.0310	mg/L	1		06/25/19 12:36

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Analyst: DMM
Analytical Date/Time: 06/25/19 12:36
Container ID: 1199419004-G

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 06/25/19 10:30
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	100 U		200	50.0	ug/L	2		06/17/19 16:04

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Analyst: EWW
Analytical Date/Time: 06/17/19 16:04
Container ID: 1199419004-G

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	40.0 J		100	31.0	ug/L	1		06/14/19 11:39

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J flagging is activated

Results of **PW-048**

Client Sample ID: **PW-048**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419004
Lab Project ID: 1199419

Collection Date: 06/09/19 14:47
Received Date: 06/11/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Analyst: EWW
Analytical Date/Time: 06/14/19 11:39
Container ID: 1199419004-H

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Aluminum	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:22
Antimony	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:22
Arsenic	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:22
Barium	89.8		3.00	0.940	ug/L	1		06/19/19 22:22
Beryllium	0.200	U	0.400	0.130	ug/L	1		06/19/19 22:22
Cadmium	0.250	U	0.500	0.150	ug/L	1		06/19/19 22:22
Calcium	125000		500	150	ug/L	1		06/19/19 22:22
Chromium	1.00	U	2.00	0.800	ug/L	1		06/19/19 22:22
Cobalt	2.00	U	4.00	1.20	ug/L	1		06/19/19 22:22
Copper	78.6		1.00	0.310	ug/L	1		06/19/19 22:22
Iron	1310		250	78.0	ug/L	1		06/19/19 22:22
Lead	3.47		0.200	0.0700	ug/L	1		06/19/19 22:22
Magnesium	14500		50.0	15.0	ug/L	1		06/19/19 22:22
Manganese	174		1.00	0.350	ug/L	1		06/19/19 22:22
Molybdenum	1.00	U	2.00	0.620	ug/L	1		06/19/19 22:22
Nickel	5.41		2.00	0.620	ug/L	1		06/19/19 22:22
Phosphorus	100	U	200	62.0	ug/L	1		06/19/19 22:22
Potassium	5310		500	150	ug/L	1		06/19/19 22:22
Selenium	2.50	U	5.00	1.50	ug/L	1		06/19/19 22:22
Silicon	3960		1000	310	ug/L	1		06/19/19 22:22
Silver	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:22
Sodium	2540		500	150	ug/L	1		06/21/19 11:24
Thallium	0.500	U	1.00	0.310	ug/L	1		06/19/19 22:22
Tin	1.06		1.00	0.310	ug/L	1		06/19/19 22:22
Titanium	12.5	U	25.0	7.75	ug/L	1		06/19/19 22:22
Vanadium	10.0	U	20.0	6.20	ug/L	1		06/19/19 22:22
Zinc	241		10.0	3.10	ug/L	1		06/19/19 22:22

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J flagging is activated

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Metals by ICP/MS**

Batch Information

Analytical Batch: MMS10541
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/21/19 11:24
Container ID: 1199419005-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Analytical Batch: MMS10539
Analytical Method: EP200.8
Analyst: DSH
Analytical Date/Time: 06/19/19 22:22
Container ID: 1199419005-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Hardness as CaCO3	371000		5000	5000	ug/L	1		06/19/19 22:22

Batch Information

Analytical Batch: MMS10539
Analytical Method: SM21 2340B
Analyst: DSH
Analytical Date/Time: 06/19/19 22:22
Container ID: 1199419005-F

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 06/19/19 14:10
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.230	J	0.625	0.188	mg/L	1		06/21/19 10:05
Surrogates								
5a Androstane (surr)	92.7		50-150		%	1		06/21/19 10:05

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Analyst: VDL
Analytical Date/Time: 06/21/19 10:05
Container ID: 1199419005-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.196	J	0.521	0.156	mg/L	1		06/21/19 10:05
Surrogates								
n-Triacontane-d62 (surr)	116		50-150		%	1		06/21/19 10:05

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK103
Analyst: VDL
Analytical Date/Time: 06/21/19 10:05
Container ID: 1199419005-B

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 06/17/19 11:42
Prep Initial Wt./Vol.: 960 mL
Prep Extract Vol: 1 mL

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Oil & Grease HEM	2080	J	4170	1040	ug/L	1		06/20/19 09:08

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Analyst: EWW
Analytical Date/Time: 06/20/19 09:08
Container ID: 1199419005-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloride	1920		200	50.0	ug/L	1		06/26/19 15:13
Fluoride	100	U	200	50.0	ug/L	1		06/26/19 15:13
Sulfate	51300		1000	250	ug/L	5		06/26/19 15:50

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 15:13
Container ID: 1199419005-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Analyst: DMM
Analytical Date/Time: 06/26/19 15:50
Container ID: 1199419005-D

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 06/26/19 09:00
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Organic Carbon	2290		1000	400	ug/L	1		06/17/19 18:27

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Analyst: BMZ
Analytical Date/Time: 06/17/19 18:27
Container ID: 1199419005-E

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Alkalinity	338000		10000	2500	ug/L	1		06/14/19 12:35

Batch Information

Analytical Batch: WTI5209
Analytical Method: SM21 2320B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:35
Container ID: 1199419005-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Conductivity	715		1.00	0.477	umhos/cm	1		06/14/19 12:35

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:35
Container ID: 1199419005-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Dissolved Solids	437000		10000	3100	ug/L	1		06/14/19 16:16

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Analyst: EWW
Analytical Date/Time: 06/14/19 16:16
Container ID: 1199419005-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Suspended Solids	1360		971	301	ug/L	1		06/14/19 17:36

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Analyst: EWW
Analytical Date/Time: 06/14/19 17:36
Container ID: 1199419005-C

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
pH	7.6		0.100	0.100	pH units	1		06/14/19 12:35

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Analyst: EWW
Analytical Date/Time: 06/14/19 12:35
Container ID: 1199419005-D

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.0375	J	0.100	0.0310	mg/L	1		06/25/19 12:38

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Analyst: DMM
Analytical Date/Time: 06/25/19 12:38
Container ID: 1199419005-G

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 06/25/19 10:30
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Total Nitrate/Nitrite-N	834		200	50.0	ug/L	2		06/17/19 16:05

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Analyst: EWW
Analytical Date/Time: 06/17/19 16:05
Container ID: 1199419005-G

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed

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J flagging is activated

Results of **PW-046**

Client Sample ID: **PW-046**
Client Project ID: **102599-005 Pre Design POET**
Lab Sample ID: 1199419005
Lab Project ID: 1199419

Collection Date: 06/09/19 15:55
Received Date: 06/13/19 16:24
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Waters Department**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0	U	100	31.0	ug/L	1		06/14/19 11:39

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Analyst: EWW
Analytical Date/Time: 06/14/19 11:39
Container ID: 1199419005-H

Print Date: 07/08/2019 4:18:32PM

J flagging is activated

Method Blank

Blank ID: MB for HBN 1795248 [MXX/32500]
Blank Lab ID: 1513943

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EP200.8**

Parameter	Results	LOQ/CL	DL	Units
Aluminum	10.0U	20.0	6.20	ug/L
Antimony	0.500U	1.00	0.310	ug/L
Arsenic	2.50U	5.00	1.50	ug/L
Barium	1.50U	3.00	0.940	ug/L
Beryllium	0.200U	0.400	0.130	ug/L
Cadmium	0.250U	0.500	0.150	ug/L
Calcium	250U	500	150	ug/L
Chromium	1.00U	2.00	0.800	ug/L
Cobalt	2.00U	4.00	1.20	ug/L
Copper	0.500U	1.00	0.310	ug/L
Iron	125U	250	78.0	ug/L
Lead	0.100U	0.200	0.0700	ug/L
Magnesium	25.0U	50.0	15.0	ug/L
Manganese	0.500U	1.00	0.350	ug/L
Molybdenum	1.00U	2.00	0.620	ug/L
Nickel	0.644J	2.00	0.620	ug/L
Phosphorus	100U	200	62.0	ug/L
Potassium	250U	500	150	ug/L
Selenium	2.50U	5.00	1.50	ug/L
Silicon	500U	1000	310	ug/L
Silver	0.500U	1.00	0.310	ug/L
Sodium	250U	500	150	ug/L
Thallium	0.500U	1.00	0.310	ug/L
Tin	0.500U	1.00	0.310	ug/L
Titanium	12.5U	25.0	7.75	ug/L
Vanadium	10.0U	20.0	6.20	ug/L
Zinc	5.00U	10.0	3.10	ug/L

Batch Information

Analytical Batch: MMS10539
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/19/2019 9:46:45PM

Prep Batch: MXX32500
Prep Method: E200.2
Prep Date/Time: 6/19/2019 2:10:36PM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [MXX32500]
Blank Spike Lab ID: 1513944
Date Analyzed: 06/19/2019 21:49

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EP200.8**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Aluminum	1000	988	99	(85-115)
Antimony	1000	1000	100	(85-115)
Arsenic	1000	1010	101	(85-115)
Barium	1000	1010	101	(85-115)
Beryllium	100	98.6	99	(85-115)
Cadmium	100	101	101	(85-115)
Calcium	10000	10100	101	(85-115)
Chromium	400	390	98	(85-115)
Cobalt	500	527	105	(85-115)
Copper	1000	1060	106	(85-115)
Iron	5000	4910	98	(85-115)
Lead	1000	1030	103	(85-115)
Magnesium	10000	10300	103	(85-115)
Manganese	500	517	103	(85-115)
Molybdenum	400	405	101	(85-115)
Nickel	1000	1040	104	(85-115)
Phosphorus	500	501	100	(85-115)
Potassium	10000	9910	99	(85-115)
Selenium	1000	1040	104	(85-115)
Silicon	10000	9680	97	(85-115)
Silver	100	98.3	98	(85-115)
Sodium	10000	9820	98	(85-115)
Thallium	10	9.74	97	(85-115)
Tin	100	95.4	95	(85-115)
Titanium	100	101	101	(85-115)
Vanadium	200	183	91	(85-115)
Zinc	1000	1050	105	(85-115)

Batch Information

Analytical Batch: **MMS10539**
Analytical Method: **EP200.8**
Instrument: **Perkin Elmer Nexlon P5**
Analyst: **DSH**

Prep Batch: **MXX32500**
Prep Method: **E200.2**
Prep Date/Time: **06/19/2019 14:10**
Spike Init Wt./Vol.: 1000 ug/L Extract Vol: 50 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1513946
MS Sample ID: 1513947 MS
MSD Sample ID:

Analysis Date: 06/19/2019 21:55
Analysis Date: 06/19/2019 21:58
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EP200.8**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Aluminum	10.0U	1000	907	91				70-130		
Antimony	0.500U	1000	1000	100				70-130		
Arsenic	2.50U	1000	993	99				70-130		
Barium	1.50U	1000	995	100				70-130		
Beryllium	0.200U	100	95.9	96				70-130		
Cadmium	0.250U	100	99	99				70-130		
Calcium	605	10000	10100	95				70-130		
Chromium	0.888J	400	386	96				70-130		
Cobalt	2.00U	500	512	102				70-130		
Copper	49.7	1000	1060	101				70-130		
Iron	125U	5000	4890	98				70-130		
Lead	0.546	1000	995	100				70-130		
Magnesium	72.9	10000	9380	93				70-130		
Manganese	1.74	500	509	102				70-130		
Molybdenum	1.00U	400	405	101				70-130		
Nickel	1.00U	1000	1010	101				70-130		
Phosphorus	100U	500	468	94				70-130		
Potassium	1980	10000	11200	93				70-130		
Selenium	2.50U	1000	1020	102				70-130		
Silicon	500U	10000	9630	96				70-130		
Silver	0.500U	100	93.3	93				70-130		
Thallium	0.500U	10.0	9.61	96				70-130		
Tin	0.500U	100	95.2	95				70-130		
Titanium	12.5U	100	97	97				70-130		
Vanadium	10.0U	200	178	89				70-130		
Zinc	4.66J	1000	993	99				70-130		
Sodium	190000	10000	208000	183 *				70-130		

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Matrix Spike Summary

Original Sample ID: 1513946
MS Sample ID: 1513947 MS
MSD Sample ID:

Analysis Date: 06/21/2019 10:57
Analysis Date: 06/21/2019 11:00
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EP200.8**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: MMS10539
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/19/2019 9:58:40PM

Prep Batch: MXX32500
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 6/19/2019 2:10:36PM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Analytical Batch: MMS10541
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/21/2019 11:00:36AM

Prep Batch: MXX32500
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 6/19/2019 2:10:36PM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 07/08/2019 4:18:38PM

Matrix Spike Summary

Original Sample ID: 1513948
MS Sample ID: 1513949 MS
MSD Sample ID:

Analysis Date: 06/19/2019 22:37
Analysis Date: 06/19/2019 22:40
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EP200.8**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Aluminum	14.9J	1000	1010	99				70-130		
Antimony	0.500U	1000	987	99				70-130		
Arsenic	7.97	1000	997	99				70-130		
Barium	45.3	1000	1020	97				70-130		
Beryllium	0.200U	100	94.4	94				70-130		
Cadmium	0.250U	100	99.4	99				70-130		
Calcium	33200	10000	43800	107				70-130		
Chromium	1.00U	400	380	95				70-130		
Cobalt	2.00U	500	505	101				70-130		
Copper	7.33	1000	1010	101				70-130		
Iron	125U	5000	4810	96				70-130		
Lead	0.0820J	1000	1030	103				70-130		
Magnesium	9670	10000	19500	98				70-130		
Manganese	78.5	500	586	102				70-130		
Molybdenum	1.06J	400	408	102				70-130		
Nickel	0.979J	1000	997	100				70-130		
Phosphorus	100U	500	533	107				70-130		
Potassium	1320	10000	11000	97				70-130		
Selenium	2.50U	1000	1020	102				70-130		
Silicon	4830	10000	15000	102				70-130		
Silver	0.500U	100	95	95				70-130		
Sodium	8650	10000	17900	93				70-130		
Thallium	0.500U	10.0	10.1	101				70-130		
Tin	0.500U	100	93.9	94				70-130		
Titanium	12.5U	100	100	100				70-130		
Vanadium	10.0U	200	181	90				70-130		
Zinc	7.88J	1000	999	99				70-130		

Batch Information

Analytical Batch: MMS10539
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 6/19/2019 10:40:25PM

Prep Batch: MXX32500
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 6/19/2019 2:10:36PM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 07/08/2019 4:18:38PM

Method Blank

Blank ID: MB for HBN 1795029 [STS/6321]
Blank Lab ID: 1513033

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2540C**

Parameter	Results	LOQ/CL	DL	Units
Total Dissolved Solids	9000J	10000	3100	ug/L

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Instrument:
Analyst: EWW
Analytical Date/Time: 6/14/2019 4:16:00PM

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Duplicate Sample Summary

Original Sample ID: 1199419005
Duplicate Sample ID: 1513036
Analysis Date: 06/14/2019 16:16
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2540C**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Dissolved Solids	437000	436000	ug/L	0.23	(< 5)

Batch Information

Analytical Batch: STS6321
Analytical Method: SM21 2540C
Instrument:
Analyst: EWW

Print Date: 07/08/2019 4:18:41PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [STS6321]
Blank Spike Lab ID: 1513034
Date Analyzed: 06/14/2019 16:16

Spike Duplicate ID: LCSD for HBN 1199419 [STS6321]
Spike Duplicate Lab ID: 1513035
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2540C**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Dissolved Solids	333000	314000	94	333000	315000	95	(75-125)	0.32	(< 5)

Batch Information

Analytical Batch: **STS6321**
Analytical Method: **SM21 2540C**
Instrument:
Analyst: **EWW**

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Method Blank

Blank ID: MB for HBN 1795033 [STS/6322]
Blank Lab ID: 1513059

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2540D**

Parameter	Results	LOQ/CL	DL	Units
Total Suspended Solids	500U	1000	310	ug/L

Batch Information

Analytical Batch: STS6322
Analytical Method: SM21 2540D
Instrument:
Analyst: EWW
Analytical Date/Time: 6/14/2019 5:36:36PM

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Duplicate Sample Summary

Original Sample ID: 1194050001
Duplicate Sample ID: 1514036

Analysis Date: 03/12/6019 1M43
x atriW (ater fSur,aceE. ,,GEo rdun) R

CP ,dr Samples:

1199219001E1199219006E1199219004E1199219002E1199219005

b esults Qy **SM21 2540D**

UAx .	Original	Duplicate	L nits	b %D fN R	b %D P7
Tdtal Suspen) e) Sdli) s	21000	26000	ug/7	6Q20	fv 5 R

Batch Information

Analytical <atcB: STS3466
Analytical x etBd) : Sx 61 6520D
Instrument:
Analyst: . ((

%rint Date: 0M0h/6019 2:1h:22%x

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [STS6322]
Blank Spike Lab ID: 1513060
Date Analyzed: 06/14/2019 1u:36

Spike DcpliRate ID: LCSD for HBN 1199419 [STS6322]
Spike DcpliRate Lab ID: 1513061
x atriW (ater ,ScrfaReE. ffGE) rocndP

v C for Sa%pleM 1199419001E1199419002E1199419003E1199419004E1199419005

s eMcItMby **SM21 2540D**

	Blank Spike ,cQLP			Spike DcpliRate ,cQLP					
mara%eter	Spike	s eMcIt	s eR,g P	Spike	s eMcIt	s eR,g P	CL	s mD ,g P	s mD CL
Total ScMpended SolidM	25000	23300	93	25000	24400	97	, u5-125 P	4G60	,< 5 P

Batch Information

AnalytiRal BatRh: **STS6322**
AnalytiRal x ethod: **SM21 2540D**
InMrc%ent:
AnalyM: **EWW**

mrint Date: 0u/07/2019 4:17:44mx

Method Blank

Blank ID: MB for HBN 1795257 [THOG/1283]
Blank Lab ID: 1513982

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 1664B**

Parameter	Results	LOQ/CL	DL	Units
Oil & Grease HEM	1800J	4000	1000	ug/L

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Instrument:
Analyst: EWW
Analytical Date/Time: 6/20/2019 9:08:39AM

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [THOG1283]
Blank Spike Lab ID: 1513983
Date Analyzed: 06/20/2019 09:08

Spike Duplicate ID: LCSD for HBN 1199419 [THOG1283]
Spike Duplicate Lab ID: 1513984
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 1664B**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Oil & Grease HEM	40000	39600	99	40000	40100	100	(78-114)	1.30	(< 18)

Batch Information

Analytical Batch: **THOG1283**
Analytical Method: **EPA 1664B**
Instrument:
Analyst: **EWW**

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Matrix Spike Summary

Original Sample ID: 1513985
MS Sample ID: 1513989 MS
MSD Sample ID:

Analysis Date: 06/20/2019 9:08
Analysis Date: 06/20/2019 9:08
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 1664B**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Oil & Grease HEM	5210	41700	38100	79				78-114		

Batch Information

Analytical Batch: THOG1283
Analytical Method: EPA 1664B
Instrument:
Analyst: EWW
Analytical Date/Time: 6/20/2019 9:08:39AM

Print Date: 07/08/2019 4:18:50PM

Method Blank

Blank ID: MB for HBN 1795054 [WAT/11382]
Blank Lab ID: 1513126

Matrix: Drinking Water

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM23 4500S D**

Parameter	Results	LOQ/CL	DL	Units
Sulfide	50.0U	100	31.0	ug/L

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Instrument:
Analyst: EWW
Analytical Date/Time: 6/14/2019 11:39:00AM

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WAT11382]
Blank Spike Lab ID: 1513127
Date Analyzed: 06/14/2019 11:39

Matrix: Drinking Water

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM23 4500S D**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Sulfide	499	490	98	(75-125)

Batch Information

Analytical Batch: **WAT11382**
Analytical Method: **SM23 4500S D**
Instrument:
Analyst: **EWW**

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Matrix Spike Summary

Original Sample ID: 1193027005
MS Sample ID: 1513128 MS
MSD Sample ID: 1513129 MSD

Analysis Date: 06/14/2019 11:39
Analysis Date: 06/14/2019 11:39
Analysis Date: 06/14/2019 11:39
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM23 4500S D**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Sulfide	50.0U	499	520	104	499	510	102	75-125	1.90	(< 25)

Batch Information

Analytical Batch: WAT11382
Analytical Method: SM23 4500S D
Instrument:
Analyst: EWW
Analytical Date/Time: 6/14/2019 11:39:00AM

Print Date: 07/08/2019 4:18:53PM

Method Blank

Blank ID: MB for HBN 1795176 (WFI/2822)
Blank Lab ID: 1513678

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

Parameter	Results	LOQ/CL	DL	Units
Nitrate-N	50.8J	200	50.0	ug/L
Nitrite-N	100U	200	50.0	ug/L
Total Nitrate/Nitrite-N	67.0J	200	50.0	ug/L

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 6/17/2019 3:30:55PM

Method Blank

Blank ID: MB for HBN 1795176 (WFI/2822)
Blank Lab ID: 1513680

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

Parameter	Results	LOQ/CL	DL	Units
Nitrate-N	55.4J	200	50.0	ug/L
Nitrite-N	100U	200	50.0	ug/L
Total Nitrate/Nitrite-N	67.4J	200	50.0	ug/L

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 6/17/2019 4:16:25PM

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WFI2822]
Blank Spike Lab ID: 1513677
Date Analyzed: 06/17/2019 15:29

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Nitrate-N	2500	2660	106	(70-130)
Nitrite-N	2500	2500	100	(90-110)
Total Nitrate/Nitrite-N	5000	5160	103	(90-110)

Batch Information

Analytical Batch: **WFI2822**
Analytical Method: **SM21 4500NO3-F**
Instrument: **Astoria segmented flow**
Analyst: **EWW**

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WFI2822]
Blank Spike Lab ID: 1513679
Date Analyzed: 06/17/2019 16:14

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Nitrate-N	2500	2420	97	(70-130)
Nitrite-N	2500	2390	96	(90-110)
Total Nitrate/Nitrite-N	5000	4820	96	(90-110)

Batch Information

Analytical Batch: **WFI2822**
Analytical Method: **SM21 4500NO3-F**
Instrument: **Astoria segmented flow**
Analyst: **EWW**

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Matrix Spike Summary

Original Sample ID: 1193136006
MS Sample ID: 1513641 MS
MSD Sample ID: 1513642 MSD

Analysis Date: 06/17/2019 17:24
Analysis Date: 06/17/2019 17:26
Analysis Date: 06/17/2019 17:27
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)						
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Nitrate-N	114J	2500	2700	103	2500	2270	86		70-130	17.30	(< 25)
Nitrite-N	100U	2500	2390	96	2500	2170	87	*	90-110	9.90	(< 25)

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 6/17/2019 5:26:04PM

Print Date: 07/08/2019 4:18:56PM

Matrix Spike Summary

Original Sample ID: 1199410001
MS Sample ID: 1513643 MS
MSD Sample ID: 1513644 MSD

Analysis Date: 06/17/2019 15:34
Analysis Date: 06/17/2019 15:36
Analysis Date: 06/17/2019 15:37
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500NO3-F**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Nitrate/Nitrite-N	274	5000	5760	110	5000	6120	117 *	90-110	6.00	(< 25)

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 6/17/2019 3:36:10PM

Print Date: 07/08/2019 4:18:56PM

Matrix Spike Summary

Original Sample ID: 1199423001
MS Sample ID: 1513645 MS
MSD Sample ID: 1513646 MSD

Analysis Date: 06/17/2019 14:59
Analysis Date: 06/17/2019 15:01
Analysis Date: 06/17/2019 15:02
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

Results by **SM21 4500NO3-F**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Nitrate/Nitrite-N	141J	5000	5490	107	5000	5440	106	90-110	0.79	(< 25)

Batch Information

Analytical Batch: WFI2822
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 6/17/2019 3:01:10PM

Print Date: 07/08/2019 4:18:56PM

Method Blank

Blank ID: MB for HBN 1795133 [WTC/2928]
Blank Lab ID: 1513469

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM 5310B**

Parameter	Results	LOQ/CL	DL	Units
Total Organic Carbon	500U	1000	400	ug/L

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Instrument: TOC Analyzer
Analyst: BMZ
Analytical Date/Time: 6/17/2019 1:56:20PM

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WTC2928]
Blank Spike Lab ID: 1513467
Date Analyzed: 06/17/2019 13:38

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM 5310B**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Total Organic Carbon	75000	77200	103	(80-120)

Batch Information

Analytical Batch: **WTC2928**
Analytical Method: **SM 5310B**
Instrument: **TOC Analyzer**
Analyst: **BMZ**

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Matrix Spike Summary

Original Sample ID: 1193071001
MS Sample ID: 1513471 MS
MSD Sample ID: 1513472 MSD

Analysis Date: 06/17/2019 14:13
Analysis Date: 06/17/2019 14:31
Analysis Date: 06/17/2019 14:47
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM 5310B**

		Matrix Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Total Organic Carbon	1590	10000	13700	121	10000	11700	101	75-125	16.20	(< 25)

Batch Information

Analytical Batch: WTC2928
Analytical Method: SM 5310B
Instrument: TOC Analyzer
Analyst: BMZ
Analytical Date/Time: 6/17/2019 2:31:14PM

Print Date: 07/08/2019 4:18:59PM

Duplicate Sample Summary

Original Sample ID: 1193045001
Duplicate Sample ID: 1513220
Analysis Date: 06/14/2019 11:33
Matrix: Drinking Water

QC for Samples:

1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-H B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
pH	6.0	6.00	pH units	0.00	(< 5)

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Instrument: Titration
Analyst: EWW

Print Date: 07/08/2019 4:19:00PM

Duplicate Sample Summary

Original Sample ID: 1199419001
Duplicate Sample ID: 1513221
Analysis Date: 06/14/2019 11:53
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-H B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
pH	7.5	7.50	pH units	0.00	(< 5)

Batch Information

Analytical Batch: WTI5207
Analytical Method: SM21 4500-H B
Instrument: Titration
Analyst: EWW

Print Date: 07/08/2019 4:19:00PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WTI5207]
Blank Spike Lab ID: 1513217
Date Analyzed: 06/14/2019 10:02

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-H B**

Blank Spike (pH units)

Parameter	Spike	Result	Rec (%)	CL
pH	6.98	7.01	100	(99-101)

Batch Information

Analytical Batch: **WTI5207**
Analytical Method: **SM21 4500-H B**
Instrument: **Titration**
Analyst: **EWW**

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Method Blank

Blank ID: MB for HBN 1795072 [WTI/5208]
Blank Lab ID: 1513224

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2510B**

Parameter	Results	LOQ/CL	DL	Units
Conductivity	2.30*	1.00	0.477	umhos/cm

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Instrument: Titration
Analyst: EWW
Analytical Date/Time: 6/14/2019 10:27:06AM

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Method Blank

Blank ID: MB for HBN 1795072 [WTI/5208]
Blank Lab ID: 1513227

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2510B**

Parameter	Results	LOQ/CL	DL	Units
Conductivity	0.500U	1.00	0.477	umhos/cm

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Instrument: Titration
Analyst: EWW
Analytical Date/Time: 6/14/2019 4:22:42PM

Duplicate Sample Summary

Original Sample ID: 1193045001
Duplicate Sample ID: 1513225
QC for Samples:
1199419001

Analysis Date: 06/14/2019 11:33
Matrix: Drinking Water

Results by **SM21 2510B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Conductivity	102	101	umhos/cm	0.89	(< 20)

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Instrument: Titration
Analyst: EWW

Print Date: 07/08/2019 4:19:03PM

Duplicate Sample Summary

Original Sample ID: 1199419001
Duplicate Sample ID: 1513226
Analysis Date: 06/14/2019 11:53
Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2510B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Conductivity	763	766	umhos/cm	0.38	(< 20)

Batch Information

Analytical Batch: WTI5208
Analytical Method: SM21 2510B
Instrument: Titration
Analyst: EWW

Print Date: 07/08/2019 4:19:03PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WTI5207]
Blank Spike Lab ID: 1513222
Date Analyzed: 06/14/2019 09:53

Matrix: Water (Surface, Eff., Ground)

8 C for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2510B**

Blank Spike (umQ.s/cm)

Parameter	Spike	Result	Rec (%)	CL
Conducti- ity	10.1	10.v	106	(90h110)

Batch Information

Analytical BatcQ **WTI5208**
Analytical MetQod: **SM21 2510B**
Instrument: **Titration**
Analyst: **EWW**

Print Date: 0v/07/2019 4:19:03PM

Method Blank

Blank ID: MB for HBN 1795072 [S TI/56093
Blank] aL ID: 151266b

MairxW S aisr (murfacst Eff.t Ground)

QC for map els4:
1199, 19001t 1199, 19006t 1199, 19002t 1199, 1900, t 1199, 19005

Rs4uli4 Ly **SM21 2320B**

Parap sisr	Rs4uli4	] OQ/C]	D]	Unxi4
v lkalxnxiy	6910J	10000	6500	ug/]

Batch Information

v nalyixcal BaicA: S TI5609
v nalyixcal MsiAod: mM61 6260B
In4irup sni: Txiraixon
v naly4i: ES S
v nalyixcal Dais/Txp s: h/1, /6019 10:67:0hv M

Duplicate Sample Summary

Original Sample ID: 1193045001
Duplicate Sample ID: 1513230
QC for Samples:
1199419001

Analysis Date: 06/14/2019 11:33
Matrix: Drinking Water

Results by **SM21 2320B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Alkalinity	19900	19440	ug/L	2.20	(8 25)

Batch Information

Analytical datcv: WhI5209
Analytical Metvo<: SM21 2320d
Instrument: hitration
Analyst: EWW

Print Date: 0B/0T/2019 4:19:06PM

Duplicate Sample Summary

Original Sample ID: 1199419001
Duplicate Sample ID: 1513231

Analysis Date: 06/14/2019 11:53
Matrix: Water (Surface, Eff., 7 roun<)

QC for Samples:

1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 2320B**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Alkalinity	26B000	26T060	ug/L	0.44	(8 25)

Batch Information

Analytical datcv: WhI5209
Analytical Metvo<: SM21 2320d
Instrument: hitration
Analyst: EWW

Print Date: 0B/0T/2019 4:19:06PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WTI52097
Blank Spike La] ID: 151b229
Da3e t nalAyez: 0d6l462019 10:b5

u a3iM Wa3er xSsrfa(ec, ffEc. rosnzG

QC for SaP pleR 1199419001c1199419002c119941900bc1199419004c1199419005

/ eRsl3R] A SM21 2320B

Blank Spike xs%6LG

) araP e3er	Spike	/ eRsl3	/ e(xmG	CL
t lkalini3A	250000	240000	9d	x85-115 G

Batch Information

t nalA3(al Ba3{h: **WTI5209**
t nalA3(al u e3noz: **SM21 2320B**
InR3sP en3 **Titration**
t nalAR3 **EWW**

) rin3Da3e: 0v6086 2019 4:19:0v) u

Method Blank

Blank ID: MB for HBN 1795465 [WXX/12883]
Blank Lab ID: 1514922

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-NH3 G**

Parameter	Results	LOQ/CL	DL	Units
Ammonia-N	0.0500U	0.100	0.0310	mg/L

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Instrument: Discrete Analyzer 2
Analyst: DMM
Analytical Date/Time: 6/25/2019 12:04:36PM

Prep Batch: WXX12883
Prep Method: METHOD
Prep Date/Time: 6/25/2019 10:30:00AM
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WXX12883]
Blank Spike Lab ID: 1514923
Date Analyzed: 06/25/2019 12:06

Spike Duplicate ID: LCSD for HBN 1199419 [WXX12883]
Spike Duplicate Lab ID: 1514924
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-NH3 G**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Ammonia-N	1	1.03	103	1	1.05	105	(75-125)	1.40	(< 25)

Batch Information

Analytical Batch: **WDA4586**
Analytical Method: **SM21 4500-NH3 G**
Instrument: **Discrete Analyzer 2**
Analyst: **DMM**

Prep Batch: **WXX12883**
Prep Method: **METHOD**
Prep Date/Time: **06/25/2019 10:30**
Spike Init Wt./Vol.: 1 mg/L Extract Vol: 6 mL
Dupe Init Wt./Vol.: 1 mg/L Extract Vol: 6 mL

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Matrix Spike Summary

Original Sample ID: 1199410001
MS Sample ID: 1514925 MS
MSD Sample ID: 1514926 MSD

Analysis Date: 06/25/2019 12:09
Analysis Date: 06/25/2019 12:11
Analysis Date: 06/25/2019 12:13
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **SM21 4500-NH3 G**

		Matrix Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Ammonia-N	0.0500U	1.00	.995	100	1.00	0.985	99	75-125	1.00	(< 25)

Batch Information

Analytical Batch: WDA4586
Analytical Method: SM21 4500-NH3 G
Instrument: Discrete Analyzer 2
Analyst: DMM
Analytical Date/Time: 6/25/2019 12:11:20PM

Prep Batch: WXX12883
Prep Method: Ammonia by SM21 4500F prep (W)
Prep Date/Time: 6/25/2019 10:30:00AM
Prep Initial Wt./Vol.: 6.00mL
Prep Extract Vol: 6.00mL

Print Date: 07/08/2019 4:19:12PM

Method Blank

Blank ID: MB for HBN 1795566 [WXX/12888]
Blank Lab ID: 1515374

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 300.0**

Parameter	Results	LOQ/CL	DL	Units
Chloride	100U	200	50.0	ug/L
Fluoride	100U	200	50.0	ug/L
Sulfate	100U	200	50.0	ug/L

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: DMM
Analytical Date/Time: 6/26/2019 10:48:15AM

Prep Batch: WXX12888
Prep Method: METHOD
Prep Date/Time: 6/26/2019 9:00:00AM
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [WXX12888]
Blank Spike Lab ID: 1515375
Date Analyzed: 06/26/2019 11:07

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 300.0**

Blank Spike (ug/L)

Parameter	Spike	Result	Rec (%)	CL
Chloride	5000	5280	106	(90-110)
Fluoride	5000	5270	105	(90-110)
Sulfate	5000	5240	105	(90-110)

Batch Information

Analytical Batch: **WIC5926**
Analytical Method: **EPA 300.0**
Instrument: **930 Metrohm compact IC flex**
Analyst: **DMM**

Prep Batch: **WXX12888**
Prep Method: **METHOD**
Prep Date/Time: **06/26/2019 09:00**
Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 10 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1199410001
MS Sample ID: 1515376 MS
MSD Sample ID: 1515377 MSD

Analysis Date: 06/26/2019 19:00
Analysis Date: 06/26/2019 19:19
Analysis Date: 06/26/2019 19:37
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **EPA 300.0**

		Matrix Spike (ug/L)				Spike Duplicate (ug/L)						
Parameter	Sample	Spike	Result	Rec (%)		Spike	Result	Rec (%)		CL	RPD (%)	RPD CL
Chloride	181J	5000	4550	87	*	5000	4540	87	*	90-110	0.33	(< 15)
Fluoride	100U	5000	4250	85	*	5000	4250	85	*	90-110	0.09	(< 15)
Sulfate	14700	5000	18300	73	*	5000	18300	72	*	90-110	0.16	(< 15)

Batch Information

Analytical Batch: WIC5926
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: DMM
Analytical Date/Time: 6/26/2019 7:19:04PM

Prep Batch: WXX12888
Prep Method: EPA 300.0 Extraction Waters/Liquids
Prep Date/Time: 6/26/2019 9:00:00AM
Prep Initial Wt./Vol.: 10.00mL
Prep Extract Vol: 10.00mL

Print Date: 07/08/2019 4:19:15PM

Method Blank

Blank ID: MB for HBN 1795068 [XXX/41597]
Blank Lab ID: 1513209

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.300U	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	86.9	60-120		%

Batch Information

Analytical Batch: XFC15069
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: VDL
Analytical Date/Time: 6/21/2019 8:42:00AM

Prep Batch: XXX41597
Prep Method: SW3520C
Prep Date/Time: 6/17/2019 11:42:12AM
Prep Initial Wt./Vol.: 1000 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [XXX41597]
Blank Spike Lab ID: 1513210
Date Analyzed: 06/21/2019 08:53

Spike Duplicate ID: LCSD for HBN 1199419 [XXX41597]
Spike Duplicate Lab ID: 1513211
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	5	5.90	118	5	5.41	108	(75-125)	8.70	(< 20)
Surrogates									
5a Androstane (surr)	0.1	110	110	0.1	102	102	(60-120)	7.40	

Batch Information

Analytical Batch: **XFC15069**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **VDL**

Prep Batch: **XXX41597**
Prep Method: **SW3520C**
Prep Date/Time: **06/17/2019 11:42**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1795068 [XXX/41597]
Blank Lab ID: 1513209

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.250U	0.500	0.150	mg/L
Surrogates				
nA riacontaneAd62 (surr)	108	60A120		%

Batch Information

hnalytical BatcF: XKC15069
hnalytical MetFod: hV103
Instrument: hgilent 7890B K
hnalyst: TDL
hnalytical Date/- ime: 6/21/2019 8:42:00hM

Prep BatcF: XXX41597
Prep MetFod: SW3520C
Prep Date/- ime: 6/17/2019 11:42:12hM
Prep Initial Wt./Tol.: 1000 mL
Prep Extract Tol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1199419 [XXX41597]
Blank Spike Lab ID: 1513210
Date Analyzed: 06/21/2019 08:53

Spike Duplicate ID: LCSD for HBN 1199419 [XXX41597]
Spike Duplicate Lab ID: 1513211
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1199419001, 1199419002, 1199419003, 1199419004, 1199419005

Results by **AK102**

	Blank Spike (mg/L)				Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)		Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	5	5.31	106		5	4.92	98	(60-120)	7.70	(< 20)
Surrogates										
n-Triacontane-d62 (surr)	0.1	125	125	*	0.1	119	119	(60-120)	4.70	

Batch Information

Analytical Batch: **XFC15069**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **VDL**

Prep Batch: **XXX41597**
Prep Method: **SW2530C**
Prep Date/Time: **06/17/3019 11:43**
Spike Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 5 mg/L Extract Vol: 1 mL

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1199419

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Laboratory SGS

Attn:

Turn Around Time: [x] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [x] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS (24 analytes) See attached list	0&G; Grease DRO/RRO	TSS	TOC	Metals 200.8 + Hardness	Ammonia, NO2+NO3	Sulfide	TDS, pH, Alk, Cond, Cl, F, SO4	Arsenate + Arsenite	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-001	1 AK	1030	6/7/19	2	2	1	1	1	1	1	1	1	11	Groundwater PFAS jars are from Test America
PW-013	2 AK	1114	6/8/19	2	2	1	1	1	1	1	1	1	11	Groundwater
Airport Terminal	3 AK	1230	6/8/19	2	2	1	1	1	1	1	1	1	11	"
PW-048	4 AK	1447	6/9/19	2	2	1	1	1	1	1	1	1	11	"
PW-046	5 AK	1555	6/9/19	2	2	1	1	1	1	1	1	1	11	"

Project Information

Number: 102599-005
Name: Pre Design POET
Contact: KRF
Ongoing Project? Yes [x] No [ ]
Sampler: SMH

Sample Receipt

Total No. of Containers: 55
COC Seals/Intact? Y/N/NA:
Received Good Cond./Cold:
Temp:
Delivery Method: Goldstreak

Notes:

Bill to SWI
See att. for analyte list.
TSS + sulfide break hold on 6/14/19; a.m.

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time: 1650	Signature: Time:
Printed Name: Sheila Hinckley Date: 6/10/19	Printed Name: David Ha Date: 6/12/19	Printed Name: Date:
Company: Shannon & Wilson	Company: ETA - Sac	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time: 16:43	Signature: Time: 16:24
Printed Name: Sarah Thompson Date: 6/12/19	Printed Name: MORENO Date:	Printed Name: E MORENO Date: 6/11/19
Company: ETA Sac	Company: SGS	Company: SGS

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

367128

No. 35960

1199419

SHAI GEOTECH

(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn:

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS (24 analytes) See attached list	Oil, Grease DRO/RRO	TSS	TOC	Metals 200.8 + Hardness	Ammonia, NO2+NO3	Sulfide	TDS, pH, Alk, Cond, Cl, F, SO4	Arsenate + Arsenite	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-001	1 AK	1030	6/7/19	2	2	1	1	1	1	1	1	1	11	Groundwater PFAS jar are from Test America
PW-013	2 AK	1114	6/8/19	2	2	1	1	1	1	1	1	1	11	Groundwater
Airport Terminal	3 AK	1230	6/8/19	2	2	1	1	1	1	1	1	1	11	"
PW-048	4 AK	1447	6/9/19	2	2	1	1	1	1	1	1	1	11	"
PW-046	5 AK	1555	6/9/19	2	2	1	1	1	1	1	1	1	11	"

Project Information	
Number:	102599-005
Name:	Pre Design POET
Contact:	KRF
Ongoing Project?	Yes [X] No [ ]
Sampler:	SMH

Sample Receipt	
Total No. of Containers:	55
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	
Delivery Method:	Goldstreak

Notes:

Bill to SWI
See att. for analyte list.
TSS + sulfide break hold on 6/14/19; a.m.

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time: 1630	Signature: Time:
Printed Name: Sheila Hinckley Date: 6/10/19	Printed Name: David Hu Date: 6/12/19	Printed Name: Date:
Company: Shannon & Wilson	Company: ETA · SW	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time:	Signature: Time: 14:45	Signature: Time: 16:24
Printed Name: Date: 6/11/19	Printed Name: Date:	Printed Name: Date: 6/11/19
Company:	Company: SGS	Company: SGS

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

No. 35960

TABLE 1
GUSTAVUS AIRPORT PRIVATE WELL SAMPLES DECEMBER 2018 RESULTS

Analytical Method	Analyte	Units	*PW-200* 1270 Gustavus Road	*PW-202* 2 Fara Way	*PW-405 / PW-505* 1 Fara Way	*PW-406* 1 White Drive	*PW-408* 11 Wilson Road
EPA 537M BY ID	4:2 Fluorotelomer sulfonate	ng/L	<7.70	<8.00	<8.00	<7.70	<7.70
	6:2 Fluorotelomer sulfonate	ng/L	<7.70	<8.00	<8.00	<7.70	<7.70
	8:2 Fluorotelomer sulfonate	ng/L	<7.70	<8.00	<8.00	<7.70	<7.70
	N-ethyl perfluorooctane sulfonamidoacetic acid (NETFOSAA)	ng/L	<15.0	<16.0	<16.0	<15.0	<15.0
	N-methyl perfluorooctane sulfonamidoacetic acid (NMEFOSAA)	ng/L	<15.0	<16.0	<16.0	<15.0	<15.0
	Perfluorobutanoic acid (PFBA)	ng/L	<7.70 J*	<8.00	4.92 J	5.20 J	<7.70
	Perfluorodecanesulfonic acid (PFDS)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluorodecanoic acid (PFDA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluorododecanoic acid (PFDOA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluoroheptanesulfonic acid (PFHPS)	ng/L	2.13 J	<4.00	3.23 J	2.30 J	<3.80
	Perfluoro-heptanoic acid (PFHpA)	ng/L	2.80 J*	2.33 J	4.57 J	5.44 J	3.20 J
	Perfluorohexanoic acid (PFHXA)	ng/L	<7.70 B*	<8.80 B*	<9.95 B*	12.1 JH*	8.67
	Perfluoro-hexansulfonic acid (PFHxS)	ng/L	23	8.77	28.8	23.8	21.1
	Perfluorononanesulfonic acid	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluoro-nonanoic acid (PFNA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluorooctane sulfonamide (FOSA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluoro-octane sulfonate (PFOS)	ng/L	97.7	20.0	114	113	115
	Perfluoro-octanoic acid (PFOA)	ng/L	<7.70 B*	<8.22 B*	<16.8 B*	<13.4 B*	2.64 J
	Perfluoropentanesulfonic acid	ng/L	3.33 J	<4.00	3.51 J	2.99 J	2.34 J
	Perfluoropentanoic acid (PFPEA)	ng/L	8.47 J*	5.15 J	11.6	14.3	13.1
	Perfluorotetradecanoic acid (PFTEA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluorotridecanoic acid (PFTRIA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perfluoroundecanoic acid (PFUNA)	ng/L	<3.80	<4.00	<4.00	<3.80	<3.80
	Perluor-obutane-sulfonic acid (PFBS)	ng/L	2.18 J	2.51 J	2.19 J	1.98 J	<3.80
EPA 1664B	Oil & Grease, Total	mg/L	<4.26 B*	<4.26 B*	<4.26 B*	<4.26 B*	<4.26 B*
SM 5310B	Total Organic Carbon	mg/L	2.2	2.75	2.27	3.03	2.53
SM21 2540C	Total Dissolved Solids	mg/L	379	317	393	481	455
SM21 2540D	Total Suspended Solids	mg/L	5.63	13.2	5.76	14	13.8 J
SM21 4500-H B	pH	N/A	7.60	7.60	7.60	7.60	7.60
SM21 2320B	Alkalinity	mg/L	232	257	239	224	217
SM21 2340B	Hardness as CaCO3	mg/L	202	264	220	198	220
SM21 2510B	Conductivity	umhos/cm	689	592	727	882	845
SM21 4500-NH3 G	Ammonia as N	µg/L	120	135	95.8 J*	292	274 JL*
SM21 4500NO3-F	Nitrate+Nitrite	µg/L	<100 B*	<100 B*	<100 B*	<100 B*	<50.0
SM23 4500S D	Sulfide	µg/L	<50.0	<50.0	<50.0	<50.0	<50.0
EPA 300.0	Chloride	mg/L	68.2	15.8	74.9	127	127
	Fluoride	µg/L	126 J	84.0 J	123 J	151 J	125 J
	Sulfate	mg/L	9.05	19	12.1	15.4	13.4
EP200.8	Calcium	mg/L	64.9	96	71.5	64.1	65.8
	Chromium	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Iron	mg/L	2.44	6.02	2.12	7.74	4.19
	Magnesium	mg/L	9.7	5.87	10.1	9.21	13.5
	Manganese	mg/L	0.339	0.146	0.23	0.218	0.225
	Potassium	mg/L	6.11	1.66	6.67	8.54	7.05
	Sodium	mg/L	51.3	8.89	57.3	100	78.1
SOP BAL-4100	AS(III) (Arsenite)	µg/L	9.70	3.85	10.9	19.6	18.5
	AS(V) (Arsenate)	µg/L	1.31	0.642	0.949	2.29	1.65

SGS

Multi-Cooler Temperature Report

1199419

Documented by: ELIE MORENO SGS WO#:

Cooler ID/Temp/Thermometer ID	Samples Included:	Analyses Included:	*Note which Containers had Ice, if any.
5.2°C D30	PW001 PW013	ALL	
5.8°C D30	AIRPORT TERMINAL PW0028	ALL	
0.5 D52	PW 046	ALL	

Note:

e-Sample Receipt Form

SGS Workorder #: 1199419

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements	N/A	Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?		
**Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 5.2 °C Therm. ID: D30
	Yes	Cooler ID: 2 @ 5.8 °C Therm. ID: D30
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.	Yes	Cooler ID: 3 @ 0.5 °C Therm. ID: D52
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Cooler accidentaly sendt to Sacramento received on the 06/13/19 containing all containers for sample "PW-046"

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1199419001-A	HCL to pH < 2	OK			
1199419001-B	HCL to pH < 2	OK			
1199419001-C	No Preservative Required	OK			
1199419001-D	No Preservative Required	OK			
1199419001-E	HCL to pH < 2	OK			
1199419001-F	HNO3 to pH < 2	OK			
1199419001-G	H2SO4 to pH < 2	OK			
1199419001-H	Zn Acetate,NaOH to pH > 9	OK			
1199419001-I	No Preservative Required	OK			
1199419001-J	No Preservative Required	OK			
1199419001-K	No Preservative Required	OK			
1199419002-A	HCL to pH < 2	OK			
1199419002-B	HCL to pH < 2	OK			
1199419002-C	No Preservative Required	OK			
1199419002-D	No Preservative Required	OK			
1199419002-E	HCL to pH < 2	OK			
1199419002-F	HNO3 to pH < 2	OK			
1199419002-G	H2SO4 to pH < 2	OK			
1199419002-H	Zn Acetate,NaOH to pH > 9	OK			
1199419002-I	No Preservative Required	OK			
1199419002-J	No Preservative Required	OK			
1199419002-K	No Preservative Required	OK			
1199419003-A	HCL to pH < 2	OK			
1199419003-B	HCL to pH < 2	OK			
1199419003-C	No Preservative Required	OK			
1199419003-D	No Preservative Required	OK			
1199419003-E	HCL to pH < 2	OK			
1199419003-F	HNO3 to pH < 2	OK			
1199419003-G	H2SO4 to pH < 2	OK			
1199419003-H	Zn Acetate,NaOH to pH > 9	OK			
1199419003-I	No Preservative Required	OK			
1199419003-J	No Preservative Required	OK			
1199419003-K	No Preservative Required	OK			
1199419004-A	HCL to pH < 2	OK			
1199419004-B	HCL to pH < 2	OK			
1199419004-C	No Preservative Required	OK			
1199419004-D	No Preservative Required	OK			
1199419004-E	HCL to pH < 2	OK			
1199419004-F	HNO3 to pH < 2	OK			
1199419004-G	H2SO4 to pH < 2	OK			
1199419004-H	Zn Acetate,NaOH to pH > 9	OK			
1199419004-I	No Preservative Required	OK			
1199419004-J	No Preservative Required	OK			
1199419004-K	No Preservative Required	OK			
1199419005-A	HCL to pH < 2	OK			
1199419005-B	HCL to pH < 2	OK			
1199419005-C	No Preservative Required	OK			
1199419005-D	No Preservative Required	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1199419005-E	HCL to pH < 2	OK			
1199419005-F	HNO3 to pH < 2	OK			
1199419005-G	H2SO4 to pH < 2	OK			
1199419005-H	Zn Acetate,NaOH to pH > 9	OK			
1199419005-I	No Preservative Required	OK			
1199419005-J	No Preservative Required	OK			
1199419005-K	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.

BROOKS APPLIED LABS
18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

July 2, 2019

SGS Environmental
ATTN: Julie Shumway
200 West Potter Drive
Anchorage AK 99518
julie.shumway@sgs.com

RE: Project SGS-AN1803 Client Project ID: 1199419

Dear Julie Shumway,

On June 18, 2019, Brooks Applied Labs (BAL) received five (5) water samples in a sealed cooler. The samples were logged-in for dissolved arsenite [*(As(III)*], arsenate [*As(V)*], monomethylarsonic acid [*MMAs*], and dimethylarsinic acid [*DMAs*]. The samples were filtered in the field by the client. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

Arsenic speciation was preformed using ion chromatography inductively coupled plasma collision reaction cell mass spectrometry (IC-ICP-CRC-MS). Arsenic species are chromatographically separated on an ion exchange column and then quantified using inductively coupled plasma collision reaction cell mass spectrometry (ICP-CRC-MS)

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C).

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria. BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Sincerely,

Lydia Greaves

Lydia Greaves
Client Services Manager
Lydia@brooksapplied.com

Jeremy Thompson
Project Coordinator
jeremyt@brooksapplied.com

Report Information

Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

Common Abbreviations

AR	as received	**MS**	matrix spike
BAL	Brooks Applied Labs	**MSD**	matrix spike duplicate
BLK	method blank	**ND**	non-detect
BS	blank spike	**NR**	non-reportable
CAL	calibration standard	**N/C**	not calculated
CCB	continuing calibration blank	**PS**	post preparation spike
CCV	continuing calibration verification	**REC**	percent recovery
COC	chain of custody record	**RPD**	relative percent difference
D	dissolved fraction	**SCV**	secondary calibration verification
DUP	duplicate	**SOP**	standard operating procedure
IBL	instrument blank	**SRM**	standard reference material
ICV	initial calibration verification	**T**	total fraction
MDL	method detection limit	**TR**	total recoverable fraction
MRL	method reporting limit		

Definition of Data Qualifiers

(Effective 9/23/09)

E An estimated value due to the presence of interferences. A full explanation is presented in the narrative.
H Holding time and/or preservation requirements not met. Please see narrative for explanation.
J Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.
J-1 Estimated value. A full explanation is presented in the narrative.
M Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.
N Spike recovery was not within acceptance criteria. Please see narrative for explanation.
R Rejected, unusable value. A full explanation is presented in the narrative.
U Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.
X Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated.

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
PW-001	1925009-01	Water	Sample	06/07/2019	06/18/2019
PW-013	1925009-02	Water	Sample	06/08/2019	06/18/2019
Airport Terminal	1925009-03	Water	Sample	06/08/2019	06/18/2019
PW-048	1925009-04	Water	Sample	06/09/2019	06/18/2019
PW-046	1925009-05	Water	Sample	06/09/2019	06/18/2019

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	06/19/2019	06/21/2019	B191668	1900764
As(V)	Water	SOP BAL-4100	06/19/2019	06/21/2019	B191668	1900764
DMAs	Water	SOP BAL-4100	06/19/2019	06/21/2019	B191668	1900764
MMAs	Water	SOP BAL-4100	06/19/2019	06/21/2019	B191668	1900764

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
PW-001										
1925009-01	As(III)	Water	D	14.0		0.043	0.216	µg/L	B191668	1900764
1925009-01	As(V)	Water	D	1.82		0.043	0.216	µg/L	B191668	1900764
1925009-01	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B191668	1900764
1925009-01	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B191668	1900764
PW-013										
1925009-02	As(III)	Water	D	7.47		0.043	0.216	µg/L	B191668	1900764
1925009-02	As(V)	Water	D	1.04		0.043	0.216	µg/L	B191668	1900764
1925009-02	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B191668	1900764
1925009-02	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B191668	1900764
Airport Terminal										
1925009-03	As(III)	Water	D	1.33		0.043	0.216	µg/L	B191668	1900764
1925009-03	As(V)	Water	D	1.21		0.043	0.216	µg/L	B191668	1900764
1925009-03	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B191668	1900764
1925009-03	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B191668	1900764
PW-048										
1925009-04	As(III)	Water	D	8.64		0.043	0.216	µg/L	B191668	1900764
1925009-04	As(V)	Water	D	0.610		0.043	0.216	µg/L	B191668	1900764
1925009-04	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B191668	1900764
1925009-04	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B191668	1900764
PW-046										
1925009-05	As(III)	Water	D	0.065	J	0.043	0.216	µg/L	B191668	1900764
1925009-05	As(V)	Water	D	≤ 0.043	U	0.043	0.216	µg/L	B191668	1900764
1925009-05	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B191668	1900764
1925009-05	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B191668	1900764

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Accuracy & Precision Summary

Batch: B191668
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B191668-BS1	**Blank Spike, (1902089)**						
	As(III)		5.010	5.074	µg/L	101% 75-125	
	As(V)		5.000	5.253	µg/L	105% 75-125	
	DMAs		5.210	5.158	µg/L	99% 75-125	
B191668-BS2	**Blank Spike, (1911013)**						
	MMAs		4.870	4.857	µg/L	100% 75-125	
B191668-DUP1	**Duplicate, (1925009-05)**						
	As(III)	0.065		0.068	µg/L		5% 25
	As(V)	ND		ND	µg/L		N/C 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
B191668-MS1	**Matrix Spike, (1925009-05)**						
	As(III)	0.065	11.12	11.30	µg/L	101% 75-125	
	As(V)	ND	11.23	11.61	µg/L	103% 75-125	
	DMAs	ND	11.02	11.23	µg/L	102% 75-125	
	MMAs	ND	10.80	11.06	µg/L	102% 75-125	
B191668-MSD1	**Matrix Spike Duplicate, (1925009-05)**						
	As(III)	0.065	11.12	11.49	µg/L	103% 75-125	2% 25
	As(V)	ND	11.23	11.67	µg/L	104% 75-125	0.5% 25
	DMAs	ND	11.02	11.29	µg/L	102% 75-125	0.5% 25
	MMAs	ND	10.80	11.20	µg/L	104% 75-125	1% 25

18804 North Creek Parkway, Suite 100, Bothell, WA 98011 · P(206) 632-6206 · F(206) 632-6017 · info@brooksapplied.com · www.brooksapplied.com

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Method Blanks & Reporting Limits

Batch: B191668
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units
B191668-BLK1	0.00	µg/L
B191668-BLK2	0.00	µg/L
B191668-BLK3	0.00	µg/L
B191668-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.020

MDL: 0.004
MRL: 0.020

Analyte: As(V)

Sample	Result	Units
B191668-BLK1	0.003	µg/L
B191668-BLK2	0.002	µg/L
B191668-BLK3	0.002	µg/L
B191668-BLK4	0.001	µg/L

Average: 0.002
Limit: 0.020

MDL: 0.004
MRL: 0.020

Analyte: DMAs

Sample	Result	Units
B191668-BLK1	0.00	µg/L
B191668-BLK2	0.00	µg/L
B191668-BLK3	0.00	µg/L
B191668-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.021

MDL: 0.005
MRL: 0.021

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B191668-BLK1	0.00	µg/L
B191668-BLK2	0.002	µg/L
B191668-BLK3	0.00	µg/L
B191668-BLK4	0.00	µg/L

Average: 0.001
Limit: 0.023

MDL: 0.009
MRL: 0.023

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Sample Containers

Lab ID: 1925009-01
Sample: PW-001
Report Matrix: Water
Sample Type: Sample
Collected: 06/07/2019
Received: 06/18/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125mL	18-0235	10mL EDTA (PP)	1916015	5	Styrocooler - 1925009

Lab ID: 1925009-02
Sample: PW-013
Report Matrix: Water
Sample Type: Sample
Collected: 06/08/2019
Received: 06/18/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125mL	18-0235	10mL EDTA (PP)	1916015	5	Styrocooler - 1925009

Lab ID: 1925009-03
Sample: Airport Terminal
Report Matrix: Water
Sample Type: Sample
Collected: 06/08/2019
Received: 06/18/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125mL	18-0235	10mL EDTA (PP)	1916015	5	Styrocooler - 1925009

Lab ID: 1925009-04
Sample: PW-048
Report Matrix: Water
Sample Type: Sample
Collected: 06/09/2019
Received: 06/18/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125mL	18-0235	10mL EDTA (PP)	1916015	5	Styrocooler - 1925009

Lab ID: 1925009-05
Sample: PW-046
Report Matrix: Water
Sample Type: Sample
Collected: 06/09/2019
Received: 06/18/2019

Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125mL	18-0235	10mL EDTA (PP)	1916015	5	Styrocooler - 1925009

Project ID: SGS-AN1803
PM: Amanda Royal

Client PM: Julie Shumway
Client Project: 1199419

Shipping Containers

Styrocooler - 1925009

Received: June 18, 2019 10:25
Tracking No: 1Z A86 19W 01 6777 5214 via UF
Coolant Type: Blue Ice
Temperature: 5.7 °C

Description: Styrocooler
Damaged in transit? No
Returned to client? No
Comments: IR#17

Custody seals present? Yes
Custody seals intact? Yes
COC present? Yes

SGS

SGS North America Inc.

CHAIN OF CUSTODY RECORD

1199419

Locations Nationwide

Alaska Florida
New Jersey Colorado
Texas North Carolina
Virginia Louisiana

www.us.sgs.com

CLIENT:	SGS North America Inc. - Alaska Division	**SGS Reference:**	**Brooks Applied**
CONTACT:	Julie Shumway	**PHONE NO:**	(907) 562-2343
PROJECT NAME:	1199419	**PWSID#:**	
		NPDL#:	
REPORTS TO:		**E-MAIL:**	Julie.Shumway@sgs.com
INVOICE TO:	SGS - Alaska	**QUOTE #:**	
		P.O. #:	1199419

Additional Comments: All soils report out in dry weight unless otherwise requested.

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/ MATRIX	# CONTAINERS	Preservative Used:	ADTA				MS	MSD	SGS lab #	Location ID
						TYPE C = COMP G = GRAB Multi Incremental Soils	As Speciation							
	PW-001	6/7/2019	10:30	Water	1	G	X						1199419001	
	PW-013	6/8/2019	11:14	Water	1	G	X						1199419002	
	Airport Terminal	6/8/2019	12:30	Water	1	G	X						1199419003	
	PW-048	6/9/2019	14:47	Water	1	G	X						1199419004	
	PW-046	6/9/2019	15:55	Water	1	G	X						1199419005	

Relinquished By: (1)	**Date**	**Time**	**Received By:**	DOD Project? NO Report to DL (J Flags)? YES Cooler ID:
Relinquished By: (2)	**Date**	**Time**	**Received By:**	**Requested Turnaround Time and-or Special Instructions:**
Relinquished By: (3)	**Date**	**Time**	**Received By:**	Report all analyses for Soils/Waters in mg/L or mg/Kg, where possible
Relinquished By: (4) J Shumway	**Date** 6/17/19	**Time** 1058	**Received For Laboratory By:** 6/18/19 1025	**Temp Blank °C:** _____ or Ambient [ ]

Data Deliverable Requirements: Level 2 Report +DV EDD

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

[X] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

REVIEWED

The results set forth herein are provided by SGS North America Inc.

e-Hardcopy 2.0
Automated Report

Technical Report for

SGS North America, Inc

1199419

SGS Job Number: FA65261

Sampling Dates: 06/07/19 - 06/09/19

Report to:

SGS North America, Inc
200 W Potter Dr
Anchorage, AK 99518
julie.shumway@sgs.com

ATTN: Julie Shumway

Total number of pages in report: **40**

Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Program and/or state specific certification programs as applicable.

Caitlin Brice, M.S.
General Manager

Client Service contact: Andrea Colby 407-425-6700

Certifications: FL(E83510), LA(03051), KS(E-10327), IL(200063), NC(573), NJ(FL002), NY(12022), SC(96038001) DoD ELAP(ANAB L2229), AZ(AZ0806), CA(2937), TX(T104704404), PA(68-03573), VA(460177), AK, AR, IA, KY, MA, MS, ND, NH, NV, OK, OR, UT, WA, WV

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Sample Summary

SGS North America, Inc

1199419

Job No: FA65261

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
FA65261-1	06/07/19	10:30	JS	06/18/19	AQ	Water	PW-001
FA65261-2	06/08/19	11:14	JS	06/18/19	AQ	Water	PW-013
FA65261-3	06/08/19	12:30	JS	06/18/19	AQ	Water	AIRPORT TERMINAL
FA65261-4	06/09/19	14:47	JS	06/18/19	AQ	Water	PW-048
FA65261-5	06/09/19	15:55	JS	06/18/19	AQ	Water	PW-046

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: SGS North America, Inc **Job No:** FA65261

Site: 1199419 **Report Date:** 7/5/2019 1:12:41 PM

5 Samples were collected on between 06/07/2019 and 06/09/2019 and were received at SGS North America Inc - Orlando on 06/18/2019 properly preserved, at 3.3 Deg. C and intact. These Samples received an SGS Orlando job number of FA65261. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section. Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

MS Semi-volatiles By Method EPA 537M BY ID

Matrix: AQ **Batch ID:** OP75609

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA65255-2MS, FA65259-6DUP, FA65255-2MS were used as the QC samples indicated.

Matrix Spike Recovery(s) for Perfluorooctanesulfonic acid are outside control limits. Outside control limits due to high level in sample relative to spike amount.

RPD(s) for Duplicate for Perfluorohexanesulfonic acid are outside control limits for sample OP75609-DUP. Probable cause is due to sample non-homogeneity.

Sample(s) FA65261-1, FA65261-2, FA65261-4 have surrogates outside control limits.

Sample(s) FA65261-1, FA65261-2 are outside limits due to dilution.

FA65261-1 for 13C2-PFTeDA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for 13C2-6:2FTS: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

OP75609-BS for 6:2 Fluorotelomer sulfonate: Associated ID Standard outside control limits.

FA65261-1 for Perfluorotridecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for Perfluorotetradecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for Perfluorododecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for Perfluoroundecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for 13C8-PFOS: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for d3-MeFOSAA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for MeFOSAA: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for 13C8-PFOS: Outside control limits due to dilution.

FA65261-1 for d3-MeFOSAA: Outside control limits due to dilution.

FA65261-1 for 13C2-PFDoDA: Outside control limits due to dilution.

FA65261-1 for 13C2-8:2FTS: Outside control limits due to dilution.

FA65261-1 for 13C2-6:2FTS: Outside control limits due to dilution.

FA65261-1 for EtFOSAA: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for 13C2-PFTeDA: Outside control limits due to dilution.

FA65261-1 for 13C6-PFDA: Outside control limits due to dilution.

FA65261-1 for 13C7-PFUnDA: Outside control limits due to dilution.

FA65261-1 for 13C7-PFUnDA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-1 for 13C2-PFDoDA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-2: Associated MB ID recovery standard outside control limits. Sample confirmed by re-extraction and re-analysis.

FA65261-2 for 13C2-6:2FTS: Outside control limits due to dilution.

FA65261-4 for Perfluoroundecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

MS Semi-volatiles By Method EPA 537M BY ID

Matrix: AQ **Batch ID:** OP75609

FA65261-4 for 13C8-PFOS: Outside control limits due to matrix interference.

FA65261-4 for 13C2-PFDoDA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-4 for Perfluorododecanoic acid: Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

FA65261-4 for Perfluorooctanesulfonic acid: Associated ID Standard outside control limits due to matrix interference.

FA65261-4 for 13C7-PFUnDA: Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

OP75609-BS for 13C2-6:2FTS: Outside control limits.

OP75609-DUP for 13C2-6:2FTS: Outside control limits.

Matrix: AQ **Batch ID:** OP75738

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

All method blanks for this batch meet method specific criteria.

Sample(s) FA65261-1, FA65261-2, FA65261-4 have surrogates outside control limits.

FA65261-1: Confirmation run.

FA65261-2: Confirmation run.

FA65261-4: Confirmation run.

OP75738-BS: Insufficient sample for MS/MSD.

SGS Orlando certifies that this report meets the project requirements for analytical data produced for the samples as received at SGS Orlando and as stated on the COC. SGS Orlando certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the SGS Orlando Quality Manual except as noted above. This report is to be used in its entirety. SGS Orlando is not responsible for any assumptions of data quality if partial data packages are used.

Narrative prepared by:

_____

Jenna Kravitz, Client Services *(Signature on File)*

Summary of Hits

Job Number: FA65261
Account: SGS North America, Inc
Project: 1199419
Collected: 06/07/19 thru 06/09/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
FA65261-1	**PW-001**					
Perfluorobutanoic acid		0.109	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.500	0.040	0.020	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.216	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.0264	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0241	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00420	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0252	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0695	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.489	0.040	0.020	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0337	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		2.88	0.040	0.020	ug/l	EPA 537M BY ID
PFOSA		0.00204 J	0.0040	0.0020	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.635	0.080	0.040	ug/l	EPA 537M BY ID
FA65261-2	**PW-013**					
Perfluorobutanoic acid [a]		0.604	0.080	0.040	ug/l	EPA 537M BY ID
Perfluoropentanoic acid [a]		3.78	0.040	0.020	ug/l	EPA 537M BY ID
Perfluorohexanoic acid [a]		1.32	0.040	0.020	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid [a]		0.272	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid [a]		0.129	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorononanoic acid [a]		0.0142	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorodecanoic acid [a]		0.00288 J	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid [a]		0.0321	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid [a]		0.0664	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid [a]		0.692	0.040	0.020	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid [a]		0.102	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid [a]		5.49	1.0	0.50	ug/l	EPA 537M BY ID
Perfluorononanesulfonic acid [a]		0.0342	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorodecanesulfonic acid [a]		0.00754	0.0040	0.0020	ug/l	EPA 537M BY ID
PFOSA [a]		0.00942	0.0040	0.0020	ug/l	EPA 537M BY ID
4:2 Fluorotelomer sulfonate [a]		0.00259 J	0.0080	0.0040	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate [a]		44.6	2.0	1.0	ug/l	EPA 537M BY ID
8:2 Fluorotelomer sulfonate [a]		0.0285	0.0080	0.0040	ug/l	EPA 537M BY ID
FA65261-3	**AIRPORT TERMINAL**					
Perfluorobutanoic acid		0.0131	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0462	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0269	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00581	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00285 J	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00261 J	0.0040	0.0020	ug/l	EPA 537M BY ID

Summary of Hits

Job Number: FA65261
Account: SGS North America, Inc
Project: 1199419
Collected: 06/07/19 thru 06/09/19

Lab Sample ID / Analyte	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
Perfluoropentanesulfonic acid		0.00287 J	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0231	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00238 J	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.330	0.0040	0.0020	ug/l	EPA 537M BY ID
6:2 Fluorotelomer sulfonate		0.223	0.0080	0.0040	ug/l	EPA 537M BY ID
8:2 Fluorotelomer sulfonate		0.00228 J	0.0080	0.0040	ug/l	EPA 537M BY ID
FA65261-4	**PW-048**					
Perfluorobutanoic acid		0.00229 J	0.0080	0.0040	ug/l	EPA 537M BY ID
FA65261-5	**PW-046**					
Perfluorobutanoic acid		0.00845	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0152	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0365	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00827	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0306	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorononanoic acid		0.00178 J	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.0290	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.0710	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.865	0.040	0.020	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.0147	0.0040	0.0020	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.0683	0.0040	0.0020	ug/l	EPA 537M BY ID

(a) Associated MB ID recovery standard outside control limits. Sample confirmed by re-extraction and re-analysis.

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID: PW-001
Lab Sample ID: FA65261-1
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: 1199419

Date Sampled: 06/07/19
Date Received: 06/18/19
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q31448.D	1	06/26/19 15:26	NG	06/24/19 12:30	OP75609	S2Q501
Run #2 [a]	3Q5417.D	1	07/03/19 12:41	NG	07/02/19 13:30	OP75738	S3Q122
Run #3	2Q31558.D	10	06/27/19 21:17	NAF	06/24/19 12:30	OP75609	S2Q502

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml
Run #3	250 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.109	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.500 [b]	0.040	0.020	0.015	ug/l	
307-24-4	Perfluorohexanoic acid	0.216	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0264	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0241	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00420	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid [c]	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid [c]	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid [c]	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid [c]	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROALKYLSULFONATES							
375-73-5	Perfluorobutanesulfonic acid	0.0252	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0695	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.489 [b]	0.040	0.020	0.010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0337	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	2.88 [b]	0.040	0.020	0.015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.00204	0.0040	0.0020	0.0010	ug/l	J
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA [c]	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA [c]	0.0080 U	0.020	0.0080	0.0040	ug/l	
FLUOROTELOMER SULFONATES							

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PW-001
Lab Sample ID: FA65261-1
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: 1199419

Date Sampled: 06/07/19
Date Received: 06/18/19
Percent Solids: n/a

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.635 [b]	0.080	0.040	0.020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	98%	81%	96%	30-140%
	13C5-PFPeA	104%	83%	95%	40-140%
	13C5-PFHxA	108%	77%	96%	50-150%
	13C4-PFHpA	112%	75%	95%	50-150%
	13C8-PFOA	120%	57%	100%	50-150%
	13C9-PFNA	92%	29%	78%	50-150%
	13C6-PFDA	63%	11%	46% [d]	50-150%
	13C7-PFUnDA	43% [e]	10%	29% [d]	50-150%
	13C2-PFDoDA	40% [e]	13%	27% [d]	50-150%
	13C2-PFTeDA	38% [e]	26%	37% [d]	40-150%
	13C3-PFBS	90%	83%	93%	50-150%
	13C3-PFHxS	83%	61%	87%	50-150%
	13C8-PFOS	34% [e]	9%	39% [d]	50-150%
	13C8-FOSA	69%	21%	62%	30-140%
	d3-MeFOSAA	47% [e]	6%	39% [d]	50-150%
	13C2-4:2FTS	122%	73%	95%	50-150%
	13C2-6:2FTS	230% [e]	93%	178% [d]	50-150%
	13C2-8:2FTS	75%	8%	45% [d]	50-150%

(a) Confirmation run.
(b) Result is from Run# 3
(c) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
(d) Outside control limits due to dilution.
(e) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PW-013
Lab Sample ID: FA65261-2
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: 1199419

Date Sampled: 06/08/19
Date Received: 06/18/19
Percent Solids: n/a

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	2Q31449.D	1	06/26/19 15:41	NG	06/24/19 12:30	OP75609	S2Q501
Run #2 [b]	3Q5418.D	1	07/03/19 12:56	NG	07/02/19 13:30	OP75738	S3Q122
Run #3 [a]	2Q31559.D	10	06/27/19 21:31	NAF	06/24/19 12:30	OP75609	S2Q502
Run #4 [a]	3Q5423.D	250	07/03/19 15:32	NG	06/24/19 12:30	OP75609	S3Q122

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml
Run #3	250 ml	1.0 ml
Run #4	250 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.604 [c]	0.080	0.040	0.020	ug/l	
2706-90-3	Perfluoropentanoic acid	3.78 [c]	0.040	0.020	0.015	ug/l	
307-24-4	Perfluorohexanoic acid	1.32 [c]	0.040	0.020	0.010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.272	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.129	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0142	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.00288	0.0040	0.0020	0.0010	ug/l	J
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROALKYLSULFONATES							
375-73-5	Perfluorobutanesulfonic acid	0.0321	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0664	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.692 [c]	0.040	0.020	0.010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.102	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	5.49 [d]	1.0	0.50	0.38	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0342	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.00754	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.00942	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PW-013		
Lab Sample ID:	FA65261-2	**Date Sampled:**	06/08/19
Matrix:	AQ - Water	**Date Received:**	06/18/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1199419		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	0.00259	0.0080	0.0040	0.0020	ug/l	J
27619-97-2	6:2 Fluorotelomer sulfonate	44.6 [d]	2.0	1.0	0.50	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	0.0285	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Run# 3	Limits
	13C4-PFBA	106%	94%	94%	30-140%
	13C5-PFPeA	94%	83%	92%	40-140%
	13C5-PFHxA	106%	81%	95%	50-150%
	13C4-PFHpA	117%	84%	95%	50-150%
	13C8-PFOA	90%	60%	89%	50-150%
	13C9-PFNA	92%	55%	85%	50-150%
	13C6-PFDA	91%	32%	61%	50-150%
	13C7-PFUnDA	69%	10%	43% [e]	50-150%
	13C2-PFDoDA	62%	7%	38% [e]	50-150%
	13C2-PFTeDA	56%	17%	49%	40-150%
	13C3-PFBS	98%	96%	93%	50-150%
	13C3-PFHxS	88%	86%	88%	50-150%
	13C8-PFOS	36% [f]	33%	47% [e]	50-150%
	13C8-FOSA	96%	60%	79%	30-140%
	d3-MeFOSAA	69%	12%	56%	50-150%
	13C2-4:2FTS	130%	83%	96%	50-150%
	13C2-6:2FTS	2313% [f]	1279%	2737% [e]	50-150%
	13C2-8:2FTS	102%	22%	60%	50-150%

(a) Associated MB ID recovery standard outside control limits. Sample confirmed by re-extraction and re-analysis.
(b) Confirmation run.
(c) Result is from Run# 3
(d) Result is from Run# 4
(e) Outside control limits due to dilution.
(f) Outside control limits.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	AIRPORT TERMINAL		
Lab Sample ID:	FA65261-3	**Date Sampled:**	06/08/19
Matrix:	AQ - Water	**Date Received:**	06/18/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1199419		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q31561.D	1	06/27/19 22:01	NAF	06/24/19 12:30	OP75609	S2Q502
Run #2							

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.0131	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0462	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0269	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00581	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.00285	0.0040	0.0020	0.0010	ug/l	J
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROALKYLSULFONATES							
375-73-5	Perfluorobutanesulfonic acid	0.00261	0.0040	0.0020	0.0010	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00287	0.0040	0.0020	0.0010	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0231	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00238	0.0040	0.0020	0.0010	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.330	0.0040	0.0020	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.223	0.0080	0.0040	0.0020	ug/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: AIRPORT TERMINAL
Lab Sample ID: FA65261-3
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: 1199419

Date Sampled: 06/08/19
Date Received: 06/18/19
Percent Solids: n/a

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.00228	0.0080	0.0040	0.0020	ug/l	J

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	105%		30-140%
	13C5-PFPeA	104%		40-140%
	13C5-PFHxA	104%		50-150%
	13C4-PFHpA	99%		50-150%
	13C8-PFOA	105%		50-150%
	13C9-PFNA	94%		50-150%
	13C6-PFDA	80%		50-150%
	13C7-PFUnDA	66%		50-150%
	13C2-PFDoDA	70%		50-150%
	13C2-PFTeDA	72%		40-150%
	13C3-PFBS	97%		50-150%
	13C3-PFHxS	86%		50-150%
	13C8-PFOS	53%		50-150%
	13C8-FOSA	83%		30-140%
	d3-MeFOSAA	71%		50-150%
	13C2-4:2FTS	105%		50-150%
	13C2-6:2FTS	120%		50-150%
	13C2-8:2FTS	74%		50-150%

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PW-048		
Lab Sample ID:	FA65261-4	**Date Sampled:**	06/09/19
Matrix:	AQ - Water	**Date Received:**	06/18/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1199419		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q31453.D	1	06/26/19 16:40	NG	06/24/19 12:30	OP75609	S2Q501
Run #2 [a]	3Q5419.D	1	07/03/19 13:11	NG	07/02/19 13:30	OP75738	S3Q122

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.00229	0.0080	0.0040	0.0020	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid [b]	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid [b]	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROALKYLSULFONATES							
375-73-5	Perfluorobutanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid [c]	0.0020 U	0.0040	0.0020	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PW-048		
Lab Sample ID:	FA65261-4	**Date Sampled:**	06/09/19
Matrix:	AQ - Water	**Date Received:**	06/18/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1199419		

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	105%	98%	30-140%
	13C5-PFPeA	116%	101%	40-140%
	13C5-PFHxA	119%	95%	50-150%
	13C4-PFHpA	123%	93%	50-150%
	13C8-PFOA	128%	90%	50-150%
	13C9-PFNA	105%	78%	50-150%
	13C6-PFDA	64%	43%	50-150%
	13C7-PFUnDA	41% [d]	17%	50-150%
	13C2-PFDoDA	37% [d]	10%	50-150%
	13C2-PFTeDA	41%	29%	40-150%
	13C3-PFBS	94%	100%	50-150%
	13C3-PFHxS	91%	98%	50-150%
	13C8-PFOS	43% [e]	50%	50-150%
	13C8-FOSA	72%	76%	30-140%
	d3-MeFOSAA	50%	23%	50-150%
	13C2-4:2FTS	125%	86%	50-150%
	13C2-6:2FTS	143%	73%	50-150%
	13C2-8:2FTS	69%	32%	50-150%

(a) Confirmation run.
(b) Associated ID Standard outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
(c) Associated ID Standard outside control limits due to matrix interference.
(d) Outside control limits due to matrix interference. Confirmed by re-extraction and reanalysis.
(e) Outside control limits due to matrix interference.

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	PW-046		
Lab Sample ID:	FA65261-5	**Date Sampled:**	06/09/19
Matrix:	AQ - Water	**Date Received:**	06/18/19
Method:	EPA 537M BY ID EPA 537 MOD	**Percent Solids:**	n/a
Project:	1199419		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	3Q5420.D	1	07/03/19 13:26	NG	07/02/19 13:30	OP75738	S3Q122
Run #2	3Q5424.D	10	07/03/19 15:47	NG	07/02/19 13:30	OP75738	S3Q122

	Initial Volume	Final Volume
Run #1	250 ml	1.0 ml
Run #2	250 ml	1.0 ml

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
PERFLUOROALKYLCARBOXYLIC ACIDS							
375-22-4	Perfluorobutanoic acid	0.00845	0.0080	0.0040	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0152	0.0040	0.0020	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	0.0365	0.0040	0.0020	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00827	0.0040	0.0020	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	0.0306	0.0040	0.0020	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	0.00178	0.0040	0.0020	0.0010	ug/l	J
335-76-2	Perfluorodecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	0.0020 U	0.0040	0.0020	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROALKYLSULFONATES							
375-73-5	Perfluorobutanesulfonic acid	0.0290	0.0040	0.0020	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.0710	0.0040	0.0020	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.865 [a]	0.040	0.020	0.010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0147	0.0040	0.0020	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0683	0.0040	0.0020	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDES							
754-91-6	PFOSA	0.0020 U	0.0040	0.0020	0.0010	ug/l	
PERFLUOROOCTANESULFONAMIDOACETIC ACIDS							
2355-31-9	MeFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
2991-50-6	EtFOSAA	0.0080 U	0.020	0.0080	0.0040	ug/l	
FLUOROTELOMER SULFONATES							
757124-72-4	4:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

U = Not detected LOD = Limit of Detection J = Indicates an estimated value
LOQ = Limit of Quantitation DL = Detection Limit B = Indicates analyte found in associated method blank
E = Indicates value exceeds calibration range N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: PW-046
Lab Sample ID: FA65261-5
Matrix: AQ - Water
Method: EPA 537M BY ID EPA 537 MOD
Project: 1199419

Date Sampled: 06/09/19
Date Received: 06/18/19
Percent Solids: n/a

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0040 U	0.0080	0.0040	0.0020	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	92%	96%	30-140%
	13C5-PFPeA	95%	97%	40-140%
	13C5-PFHxA	87%	90%	50-150%
	13C4-PFHpA	84%	86%	50-150%
	13C8-PFOA	83%	83%	50-150%
	13C9-PFNA	81%	80%	50-150%
	13C6-PFDA	78%	75%	50-150%
	13C7-PFUnDA	72%	65%	50-150%
	13C2-PFDoDA	69%	65%	50-150%
	13C2-PFTeDA	81%	78%	40-150%
	13C3-PFBS	91%	98%	50-150%
	13C3-PFHxS	81%	91%	50-150%
	13C8-PFOS	77%	76%	50-150%
	13C8-FOSA	53%	53%	30-140%
	d3-MeFOSAA	62%	63%	50-150%
	13C2-4:2FTS	82%	80%	50-150%
	13C2-6:2FTS	73%	69%	50-150%
	13C2-8:2FTS	61%	55%	50-150%

(a) Result is from Run# 2

U = Not detected LOD = Limit of Detection
LOQ = Limit of Quantitation DL = Detection Limit
E = Indicates value exceeds calibration range

J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

5

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1199419

FA65261

Locations Nationwide

Alaska	Florida
New Jersey	Colorado
Texas	North Carolina
Virginia	Louisiana

www.us.sgs.com

CLIENT:	SGS North America Inc. - Alaska Division	SGS Reference:	SGS, FL
CONTACT:	Julie Shumway	PHONE NO:	(907) 562-2343
PROJECT NAME:	1199419	PWSID#:	
		NPDL#:	
REPORTS TO:		E-MAIL:	Julie.Shumway@sgs.com
INVOICE TO:	SGS - Alaska	QUOTE #:	
		P.O. #:	1199419

Additional Comments: All soils report out in dry weight unless otherwise requested.

Page 1 of 1

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/ MATRIX	# CONTAINERS	Preservative Used:	NONE				MS	MSD	SGS lab #	Location ID
						TYPE C = COMP G = GRAB Multi Incremental Soils	PFAS by EPA 537 24 Compounds							
1	PW-001	6/7/2019	10:30	Water	2	G	X						1199419001	
2	PW-013	6/8/2019	11:14	Water	2	G	X						1199419002	
3	Airport Terminal	6/8/2019	12:30	Water	2	G	X						1199419003	
4	PW-048	6/9/2019	14:47	Water	2	G	X						1199419004	
5	PW-046	6/9/2019	15:55	Water	2	G	X						1199419005	

Relinquished By: (1)		Date	Time	Received By:	DOD Project? NO Report to DL (J Flags)? YES Cooler ID:
Relinquished By: (2)		Date	Time	Received By:	Requested Turnaround Time and-or Special Instructions:
Relinquished By: (3)		Date	Time	Received By:	Client is requesting 2 reports: 1 with 24 ~~reports~~ cmpds 1 with only PFOS/PFOA Report all analyses for Soils/Waters in mg/L or mg/Kg, where possible
Relinquished By: (4)	L Shumway	6/13/19	1017	Received For Laboratory By: Pettit	6/18/19 905 Temp Blank °C: 3.3 or Ambient [ ]

Data Deliverable Requirements: Level 2 Report +DV EDD

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

[X] 200 W Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 561-5301
[ ] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms_and_conditions.htm

REVIEWED JKJ

1199419_PFC_06.14.19.xls

5.1 5

FA65261: Chain of Custody
Page 1 of 2

SGS Sample Receipt Summary

Job Number: FA65261 **Client:** SGS ALASKA **Project:** 1199419

Date / Time Received: 6/18/2019 9:00:00 AM **Delivery Method:** FX **Airbill #'s:**

Therm ID: IR 1; **Therm CF:** 0.4; **# of Coolers:** 1

Cooler Temps (Raw Measured) °C: Cooler 1: (2.9);

Cooler Temps (Corrected) °C: Cooler 1: (3.3);

Cooler Information	Y	or	N
1. Custody Seals Present	☑		☐
2. Custody Seals Intact	☑		☐
3. Temp criteria achieved	☑		☐
4. Cooler temp verification	IR Gun		
5. Cooler media	Ice (Bag)		

Trip Blank Information	Y	or	N	N/A
1. Trip Blank present / cooler	☐		☐	☑
2. Trip Blank listed on COC	☐		☐	☑

	W	or	S	N/A
3. Type Of TB Received	☐		☐	☑

Sample Information	Y	or	N	N/A
1. Sample labels present on bottles	☑		☐	
2. Samples preserved properly	☑		☐	
3. Sufficient volume/containers recvd for analysis:	☑		☐	
4. Condition of sample	Intact			
5. Sample recvd within HT	☑		☐	
6. Dates/Times/IDs on COC match Sample Label	☑		☐	
7. VOCs have headspace	☐		☐	☑
8. Bottles received for unspecified tests	☐		☑	
9. Compositing instructions clear	☐		☐	☑
10. Voa Soil Kits/Jars received past 48hrs?	☐		☐	☑
11. % Solids Jar received?	☐		☐	☑
12. Residual Chlorine Present?	☐		☐	☑

Misc. Information

Number of Encores: 25-Gram _____ 5-Gram _____ Number of 5035 Field Kits: _____ Number of Lab Filtered Metals: _____

Test Strip Lot #s: pH 0-3 230315 pH 10-12 219813A Other: (Specify) _____ _____

Residual Chlorine Test Strip Lot #: _____

Comments

SM001
Rev. Date 05/24/17

Technician: PETERH Date: 6/18/2019 9:00:00 AM Reviewer: _____ Date: _____

FA65261: Chain of Custody
Page 2 of 2

MS Semi-volatiles

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-MB	2Q31429.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	107%	30-140%
	13C5-PFPeA	113%	40-140%
	13C5-PFHxA	116%	50-150%
	13C4-PFHpA	122%	50-150%
	13C8-PFOA	131%	50-150%
	13C9-PFNA	130%	50-150%
	13C6-PFDA	106%	50-150%
	13C7-PFUnDA	89%	50-150%

Method Blank Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-MB	2Q31429.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	93%	50-150%
	13C2-PFTeDA	68%	40-150%
	13C3-PFBS	98%	50-150%
	13C3-PFHxS	93%	50-150%
	13C8-PFOS	62%	50-150%
	13C8-FOSA	91%	30-140%
	d3-MeFOSAA	96%	50-150%
	13C2-4:2FTS	125%	50-150%
	13C2-6:2FTS	145%	50-150%
	13C2-8:2FTS	110%	50-150%

Method Blank Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75738-MB	3Q5414.D	1	07/03/19	NG	07/02/19	OP75738	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	105%	30-140%
	13C5-PFPeA	105%	40-140%
	13C5-PFHxA	99%	50-150%
	13C4-PFHpA	96%	50-150%
	13C8-PFOA	93%	50-150%
	13C9-PFNA	89%	50-150%
	13C6-PFDA	88%	50-150%
	13C7-PFUnDA	79%	50-150%

Method Blank Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75738-MB	3Q5414.D	1	07/03/19	NG	07/02/19	OP75738	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-5

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	80%	50-150%
	13C2-PFTeDA	92%	40-150%
	13C3-PFBS	106%	50-150%
	13C3-PFHxS	103%	50-150%
	13C8-PFOS	95%	50-150%
	13C8-FOSA	101%	30-140%
	d3-MeFOSAA	74%	50-150%
	13C2-4:2FTS	89%	50-150%
	13C2-6:2FTS	75%	50-150%
	13C2-8:2FTS	67%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q501-IBLK	2Q31355.D	1	06/25/19	NG	n/a	n/a	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-1, FA65261-2, FA65261-4

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	93%	50-150%
	13C5-PFPeA	102%	50-150%
	13C5-PFHxA	106%	50-150%
	13C4-PFHpA	110%	50-150%
	13C8-PFOA	115%	50-150%
	13C9-PFNA	119%	50-150%
	13C6-PFDA	123%	50-150%
	13C7-PFUnDA	125%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q501-IBLK	2Q31355.D	1	06/25/19	NG	n/a	n/a	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-1, FA65261-2, FA65261-4

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	127%	50-150%
	13C2-PFTeDA	93%	50-150%
	13C3-PFBS	86%	50-150%
	13C3-PFHxS	90%	50-150%
	13C8-PFOS	93%	50-150%
	13C8-FOSA	105%	50-150%
	d3-MeFOSAA	124%	50-150%
	13C2-4:2FTS	107%	50-150%
	13C2-6:2FTS	123%	50-150%
	13C2-8:2FTS	126%	50-150%
	13C3-HFPO-DA	82%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q502-IBLK	2Q31520.D	1	06/27/19	NAF	n/a	n/a	S2Q502

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-1, FA65261-2, FA65261-3

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.0080	0.0020	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0040	0.0015	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0040	0.0010	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0040	0.0010	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0040	0.0010	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0040	0.0010	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0040	0.0010	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0040	0.0010	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0040	0.0015	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0040	0.0010	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0040	0.0010	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0040	0.0010	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0040	0.0010	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0040	0.0010	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0040	0.0010	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0040	0.0015	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0040	0.0010	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0040	0.0010	ug/l	
754-91-6	PFOSA	ND	0.0040	0.0010	ug/l	
2355-31-9	MeFOSAA	ND	0.020	0.0040	ug/l	
2991-50-6	EtFOSAA	ND	0.020	0.0040	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.0080	0.0020	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	90%	50-150%
	13C5-PFPeA	90%	50-150%
	13C5-PFHxA	91%	50-150%
	13C4-PFHpA	91%	50-150%
	13C8-PFOA	94%	50-150%
	13C9-PFNA	93%	50-150%
	13C6-PFDA	96%	50-150%
	13C7-PFUnDA	95%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q502-IBLK	2Q31520.D	1	06/27/19	NAF	n/a	n/a	S2Q502

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-1, FA65261-2, FA65261-3

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	96%	50-150%
	13C2-PFTeDA	90%	50-150%
	13C3-PFBS	89%	50-150%
	13C3-PFHxS	91%	50-150%
	13C8-PFOS	91%	50-150%
	13C8-FOSA	96%	50-150%
	d3-MeFOSAA	96%	50-150%
	13C2-4:2FTS	87%	50-150%
	13C2-6:2FTS	89%	50-150%
	13C2-8:2FTS	88%	50-150%
	13C3-HFPO-DA	107%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q122-IBLK	3Q5409.D	1	07/03/19	NG	n/a	n/a	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-2, FA65261-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.016	0.0040	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0080	0.0030	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0080	0.0020	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0080	0.0020	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0080	0.0020	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0080	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0080	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0080	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0080	0.0030	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0080	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0080	0.0020	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0080	0.0020	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0080	0.0020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0080	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0080	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0080	0.0030	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0080	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0080	0.0020	ug/l	
754-91-6	PFOSA	ND	0.0080	0.0020	ug/l	
2355-31-9	MeFOSAA	ND	0.040	0.0080	ug/l	
2991-50-6	EtFOSAA	ND	0.040	0.0080	ug/l	
757124-72-4	4:2 Fluorotelomer sulfonate	ND	0.016	0.0040	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.016	0.0040	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.016	0.0040	ug/l	

CAS No.	ID Standard Recoveries		Limits
	13C4-PFBA	112%	50-150%
	13C5-PFPeA	114%	50-150%
	13C5-PFHxA	109%	50-150%
	13C4-PFHpA	105%	50-150%
	13C8-PFOA	101%	50-150%
	13C9-PFNA	96%	50-150%
	13C6-PFDA	97%	50-150%
	13C7-PFUnDA	99%	50-150%

Instrument Blank

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S3Q122-IBLK	3Q5409.D	1	07/03/19	NG	n/a	n/a	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M QSM5.1 B-15

FA65261-2, FA65261-5

CAS No.	ID Standard Recoveries		Limits
	13C2-PFDoDA	102%	50-150%
	13C2-PFTeDA	118%	50-150%
	13C3-PFBS	117%	50-150%
	13C3-PFHxS	117%	50-150%
	13C8-PFOS	110%	50-150%
	13C8-FOSA	116%	50-150%
	d3-MeFOSAA	89%	50-150%
	13C2-4:2FTS	95%	50-150%
	13C2-6:2FTS	82%	50-150%
	13C2-8:2FTS	77%	50-150%
	13C3-HFPO-DA	115%	50-150%

Blank Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-BS	2Q31428.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0765	96	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0748	94	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0768	96	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0731	91	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0749	94	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0768	96	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0753	94	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0746	93	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0799	100	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0959	120	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0803	100	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0746	93	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0798	100	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0765	96	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0608	76	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0768	96	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0904	113	70-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0976	122	70-130
754-91-6	PFOSA	0.08	0.0779	97	70-131
2355-31-9	MeFOSAA	0.08	0.0773	97	70-130
2991-50-6	EtFOSAA	0.08	0.0708	89	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0748	94	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0721	90 [a]	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0782	98	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	115%	30-140%
	13C5-PFPeA	121%	40-140%
	13C5-PFHxA	123%	50-150%
	13C4-PFHpA	129%	50-150%
	13C8-PFOA	133%	50-150%
	13C9-PFNA	125%	50-150%
	13C6-PFDA	94%	50-150%
	13C7-PFUnDA	82%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-BS	2Q31428.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	89%	50-150%
	13C2-PFTeDA	74%	40-150%
	13C3-PFBS	105%	50-150%
	13C3-PFHxS	99%	50-150%
	13C8-PFOS	56%	50-150%
	13C8-FOSA	82%	30-140%
	d3-MeFOSAA	85%	50-150%
	13C2-4:2FTS	140%	50-150%
	13C2-6:2FTS	155%* [b]	50-150%
	13C2-8:2FTS	107%	50-150%

(a) Associated ID Standard outside control limits.
(b) Outside control limits.

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75738-BS [a]	3Q5413.D	1	07/03/19	NG	07/02/19	OP75738	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.08	0.0736	92	70-130
2706-90-3	Perfluoropentanoic acid	0.08	0.0759	95	70-130
307-24-4	Perfluorohexanoic acid	0.08	0.0776	97	70-130
375-85-9	Perfluoroheptanoic acid	0.08	0.0786	98	71-130
335-67-1	Perfluorooctanoic acid	0.08	0.0762	95	74-130
375-95-1	Perfluorononanoic acid	0.08	0.0797	100	76-130
335-76-2	Perfluorodecanoic acid	0.08	0.0775	97	70-130
2058-94-8	Perfluoroundecanoic acid	0.08	0.0750	94	70-130
307-55-1	Perfluorododecanoic acid	0.08	0.0778	97	70-130
72629-94-8	Perfluorotridecanoic acid	0.08	0.0702	88	70-139
376-06-7	Perfluorotetradecanoic acid	0.08	0.0778	97	70-130
375-73-5	Perfluorobutanesulfonic acid	0.08	0.0803	100	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.08	0.0791	99	70-130
355-46-4	Perfluorohexanesulfonic acid	0.08	0.0775	97	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.08	0.0788	99	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.08	0.0718	90	70-130
68259-12-1	Perfluorononanesulfonic acid	0.08	0.0683	85	70-130
335-77-3	Perfluorodecanesulfonic acid	0.08	0.0739	92	70-130
754-91-6	PFOSA	0.08	0.0791	99	70-131
2355-31-9	MeFOSAA	0.08	0.0787	98	70-130
2991-50-6	EtFOSAA	0.08	0.0707	88	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	0.08	0.0784	98	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.08	0.0781	98	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.08	0.0817	102	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	104%	30-140%
	13C5-PFPeA	104%	40-140%
	13C5-PFHxA	96%	50-150%
	13C4-PFHpA	93%	50-150%
	13C8-PFOA	89%	50-150%
	13C9-PFNA	86%	50-150%
	13C6-PFDA	81%	50-150%
	13C7-PFUnDA	75%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75738-BS [a]	3Q5413.D	1	07/03/19	NG	07/02/19	OP75738	S3Q122

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-5

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	75%	50-150%
	13C2-PFTeDA	86%	40-150%
	13C3-PFBS	102%	50-150%
	13C3-PFHxS	101%	50-150%
	13C8-PFOS	96%	50-150%
	13C8-FOSA	95%	30-140%
	d3-MeFOSAA	72%	50-150%
	13C2-4:2FTS	91%	50-150%
	13C2-6:2FTS	76%	50-150%
	13C2-8:2FTS	69%	50-150%

(a) Insufficient sample for MS/MSD.

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-MS	2Q31432.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501
FA65255-2	2Q31431.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	Compound	FA65255-2 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.00839		0.08	0.0898	102	70-130
2706-90-3	Perfluoropentanoic acid	0.00830		0.08	0.0868	98	70-130
307-24-4	Perfluorohexanoic acid	0.0150		0.08	0.0959	101	70-130
375-85-9	Perfluoroheptanoic acid	0.0293		0.08	0.107	97	71-130
335-67-1	Perfluorooctanoic acid	0.260		0.08	0.343	104	74-130
375-95-1	Perfluorononanoic acid	0.00665		0.08	0.0870	100	76-130
335-76-2	Perfluorodecanoic acid	ND		0.08	0.0791	99	70-130
2058-94-8	Perfluoroundecanoic acid	ND		0.08	0.0807	101	70-130
307-55-1	Perfluorododecanoic acid	ND		0.08	0.0834	104	70-130
72629-94-8	Perfluorotridecanoic acid	ND		0.08	0.100	125	70-139
376-06-7	Perfluorotetradecanoic acid	ND		0.08	0.0868	109	70-130
375-73-5	Perfluorobutanesulfonic acid	0.00508		0.08	0.0855	101	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.00527		0.08	0.0905	107	70-130
355-46-4	Perfluorohexanesulfonic acid	0.0191		0.08	0.102	104	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.0132		0.08	0.101	110	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.214		0.08	0.269	69* [a]	70-130
68259-12-1	Perfluorononanesulfonic acid	ND		0.08	0.0653	82	70-130
335-77-3	Perfluorodecanesulfonic acid	ND		0.08	0.0615	77	70-130
754-91-6	PFOSA	ND		0.08	0.0795	99	70-131
2355-31-9	MeFOSAA	ND		0.08	0.0799	100	70-130
2991-50-6	EtFOSAA	ND		0.08	0.0694	87	70-130
757124-72-4	4:2 Fluorotelomer sulfonate	ND		0.08	0.0788	99	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	ND		0.08	0.0758	95	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	ND		0.08	0.0817	102	70-130

CAS No.	ID Standard Recoveries	MS	FA65255-2	Limits
	13C4-PFBA	91%	101%	30-140%
	13C5-PFPeA	99%	110%	40-140%
	13C5-PFHxA	104%	115%	50-150%
	13C4-PFHpA	111%	125%	50-150%
	13C8-PFOA	119%	136%	50-150%
	13C9-PFNA	132%	150%	50-150%
	13C6-PFDA	122%	129%	50-150%
	13C7-PFUnDA	88%	99%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-MS	2Q31432.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501
FA65255-2	2Q31431.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	ID Standard Recoveries	MS	FA65255-2	Limits
	13C2-PFDoDA	89%	110%	50-150%
	13C2-PFTeDA	67%	85%	40-150%
	13C3-PFBS	86%	96%	50-150%
	13C3-PFHxS	90%	101%	50-150%
	13C8-PFOS	84%	82%	50-150%
	13C8-FOSA	99%	120%	30-140%
	d3-MeFOSAA	96%	103%	50-150%
	13C2-4:2FTS	122%	128%	50-150%
	13C2-6:2FTS	141%	151%* [b]	50-150%
	13C2-8:2FTS	138%	132%	50-150%

(a) Outside control limits due to high level in sample relative to spike amount.
(b) Outside control limits.

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-DUP	2Q31443.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501
FA65259-6	2Q31442.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	Compound	FA65259-6 ug/l	Q	DUP ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	0.00427	J	0.00467	J	9	30
2706-90-3	Perfluoropentanoic acid	0.00228	J	0.00267	J	16	30
307-24-4	Perfluorohexanoic acid	0.00215	J	0.00219	J	2	30
375-85-9	Perfluoroheptanoic acid	0.00146	J	0.00143	J	2	30
335-67-1	Perfluorooctanoic acid	0.00156	J	0.00156	J	0	30
375-95-1	Perfluorononanoic acid	0.0040	U	ND		nc	30
335-76-2	Perfluorodecanoic acid	0.0040	U	ND		nc	30
2058-94-8	Perfluoroundecanoic acid	0.0040	U	ND		nc	30
307-55-1	Perfluorododecanoic acid	0.0040	U	ND		nc	30
72629-94-8	Perfluorotridecanoic acid	0.0040	U	ND		nc	30
376-06-7	Perfluorotetradecanoic acid	0.0040	U	ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	0.00112	J	0.00114	J	2	30
2706-91-4	Perfluoropentanesulfonic acid	0.0040	U	ND		nc	30
355-46-4	Perfluorohexanesulfonic acid	0.00103	J	ND		200*	30
375-92-8	Perfluoroheptanesulfonic acid	0.0040	U	ND		nc	30
1763-23-1	Perfluorooctanesulfonic acid	0.0040	U	ND		nc	30
68259-12-1	Perfluorononanesulfonic acid	0.0040	U	ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	0.0040	U	ND		nc	30
754-91-6	PFOSA	0.0040	U	ND		nc	30
2355-31-9	MeFOSAA	0.020	U	ND		nc	30
2991-50-6	EtFOSAA	0.020	U	ND		nc	30
757124-72-4	4:2 Fluorotelomer sulfonate	0.0080	U	ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	0.0080	U	ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080	U	ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA65259-6	Limits
	13C4-PFBA	92%		30-140%
	13C5-PFPeA	105%		40-140%
	13C5-PFHxA	113%		50-150%
	13C4-PFHpA	121%		50-150%
	13C8-PFOA	137%	149%	50-150%
	13C9-PFNA	143%		50-150%
	13C6-PFDA	122%		50-150%
	13C7-PFUnDA	90%		50-150%

* = Outside of Control Limits.

Duplicate Summary

Job Number: FA65261
Account: SGSAKA SGS North America, Inc
Project: 1199419

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP75609-DUP	2Q31443.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501
FA65259-6	2Q31442.D	1	06/26/19	NG	06/24/19	OP75609	S2Q501

The QC reported here applies to the following samples: **Method:** EPA 537M BY ID

FA65261-1, FA65261-2, FA65261-3, FA65261-4

CAS No.	ID Standard Recoveries	DUP	FA65259-6	Limits
	13C2-PFDoDA	80%		50-150%
	13C2-PFTeDA	65%		40-150%
	13C3-PFBS	89%		50-150%
	13C3-PFHxS	97%		50-150%
	13C8-PFOS	75%	82%	50-150%
	13C8-FOSA	103%		30-140%
	d3-MeFOSAA	97%		50-150%
	13C2-4:2FTS	124%		50-150%
	13C2-6:2FTS	152%* [a]		50-150%
	13C2-8:2FTS	137%		50-150%

(a) Outside control limits.

* = Outside of Control Limits.

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ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-51336-1
Client Project/Site: GST Quarterly

For:
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger

Authorized for release by:
7/8/2019 2:12:55 PM

David Alltucker, Project Manager I
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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Job ID: 320-51336-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-51336-1

Receipt
The samples were received on 6/12/2019 12:58 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.6º C and 6.7º C.

LCMS
Method(s) WS-LC-0025 At1: The “I” qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has/have some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. PW-208 (320-51336-25)

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

Organic Prep
Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-303244.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-303247.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-303248.

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: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-401 — Lab Sample ID: 320-51336-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.7	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	43		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-010 — Lab Sample ID: 320-51336-2

No Detections.

Client Sample ID: PW-418 — Lab Sample ID: 320-51336-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.7	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	66		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-213 — Lab Sample ID: 320-51336-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.2	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	44		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-040 — Lab Sample ID: 320-51336-5

No Detections.

Client Sample ID: PW-059 — Lab Sample ID: 320-51336-6

No Detections.

Client Sample ID: PW-405 — Lab Sample ID: 320-51336-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.8	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	66		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-406 — Lab Sample ID: 320-51336-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.1	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	74		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-221 — Lab Sample ID: 320-51336-9

No Detections.

Client Sample ID: PW-503 — Lab Sample ID: 320-51336-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.9	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client Sample ID: PW-503 (Continued) — Lab Sample ID: 320-51336-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	67		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-518 — Lab Sample ID: 320-51336-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.9	J B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	63		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: NPS WELL — Lab Sample ID: 320-51336-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	3.4	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	16		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-011 — Lab Sample ID: 320-51336-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.2	B	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	80		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-111 — Lab Sample ID: 320-51336-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	82		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-203 — Lab Sample ID: 320-51336-15

No Detections.

Client Sample ID: PW-204 — Lab Sample ID: 320-51336-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	4.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-207 — Lab Sample ID: 320-51336-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-209 — Lab Sample ID: 320-51336-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-037 — Lab Sample ID: 320-51336-19

No Detections.

Client Sample ID: PW-122 — Lab Sample ID: 320-51336-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-038 — Lab Sample ID: 320-51336-21

No Detections.

Client Sample ID: PW-022 — Lab Sample ID: 320-51336-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-415 — Lab Sample ID: 320-51336-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.6	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	67		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-419 — Lab Sample ID: 320-51336-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-208 — Lab Sample ID: 320-51336-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.80	J I	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.4		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-202 — Lab Sample ID: 320-51336-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	38		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-462 — Lab Sample ID: 320-51336-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	48		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-402 — Lab Sample ID: 320-51336-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.5	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	92		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-039 — Lab Sample ID: 320-51336-29

No Detections.

Client Sample ID: PW-403 — Lab Sample ID: 320-51336-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	65		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-463 — Lab Sample ID: 320-51336-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	74		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-408 — Lab Sample ID: 320-51336-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	88		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-205 — Lab Sample ID: 320-51336-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.93	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-012 — Lab Sample ID: 320-51336-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.81	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-414 — Lab Sample ID: 320-51336-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	2.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-441 — Lab Sample ID: 320-51336-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-438 — Lab Sample ID: 320-51336-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	3.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-210 — Lab Sample ID: 320-51336-38

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	77		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-002 — Lab Sample ID: 320-51336-39

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	33		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-071 — Lab Sample ID: 320-51336-40

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.82	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: PW-433 — Lab Sample ID: 320-51336-41

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-401
Date Collected: 06/09/19 10:08
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-1
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.7	J B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 06:55	1
Perfluorooctanesulfonic acid (PFOS)	43		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 06:55	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*120*		*25 - 150*	*06/24/19 09:10*	*06/30/19 06:55*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:10*	*06/30/19 06:55*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-010
Date Collected: 06/09/19 12:02
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-2
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:10	06/30/19 07:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 07:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:13*	*1*
13C4 PFOS	*110*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:13*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-418

Date Collected: 06/09/19 10:31
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-3

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.7	J B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 07:31	1
Perfluorooctanesulfonic acid (PFOS)	66		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 07:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:31*	*1*
13C4 PFOS	*109*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:31*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-213

Date Collected: 06/09/19 11:19
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-4

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.2	B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 07:50	1
Perfluorooctanesulfonic acid (PFOS)	44		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 07:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*114*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:50*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/24/19 09:10*	*06/30/19 07:50*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-040
Date Collected: 06/08/19 14:10
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-5
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:10	06/30/19 08:08	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 08:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*123*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:08*	*1*
13C4 PFOS	*116*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:08*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-059
Date Collected: 06/09/19 09:27
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-6
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:10	06/30/19 08:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 08:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*108*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:27*	*1*
13C4 PFOS	*106*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-405
Date Collected: 06/08/19 11:31
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-7
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.8	J B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 08:45	1
Perfluorooctanesulfonic acid (PFOS)	66		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 08:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*116*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:45*	*1*
13C4 PFOS	*108*		*25 - 150*	*06/24/19 09:10*	*06/30/19 08:45*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-406

Date Collected: 06/08/19 16:13
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-8

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.1	B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 09:22	1
Perfluorooctanesulfonic acid (PFOS)	74		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 09:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*118*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:22*	*1*
13C4 PFOS	*110*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-221
Date Collected: 06/09/19 12:48
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-9
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:10	06/30/19 09:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 09:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*107*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:41*	*1*
13C4 PFOS	*116*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:41*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-503
Date Collected: 06/08/19 10:00
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-10
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.9	B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 09:59	1
Perfluorooctanesulfonic acid (PFOS)	67		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 09:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*116*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:59*	*1*
13C4 PFOS	*115*		*25 - 150*	*06/24/19 09:10*	*06/30/19 09:59*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-518
Date Collected: 06/09/19 10:21
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-11
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.9	J B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 10:18	1
Perfluorooctanesulfonic acid (PFOS)	63		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 10:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*121*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:18*	*1*
13C4 PFOS	*117*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:18*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: NPS WELL

Date Collected: 06/08/19 14:33
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-12

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	3.4	B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 10:36	1
Perfluorooctanesulfonic acid (PFOS)	16		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 10:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*102*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:36*	*1*
13C4 PFOS	*109*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:36*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-011
Date Collected: 06/08/19 12:21
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-13
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.2	B	2.0	0.75	ng/L		06/24/19 09:10	06/30/19 10:55	1
Perfluorooctanesulfonic acid (PFOS)	80		2.0	1.3	ng/L		06/24/19 09:10	06/30/19 10:55	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*104*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:55*	*1*
13C4 PFOS	*110*		*25 - 150*	*06/24/19 09:10*	*06/30/19 10:55*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-111
Date Collected: 06/08/19 12:11
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-14
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.0		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 14:17	1
Perfluorooctanesulfonic acid (PFOS)	82		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 14:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*119*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:17*	*1*
13C4 PFOS	*113*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:17*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-203
Date Collected: 06/08/19 09:18
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-15
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 14:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 14:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*119*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:36*	*1*
13C4 PFOS	*100*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:36*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-204
Date Collected: 06/07/19 12:41
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-16
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 14:54	1
Perfluorooctanesulfonic acid (PFOS)	**4.7**		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 14:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*116*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:54*	*1*
13C4 PFOS	*121*		*25 - 150*	*06/24/19 09:29*	*07/01/19 14:54*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-207
Date Collected: 06/07/19 09:43
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-17
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 15:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 15:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*122*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:13*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:13*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-209

Date Collected: 06/07/19 13:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-18

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.5		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 15:31	1
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 15:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:31*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:31*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-037

Date Collected: 06/07/19 17:53
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-19

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 15:50	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 15:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*117*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:50*	*1*
13C4 PFOS	*110*		*25 - 150*	*06/24/19 09:29*	*07/01/19 15:50*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-122
Date Collected: 06/07/19 10:22
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-20
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 16:08	1
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 16:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*120*		*25 - 150*	*06/24/19 09:29*	*07/01/19 16:08*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:29*	*07/01/19 16:08*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-038
Date Collected: 06/07/19 17:18
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-21
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 16:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 16:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*124*		*25 - 150*	*06/24/19 09:29*	*07/01/19 16:45*	*1*
13C4 PFOS	*115*		*25 - 150*	*06/24/19 09:29*	*07/01/19 16:45*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-022
Date Collected: 06/07/19 10:32
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-22
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.7	J	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 17:03	1
Perfluorooctanesulfonic acid (PFOS)	120		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 17:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:03*	*1*
13C4 PFOS	*113*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:03*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-415

Date Collected: 06/07/19 16:07
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-23

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.6	J	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 17:22	1
Perfluorooctanesulfonic acid (PFOS)	67		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 17:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*119*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:22*	*1*
13C4 PFOS	*101*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-419
Date Collected: 06/08/19 17:16
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-24
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 17:40	1
Perfluorooctanesulfonic acid (PFOS)	**14**		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 17:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*108*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:40*	*1*
13C4 PFOS	*108*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:40*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-208

Date Collected: 06/07/19 14:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-25

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.80	J I	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 17:59	1
Perfluorooctanesulfonic acid (PFOS)	8.4		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 17:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*114*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:59*	*1*
13C4 PFOS	*111*		*25 - 150*	*06/24/19 09:29*	*07/01/19 17:59*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-202
Date Collected: 06/07/19 14:06
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-26
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	4.2		2.0	0.75	ng/L		06/24/19 09:29	07/01/19 18:17	1
Perfluorooctanesulfonic acid (PFOS)	38		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 18:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*102*		*25 - 150*	*06/24/19 09:29*	*07/01/19 18:17*	*1*
13C4 PFOS	*100*		*25 - 150*	*06/24/19 09:29*	*07/01/19 18:17*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-462
Date Collected: 06/07/19 14:20
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-27
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L		06/24/19 09:29	07/01/19 18:36	1
Perfluorooctanesulfonic acid (PFOS)	48		2.0	1.3	ng/L		06/24/19 09:29	07/01/19 18:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:29*	*07/01/19 18:36*	*1*
13C4 PFOS	*105*		*25 - 150*	*06/24/19 09:29*	*07/01/19 18:36*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-402
Date Collected: 06/08/19 15:19
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-28
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.5	J	2.0	0.75	ng/L		06/24/19 09:32	07/01/19 20:26	1
Perfluorooctanesulfonic acid (PFOS)	92		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 20:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 20:26*	*1*
13C4 PFOS	*101*		*25 - 150*	*06/24/19 09:32*	*07/01/19 20:26*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-039
Date Collected: 06/08/19 13:42
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-29
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 20:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 20:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*114*		*25 - 150*	*06/24/19 09:32*	*07/01/19 20:45*	*1*
13C4 PFOS	*98*		*25 - 150*	*06/24/19 09:32*	*07/01/19 20:45*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-403
Date Collected: 06/08/19 10:06
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-30
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 21:03	1
Perfluorooctanesulfonic acid (PFOS)	65		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 21:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:03*	*1*
13C4 PFOS	*115*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:03*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-463
Date Collected: 06/08/19 16:45
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-31
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.8		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 21:22	1
Perfluorooctanesulfonic acid (PFOS)	74		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 21:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*105*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:22*	*1*
13C4 PFOS	*107*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-408

Date Collected: 06/07/19 16:00
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-32

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 21:40	1
Perfluorooctanesulfonic acid (PFOS)	88		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 21:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:40*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:40*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-205

Date Collected: 06/09/19 13:38
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-33

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.93	J	2.0	0.75	ng/L		06/24/19 09:32	07/01/19 21:59	1
Perfluorooctanesulfonic acid (PFOS)	9.0		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 21:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:59*	*1*
13C4 PFOS	*107*		*25 - 150*	*06/24/19 09:32*	*07/01/19 21:59*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-012

Date Collected: 06/08/19 13:53
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-34

Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.81	J	2.0	0.75	ng/L		06/24/19 09:32	07/01/19 22:17	1
Perfluorooctanesulfonic acid (PFOS)	14		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 22:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:32*	*07/01/19 22:17*	*1*
13C4 PFOS	*110*		*25 - 150*	*06/24/19 09:32*	*07/01/19 22:17*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-414
Date Collected: 06/08/19 15:25
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-35
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 22:54	1
Perfluorooctanesulfonic acid (PFOS)	**2.3**		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 22:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*110*		*25 - 150*	*06/24/19 09:32*	*07/01/19 22:54*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 22:54*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-441
Date Collected: 06/07/19 17:07
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-36
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 23:13	1
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L		06/24/19 09:32	07/01/19 23:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*117*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:13*	*1*
13C4 PFOS	*115*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:13*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-438
Date Collected: 06/09/19 09:50
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-37
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 23:31	1
Perfluorooctanesulfonic acid (PFOS)	**3.7**		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 23:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*121*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:31*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:31*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-210
Date Collected: 06/08/19 14:30
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-38
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L		06/24/19 09:32	07/01/19 23:50	1
Perfluorooctanesulfonic acid (PFOS)	77		2.0	1.3	ng/L		06/24/19 09:32	07/01/19 23:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*101*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:50*	*1*
13C4 PFOS	*105*		*25 - 150*	*06/24/19 09:32*	*07/01/19 23:50*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-002
Date Collected: 06/08/19 10:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-39
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	1.8	J	2.0	0.75	ng/L		06/24/19 09:32	07/02/19 00:08	1
Perfluorooctanesulfonic acid (PFOS)	33		2.0	1.3	ng/L		06/24/19 09:32	07/02/19 00:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:08*	*1*
13C4 PFOS	*106*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:08*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-071
Date Collected: 06/08/19 16:42
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-40
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	0.82	J	2.0	0.75	ng/L		06/24/19 09:32	07/02/19 00:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:32	07/02/19 00:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*113*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:27*	*1*
13C4 PFOS	*109*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-433
Date Collected: 06/09/19 13:30
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-41
Matrix: Water

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		06/24/19 09:32	07/02/19 00:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		06/24/19 09:32	07/02/19 00:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*124*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:45*	*1*
13C4 PFOS	*112*		*25 - 150*	*06/24/19 09:32*	*07/02/19 00:45*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)	
Lab Sample ID	Client Sample ID	PFOA (25-150)	PFOS (25-150)
320-51336-1	PW-401	120	112
320-51336-2	PW-010	113	110
320-51336-3	PW-418	112	109
320-51336-4	PW-213	114	111
320-51336-5	PW-040	123	116
320-51336-6	PW-059	108	106
320-51336-7	PW-405	116	108
320-51336-8	PW-406	118	110
320-51336-9	PW-221	107	116
320-51336-10	PW-503	116	115
320-51336-11	PW-518	121	117
320-51336-12	NPS WELL	102	109
320-51336-13	PW-011	104	110
320-51336-14	PW-111	119	113
320-51336-15	PW-203	119	100
320-51336-16	PW-204	116	121
320-51336-17	PW-207	122	111
320-51336-18	PW-209	113	111
320-51336-19	PW-037	117	110
320-51336-20	PW-122	120	112
320-51336-21	PW-038	124	115
320-51336-22	PW-022	113	113
320-51336-23	PW-415	119	101
320-51336-24	PW-419	108	108
320-51336-25	PW-208	114	111
320-51336-26	PW-202	102	100
320-51336-27	PW-462	113	105
320-51336-28	PW-402	112	101
320-51336-29	PW-039	114	98
320-51336-30	PW-403	112	115
320-51336-31	PW-463	105	107
320-51336-32	PW-408	112	112
320-51336-33	PW-205	112	107
320-51336-34	PW-012	113	110
320-51336-35	PW-414	110	112
320-51336-36	PW-441	117	115
320-51336-37	PW-438	121	112
320-51336-38	PW-210	101	105
320-51336-39	PW-002	113	106
320-51336-40	PW-071	113	109
320-51336-41	PW-433	124	112
LCS 320-303244/2-A	Lab Control Sample	106	108
LCS 320-303247/2-A	Lab Control Sample	117	117
LCS 320-303248/2-A	Lab Control Sample	115	109
LCSD 320-303244/3-A	Lab Control Sample Dup	117	102
LCSD 320-303247/3-A	Lab Control Sample Dup	115	115
LCSD 320-303248/3-A	Lab Control Sample Dup	106	99
MB 320-303244/1-A	Method Blank	124	113
MB 320-303247/1-A	Method Blank	122	106

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)									
Lab Sample ID	**Client Sample ID**	**PFOA (25-150)**	**PFOS (25-150)**								
MB 320-303248/1-A	Method Blank	106	106								

Surrogate Legend

PFOA = 13C4 PFOA

PFOS = 13C4 PFOS

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-303244/1-A
Matrix: Water
Analysis Batch: 304591

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 303244

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorooctanoic aci7 gPL4 9E	0fA6m	J	2f0	0fA5	nd/(		06/2m/1F 0F:10	06/30/1F 05:5F	1
Per.luorooctanesul.onic aci7 gPL4 SE	OD		2f0	1f3	nd/(		06/2m/1F 0F:10	06/30/1F 05:5F	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*124*		*25 - 150*	*06/24/19 09:10*	*06/30/19 05:59*	*1*
13C4 PFOS	*113*		*25 - 150*	*06/24/19 09:10*	*06/30/19 05:59*	*1*

Lab Sample ID: LCS 320-303244/2-A
Matrix: Water
Analysis Batch: 304591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 303244

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Per.luorooctanoic aci7 gPL4 9E	20f0	16f3		nd/(		) 2	A0 - 1m0
Per.luorooctanesul.onic aci7 gPL4 SE	1) f6	1mf1		nd/(		A6	6F - 1mm

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*106*		*25 - 150*
13C4 PFOS	*108*		*25 - 150*

Lab Sample ID: LCSD 320-303244/3-A
Matrix: Water
Analysis Batch: 304591

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 303244

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.luorooctanoic aci7 gPL4 9E	20f0	1Af3		nd/(		) 6	A0 - 1m0	6	30
Per.luorooctanesul.onic aci7 gPL4 SE	1) f6	15f5		nd/(		) 3	6F - 1mm	F	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*117*		*25 - 150*
13C4 PFOS	*102*		*25 - 150*

Lab Sample ID: MB 320-303247/1-A
Matrix: Water
Analysis Batch: 304912

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 303247

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorooctanoic aci7 gPL4 9E	OD		2f0	0fA5	nd/(		06/2m/1F 0F:2F	0A/01/1F 13:22	1
Per.luorooctanesul.onic aci7 gPL4 SE	OD		2f0	1f3	nd/(		06/2m/1F 0F:2F	0A/01/1F 13:22	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*122*		*25 - 150*	*06/24/19 09:29*	*07/01/19 13:22*	*1*
13C4 PFOS	*106*		*25 - 150*	*06/24/19 09:29*	*07/01/19 13:22*	*1*

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Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCS 320-303247/2-A
Matrix: Water
Analysis Batch: 304912

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 303247

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Per.luorooctanoic aci7 gPL4 9E			20f0	16f5		nd/(		) 3	A0 - 1m0		
Per.luorooctanesul.onic aci7 gPL4 SE			1) f6	1mf0		nd/(		A5	6F - 1mm		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*117*		*25 - 150*
13C4 PFOS	*117*		*25 - 150*

Lab Sample ID: LCSD 320-303247/3-A
Matrix: Water
Analysis Batch: 304912

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 303247

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.luorooctanoic aci7 gPL4 9E			20f0	1Af)		nd/(		) F	A0 - 1m0	)	30
Per.luorooctanesul.onic aci7 gPL4 SE			1) f6	1mf0		nd/(		A5	6F - 1mm	0	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*115*		*25 - 150*
13C4 PFOS	*115*		*25 - 150*

Lab Sample ID: MB 320-303248/1-A
Matrix: Water
Analysis Batch: 304914

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 303248

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luorooctanoic aci7 gPL4 9E	OD		2f0	0fA5	nd/(		06/2m/1F 0F:32	0A/01/1F 1F:31	1
Per.luorooctanesul.onic aci7 gPL4 SE	OD		2f0	1f3	nd/(		06/2m/1F 0F:32	0A/01/1F 1F:31	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C4 PFOA	*106*		*25 - 150*	*06/24/19 09:32*	*07/01/19 19:31*	*1*
13C4 PFOS	*106*		*25 - 150*	*06/24/19 09:32*	*07/01/19 19:31*	*1*

Lab Sample ID: LCS 320-303248/2-A
Matrix: Water
Analysis Batch: 304914

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 303248

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Per.luorooctanoic aci7 gPL4 9E			20f0	1Af6		nd/(		))	A0 - 1m0		
Per.luorooctanesul.onic aci7 gPL4 SE			1) f6	13f6		nd/(		A3	6F - 1mm		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*115*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*

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Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Method: WS-LC-0025 At1 - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-303248/3-A
Matrix: Water
Analysis Batch: 304914

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 303248

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.luorooctanoic aci7 gPL4 9E			20f0	16f)		nd/(		) m	A0 - 1m0	5	30
Per.luorooctanesul.onic aci7 gPL4 SE			1) f6	16fA		nd/(		F0	6F - 1mm	20	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C4 PFOA	*106*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*

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Prep Batch: 303244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-1	PW-401	Total/NA	Water	PFAS Prep	
320-51336-2	PW-010	Total/NA	Water	PFAS Prep	
320-51336-3	PW-418	Total/NA	Water	PFAS Prep	
320-51336-4	PW-213	Total/NA	Water	PFAS Prep	
320-51336-5	PW-040	Total/NA	Water	PFAS Prep	
320-51336-6	PW-059	Total/NA	Water	PFAS Prep	
320-51336-7	PW-405	Total/NA	Water	PFAS Prep	
320-51336-8	PW-406	Total/NA	Water	PFAS Prep	
320-51336-9	PW-221	Total/NA	Water	PFAS Prep	
320-51336-10	PW-503	Total/NA	Water	PFAS Prep	
320-51336-11	PW-518	Total/NA	Water	PFAS Prep	
320-51336-12	NPS WELL	Total/NA	Water	PFAS Prep	
320-51336-13	PW-011	Total/NA	Water	PFAS Prep	
MB 320-303244/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303244/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303244/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 303247

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-14	PW-111	Total/NA	Water	PFAS Prep	
320-51336-15	PW-203	Total/NA	Water	PFAS Prep	
320-51336-16	PW-204	Total/NA	Water	PFAS Prep	
320-51336-17	PW-207	Total/NA	Water	PFAS Prep	
320-51336-18	PW-209	Total/NA	Water	PFAS Prep	
320-51336-19	PW-037	Total/NA	Water	PFAS Prep	
320-51336-20	PW-122	Total/NA	Water	PFAS Prep	
320-51336-21	PW-038	Total/NA	Water	PFAS Prep	
320-51336-22	PW-022	Total/NA	Water	PFAS Prep	
320-51336-23	PW-415	Total/NA	Water	PFAS Prep	
320-51336-24	PW-419	Total/NA	Water	PFAS Prep	
320-51336-25	PW-208	Total/NA	Water	PFAS Prep	
320-51336-26	PW-202	Total/NA	Water	PFAS Prep	
320-51336-27	PW-462	Total/NA	Water	PFAS Prep	
MB 320-303247/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303247/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303247/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 303248

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-28	PW-402	Total/NA	Water	PFAS Prep	
320-51336-29	PW-039	Total/NA	Water	PFAS Prep	
320-51336-30	PW-403	Total/NA	Water	PFAS Prep	
320-51336-31	PW-463	Total/NA	Water	PFAS Prep	
320-51336-32	PW-408	Total/NA	Water	PFAS Prep	
320-51336-33	PW-205	Total/NA	Water	PFAS Prep	
320-51336-34	PW-012	Total/NA	Water	PFAS Prep	
320-51336-35	PW-414	Total/NA	Water	PFAS Prep	
320-51336-36	PW-441	Total/NA	Water	PFAS Prep	
320-51336-37	PW-438	Total/NA	Water	PFAS Prep	
320-51336-38	PW-210	Total/NA	Water	PFAS Prep	
320-51336-39	PW-002	Total/NA	Water	PFAS Prep	

LCMS (Continued)

Prep Batch: 303248 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-40	PW-071	Total/NA	Water	PFAS Prep	
320-51336-41	PW-433	Total/NA	Water	PFAS Prep	
MB 320-303248/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303248/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303248/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 304591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-1	PW-401	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-2	PW-010	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-3	PW-418	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-4	PW-213	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-5	PW-040	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-6	PW-059	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-7	PW-405	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-8	PW-406	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-9	PW-221	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-10	PW-503	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-11	PW-518	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-12	NPS WELL	Total/NA	Water	WS-LC-0025 At1	303244
320-51336-13	PW-011	Total/NA	Water	WS-LC-0025 At1	303244
MB 320-303244/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303244
LCS 320-303244/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303244
LCSD 320-303244/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303244

Analysis Batch: 304912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-14	PW-111	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-15	PW-203	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-16	PW-204	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-17	PW-207	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-18	PW-209	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-19	PW-037	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-20	PW-122	Total/NA	Water	WS-LC-0025 At1	303247

LCMS (Continued)

Analysis Batch: 304912 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-21	PW-038	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-22	PW-022	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-23	PW-415	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-24	PW-419	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-25	PW-208	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-26	PW-202	Total/NA	Water	WS-LC-0025 At1	303247
320-51336-27	PW-462	Total/NA	Water	WS-LC-0025 At1	303247
MB 320-303247/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303247
LCS 320-303247/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303247
LCSD 320-303247/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303247

Analysis Batch: 304914

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51336-28	PW-402	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-29	PW-039	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-30	PW-403	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-31	PW-463	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-32	PW-408	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-33	PW-205	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-34	PW-012	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-35	PW-414	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-36	PW-441	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-37	PW-438	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-38	PW-210	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-39	PW-002	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-40	PW-071	Total/NA	Water	WS-LC-0025 At1	303248
320-51336-41	PW-433	Total/NA	Water	WS-LC-0025 At1	303248
MB 320-303248/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303248
LCS 320-303248/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303248
LCSD 320-303248/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303248

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-401
Date Collected: 06/09/19 10:08
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 06:55	P1N	TAL SAC

Client Sample ID: PW-010
Date Collected: 06/09/19 12:02
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 07:13	P1N	TAL SAC

Client Sample ID: PW-418
Date Collected: 06/09/19 10:31
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 07:31	P1N	TAL SAC

Client Sample ID: PW-213
Date Collected: 06/09/19 11:19
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 07:50	P1N	TAL SAC

Client Sample ID: PW-040
Date Collected: 06/08/19 14:10
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 08:08	P1N	TAL SAC

Client Sample ID: PW-059
Date Collected: 06/09/19 09:27
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 08:27	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-405
Date Collected: 06/08/19 11:31
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-7
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 08:45	P1N	TAL SAC

Client Sample ID: PW-406
Date Collected: 06/08/19 16:13
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-8
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 09:22	P1N	TAL SAC

Client Sample ID: PW-221
Date Collected: 06/09/19 12:48
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 09:41	P1N	TAL SAC

Client Sample ID: PW-503
Date Collected: 06/08/19 10:00
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-10
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 09:59	P1N	TAL SAC

Client Sample ID: PW-518
Date Collected: 06/09/19 10:21
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-11
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 10:18	P1N	TAL SAC

Client Sample ID: NPS WELL
Date Collected: 06/08/19 14:33
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-12
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 10:36	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-011
Date Collected: 06/08/19 12:21
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-13
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303244	06/24/19 09:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304591	06/30/19 10:55	P1N	TAL SAC

Client Sample ID: PW-111
Date Collected: 06/08/19 12:11
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-14
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 14:17	D1R	TAL SAC

Client Sample ID: PW-203
Date Collected: 06/08/19 09:18
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-15
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 14:36	D1R	TAL SAC

Client Sample ID: PW-204
Date Collected: 06/07/19 12:41
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-16
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 14:54	D1R	TAL SAC

Client Sample ID: PW-207
Date Collected: 06/07/19 09:43
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-17
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 15:13	D1R	TAL SAC

Client Sample ID: PW-209
Date Collected: 06/07/19 13:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 15:31	D1R	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-037
Date Collected: 06/07/19 17:53
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 15:50	D1R	TAL SAC

Client Sample ID: PW-122
Date Collected: 06/07/19 10:22
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 16:08	D1R	TAL SAC

Client Sample ID: PW-038
Date Collected: 06/07/19 17:18
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 16:45	D1R	TAL SAC

Client Sample ID: PW-022
Date Collected: 06/07/19 10:32
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-22
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 17:03	D1R	TAL SAC

Client Sample ID: PW-415
Date Collected: 06/07/19 16:07
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-23
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 17:22	D1R	TAL SAC

Client Sample ID: PW-419
Date Collected: 06/08/19 17:16
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-24
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 17:40	D1R	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-208
Date Collected: 06/07/19 14:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-25
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 17:59	D1R	TAL SAC

Client Sample ID: PW-202
Date Collected: 06/07/19 14:06
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-26
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 18:17	D1R	TAL SAC

Client Sample ID: PW-462
Date Collected: 06/07/19 14:20
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-27
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303247	06/24/19 09:29	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304912	07/01/19 18:36	D1R	TAL SAC

Client Sample ID: PW-402
Date Collected: 06/08/19 15:19
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-28
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 20:26	P1N	TAL SAC

Client Sample ID: PW-039
Date Collected: 06/08/19 13:42
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-29
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 20:45	P1N	TAL SAC

Client Sample ID: PW-403
Date Collected: 06/08/19 10:06
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-30
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 21:03	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-463
Date Collected: 06/08/19 16:45
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-31
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 21:22	P1N	TAL SAC

Client Sample ID: PW-408
Date Collected: 06/07/19 16:00
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-32
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 21:40	P1N	TAL SAC

Client Sample ID: PW-205
Date Collected: 06/09/19 13:38
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-33
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 21:59	P1N	TAL SAC

Client Sample ID: PW-012
Date Collected: 06/08/19 13:53
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-34
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 22:17	P1N	TAL SAC

Client Sample ID: PW-414
Date Collected: 06/08/19 15:25
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-35
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 22:54	P1N	TAL SAC

Client Sample ID: PW-441
Date Collected: 06/07/19 17:07
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-36
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 23:13	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Client Sample ID: PW-438
Date Collected: 06/09/19 09:50
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-37
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 23:31	P1N	TAL SAC

Client Sample ID: PW-210
Date Collected: 06/08/19 14:30
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-38
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/01/19 23:50	P1N	TAL SAC

Client Sample ID: PW-002
Date Collected: 06/08/19 10:40
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-39
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/02/19 00:08	P1N	TAL SAC

Client Sample ID: PW-071
Date Collected: 06/08/19 16:42
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-40
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/02/19 00:27	P1N	TAL SAC

Client Sample ID: PW-433
Date Collected: 06/09/19 13:30
Date Received: 06/12/19 12:58

Lab Sample ID: 320-51336-41
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	303248	06/24/19 09:32	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304914	07/02/19 00:45	P1N	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
- 4o8ect6Site: 1 SP j / a4te4G

ToA Im: r JbD32r r 0D2

Laboratory: Eurofins TestAmerica, Sacramento

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Authority	Program	EPA Region	Identification Number	Expiration Date
ulasNa pk SP(	State - 4o) 4a7	2b	2UDbJb	b2DJbDJ2
uy ug	mom		BJC0E	b2DJbDJ2
uy ug	mL z		BJC0Efb2	b2DJbDJ2
u49ona	State - 4o) 4a7	Z	uCbUbE	bED22D2Z
u4Nansas mz j	State - 4o) 4a7	0	EEDb0Z2	b0D2UDJb
Calidb4nia	State - 4o) 4a7	Z	JEZU	b2D72DJb
Colo4avo	State - 4o) 4a7	E	CubbbCO	bED72D2Z
Connectic/ t	State		- HDb0Z2	b0D7bDJ2
Connectic/ t	State - 4o) 4a7	2	- HDb0Z2	b0D7bDJ2
Flo4va	y z Bu -	O	z EU3Ub	b0D7bDJb
Flo4va	y z Bu -		z EU3Ub	b0D7bDJb
Ha5 aii	State - 4o) 4a7	Z	y 6u	b2DJZDJb
Illinois	y z Bu -	3	Jbbb0b	br D2UD2Z *
wansas	y z Bu -	U	z D2br U3	2bD72D2Z
Bo/ isiana	y z Bu -	0	r b02J	b0D7bDJb
K aine	State - 4o) 4a7	2	CubbbO	bCD2CDJb
K ichi) an	State - 4o) 4a7	3	ZZCU	b2D72DJb
y eMava	State - 4o) 4a7	Z	CubbbCO	bUD72D2Z
y e5 Ha7 . shi4e	y z Bu -	2	JZZU	bCDJbDJb
y e5 Yo4N	y z Bu -	J	22000	bCDb2DJb
L 4e) on	y z Bu -	2b	CbCb	b2DJZDJb
L 4e) on	y z Bu -		CbCb	b2DJZDJb
- ennsGMania	y z Bu -	r	0EDb2JUJ	br D72DJb
- ennsGMania	y z Bu -		0EDb2JUJ	br D72DJb
Pexas	y z Bu -	0	P2bCUbCr ZZ	b3D72DJb
k S Fish & Wilvlide	Feve4al		Bz 2CEr EEDb	bUD72D2Z
k Smu	Feve4al		- r r bD2EDbbJr Z	b2D2UDJ2
k Sz - u k CK R	Feve4al	2	CubbbCO	2JD72DJb
k tah	y z Bu -	E	CubbbCO	bJDJZDJb
Ve47 ont	State - 4o) 4a7	2	VPDDbCb	bCD20DJb
Vi4) inia	y z Bu -	r	C0bJUE	br D2CDJb
Washin) ton	State - 4o) 4a7	2b	C3E2	b3Db3DJb
West Vi4) inia pmW(	State - 4o) 4a7	r	ZZr bC	2JD72D2Z
WGb7 in)	State - 4o) 4a7	E	EPK SDB	b2DJED2Z *

* ucc4evitation6Ce4tidcation 4ene5 al . envin) Dacc4evitation6ce4tidcation consive4ev Malivf

z / 4odns Pestu7 e4ica, Sac4a7 ento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Prep	Preparation, Direct Inject PFAS	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC = TestAmerica Laboratories, West Sacramento, Facility Standard Operating Procedure.

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: GST Quarterly

Job ID: 320-51336-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-51336-1	PW-401	Water	06/09/19 10:08	06/12/19 12:58	
320-51336-2	PW-010	Water	06/09/19 12:02	06/12/19 12:58	
320-51336-3	PW-418	Water	06/09/19 10:31	06/12/19 12:58	
320-51336-4	PW-213	Water	06/09/19 11:19	06/12/19 12:58	
320-51336-5	PW-040	Water	06/08/19 14:10	06/12/19 12:58	
320-51336-6	PW-059	Water	06/09/19 09:27	06/12/19 12:58	
320-51336-7	PW-405	Water	06/08/19 11:31	06/12/19 12:58	
320-51336-8	PW-406	Water	06/08/19 16:13	06/12/19 12:58	
320-51336-9	PW-221	Water	06/09/19 12:48	06/12/19 12:58	
320-51336-10	PW-503	Water	06/08/19 10:00	06/12/19 12:58	
320-51336-11	PW-518	Water	06/09/19 10:21	06/12/19 12:58	
320-51336-12	NPS WELL	Water	06/08/19 14:33	06/12/19 12:58	
320-51336-13	PW-011	Water	06/08/19 12:21	06/12/19 12:58	
320-51336-14	PW-111	Water	06/08/19 12:11	06/12/19 12:58	
320-51336-15	PW-203	Water	06/08/19 09:18	06/12/19 12:58	
320-51336-16	PW-204	Water	06/07/19 12:41	06/12/19 12:58	
320-51336-17	PW-207	Water	06/07/19 09:43	06/12/19 12:58	
320-51336-18	PW-209	Water	06/07/19 13:40	06/12/19 12:58	
320-51336-19	PW-037	Water	06/07/19 17:53	06/12/19 12:58	
320-51336-20	PW-122	Water	06/07/19 10:22	06/12/19 12:58	
320-51336-21	PW-038	Water	06/07/19 17:18	06/12/19 12:58	
320-51336-22	PW-022	Water	06/07/19 10:32	06/12/19 12:58	
320-51336-23	PW-415	Water	06/07/19 16:07	06/12/19 12:58	
320-51336-24	PW-419	Water	06/08/19 17:16	06/12/19 12:58	
320-51336-25	PW-208	Water	06/07/19 14:40	06/12/19 12:58	
320-51336-26	PW-202	Water	06/07/19 14:06	06/12/19 12:58	
320-51336-27	PW-462	Water	06/07/19 14:20	06/12/19 12:58	
320-51336-28	PW-402	Water	06/08/19 15:19	06/12/19 12:58	
320-51336-29	PW-039	Water	06/08/19 13:42	06/12/19 12:58	
320-51336-30	PW-403	Water	06/08/19 10:06	06/12/19 12:58	
320-51336-31	PW-463	Water	06/08/19 16:45	06/12/19 12:58	
320-51336-32	PW-408	Water	06/07/19 16:00	06/12/19 12:58	
320-51336-33	PW-205	Water	06/09/19 13:38	06/12/19 12:58	
320-51336-34	PW-012	Water	06/08/19 13:53	06/12/19 12:58	
320-51336-35	PW-414	Water	06/08/19 15:25	06/12/19 12:58	
320-51336-36	PW-441	Water	06/07/19 17:07	06/12/19 12:58	
320-51336-37	PW-438	Water	06/09/19 09:50	06/12/19 12:58	
320-51336-38	PW-210	Water	06/08/19 14:30	06/12/19 12:58	
320-51336-39	PW-002	Water	06/08/19 10:40	06/12/19 12:58	
320-51336-40	PW-071	Water	06/08/19 16:42	06/12/19 12:58	
320-51336-41	PW-433	Water	06/09/19 13:30	06/12/19 12:58	

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory Test America
Attn: D. Allwicker

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS+ PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-401		1008	6/9/19	X	2	Groundwater
PW-010		1202	6/9/19	X	2	
PW-418		1031	6/9/19	X	2	
~~PW-221~~		~~1248~~	~~6/9/19~~	~~X~~	~~2~~	
PW-213		1119	6/9/19	X	2	
PW-040		1410	6/8/19	X	2	
PW-059		0927	6/9/19	X	2	
PW-405		1131	6/8/19	X	2	
PW-406		1613	6/8/19	X	2	
PW-221		1248	6/9/19	X	2	

Project Information	
Number:	102599-001
Name:	GST Quarterly
Contact:	KRF
Ongoing Project?	Yes [X] No [ ]
Sampler:	ARM, SMH

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

Notes:

Bill to SWI

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time:	Signature: Time:
Printed Name: A Masters Date: 6/10/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon+Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Sarah Thompson Date: 6/12/19	Printed Name: Date	
Company: TA Sac	Company:	

320-51336 Chain of Custody

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

No. 35817

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory Test America
Attn: D. Althueser

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS + PFOA							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-503 x		1000	6/8/19	X							2	Groundwater
PW-519 x		1021	6/9/19	X							2	
NPS Well x		1433	6/8/19	X							2	
PW-011 x		1221	6/8/19	X							2	
PW-111 x		1211	6/8/19	X							2	
PW-203 x		0918	6/8/19	X							2	
PW-204 x		1241	6/7/19	X							2	
PW-207 x		0943	6/7/19	X							2	
PW-209 x		1340	6/7/19	X							2	
PW-037 x		1753	6/7/19	X							2	

Project Information	
Number:	102599-001
Name:	GST Quarterly
Contact:	KRF
Ongoing Project?	Yes [X] No [ ]
Sampler:	ARM + SMH

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

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 600	Signature: Time:	Signature: Time:
Printed Name: A Masters Date: 6/10/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Sarah Thompson Date: 6/12/19	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

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

No. 35959

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory Test America
Attn: D. Altucker

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS + PFOA							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-122 x		1022	6/7/19	X							2	Groundwater
PW-038 x		1718	6/7/19	X							2	
PW-022 x		1032	6/7/19	X							2	
PW-415 x		1607	6/7/19	X							2	
PW-419 x		1716	6/8/19	X							2	
PW-208 x		1440	6/7/19	X							2	
PW-202 x		1406	6/7/19	X							2	
PW-462 x		1420	6/7/19	X							2	
PW-402 x		1519	6/8/19	X							2	
PW-039		1342	6/8/19	X							2	

Project Information	
Number:	102599-001
Name:	GWQuarterly
Contact:	KHE
Ongoing Project?	Yes [X] No [ ]
Sampler:	AHM, SMH

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

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time:	Signature: Time:
Printed Name: A. Masters Date: 6/11/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Sarah Thompson Date: 6/12/19	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

Notes:

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

No. 35961

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: D. Altucicor

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS + PFOA							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-403		1006	6/8/19	2							2	groundwater
PW-463		1645	6/8/19	2							2	
PW-408		1600	6/7/19	2							2	
PW-205		1338	6/9/19	2							2	
PW-012		1353	6/8/19	2							2	
PW-414		1525	6/8/19	2							2	
PW-441		1707	6/7/19	2							2	
PW-438		0950	6/9/19	2							2	
PW-210		1430	6/8/19	2							2	
PW-002		1040	6/8/19	2							2	

Project Information	Sample Receipt
Number: 102599-001	Total No. of Containers:
Name: GWS Quarterly	COC Seals/Intact? Y/N/NA
Contact: KRF	Received Good Cond./Cold
Ongoing Project? Yes [X] No [ ]	Temp:
Sampler: ARM	Delivery Method: goldstreak

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time:	Signature: Time:
Printed Name: A. Masters Date: 6/10/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Sarah Thompson Date: 6/12/19	Printed Name: Date:	Printed Name: Date:
Company: TA Rac	Company:	Company:

Notes:

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

No. 35962

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn:

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS + PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-071		1642	6/8/09	2	2	Groundwater
PW-433		1330	6/9/09	2	2	1

Project Information		Sample Receipt	
Number:	102599-001	Total No. of Containers:	
Name:	GVS Quarterly	COC Seals/Intact? Y/N/NA	
Contact:	CRF	Received Good Cond./Cold	
Ongoing Project?	Yes [X] No [ ]	Temp:	
Sampler:	ARM, SMH	Delivery Method:	goldstreak

Notes:

Bill to SWI

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1600	Signature: Time:	Signature: Time:
Printed Name: A. Masters Date: 6/10/09	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Sarah Thompson Date: 6/12/09	Printed Name: Date:	Printed Name: Date:
Company: TA Sac	Company:	Company:

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

No. 35963

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-51336-1

Login Number: 51336
List Number: 1
Creator: Her, David A

List Source: Eurofins TestAmerica, Sacramento

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

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ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-55424-1
Client Project/Site: Gus Quarterly

For:
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger

Authorized for release by:
11/13/2019 7:40:51 AM

David Alltucker, Project Manager I
(916)374-4383
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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

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.

Glossary

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

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Job ID: 320-55424-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-55424-1

Receipt
The samples were received on 10/17/2019 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 6 coolers at receipt time were 4.5º C, 4.8º C, 5.5º C, 5.6º C, 6.0º C and 6.2º C.

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

Organic Prep
Method 537.1 DW: The following samples PW-4S (320-55424-1), PW-401 (320-55424-2), PW-37 (320-55424-5), PW-41S (320-55424-7), NPS Well (320-55424-8) and NPS Well 2 (320-55424-9) in preparation batch 320-333815 were observed to be yellow in color and contained sediments.

Method 537.1 DW: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-333815.

Method 537.1 DW: The following samples PW-37 (320-55424-5), NPS Well (320-55424-8) and NPS Well 2 (320-55424-9) in preparation batch 320-333815 were observed to be a pale yellow color after extraction.

Method 537.1 DW: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-333892.

Method 537.1 DW: The following samples: PW-010 (320-55424-10), PW-110 (320-55424-11), PW-012 (320-55424-12), PW-059 (320-55424-13), PW-205 (320-55424-14), PW-221 (320-55424-15), PW-211 (320-55424-16) and PW-203 (320-55424-18) in preparation batch 320-333892 were observed to be a yellow color prior to extraction.

Method 537.1 DW: The following sample: PW-464 (320-55424-17) in preparation batch 320-333892 was observed to be a turbid yellow color prior to extraction.

Method 537.1 DW: Elevated reporting limits are provided for the following samples due to insufficient sample provided for PW-010 (320-55424-10) in preparation batch 320-333892.

Method 537.1 DW: The following samples: PW-010 (320-55424-10), PW-110 (320-55424-11), PW-012 (320-55424-12), PW-059 (320-55424-13), PW-205 (320-55424-14), PW-221 (320-55424-15) and PW-203 (320-55424-18) in preparation batch 320-333892 were observed to be a yellow color after they were brought up to final volume.

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: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-4S — Lab Sample ID: 320-55424-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.00048	J	0.0019	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.00079	J	0.0019	0.00046	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-401 — Lab Sample ID: 320-55424-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0054		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0018	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0014	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0013	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.016		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.045		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-39 — Lab Sample ID: 320-55424-3

No Detections.

Client Sample ID: PW-40 — Lab Sample ID: 320-55424-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.00066	J	0.0019	0.00046	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-37 — Lab Sample ID: 320-55424-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.00089	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-38 — Lab Sample ID: 320-55424-6

No Detections.

Client Sample ID: PW-41S — Lab Sample ID: 320-55424-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.015		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0060		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0024		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0017	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.027		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.12		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

Client Sample ID: NPS Well — Lab Sample ID: 320-55424-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0018	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0013	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0028		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.00073	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0093		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.018		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: NPS Well 2 — Lab Sample ID: 320-55424-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0022		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0014	J	0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0029		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0010	J	0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.010		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.019		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	0.0040		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-010 — Lab Sample ID: 320-55424-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0010	J	0.0020	0.00050	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0029		0.0020	0.00050	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0022		0.0020	0.00050	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-110 — Lab Sample ID: 320-55424-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.00097	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0025		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0020		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-012 — Lab Sample ID: 320-55424-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0028		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00086	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.00074	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.00099	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0093		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.013		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-059 — Lab Sample ID: 320-55424-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.0011	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-205 — Lab Sample ID: 320-55424-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0030		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00063	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.00076	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0014	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.010		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.010		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-221 — Lab Sample ID: 320-55424-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.00087	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0021		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0024		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-211 — Lab Sample ID: 320-55424-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.00083	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00051	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0010	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0014	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0010	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.0037		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-464 — Lab Sample ID: 320-55424-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.00051	J	0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0021		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0016	J	0.0020	0.00049	ug/L	1		537.1 DW	Total/NA

Client Sample ID: PW-203 — Lab Sample ID: 320-55424-18

No Detections.

Client Sample ID: PW-212 — Lab Sample ID: 320-55424-19

No Detections.

Client Sample ID: PW-219 — Lab Sample ID: 320-55424-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.00074	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00049	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.00084	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0012	J	0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-4S
Date Collected: 10/11/19 16:30
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-1
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00057	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00048**	**J**	0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Perfluorooctanesulfonic acid (PFOS)	**0.00079**	**J**	0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 19:39	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*99*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:39*	*1*
13C2 PFDA	*101*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:39*	*1*
d5-NEtFOSAA	*88*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:39*	*1*
13C3 HFPO-DA	*70*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:39*	*1*

Client Sample ID: PW-401

Date Collected: 10/11/19 15:02
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-2

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0054**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluoroheptanoic acid (PFHpA)	**0.0018**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorooctanoic acid (PFOA)	**0.0014**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorobutanesulfonic acid (PFBS)	**0.0013**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorohexanesulfonic acid (PFHxS)	**0.016**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Perfluorooctanesulfonic acid (PFOS)	**0.045**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 19:47	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*104*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:47*	*1*
13C2 PFDA	*101*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:47*	*1*
d5-NEtFOSAA	*88*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:47*	*1*
13C3 HFPO-DA	*100*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:47*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-39
Date Collected: 10/11/19 14:03
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-3
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorooctanoic acid (PFOA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorononanoic acid (PFNA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorodecanoic acid (PFDA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0018	0.00047	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorododecanoic acid (PFDoA)	ND		0.0018	0.00057	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 19:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*95*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:55*	*1*
13C2 PFDA	*99*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:55*	*1*
d5-NEtFOSAA	*85*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:55*	*1*
13C3 HFPO-DA	*76*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:55*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-40
Date Collected: 10/11/19 12:54
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-4
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00057	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	**0.00066**	**J**	0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00046	ug/L		10/25/19 14:47	11/04/19 20:03	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*102*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:03*	*1*
13C2 PFDA	*107*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:03*	*1*
d5-NEtFOSAA	*102*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:03*	*1*
13C3 HFPO-DA	*70*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:03*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-37
Date Collected: 10/11/19 12:28
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-5
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00049	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	**0.00089**	**J**	0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*101*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:11*	*1*
13C2 PFDA	*103*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:11*	*1*
d5-NEtFOSAA	*92*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:11*	*1*
13C3 HFPO-DA	*85*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:11*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-38
Date Collected: 10/11/19 11:54
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-6
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorooctanoic acid (PFOA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorononanoic acid (PFNA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorodecanoic acid (PFDA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorododecanoic acid (PFDoA)	ND		0.0018	0.00056	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 20:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*99*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:19*	*1*
13C2 PFDA	*107*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:19*	*1*
d5-NEtFOSAA	*99*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:19*	*1*
13C3 HFPO-DA	*90*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:19*	*1*

Client Sample ID: PW-41S

Date Collected: 10/11/19 10:38
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-7

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.015**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluoroheptanoic acid (PFHpA)	**0.0060**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorooctanoic acid (PFOA)	**0.0024**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00058	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorobutanesulfonic acid (PFBS)	**0.0017**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorohexanesulfonic acid (PFHxS)	**0.027**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Perfluorooctanesulfonic acid (PFOS)	**0.12**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 20:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*107*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:27*	*1*
13C2 PFDA	*110*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:27*	*1*
d5-NEtFOSAA	*89*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:27*	*1*
13C3 HFPO-DA	*86*		*70 - 130*	*10/25/19 14:47*	*11/04/19 20:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: NPS Well

Date Collected: 10/11/19 09:22
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-8

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0018**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluoroheptanoic acid (PFHpA)	**0.0013**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorooctanoic acid (PFOA)	**0.0028**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00058	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorobutanesulfonic acid (PFBS)	**0.00073**	**J**	0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0093**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Perfluorooctanesulfonic acid (PFOS)	**0.018**		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/25/19 14:47	11/04/19 21:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*87*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:15*	*1*
13C2 PFDA	*101*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:15*	*1*
d5-NEtFOSAA	*84*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:15*	*1*
13C3 HFPO-DA	*75*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:15*	*1*

Client Sample ID: NPS Well 2

Date Collected: 10/11/19 09:15
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-9

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0022**		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluoroheptanoic acid (PFHpA)	**0.0014**	**J**	0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorooctanoic acid (PFOA)	**0.0029**		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorononanoic acid (PFNA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorodecanoic acid (PFDA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0018	0.00046	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorododecanoic acid (PFDoA)	ND		0.0018	0.00055	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorobutanesulfonic acid (PFBS)	**0.0010**	**J**	0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorohexanesulfonic acid (PFHxS)	**0.010**		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Perfluorooctanesulfonic acid (PFOS)	**0.019**		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	**0.0040**		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0018	0.00045	ug/L		10/25/19 14:47	11/04/19 21:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*106*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:24*	*1*
13C2 PFDA	*102*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:24*	*1*
d5-NEtFOSAA	*93*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:24*	*1*
13C3 HFPO-DA	*97*		*70 - 130*	*10/25/19 14:47*	*11/04/19 21:24*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-010
Date Collected: 10/12/19 12:27
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-10
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0010**	**J**	0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorooctanoic acid (PFOA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0020	0.00051	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.00062	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0029**		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Perfluorooctanesulfonic acid (PFOS)	**0.0022**		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 09:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*101*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:42*	*1*
13C2 PFDA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:42*	*1*
d5-NEtFOSAA	*79*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:42*	*1*
13C3 HFPO-DA	*104*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:42*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-110
Date Collected: 10/12/19 12:10
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-11
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.00097**	**J**	0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00049	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00060	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0025**		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Perfluorooctanesulfonic acid (PFOS)	**0.0020**		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*103*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:50*	*1*
13C2 PFDA	*106*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:50*	*1*
d5-NEtFOSAA	*95*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:50*	*1*
13C3 HFPO-DA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:50*	*1*

Client Sample ID: PW-012

Date Collected: 10/12/19 15:19
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-12

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0028**		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluoroheptanoic acid (PFHpA)	**0.00086**	**J**	0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorooctanoic acid (PFOA)	**0.00074**	**J**	0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00049	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00060	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorobutanesulfonic acid (PFBS)	**0.00099**	**J**	0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0093**		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Perfluorooctanesulfonic acid (PFOS)	**0.013**		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 09:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*94*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:58*	*1*
13C2 PFDA	*109*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:58*	*1*
d5-NEtFOSAA	*90*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:58*	*1*
13C3 HFPO-DA	*74*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:58*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-059
Date Collected: 10/12/19 13:28
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-13
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0011**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*106*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:06*	*1*
13C2 PFDA	*110*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:06*	*1*
d5-NEtFOSAA	*94*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:06*	*1*
13C3 HFPO-DA	*106*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:06*	*1*

Client Sample ID: PW-205

Date Collected: 10/12/19 09:53
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-14

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0030**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluoroheptanoic acid (PFHpA)	**0.00063**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorooctanoic acid (PFOA)	**0.00076**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorobutanesulfonic acid (PFBS)	**0.0014**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorohexanesulfonic acid (PFHxS)	**0.010**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Perfluorooctanesulfonic acid (PFOS)	**0.010**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:14*	*1*
13C2 PFDA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:14*	*1*
d5-NEtFOSAA	*93*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:14*	*1*
13C3 HFPO-DA	*106*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:14*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-221
Date Collected: 10/12/19 12:53
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-15
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.00087**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00058	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0021**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Perfluorooctanesulfonic acid (PFOS)	**0.0024**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*104*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:22*	*1*
13C2 PFDA	*104*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:22*	*1*
d5-NEtFOSAA	*90*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:22*	*1*
13C3 HFPO-DA	*95*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-211
Date Collected: 10/13/19 17:16
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-16
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.00083**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluoroheptanoic acid (PFHpA)	**0.00051**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorooctanoic acid (PFOA)	**0.0010**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorobutanesulfonic acid (PFBS)	**0.0014**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Perfluorooctanesulfonic acid (PFOS)	**0.0010**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	**0.0037**		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 10:30	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*107*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:30*	*1*
13C2 PFDA	*113*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:30*	*1*
d5-NEtFOSAA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:30*	*1*
13C3 HFPO-DA	*98*		*70 - 130*	*10/26/19 06:48*	*11/05/19 10:30*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-464
Date Collected: 10/13/19 13:20
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-17
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.00051**	**J**	0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorooctanoic acid (PFOA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.00061	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0021**		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Perfluorooctanesulfonic acid (PFOS)	**0.0016**	**J**	0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*110*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:19*	*1*
13C2 PFDA	*101*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:19*	*1*
d5-NEtFOSAA	*88*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:19*	*1*
13C3 HFPO-DA	*98*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:19*	*1*

Client Sample ID: PW-203

Date Collected: 10/14/19 17:48
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-18

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorooctanoic acid (PFOA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0020	0.00050	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.00060	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0020	0.00049	ug/L		10/26/19 06:48	11/05/19 11:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*101*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:27*	*1*
13C2 PFDA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:27*	*1*
d5-NEtFOSAA	*83*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:27*	*1*
13C3 HFPO-DA	*95*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-212
Date Collected: 10/14/19 17:12
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-19
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorooctanoic acid (PFOA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*99*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:35*	*1*
13C2 PFDA	*100*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:35*	*1*
d5-NEtFOSAA	*95*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:35*	*1*
13C3 HFPO-DA	*85*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:35*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: PW-219
Date Collected: 10/14/19 16:43
Date Received: 10/17/19 10:10

Lab Sample ID: 320-55424-20
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.00074**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluoroheptanoic acid (PFHpA)	**0.00049**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorooctanoic acid (PFOA)	**0.00084**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00059	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorobutanesulfonic acid (PFBS)	**0.0012**	**J**	0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		10/26/19 06:48	11/05/19 11:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*100*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:43*	*1*
13C2 PFDA	*102*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:43*	*1*
d5-NEtFOSAA	*101*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:43*	*1*
13C3 HFPO-DA	*91*		*70 - 130*	*10/26/19 06:48*	*11/05/19 11:43*	*1*

Surrogate Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	PFHxA (70-130)	PFDA (70-130)	-NEtFOS/ (70-130)	HFPODA (70-130)
320-55424-1	PW-4S	99	101	88	70
320-55424-2	PW-401	104	101	88	100
320-55424-3	PW-39	95	99	85	76
320-55424-4	PW-40	102	107	102	70
320-55424-5	PW-37	101	103	92	85
320-55424-6	PW-38	99	107	99	90
320-55424-7	PW-41S	107	110	89	86
320-55424-8	NPS Well	87	101	84	75
320-55424-9	NPS Well 2	106	102	93	97
320-55424-10	PW-010	101	102	79	104
320-55424-11	PW-110	103	106	95	102
320-55424-12	PW-012	94	109	90	74
320-55424-13	PW-059	106	110	94	106
320-55424-14	PW-205	102	102	93	106
320-55424-15	PW-221	104	104	90	95
320-55424-16	PW-211	107	113	102	98
320-55424-17	PW-464	110	101	88	98
320-55424-18	PW-203	101	102	83	95
320-55424-19	PW-212	99	100	95	85
320-55424-20	PW-219	100	102	101	91
LCS 320-333815/2-A	Lab Control Sample	108	103	97	88
LCS 320-333892/2-A	Lab Control Sample	106	101	102	94
LCSD 320-333815/3-A	Lab Control Sample Dup	95	103	88	70
LCSD 320-333892/3-A	Lab Control Sample Dup	101	101	87	106
MB 320-333815/1-A	Method Blank	108	105	85	101
MB 320-333892/1-A	Method Blank	109	106	92	93

Surrogate Legend

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA
d5-NEtFOSAA = d5-NEtFOSAA
HFPODA = 13C3 HFPO-DA

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Lab Sample ID: MB 320-333815/1-A
Matrix: Water
Analysis Batch: 335910

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333815

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorohe7tanoic acid (PFH7A)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorooctanoic acid (PFp A)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluoroundecanoic acid (PFOnA)	ND		0.0020	0.00051	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.000U2	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Perfluorooctanesulfonic acid (PFp S)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)	ND		0.0020	0.00050	u9/6		10/25/1g 14:4L	11/04/1g 1g:31	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*108*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:31*	*1*
13C2 PFDA	*105*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:31*	*1*
d5-NEtFOSAA	*85*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:31*	*1*
13C3 HFPO-DA	*101*		*70 - 130*	*10/25/19 14:47*	*11/04/19 19:31*	*1*

Lab Sample ID: LCS 320-333815/2-A
Matrix: Water
Analysis Batch: 337238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333815

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.100	0.105		u9/6		105	L0 - 130
Perfluorohe7tanoic acid (PFH7A)	0.100	0.10L		u9/6		10L	L0 - 130
Perfluorooctanoic acid (PFp A)	0.100	0.10U		u9/6		10U	L0 - 130
Perfluorononanoic acid (PFNA)	0.100	0.104		u9/6		104	L0 - 130
Perfluorodecanoic acid (PFDA)	0.100	0.0g82		u9/6		g8	L0 - 130
Perfluoroundecanoic acid (PFOnA)	0.100	0.101		u9/6		101	L0 - 130
Perfluorododecanoic acid (PFDoA)	0.100	0.104		u9/6		104	L0 - 130
Perfluorotridecanoic acid (PFTriA)	0.100	0.114		u9/6		114	L0 - 130
Perfluorotetradecanoic acid (PFTeA)	0.100	0.103		u9/6		103	L0 - 130
Perfluorobutanesulfonic acid (PFBS)	0.0884	0.0g3g		u9/6		10U	L0 - 130

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCS 320-333815/2-A
Matrix: Water
Analysis Batch: 337238

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333815

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorohexanesulfonic acid (PFHxS)			0.0g10	0.0gL0		u9/6		10L	L0 - 130		
Perfluorooctanesulfonic acid (PFp S)			0.0g28	0.0g81		u9/6		10U	L0 - 130		
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)			0.100	0.0g88		u9/6		gg	L0 - 130		
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)			0.100	0.0gg5		u9/6		gg	L0 - 130		
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p			0.0g32	0.0g32		u9/6		100	L0 - 130		
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF			0.0g42	0.0gU2		u9/6		102	L0 - 130		
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)			0.100	0.101		u9/6		101	L0 - 130		
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)			0.0g42	0.102		u9/6		108	L0 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*108*		*70 - 130*
13C2 PFDA	*103*		*70 - 130*
d5-NEtFOSAA	*97*		*70 - 130*
13C3 HFPO-DA	*88*		*70 - 130*

Lab Sample ID: LCSD 320-333815/3-A
Matrix: Water
Analysis Batch: 335910

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333815

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)			0.100	0.0g33		u9/6		g3	L0 - 130	15	30
Perfluorohe7tanoic acid (PFH7A)			0.100	0.103		u9/6		103	L0 - 130	5	30
Perfluorooctanoic acid (PFp A)			0.100	0.103		u9/6		103	L0 - 130	5	30
Perfluorononanoic acid (PFNA)			0.100	0.108		u9/6		108	L0 - 130	4	30
Perfluorodecanoic acid (PFDA)			0.100	0.103		u9/6		103	L0 - 130	U	30
Perfluoroundecanoic acid (PFOnA)			0.100	0.103		u9/6		103	L0 - 130	1	30
Perfluorododecanoic acid (PFDoA)			0.100	0.105		u9/6		105	L0 - 130	2	30
Perfluorotridecanoic acid (PFTriA)			0.100	0.112		u9/6		112	L0 - 130	4	30
Perfluorotetradecanoic acid (PFTeA)			0.100	0.0gg2		u9/6		gg	L0 - 130	1	30
Perfluorobutanesulfonic acid (PFBS)			0.0884	0.0L2L		u9/6		82	L0 - 130	2L	30
Perfluorohexanesulfonic acid (PFHxS)			0.0g10	0.0gLg		u9/6		108	L0 - 130	g	30
Perfluorooctanesulfonic acid (PFp S)			0.0g28	0.0g21		u9/6		gg	L0 - 130	L	30
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)			0.100	0.0gUL		u9/6		gL	L0 - 130	U	30
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)			0.100	0.0g40		u9/6		g4	L0 - 130	1	30
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p			0.0g32	0.105		u9/6		112	L0 - 130	3	30

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCSD 320-333815/3-A
Matrix: Water
Analysis Batch: 335910

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333815

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF			0.0g42	0.100		u9/6		10L	L0 - 130	1	30
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)			0.100	0.103		u9/6		103	L0 - 130	25	30
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)			0.0g42	0.0gLg		u9/6		104	L0 - 130	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*95*		*70 - 130*
13C2 PFDA	*103*		*70 - 130*
d5-NEtFOSAA	*88*		*70 - 130*
13C3 HFPO-DA	*70*		*70 - 130*

Lab Sample ID: MB 320-333892/1-A
Matrix: Water
Analysis Batch: 336059

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 333892

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorohe7tanoic acid (PFH7A)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorooctanoic acid (PFp A)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluoroundecanoic acid (PFOnA)	ND		0.0020	0.00051	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.000U2	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Perfluorooctanesulfonic acid (PFp S)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)	ND		0.0020	0.00050	u9/6		10/2U/1g 0U:48	11/05/1g 0g:34	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*109*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:34*	*1*
13C2 PFDA	*106*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:34*	*1*
d5-NEtFOSAA	*92*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:34*	*1*
13C3 HFPO-DA	*93*		*70 - 130*	*10/26/19 06:48*	*11/05/19 09:34*	*1*

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCS 320-333892/2-A
Matrix: Water
Analysis Batch: 336059

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 333892

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.200	0.1g8		u9/6		gg	L0 - 130
Perfluorohe7tanoic acid (PFH7A)	0.200	0.1g0		u9/6		g5	L0 - 130
Perfluorooctanoic acid (PFp A)	0.200	0.1g1		u9/6		gU	L0 - 130
Perfluorononanoic acid (PFNA)	0.200	0.1gg		u9/6		100	L0 - 130
Perfluorodecanoic acid (PFDA)	0.200	0.20U		u9/6		103	L0 - 130
Perfluoroundecanoic acid (PFOnA)	0.200	0.1gU		u9/6		g8	L0 - 130
Perfluorododecanoic acid (PFDoA)	0.201	0.1gU		u9/6		gL	L0 - 130
Perfluorotridecanoic acid (PFTriA)	0.200	0.1gg		u9/6		gg	L0 - 130
Perfluorotetradecanoic acid (PFTeA)	0.200	0.1g3		u9/6		gU	L0 - 130
Perfluorobutanesulfonic acid (PFBS)	0.1LL	0.1LU		u9/6		gg	L0 - 130
Perfluorohexanesulfonic acid (PFHxS)	0.182	0.1g3		u9/6		10U	L0 - 130
Perfluorooctanesulfonic acid (PFp S)	0.18U	0.184		u9/6		gg	L0 - 130
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)	0.200	0.1g3		u9/6		gU	L0 - 130
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)	0.200	0.205		u9/6		102	L0 - 130
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p	0.18U	0.18L		u9/6		100	L0 - 130
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	0.188	0.1L2		u9/6		g1	L0 - 130
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)	0.200	0.214		u9/6		10L	L0 - 130
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)	0.188	0.1U0		u9/6		85	L0 - 130

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*106*		*70 - 130*
13C2 PFDA	*101*		*70 - 130*
d5-NEtFOSAA	*102*		*70 - 130*
13C3 HFPO-DA	*94*		*70 - 130*

Lab Sample ID: LCSD 320-333892/3-A
Matrix: Water
Analysis Batch: 336059

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333892

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	0.200	0.1g3		u9/6		gL	L0 - 130	2	30
Perfluorohe7tanoic acid (PFH7A)	0.200	0.1g5		u9/6		gL	L0 - 130	2	30
Perfluorooctanoic acid (PFp A)	0.200	0.18L		u9/6		g3	L0 - 130	2	30
Perfluorononanoic acid (PFNA)	0.200	0.1gg		u9/6		gg	L0 - 130	0	30
Perfluorodecanoic acid (PFDA)	0.200	0.1gL		u9/6		gg	L0 - 130	4	30
Perfluoroundecanoic acid (PFOnA)	0.200	0.183		u9/6		g1	L0 - 130	L	30
Perfluorododecanoic acid (PFDoA)	0.201	0.1LU		u9/6		8L	L0 - 130	11	30

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCSD 320-333892/3-A
Matrix: Water
Analysis Batch: 336059

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 333892

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTriA)			0.200	0.18L		u9/6		g3	L0 - 130	U	30
Perfluorotetradecanoic acid (PFTeA)			0.200	0.188		u9/6		g4	L0 - 130	3	30
Perfluorobutanesulfonic acid (PFBS)			0.1LL	0.1L5		u9/6		gg	L0 - 130	1	30
Perfluorohexanesulfonic acid (PFHxS)			0.182	0.18U		u9/6		102	L0 - 130	4	30
Perfluorooctanesulfonic acid (PFp S)			0.18U	0.182		u9/6		g8	L0 - 130	1	30
N-methyl7erfluorooctanesulfonamidoacetic acid (NMeFp SAA)			0.200	0.1g1		u9/6		gU	L0 - 130	1	30
N-ethyl7erfluorooctanesulfonamidoacetic acid (NEtFp SAA)			0.200	0.1Lg		u9/6		g0	L0 - 130	13	30
g-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (gCl-PF3p			0.18U	0.1g1		u9/6		103	L0 - 130	2	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF			0.188	0.1LU		u9/6		g3	L0 - 130	3	30
Hexafluoro7ro7ylene p xide Dimer Acid (HFPp -DA)			0.200	0.221		u9/6		111	L0 - 130	3	30
4,8-Dioxa-3H-7erfluorononanoic acid (ADp NA)			0.188	0.1L4		u9/6		g2	L0 - 130	8	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*101*		*70 - 130*
13C2 PFDA	*101*		*70 - 130*
d5-NEtFOSAA	*87*		*70 - 130*
13C3 HFPO-DA	*106*		*70 - 130*

LCMS

Prep Batch: 333815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-1	PW-4S	Total/NA	Water	537.1 DW	
320-55424-2	PW-401	Total/NA	Water	537.1 DW	
320-55424-3	PW-39	Total/NA	Water	537.1 DW	
320-55424-4	PW-40	Total/NA	Water	537.1 DW	
320-55424-5	PW-37	Total/NA	Water	537.1 DW	
320-55424-6	PW-38	Total/NA	Water	537.1 DW	
320-55424-7	PW-41S	Total/NA	Water	537.1 DW	
320-55424-8	NPS Well	Total/NA	Water	537.1 DW	
320-55424-9	NPS Well 2	Total/NA	Water	537.1 DW	
MB 320-333815/1-A	Method Blank	Total/NA	Water	537.1 DW	
LCS 320-333815/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	
LCSD 320-333815/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	

Prep Batch: 333892

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-10	PW-010	Total/NA	Water	537.1 DW	
320-55424-11	PW-110	Total/NA	Water	537.1 DW	
320-55424-12	PW-012	Total/NA	Water	537.1 DW	
320-55424-13	PW-059	Total/NA	Water	537.1 DW	
320-55424-14	PW-205	Total/NA	Water	537.1 DW	
320-55424-15	PW-221	Total/NA	Water	537.1 DW	
320-55424-16	PW-211	Total/NA	Water	537.1 DW	
320-55424-17	PW-464	Total/NA	Water	537.1 DW	
320-55424-18	PW-203	Total/NA	Water	537.1 DW	
320-55424-19	PW-212	Total/NA	Water	537.1 DW	
320-55424-20	PW-219	Total/NA	Water	537.1 DW	
MB 320-333892/1-A	Method Blank	Total/NA	Water	537.1 DW	
LCS 320-333892/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	
LCSD 320-333892/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	

Analysis Batch: 335910

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-1	PW-4S	Total/NA	Water	537.1 DW	333815
320-55424-2	PW-401	Total/NA	Water	537.1 DW	333815
320-55424-3	PW-39	Total/NA	Water	537.1 DW	333815
320-55424-4	PW-40	Total/NA	Water	537.1 DW	333815
320-55424-5	PW-37	Total/NA	Water	537.1 DW	333815
320-55424-6	PW-38	Total/NA	Water	537.1 DW	333815
320-55424-7	PW-41S	Total/NA	Water	537.1 DW	333815
MB 320-333815/1-A	Method Blank	Total/NA	Water	537.1 DW	333815
LCSD 320-333815/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	333815

Analysis Batch: 335912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-8	NPS Well	Total/NA	Water	537.1 DW	333815
320-55424-9	NPS Well 2	Total/NA	Water	537.1 DW	333815

Analysis Batch: 336059

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-10	PW-010	Total/NA	Water	537.1 DW	333892
320-55424-11	PW-110	Total/NA	Water	537.1 DW	333892

LCMS (Continued)

Analysis Batch: 336059 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-12	PW-012	Total/NA	Water	537.1 DW	333892
320-55424-13	PW-059	Total/NA	Water	537.1 DW	333892
320-55424-14	PW-205	Total/NA	Water	537.1 DW	333892
320-55424-15	PW-221	Total/NA	Water	537.1 DW	333892
320-55424-16	PW-211	Total/NA	Water	537.1 DW	333892
MB 320-333892/1-A	Method Blank	Total/NA	Water	537.1 DW	333892
LCS 320-333892/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	333892
LCSD 320-333892/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	333892

Analysis Batch: 336087

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-55424-17	PW-464	Total/NA	Water	537.1 DW	333892
320-55424-18	PW-203	Total/NA	Water	537.1 DW	333892
320-55424-19	PW-212	Total/NA	Water	537.1 DW	333892
320-55424-20	PW-219	Total/NA	Water	537.1 DW	333892

Analysis Batch: 337238

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-333815/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	333815

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: W- 02S — **Lab Sample ID: 348066242 01**
Date Collected: 18/11/17 19:38 — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			269.9 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 19:39	JRB	TAL SAC

Client Sample ID: W- 0281 — **Lab Sample ID: 348066242 04**
Date Collected: 18/11/17 16:84 — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			263.9 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 19:47	JRB	TAL SAC

Client Sample ID: W- 037 — **Lab Sample ID: 348066242 03**
Date Collected: 18/11/17 12:83 — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			272.9 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 19:55	JRB	TAL SAC

Client Sample ID: W- 028 — **Lab Sample ID: 348066242 02**
Date Collected: 18/11/17 14:62 — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			270.1 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 20:03	JRB	TAL SAC

Client Sample ID: W- 03v — **Lab Sample ID: 348066242 06**
Date Collected: 18/11/17 14:4N — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			261.5 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 20:11	JRB	TAL SAC

Client Sample ID: W- 03N — **Lab Sample ID: 348066242 09**
Date Collected: 18/11/17 11:62 — **Matrix: - ater**
Date 5 eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			275.6 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 20:19	JRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: W- 021S — **Lab Sample ID: 3480662420v**
Date Collected: 18/11/17 18:3N — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			267.1 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335910	11/04/19 20:27	JRB	TAL SAC

Client Sample ID: FWS - ell — **Lab Sample ID: 3480662420N**
Date Collected: 18/11/17 87:44 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			265.9 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335912	11/04/19 21:15	JRB	TAL SAC

Client Sample ID: FWS - ell 4 — **Lab Sample ID: 3480662420Y**
Date Collected: 18/11/17 87:16 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			280.1 mL	10.00 mL	333815	10/25/19 14:47	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			335912	11/04/19 21:24	JRB	TAL SAC

Client Sample ID: W- 0818 — **Lab Sample ID: 348066242018**
Date Collected: 18/14/17 14:4v — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			249.4 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 09:42	JRB	TAL SAC

Client Sample ID: W- 0118 — **Lab Sample ID: 348066242011**
Date Collected: 18/14/17 14:18 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			260.4 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 09:50	JRB	TAL SAC

Client Sample ID: W- 0814 — **Lab Sample ID: 348066242014**
Date Collected: 18/14/17 16:17 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			259.6 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 09:58	JRB	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: W- 0867 — **Lab Sample ID: 348066242013**
Date Collected: 18/14/17 13:4N — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			263.4 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 10:06	JRB	TAL SAC

Client Sample ID: W- 0486 — **Lab Sample ID: 348066242012**
Date Collected: 18/14/17 87:63 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			263.5 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 10:14	JRB	TAL SAC

Client Sample ID: W- 0441 — **Lab Sample ID: 348066242016**
Date Collected: 18/14/17 14:63 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			267.7 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 10:22	JRB	TAL SAC

Client Sample ID: W- 0411 — **Lab Sample ID: 348066242019**
Date Collected: 18/13/17 1v:19 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			264 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336059	11/05/19 10:30	JRB	TAL SAC

Client Sample ID: W- 0292 — **Lab Sample ID: 348066242v1v**
Date Collected: 18/13/17 13:48 — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			254.9 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336087	11/05/19 11:19	P1N	TAL SAC

Client Sample ID: W- 0483 — **Lab Sample ID: 348066242021N**
Date Collected: 18/12/17 1v:2N — **Matrix: - ater**
Date 5eceiRed: 18/1v/17 18:18

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			256.2 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336087	11/05/19 11:27	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Client Sample ID: W- 0414
Date Collected: 18/12/17 1v:14
Date 5eceiRed: 18/1v/17 18:18

Lab Sample ID: 348066242017
Matrix: - ater

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			264.7 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336087	11/05/19 11:35	P1N	TAL SAC

Client Sample ID: W- 0417
Date Collected: 18/12/17 19:23
Date 5eceiRed: 18/1v/17 18:18

Lab Sample ID: 348066242048
Matrix: - ater

Wrep Type	Batch Type	Batch Method	5sn	Dil zactor	Initial Pmosnt	zinal Pmosnt	Batch Fsmber	Wrepared or Pnalyued	PnalyAt	Lab
Total/NA	Prep	537.1 DW			264.4 mL	10.00 mL	333892	10/26/19 06:48	SK	TAL SAC
Total/NA	Analysis	537.1 DW		1			336087	11/05/19 11:43	P1N	TAL SAC

Laboratory 5eferenceA:
TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
USEPA UCMR	Federal	CA00044	12-31-20
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Method	Method Description	Protocol	Laboratory
537.1 DW	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537.1 DW	Extraction of Perfluorinated Alkyl Acids	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Gus Quarterly

Job ID: 320-55424-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-55424-1	PW-4S	Water	10/11/19 16:30	10/17/19 10:10	
320-55424-2	PW-401	Water	10/11/19 15:02	10/17/19 10:10	
320-55424-3	PW-39	Water	10/11/19 14:03	10/17/19 10:10	
320-55424-4	PW-40	Water	10/11/19 12:54	10/17/19 10:10	
320-55424-5	PW-37	Water	10/11/19 12:28	10/17/19 10:10	
320-55424-6	PW-38	Water	10/11/19 11:54	10/17/19 10:10	
320-55424-7	PW-41S	Water	10/11/19 10:38	10/17/19 10:10	
320-55424-8	NPS Well	Water	10/11/19 09:22	10/17/19 10:10	
320-55424-9	NPS Well 2	Water	10/11/19 09:15	10/17/19 10:10	
320-55424-10	PW-010	Water	10/12/19 12:27	10/17/19 10:10	
320-55424-11	PW-110	Water	10/12/19 12:10	10/17/19 10:10	
320-55424-12	PW-012	Water	10/12/19 15:19	10/17/19 10:10	
320-55424-13	PW-059	Water	10/12/19 13:28	10/17/19 10:10	
320-55424-14	PW-205	Water	10/12/19 09:53	10/17/19 10:10	
320-55424-15	PW-221	Water	10/12/19 12:53	10/17/19 10:10	
320-55424-16	PW-211	Water	10/13/19 17:16	10/17/19 10:10	
320-55424-17	PW-464	Water	10/13/19 13:20	10/17/19 10:10	
320-55424-18	PW-203	Water	10/14/19 17:48	10/17/19 10:10	
320-55424-19	PW-212	Water	10/14/19 17:12	10/17/19 10:10	
320-55424-20	PW-219	Water	10/14/19 16:43	10/17/19 10:10	

Project: Private wells

CHAIN-OF-CUSTODY RECORD

Private wells

Page 1 of 2

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory: Eurofins
Attn: D. Altucker

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:	J-Flags:
☐ Normal ☐ Rush		☐ Yes ☐ No
Please Specify		

320-55424 Chain of Custody

Sample Identity	Lab No.	Time	Date Sampled	PFAS 537.1 (Feb 2019)	Cooler #1	Total	Composition/Grab/ Sample Containers
PW-45		1630	10/11/19	X	X	2	Drinking Water
PW-401		1502		X	X	2	
PW-39		1403		X	X	2	
PW-40		1254		X	X	2	
PW-37		1228		X	X	2	
PW-38		1154		X	X	2	
PW-415		1038		X	X	2	
NPS well		922		X	X	2	
NPS well 2		915		X	X	2	
PW-010		1227	10/12/19	X	X	2	

Project Information	
Number:	102599-001
Name:	Gus Quarry
Contact:	KRF
Ongoing Project?	Yes ☒ No ☐
Sampler:	KRF

Sample Receipt	
Total No. of Containers:	40
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	
Delivery Method:	

Notes:

Analysis by 537.1 list

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1547	Signature: Time:	Signature: Time:
Printed Name: Kristen Freiburger Date: 10/15/19	Printed Name: Date:	Printed Name: Date:
Company: S&W	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 10:10	Signature: Time:	Signature: Time:
Printed Name: Jennifer Darlington Date: 16 Oct 19	Printed Name: Date:	Printed Name: Date:
Company: ETAW Inc	Company:	Company:

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

5.5°/5.6°, 6.1°/6.2°, 4.4°/4.5°, 5.4°/5.5°, 5.9°/6.0°

No. 411433

Project: Private wells

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Private wells Page 2 of 2
Laboratory Eurofins
Attn:

Turn Around Time: ☐ Normal ☐ Rush
Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS 537.1 (Trz Ma)			Cooler #1	Cooler #4	Cooler #5		Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
✓ PW-110		1210	10/12/2019	X			X				2	Drinking water
✓ PW-012		1519	↓	X			X				2	↓
✓ PW-059		1328	↓	X			X				2	↓
✓ PW-205		953	↓	X			X				2	↓
✓ PW-221		1253	↓	X			X				2	↓
✓ PW-211		1716	10/13/19	X				X			2	↓
✓ PW-464		1320	10/13/19	X				X			2	↓
✓ PW-203		1748	10/14/19	X					X		2	↓
✓ PW-212		1712	↓	X					X		2	↓
✓ PW-219		1643	↓	X					X		2	↓

Project Information
Number:
Name:
Contact:
Ongoing Project? Yes ☐ No ☐
Sampler:

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

Notes:

See Page 1

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time:	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company:	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time:	Signature: Time:	Signature: [signature] Time: 10:10
Printed Name: Date:	Printed Name: Date:	Printed Name: Jennifer Dillingham Date: 14 Oct 19
Company:	Company:	Company: ETA [illegible]

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

No. 411432

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-55424-1

Login Number: 55424
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins TestAmerica, Sacramento

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

APPENDIX C: PUBLIC INFORMATION

Appendix C

PUBLIC INFORMATION

CONTENTS

- DOT&PF Statewide PFAS Fact Sheet
- December 2019 Highest Analytical Result Map
- DOT&PF Community Update, October 4, 2019.

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

P.O. Box 196900, 99519-6900
4111 Aviation Avenue, 99502
Anchorage, AK
Main: 907.269.0730
Fax: 907.269.0489
dot.state.ak.us

PFAS Fact Sheet – Gustavus Airport

July 2019

Per- and polyfluoroalkyl substances (PFAS) are a group of manmade chemicals used for a wide variety of residential, commercial, and industrial uses. PFAS are considered emerging environmental contaminants and the health effects are not well known.

The presumed source of PFAS in groundwater in your community is the use of a fire-fighting foam called aqueous film forming foam (AFFF). Airport firefighters used the foam to extinguish petroleum fires during training exercises and emergency events.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has tested 100 private water-supply wells starting in August 2018. Private wells on airport property and wells along and off the southern portion of Wilson Road were found to be impacted.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has hired Shannon & Wilson to test private wells for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). The U.S. Environmental Protection Agency (EPA) lifetime health advisory (LHA) level for drinking water is **70 parts per trillion** for the sum of PFOS and PFOA.

We advise residents with test results above this level not to use their water for drinking or cooking. If your well is considered affected, you can continue to shower, clean, and do laundry.

Test results are typically available within three to four weeks of sample collection. If your well is found to have PFAS above the EPA LHA, DOT&PF will assist with access to an alternate source of drinking water.

For results and sampling area map:
www.dot.alaska.gov/airportwater/gustavus/

For questions about well testing:
Shannon & Wilson, Inc.
Kristen Freiburger, Project Manager
Phone: 907-458-3146
Email: krf@shanwil.com

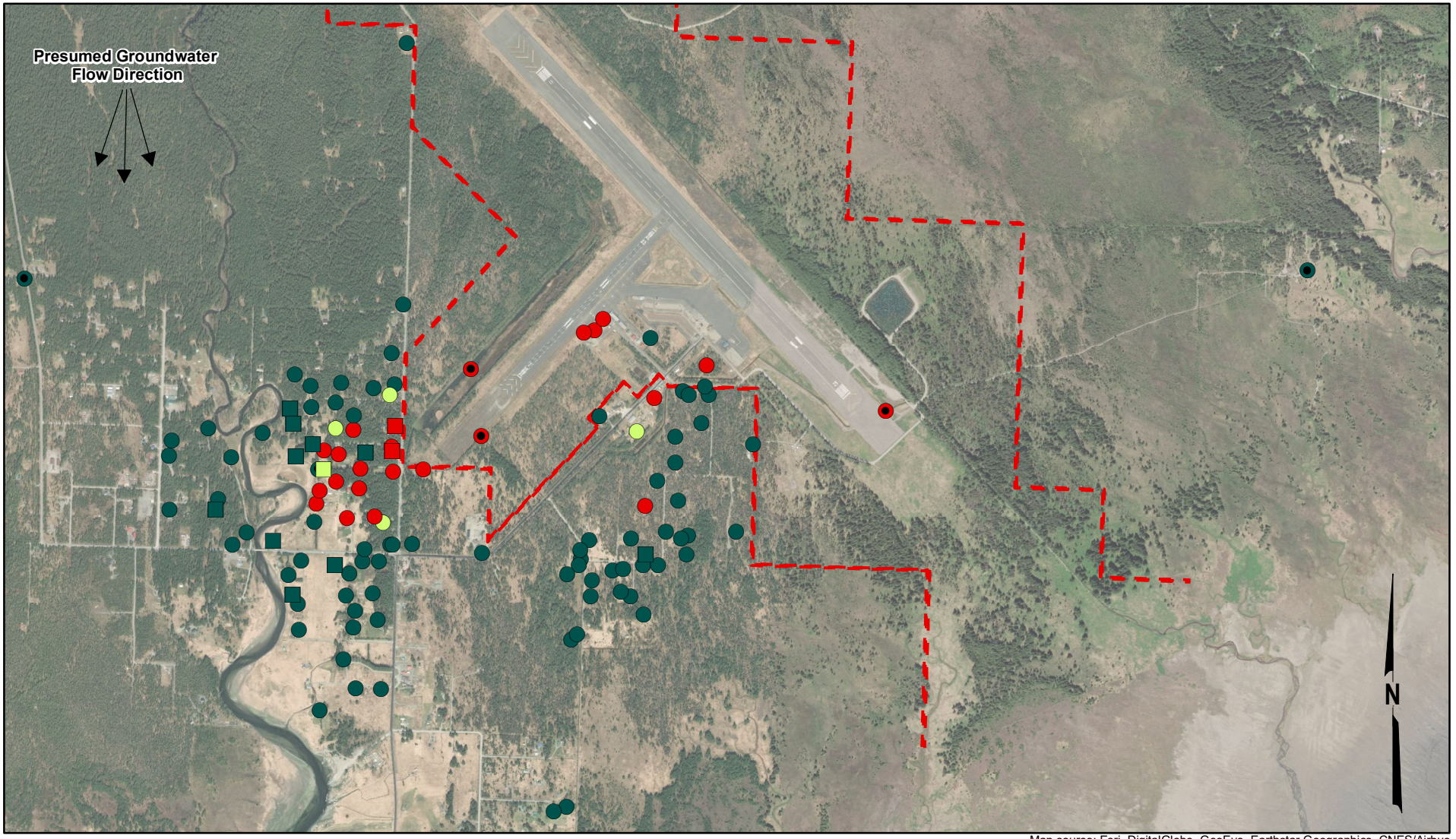
For regulatory questions:
Dept. of Environmental Conservation
Contaminated Sites Program,
Danielle Duncan
Phone: 907-465-5207
Email: danielle.duncan@alaska.gov

For questions about PFAS and health:
Dept. of Health & Social Services
Sarah Yoder, Public Health Specialist
Phone: 907-269-8054
Email: sarah.yoder@alaska.gov

To arrange your next water delivery:
Jarred Mitrea
Phone: 559-515-3680

To file an insurance claim:
Dept. of Admin., Risk Management
Scott Jordan, Risk Assessor
Phone: (907) 465-2183
Email: scott.jordan@alaska.gov

For questions about fire training and other inquiries:
Sammy Loud, DOT&PF Statewide Aviation
Phone: 907-888-5671
Email: airportwater@alaska.gov



Map source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

Wells sampled before April 2019: compared to former DEC action level*

- ≤17 parts per trillion (ppt)
- 18 to 69 ppt
- ≥70 ppt (over former action level)

Wells sampled after April 2019: compared to EPA health advisory level (sum of PFOS and PFOA)

- ≤17 ppt
- 18 to 69 ppt
- ≥70 ppt (over EPA advisory)

- Surface Water Sample
- Airport Property Boundary

0 0.5 1

Miles

*Sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA

Gustavus Airport
Gustavus, Alaska

HIGHEST REPORTED ANALYTICAL RESULTS

December 2019 102599

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

Gustavus PFAS Project - Oct. 4, 2019

Good morning,

Below is the Gustavus PFAS project update as of Oct. 4, 2019. For additional information regarding the department's statewide PFAS project please visit http://www.dot.state.ak.us/airportwater/.

If you have questions, please contact the multi-agency PFAS project team:

- Sammy (Loud) Cummings, Alaska DOT&PF, 907-888-5671, airportwater@alaska.gov
- Kristen Freiburger, Shannon & Wilson, Inc., 907-479-0600, krf@shanwil.com
- Bill O'Connell, Alaska DEC, 907-269-3057, bill.oconnell@alaska.gov
- Sarah Yoder, Alaska DHSS, 907-269-8054, sarah.yoder@alaska.gov
- Sheri Gray, Risk Management, 907-465-5724, sheri.gray@alaska.gov

Updates

Site Characterization

- Shannon & Wilson along with their subcontractors will be in Gustavus beginning Friday, October 4th and will be in town for approximately 7 to 14 days to perform site characterization work. During this time Shannon & Wilson will be installing several monitoring and temporary wells along the road ways; sampling various drainage ditches originating at the airport property; collecting samples from private wells; and several other activities on the airport property.

Quarterly and Annual Monitoring Schedule Update

- In June, DEC provided DOT&PF guidance in regards to annual and quarterly monitoring criteria. At that time DOT&PF was informed that properties where an alternative water source is being provided do not need to be re-sampled regularly, unless the information is needed to evaluate changes in the contaminant plume, the effectiveness of a treatment system, or is needed for other purposes. Monitoring schedules and plans will be re-evaluated annually to determine what changes are appropriate. Those wells that fall under the quarterly or annual monitoring wells under the distance buffer and are not receiving alternate water will continue to be monitored. Shannon & Wilson will be installing monitoring wells to conduct groundwater monitoring efforts moving forward. Community members who have impacted wells and are currently receiving alternate water will not have their wells re-sampled.

Summer Sampling

- In June 2019 Shannon & Wilson, Inc. conducted quarterly monitoring. During this event, Shannon & Wilson, Inc. also made contact with property owners with drinking water wells located in the previously established sampling area that they had not been able to obtain samples from. Of these new samples, one well located on the same property as a previous exceedance, sampled above the EPA's Lifetime Health Advisory level. A total of 19 wells have been reported to have PFAS concentrations above the actionable levels that DOT&PF is responsible for.

Airport Ditch Work

- We received multiple inquiries regarding the ditch work that took place this summer on airport property. Due to the lack of rain this season DOT&PF crew were prepping the ditch to possibly increase the flow of water to help with possible future flooding. No soil was excavated or disturbed during this process. Additional ditch sampling will take place during Shannon & Wilson's visit this coming week to determine contamination. Once we receive results the department will work with DEC to determine if additional ditch work is possible and, if needed, the soil will be disposed of properly.

Website Updates

The DOT&PF Gustavus PFAS website has been updated since the most recent sampling event. Community members and stakeholders can sign up for or cancel community updates at the following link: http://www.dot.state.ak.us/airportwater/gustavus/. Please email airportwater@alaska.gov with any questions.

APPENDIX D: QA/QC SUMMARY AND DEC LDRCS

Appendix D

QA/QC Summary and DEC LDRCs

CONTENTS

- QA/QC Summary
- DEC Laboratory Data Review Checklists

APPENDIX D: QA/QC SUMMARY AND DEC LDRCS

QA/QC SUMMARY

QA/QC procedures assist in producing data of acceptable quality and reliability. Shannon & Wilson reviewed the analytical results for laboratory QC samples and conducted our own QA assessment for this project. Shannon & Wilson reviewed the COC records and laboratory-receipt forms to check custody was not breached, sample holding-times were met, and the samples were properly handled from the point of collection through analysis by the laboratory. Our QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

Shannon & Wilson reviewed analytical sample results (TestAmerica WOs 48266, 48268, 51336, 55424, and SGS WO 1199419) for this project. The laboratory reports, including case narratives describing laboratory QA results, along with completed DEC data-review, are included in Appendix C. Details regarding our QA analysis are presented below.

SAMPLE HANDLING

Coolers containing water samples were shipped via FedEx to perform analyses noted on the COC. The coolers with water samples contained a temperature blank to measure whether samples were kept appropriately cold. Lab personnel measured the temperature blank at the time the samples arrived at each of their facilities; the temperature blank was within the proper temperature range upon arrival at the laboratories with the exception of one cooler each from work orders 51336 and 55424. Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the slightly-high cooler temperature. In an e-mail dated August 3, 2015 the DEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results." PFAS are also known as PFC.

Our review of COC records and laboratory sample-receipt documents did not reveal sample-handling anomalies that would affect the quality or usability of the data, and the samples were processed within the appropriate method holding times.

ANALYTICAL SENSITIVITY

Shannon & Wilson compared groundwater-sample limits of detection (LODs) to the DEC regulatory levels. For groundwater data, LODs were less than DEC-established CULs, where applicable.

The laboratory runs a method blank with each sample batch to detect analyte carryover during analysis. In TestAmerica work order 428266, PFOA was detected below the limit of quantitation (LOQ). PFOA concentrations detected in samples *PW-002*, *PW-011*, *PW-012*, *PW-401*, *PW-402* and *PW-418* were within five times that of the concentration detected in the method blank. In TestAmerica work order 51336, PFOA was detected below the LOQ. PFOA concentrations detected in samples *NPS Well*, *PW-213*, *PW-401*, *PW-405*, *PW-406*, *PW-418*, *PW-503*, and *PW-518* were within five times that of the concentration detected in the method blank. Samples within five times the method blank concentration for these two work orders are considered false positives attributed to laboratory contamination and are flagged 'UB' at the sample result or LOQ (whichever is greater). For work order 428266, the PFOA concentrations detected in samples *PW-022* and *PW-046* were greater than ten times that of the concentration detected in the method blank. These results were considered unaffected.

In SGS work order 1199419, conductivity was detected in the associated method blank at a concentration greater than the LOQ. In addition, nickel, alkalinity, total nitrate/nitrite, oil & grease, and TDS were detected in the associated method blanks at estimated concentration below the LOQ. Project samples are considered affected if they are in the same preparatory batch and have detected results less than ten times the associated method blank detection. Project samples *PW-013*, *PW-046*, and *Airport Terminal* had detections (above the LOQ) less than ten times but greater than five times the method blank detection for nickel. The sample results are considered estimated, biased high, and are flagged 'JH' in the analytical database. The project sample *PW-048* had a detection (above the LOQ) less than five times the method blank detection for nickel. The sample result is considered non-detect and is flagged 'UB' at the detected result in the analytical database. The project samples *PW-013* and *Airport Terminal* had estimated detections (below the LOQ) less than five times the method blank detection for total nitrate/nitrite. The sample results are considered non-detect and are flagged 'UB' at the LOQ in the analytical database. The project samples *PW-001*, *PW-013*, *PW-046*, *PW-048*, and *Airport Terminal* had estimated detections (below the LOQ) less than five times the method blank detection for oil & grease. The sample results are considered non-detect and are flagged 'UB' at the LOQ in the analytical database.

ACCURACY

The laboratory assessed the accuracy of its analytical procedures by analyzing laboratory control samples (LCS), LCS duplicate samples (LCSD) matrix spike samples (MS), MS duplicate samples (MSD) and laboratory duplicate samples. LCS/LCSD analysis allows the laboratory to evaluate their ability to recover analytes added to clean aqueous matrices.

For TestAmerica work orders 48266, 48268, 51336 and 55424 LCS/LCSD samples were reported. Laboratory accuracy was also measured for each sample by assessing the recovery of analyte surrogates added to the individual project samples. For these work orders, the

LCS/LCSD and surrogate recovery data were within laboratory control limits, indicating the sample results are accurate.

For SGS work order 1199419 accuracy of analytical procedures were assessed as follows:

- LCS/LCSD samples were analyzed for DRO and RRO analyses.
- LCS/LCSD and MS samples were analyzed for oil & grease analysis.
- LCS, MS, and laboratory duplicate samples were analyzed for the PFAS samples associated with batch ID OP75609.
- An LCS samples was analyzed for the PFAS samples associated with batch ID OP75738. Shannon & Wilson have no measure of laboratory precision for this analysis.
- LCS and MS samples were analyzed for metals analysis. Shannon & Wilson have no measure of laboratory precision for this analysis.
- LCS/LCSD and laboratory duplicate samples were analyzed for total dissolved solids (TDS) and total suspended solids (TSS).
- LCS and MS/MSD samples were analyzed for sulfide, total nitrate/nitrite, total organic carbon (TOC), and anion analyses.
- LCS and laboratory duplicate samples were analyzed for pH, conductivity, and alkalinity analyses.
- LCS/LCSD and MS/MSD samples were analyzed for ammonia analysis.

Recovery failures of sodium, nitrate, total nitrate/nitrite, chloride, fluoride, sulfate and PFOS were recorded in either MS or MS/MSD pairs. However, the parent sample is not a part of the project sample set and not considered to effect project samples.

For SGS work order 1199419 surrogate recovery failures were as follows:

- The RRO LCS 151320 had a surrogate recovery failure for n-triacontane.
- The reported results for project sample *PW-001* had low surrogate recovery failures for the IDA compounds associated with perfluoroundecanoic acid (PFUnDA, or PFDA), perfluorododecanoic acid (PFDoDA, or PFDoA), perfluorotetradodecanoic acid (PFTeDA, or PFTeA), and 2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA) due to matrix interference.
- The reported results for project samples *PW-001* and *PW-013* had low surrogate recovery failures for the IDA compounds associated with perfluorooctanesulfonic acid (PFOS) and high surrogate recovery failures for the IDA compounds associated with 6:2 fluorotelomer sulfonate (6:2 FTS) due to sample dilution.
- The reported results for project sample *PW-048* had low surrogate recovery failures for the IDA compounds associated with PFUnDA, PFDoDA, and PFOS.

For SGS work order 1199419 project samples surrogate recovery failures were treated as follows:

- Project samples are not affected by surrogate recovery failures in QC samples as long as the QC sample results are within laboratory QC criteria. The project samples are not affected by the RRO surrogate recovery failure in the LCS sample.
- The analytes PFUnDA, PFDoDA, PFTeDA, and MeFOSAA were not detected in the project sample PW-001. The LODs are considered estimated and are flagged 'UJ' in the analytical database.
- The analyte PFOS for project samples *PW-001* and *PW-013* are not affected by the low recovery failures due to sample dilution. However, the analyte 6:2 FTS associated with these samples is considered affected by the high-recovery failure. The detected sample results are considered estimated, biased high, and are flagged 'JH' in the analytical database.
- The analytes PFUnDA, PFDoDA, and PFOS were not detected in the project sample *PW-048*. The LODs are considered estimated and are flagged 'UJ' in the analytical database.

PRECISION

Shannon & Wilson submitted nine field duplicate samples in our work orders. To evaluate data precision and reproducibility of our sampling techniques, the relative percent difference (RPD) was calculated between the sample and its duplicate. Shannon & Wilson can only evaluate RPDs if the results of the analysis for both the sample and its duplicate are greater than the LOQs for a given analyte. The field-duplicate RPDs for detected analytes were within the project-specified data quality objective of 30% for groundwater. PFAS compounds were not detected in the field duplicate samples *PW-039* and *PW-139* from TestAmerica work order 48266, so the relative precision could not be assessed. The results for PFAS in this work order are not affected.

In TestAmerica work order 55424, the PFBS results for project samples *NPS Well* and *NPS Well 2* has an RPD of 31.2%. Additionally, HFPO-DA was detected above the LOQ in sample *NPS Well 2* and not detected in sample NPS Well. Shannon & Wilson considers this to be a precision failure. PFBS and HFPO-DA results for the duplicate pair *NPS Well* / *NPS Well 2* are considered estimated due to field duplicate imprecision and are flagged 'J' in analytical tables.

Shannon & Wilson also evaluated laboratory analytical precision using RPD calculations. The LCS/LCSDs provide information regarding the reproducibility of laboratory procedures and are therefore a measure of the laboratory's analytical precision. The RPD results for the LCS/LCSD were within acceptable laboratory QC limits, with one exception from SGS work order 1199419. The laboratory duplicate OP75609-DUP was identified as having an RPD

failure for PFHxS. The analyte was detected at an estimated concentration below the LOW in the parent sample and non-detect in the laboratory duplicate sample. An RPD cannot be calculated for this result and the project samples are not affected by this QC failure.

DATA QUALITY SUMMARY

By working in general accordance with our proposed scope of services, Shannon & Wilson consider the samples Shannon & Wilson collected for this project to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures. In general, the quality of the analytical data for this project does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

Laboratory Data Review Checklist

Completed By:

Adam Wyborny

Title:

Environmental Engineering Staff

Date:

March 20, 2019

CS Report Name:

Gustavus DOT&PF PFAS

Report Date:

March 20, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-48268-1

ADEC File Number:

1507.38.017

Hazard Identification Number:

26904

320-48268-1

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   (●) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (●) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (●) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (●) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (●) Yes ( ) No Comments:

The temperature blank was measured within the acceptable temperature range of 0° C to 6° C upon receipt at the laboratory.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   (●) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

   c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

   (●) Yes ( ) No Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

(•) Yes ( ) No Comments:

The sample receipt form and case narrative note that there was a 20-minute discrepancy between the sample times listed on the labels and those listed on the COC. The laboratory logged the samples in per the COC at the direction of Shannon & Wilson, Inc.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected by the sample time discrepancy. The samples were analyzed well within holding time.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

(•) Yes ( ) No Comments:

The samples arrived in good condition and properly preserved. The temperatures of the two sample coolers received with this shipment were 5.2 º C and 5.9 º C upon arrival at the laboratory.

The case narrative notes that the samples associated with this work order contained small black particles suspended in solution.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batch 320-282076.

c. Were all corrective actions documented?

( ) Yes (•) No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

( ) Yes (•) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(•) Yes ( ) No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water and soil.

e. Data quality or usability affected?

( ) Yes (•) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(•) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(•) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank samples.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

No samples are affected; therefore, qualification of the results was not required

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

◉ Yes ○ No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ◉ No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

◉ Yes ○ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

◉ Yes ○ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

○ Yes ◉ No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

○ Yes ◉ No Comments:

A field duplicate pair was not submitted with this work order. However, field duplicate samples have been submitted at the required frequency for the overall project.

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

N/A; field duplicate samples were not submitted with this work order.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability is not affected; see above.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

○ Yes ○ No ◉ Not Applicable

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ?

◉ Yes ○ No Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Adam Wyborny

Title:

Environmental Engineering Staff

Date:

March 25, 2019

CS Report Name:

Gustavus DOT&PF PFAS

Report Date:

March 25, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-48266-1

ADEC File Number:

1507.38.017

Hazard Identification Number:

26904

320-48266-1

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   (●) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (●) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (●) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (●) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (●) Yes ( ) No Comments:

The temperature blanks were measured within the acceptable temperature range of 0° C to 6° C upon receipt at the laboratory.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   (●) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

   c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

   (●) Yes ( ) No Comments:

The sample receipt form notes that one of the two containers constituting sample *PW-022* was received with a broken lid and lost volume. The remaining volume in the broken container was not used for analysis.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

(•) Yes ( ) No Comments:

The sample receipt form and case narrative note that there was a discrepancy between the sample time listed on the labels and that listed on the COC for sample *PW-203*. The discrepancy was addressed with Shannon & Wilson, who verified the sample time from field documentation.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected. The sample time discrepancy was corrected for sample *PW-203*, and there was sufficient volume in the surviving container of sample *PW-022* to proceed with the analysis.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

(•) Yes ( ) No Comments:

The samples arrived in good condition and properly preserved. The temperatures of the two sample coolers received with this shipment were 5.2 º C and 5.9 º C upon arrival at the laboratory.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-281969, 320-282334, 320-282571, and 320-283099.

c. Were all corrective actions documented?

( ) Yes (•) No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

◉ Yes ○ No Comments:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

○ Yes ◉ No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

◉ Yes ○ No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water and soil.

e. Data quality or usability affected?

○ Yes ◉ No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

◉ Yes ○ No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

◉ Yes ○ No Comments:

Perfluoro-octanoic acid (PFOA) was detected at an estimated concentration in the method blank sample associated with preparation batch 320-281969.

iii. If above LOQ, what samples are affected?

Comments:

The samples associated with preparation batch 320-281969 containing detectable concentrations of PFOA include *PW-022*, *PW-402*, *PW-1000*, *PW-012*, *PW-401*, *PW-418*, *PW-011*, *PW-046*, and *PW-002*.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

(●) Yes ( ) No Comments:

The PFOA concentrations detected in the samples *PW-402*, *PW-1000*, *PW-012*, *PW-401*, *PW-418*, *PW-011*, and *PW-002* were within five times that of the concentration detected in the method blank. These results are considered false positives attributed to laboratory contamination and are flagged 'UB' at the sample result or LOQ (whichever is greater).

The PFOA concentrations detected in samples *PW-022* and *PW-046* were greater than ten times that of the concentration detected in the method blank. These results are considered unaffected.

v. Data quality or usability affected?

Comments:

The data quality and/or usability is affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(●) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (●) No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(●) Yes ( ) No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

(●) Yes ( ) No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

◉ Yes ○ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

◉ Yes ○ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

○ Yes ◉ No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

The field duplicate pairs *PW-039* / *PW-139*, *PW-405* / *PW-505*, and *PW-406* / *PW-506* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

○ Yes ◉ No Comments:

PFAS compounds were not detected in the field duplicate samples *PW-039* and *PW-139*, so the relative precision could not be assessed.

The analytical precision demonstrated between the PFAS results of the field duplicate samples *PW-405* and *PW-505* was within the recommended DQO of 30% for all analytes.

The analytical precision demonstrated between the PFAS results of the field duplicate samples *PW-406* and *PW-506* was within the recommended DQO of 30% for all analytes except PFOA.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The PFOA results of the field duplicate samples *PW-406* and *PW-506* are considered estimated due to the relative precision failure. These results are flagged 'J' to identify the imprecision.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

○ Yes ○ No ◉ Not Applicable

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ?

◉ Yes ○ No Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Michael Jaramillo

Title:

Environmental Chemist

Date:

July 15, 2019

CS Report Name:

Gustavus DOT&PF PFAS

Report Date:

July 8, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1199419_Rev 1

ADEC File Number:

1507.38.017

Hazard Identification Number:

26904

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   ◉ Yes ○ No Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ◉ Yes ○ No Comments:

   Contract laboratories are ADEC or NELAP certified for the requested analyses.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   ○ Yes ◉ No Comments:

   The sample cooler containing project sample *PW-046* was initially sent to TestAmerica of Sacramento, CA. The TestAmerica laboratory signed for the receipt of the sample cooler on 6/12/2019 but neglected to include a sample receiving time. The final receipt of the samples by SGS of Anchorage, AK is listed as 6/11/2019, when all samples except *PW-046* were received. The laboratory noted in the Sample Receipt Form that sample *PW-046* was received on 6/13/2019.

   The project samples were analyzed within the method recognized hold times and are not considered affected by these discrepancies.

   b. Correct Analyses requested?

   ◉ Yes ○ No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   ◉ Yes ○ No Comments:

   The temperature blanks were measured within the acceptable temperature range of 0° C to 6° C upon receipt at the laboratory.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ◉ Yes ○ No Comments:

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

(●) Yes ( ) No Comments:

The sample receipt forms note that sample containers were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

( ) Yes (●) No Comments:

There were no sample handling discrepancies noted by the laboratory other than the sample shipment of *PW-046* to TestAmerica of Sacramento, CA. Refer to Section 2.a. for further details.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

4. Case Narrative

a. Present and understandable?

(●) Yes ( ) No Comments:

**********SGS – Anchorage, AK**********

Project samples for the analysis of PFAS by EPA method 537 were analyzed by SGS of Orlando, FL. Project samples for the analysis of arsenic speciation were analyzed by Brooks Applied of Bothell, WA.

The residual range organics (RRO) laboratory control sample (LCS) 1513210 had a surrogate recovery failure n-triacontane. The surrogate recoveries in the samples were within QC criteria.

Conductivity was detected in the method blank at a concentration above the limit of quantitation (LOQ). The associated samples had detections greater than ten times the method blank result.

b. Discrepancies, errors, or QC failures identified by the lab?

(●) Yes ( ) No Comments:

**********SGS – Orlando, FL**********

The per- and polyfluorinated alkyl substances (PFAS) matrix spike (MS) associated with batch ID OP75609 had a recovery failure for perfluorooctane-sulfonic acid (PFOS). The recovery failure is likely due to high levels in the parent sample relative to the spiking concentration.

The PFAS laboratory duplicate associated with batch ID OP75609 had a relative percent difference (RPD) failure for perfluorohexanesulfonic acid (PFHxS).

Samples *PW-001*, *PW-013*, and *PW-048* had several PFAS surrogate recovery failures due to sample dilution or matrix interference.

The PFAS LCS associated with batch ID OP75609 had a surrogate recovery failure for 13C2-6:2FTS.

c. Were all corrective actions documented?

(•) Yes ( ) No Comments:

Results for project samples with surrogate recovery failures were re-extracted and reanalyzed to confirm the initial sample results; initial results were confirmed.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

c. All soils reported on a dry weight basis?

( ) Yes (•) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(•) Yes ( ) No Comments:

The LOQ or Reporting Limit (RL), is less than the applicable ADEC regulatory limits.

e. Data quality or usability affected?

( ) Yes (•) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(•) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

○ Yes ◉ No Comments:

Conductivity was detected in the associated method blank at a concentration greater than the LOQ.

In addition, nickel, alkalinity, total nitrate/nitrite, oil & grease, and TDS were detected in the associated method blanks at estimated concentration below the LOQ.

iii. If above LOQ, what samples are affected?

Comments:

Project samples are considered affected if they are in the same preparatory batch and have detected results less than ten times the associated method blank detection.

The project samples *PW-013*, *PW-046*, and *Airport Terminal* had detections (above the LOQ) less than ten times but greater than five times the method blank detection for nickel. The sample results are considered estimated, biased high, and are flagged 'JH' in the analytical database.

The project sample *PW-048* had a detection (above the LOQ) less than five times the method blank detection for nickel. The sample result is considered non-detect and is flagged 'UB' at the detected result in the analytical database.

The project samples *PW-013* and *Airport Terminal* had estimated detections (below the LOQ) less than five times the method blank detection for total nitrate/nitrite. The sample sample results are considered non-detect and are flagged 'UB' at the LOQ in the analytical database.

The project samples *PW-001*, *PW-013*, *PW-046*, *PW-048*, and *Airport Terminal* had estimated detections (below the LOQ) less than five times the method blank detection for oil & grease. The sample sample results are considered non-detect and are flagged 'UB' at the LOQ in the analytical database.

The remaining project samples either did not have detections for these analytes or had detections greater than ten times the associated method blank detections. The project samples are not affected by these QC failures.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

◉ Yes ○ No Comments:

See above for applied qualifiers.

v. Data quality or usability affected?

Comments:

The data quality and/or usability is affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

○ Yes ◉ No Comments:

LCS/LCSD samples were analyzed for DRO and RRO analyses.

LCS/LCSD and MS samples were analyzed for oil & grease analysis.

LCS, MS, and laboratory duplicate samples were analyzed for the PFAS samples associated with batch ID OP75609.

An LCS samples was analyzed for the PFAS samples associated with batch ID OP75738. We have no measure of laboratory precision for this analysis.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ◉ No Comments:

LCS and MS samples were analyzed for metals analysis. We have no measure of laboratory precision for this analysis.

LCS/LCSD and laboratory duplicate samples were analyzed for total dissolved solids (TDS) and total suspended solids (TSS).

LCS and MS/MSD samples were analyzed for sulfide, total nitrate/nitrite, total organic carbon (TOC), and anion analyses.

LCS and laboratory duplicate samples were analyzed for pH, conductivity, and alkalinity analyses.

LCS/LCSD and MS/MSD samples were analyzed for ammonia analysis.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

○ Yes ◉ No Comments:

The MS 1513947 had a high recovery failure for sodium. The parent sample is not a part of the project sample set.

The MS 1513641 and MSD 1513642 had low recovery failures for nitrite. The parent sample is not a part of the project sample set.

The MS 1513643 and MSD 1513644 had high recovery failures for total nitrate/nitrite. The parent sample is not a part of the project sample set.

The MS 1515376 and MSD 1515377 had low recovery failures for chloride, fluoride, and sulfate. The parent sample is not a part of the project sample set.

The MS OP75609-MS had a low recovery for PFOS. The parent sample is not a part of the project sample set.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

However, the laboratory duplicate OP75609-DUP was identified as having an RPD failure for PFHxS. The analyte was detected at an estimated concentration below the RL in the parent sample and non-detect in the laboratory duplicate sample. An RPD cannot be calculated for this result and the project samples are not affected by this QC failure.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; project samples are not affected by MS and MSD recovery failures if the parent sample is not a a part of the project sample set.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(•) Yes ( ) No Comments:

The analytical method 537 uses isoptic dilution analyte (IDA) recovery, which entails adding a 13C-isotope of each target analyte, to assess the recovery of each analyte. The IDA compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

( ) Yes (•) No Comments:

The RRO LCS 151320 had a surrogate recovery failure for n-triacontane.

The reported results for project sample *PW-001* had **low** surrogate recovery failures for the IDA compounds associated with perfluoroundecanoic acid (PFUnDA), perfluorododecanoic acid (PFDoDA), perfluorotetradodecanoic acid (PFTeDA), and 2-(N-Methyl-perfluorooctane sulfonamido) acetic acid (MeFOSAA) due to matrix interference.

The reported results for project samples *PW-001* and *PW-013* had **low** surrogate recovery failures for the IDA compounds associated with perfluorooctanesulfonic acid (PFOS) and **high** surrogate recovery failures for the IDA compounds associated with 6:2 fluorotelomer sulfonate (6:2 FTS) due to sample dilution.

The reported results for project sample *PW-048* had **low** surrogate recovery failures for the IDA compounds associated with PFUnDA, PFDoDA, and PFOS.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

(•) Yes ( ) No Comments:

Project samples are not affected by surrogate recovery failures in QC samples as long as the QC sample results are within laboratory QC criteria. The project samples are not affected by the RRO surrogate recovery failure in the LCS sample.

The analytes PFUnDA, PFDoDA, PFTeDA, and MeFOSAA were not detected in the project sample *PW-001*. The sample results are considered estimated and are flagged 'UJ' in the analytical database.

The analyte PFOS for project samples *PW-001* and *PW-013* are not affected by the low recovery failures due to sample dilution. However, the analyte 6:2 FTS associated with these samples are considered affected by the high recovery failure. The detected sample results are considered estimated, biased high, and are flagged 'JH' in the analytical database.

The analytes PFUnDA, PFDoDA, and PFOS were not detected in the project sample *PW-048*. The sample results are considered estimated and are flagged 'UJ' in the analytical database.

iv. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

○ Yes ◉ No Comments:

Volatile compounds were not submitted with this work order; a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

○ Yes ◉ No Comments:

A field-duplicate was not required for this work order.

ii. Submitted blind to lab?

○ Yes ◉ No Comments:

N/A; a field-duplicate was not required for this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

○ Yes ◉ No Comments:

N/A; a field-duplicate was not required for this work order.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

○ Yes ○ No ◉ Not Applicable

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ?

◉ Yes ○ No Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Amber Masters

Title:

Environmental Scientist

Date:

12/11/2019

Consultant Firm:

Shannon and Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-51336-1 Rev 0 and Rev 2

Laboratory Report Date:

7/8/19 & 12/3/19

CS Site Name:

Gustavus DOT&PF PFAS Quarterly

ADEC File Number:

2569.38.033

Hazard Identification Number:

26981

320-51336-1 Rev 0 and Rev 2

Laboratory Report Date:

7/8/19 & 12/3/19

CS Site Name:

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Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☐ No☒ N/A☐ Comments:

   One of the two coolers was received at 6.7° C upon receipt at the laboratory.

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

   Samples were preserved with Trizma.

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c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☒ N/A☐ Comments:

The sample receipt form and case narrative note that the temperature of one cooler was 6.7° C upon receipt.

e. Data quality or usability affected?

Comments:

The data quality and/or usability were not affected. Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the slightly-high cooler temperature. Analysis of PFAS does not require a preservative. In an e-mail dated August 3, 2015, the ADEC project manager noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results." PFAS are also known as PFCs.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

The samples arrived in good condition and properly preserved.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-303244, 320-303247, and 320-303248.

The case narrative also notes and “I” qualifier; however, it was not applied to the reported results. Results are unaffected.

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c. Were all corrective actions documented?

Yes☐ No☐ N/A☒ Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

PFOS and PFOA were requested on the COC; however, the client later requested PFHpA, PFHxS, PFBS, and PFNA (the other available information for previously reported analytes).

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water .

e. Data quality or usability affected?

The data quality and/or usability are not affected.

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6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

Method blank 320-303244/1-A had a detection below the LOQ for PFOA at 0.764 ng/L.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples *NPS Well, PW-011, PW-213, PW-401, PW-405, PW-406, PW-418, PW-503* and *PW-518* were affected.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

Samples *PW-401, PW-405, PW-418* and *PW-518* were flagged 'UB' at the LOQ. Samples *NPS Well, PW-011, PW-213, PW-406* and *PW-503* were flagged 'UB' at their detected concentration. Samples flagged with a 'UB' flag are considered not detected due to sample-contamination identified in the blank.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

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ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

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c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☒ N/A☐ Comments:

Insufficient sample volume was available to perform a MS/MSD with the associated preparatory batches.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

N/A; metals and/or inorganics were not analyzed as a part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

See above.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

See above.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

See above.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

See above.

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vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and/or usability is not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

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ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

N/A; a trip blank is not required.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; a trip blank is not required.

v. Data quality or usability affected?

Comments:

N/A; a trip blank is not required.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☐ No☐ N/A☐ Comments:

The field duplicate pairs *PW-011 / PW-111, PW-022 / PW-122, PW-403 / PW-503* and *PW-418 / PW-518* were submitted with this work order.

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iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability is not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☐ Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

   a. Defined and appropriate?

      Yes☐ No☐ N/A☐ Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Amber Masters

Title:

Environmental Scientist

Date:

11/25/019

Consultant Firm:

Shannon and Wilson, Inc.

Laboratory Name:

Eurofins TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-55424-1

Laboratory Report Date:

11/13/2019

CS Site Name:

Gustavus DOT&PF PFAS Quarterly

ADEC File Number:

2569.38.033

Hazard Identification Number:

26981

320-55424-1

Laboratory Report Date:

11/13/2019

CS Site Name:

Gustavus DOT&PF PFAS Quarterly

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   The ADEC certified the Eurofins TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☐ No☒ N/A☐ Comments:

   The laboratory indicated that the temperature of one cooler was at 6.2° C upon receipt (cooler #6).

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

   Samples were preserved with Trizma.

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c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☒ N/A☐ Comments:

Other than the temperature discrepancy noted above, the samples were noted as arriving in good condition, properly preserved, and on ice.

e. Data quality or usability affected?

Comments:

The data quality and/or usability were not affected. Due to the high chemical and biological stability of PFAS, it is unlikely the integrity of the project samples was adversely affected by the slightly-high cooler temperature. Analysis of PFAS does not require a preservative. In an e-mail dated August 3, 2015, one of the ADEC project managers noted that he had spoken with their chemist, who "agrees the high temperature probably would not affect the PFC results." PFAS are also known as PFCs.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

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b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

The samples arrived in good condition and properly preserved.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-333815 and 320-333892.

The following samples PW-4S, PW-401, PW-37, PW-41S, NPS Well and NPS Well 2 in preparation batch 320-333815 were observed to be yellow in color and contained sediments.

The following samples assocaited with prepatory batch 333815 were noted to be yellow after extraction : *PW-37, NPS Well,* and *NPS Well 2.*

The following samples assocaited with prepatory batch 333892 were noted to be yellow prior to extraction: *PW-010, PW-110, PW-012, PW-205, PW-059, PW-221, PW-211,*and *PW-203.*

The following samples assocaited with prepatory batch 333892 were noted to be turbid and yellow prior to extraction: *PW-464.*

The following samples: PW-010, PW-110, PW-012, PW-059, PW-205, PW-221 and PW-203 in preparation batch 320-333892 were observed to be a yellow color after they were brought up to final volume.

Elevated reporting limits are provided for *PW-010* due to insuffiecnt sample provided.

c. Were all corrective actions documented?

Yes☐ No☐ N/A☒ Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

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5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

The correct analyses were performed and reported as requested on the COC, however, samples PW-45 and PW-415 were inadvertently logged in as PW-4S and PW-41S, respectively. In the laboratory report and this checklist these samples are called PW-4S and PW-41S while in the reporting tables these samples are correctly labeled as PW-45 and PW-415.

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

The LOQ, equivalent to the Eurofins TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water .

e. Data quality or usability affected?

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

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ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☐ No☐ N/A☒ Comments:

None; PFAS compounds were not detected in the method blank samples.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

Samples are not affected; therefore, qualification of the results was not required

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

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iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☒ N/A☐ Comments:

Insufficient sample volume was available to perform a MS/MSD with preparatory batches 320-333815 and 320-333892

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

N/A; metals and/or inorganics were not analyzed as a part of this work order.

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iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

See above.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

See above.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

See above.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

See above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and/or usability is not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

The analytical method 537.1 DW uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

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ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

N/A; a trip blank is not required.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; a trip blank is not required.

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v. Data quality or usability affected?

Comments:

N/A; a trip blank is not required.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☐ No☐ N/A☐ Comments:

The field duplicate pairs *PW-010* / *PW-110* and *NPS Well / NPS Well 2* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☐ No☒ N/A☐ Comments:

The PFBS results for *NPS Well* and *NPS Well 2* has an RPD of 31.2%. Additionally, HFPO-DA was detected above the LOQ in sample NPS Well 2 and not detected in sample NPS Well. We consider this to be a precision failure.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

PFBS and HFPO-DA results for the duplicate pair *NPS Well / NPS Well 2* are considered estimated due to field duplicate imprecision and are flagged J in analytical tables.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

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i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☐ Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☐ No☐ N/A☐ Comments:

There were no additional flags/qualifiers required for this work order.

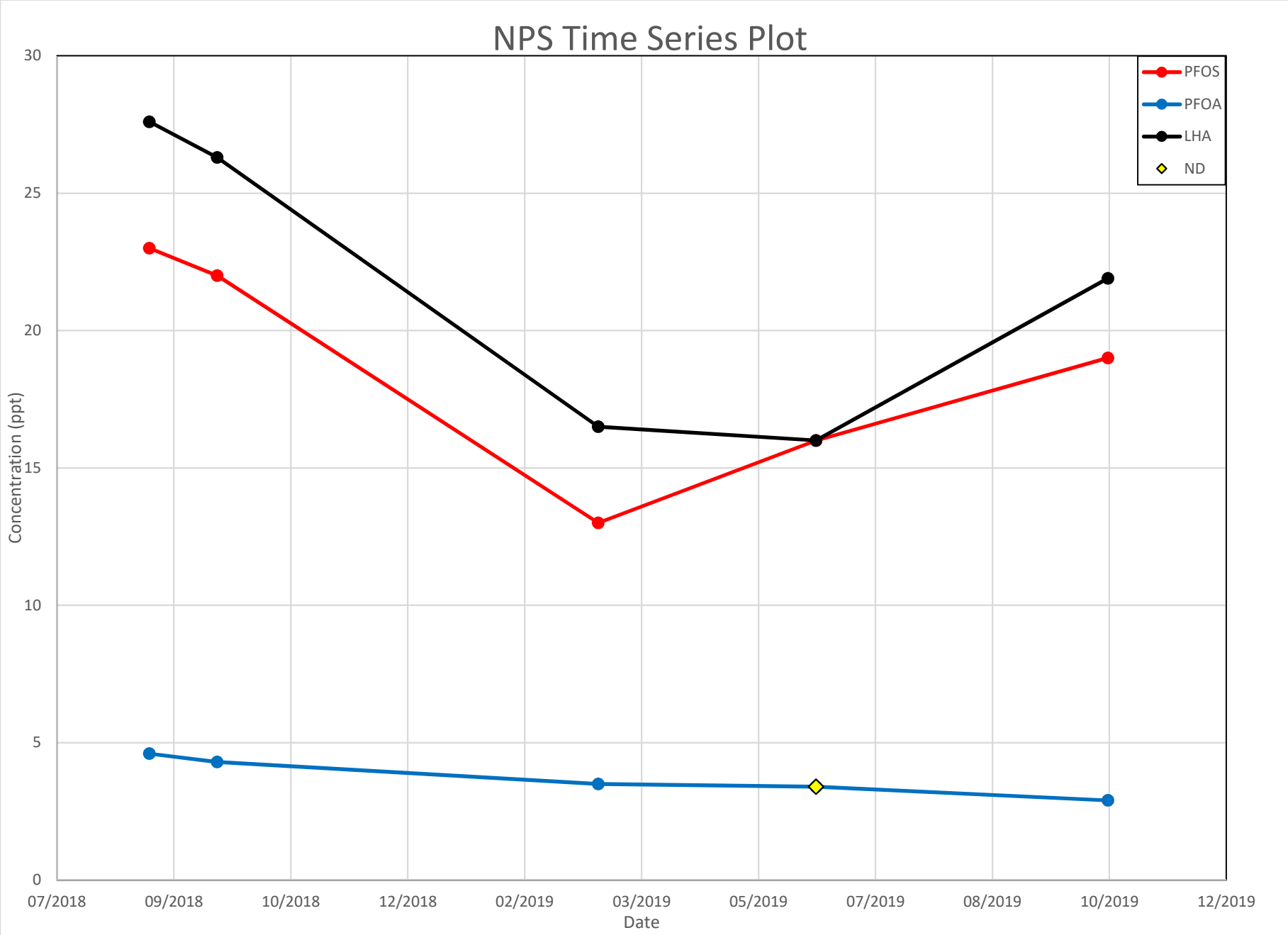
APPENDIX E: TREND ANALYSIS PLOTS

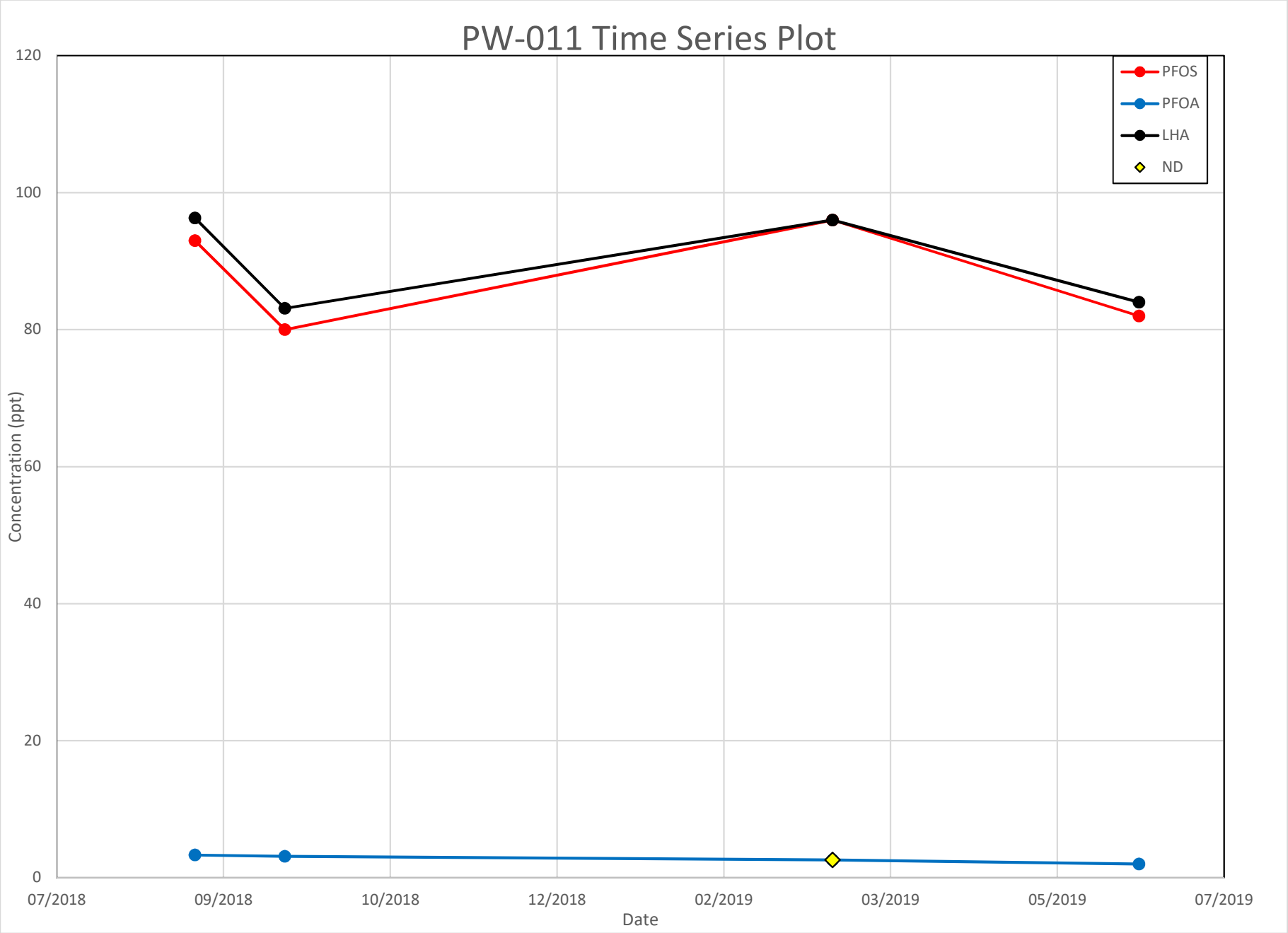
Appendix E

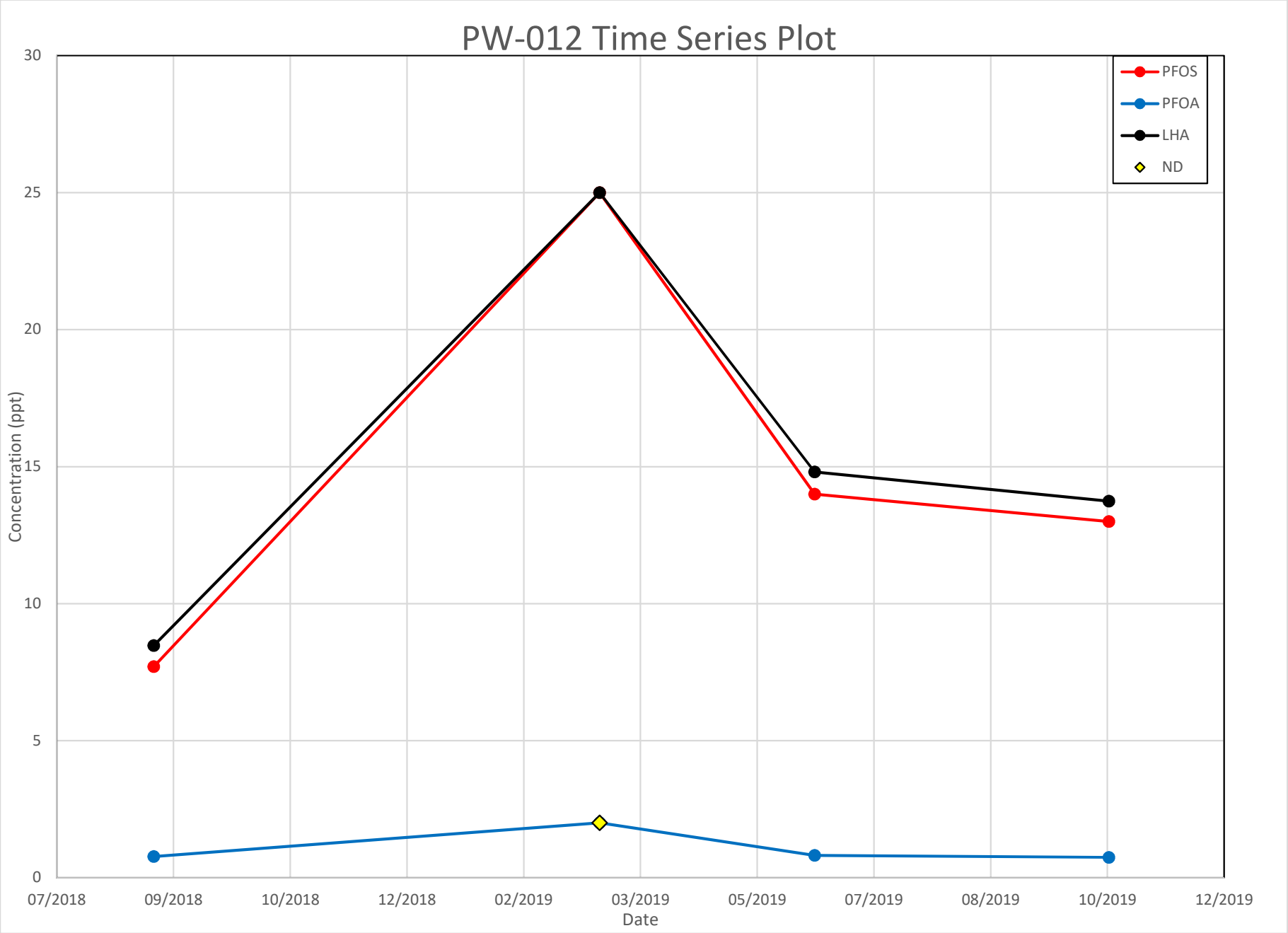
Trend Analysis Plots

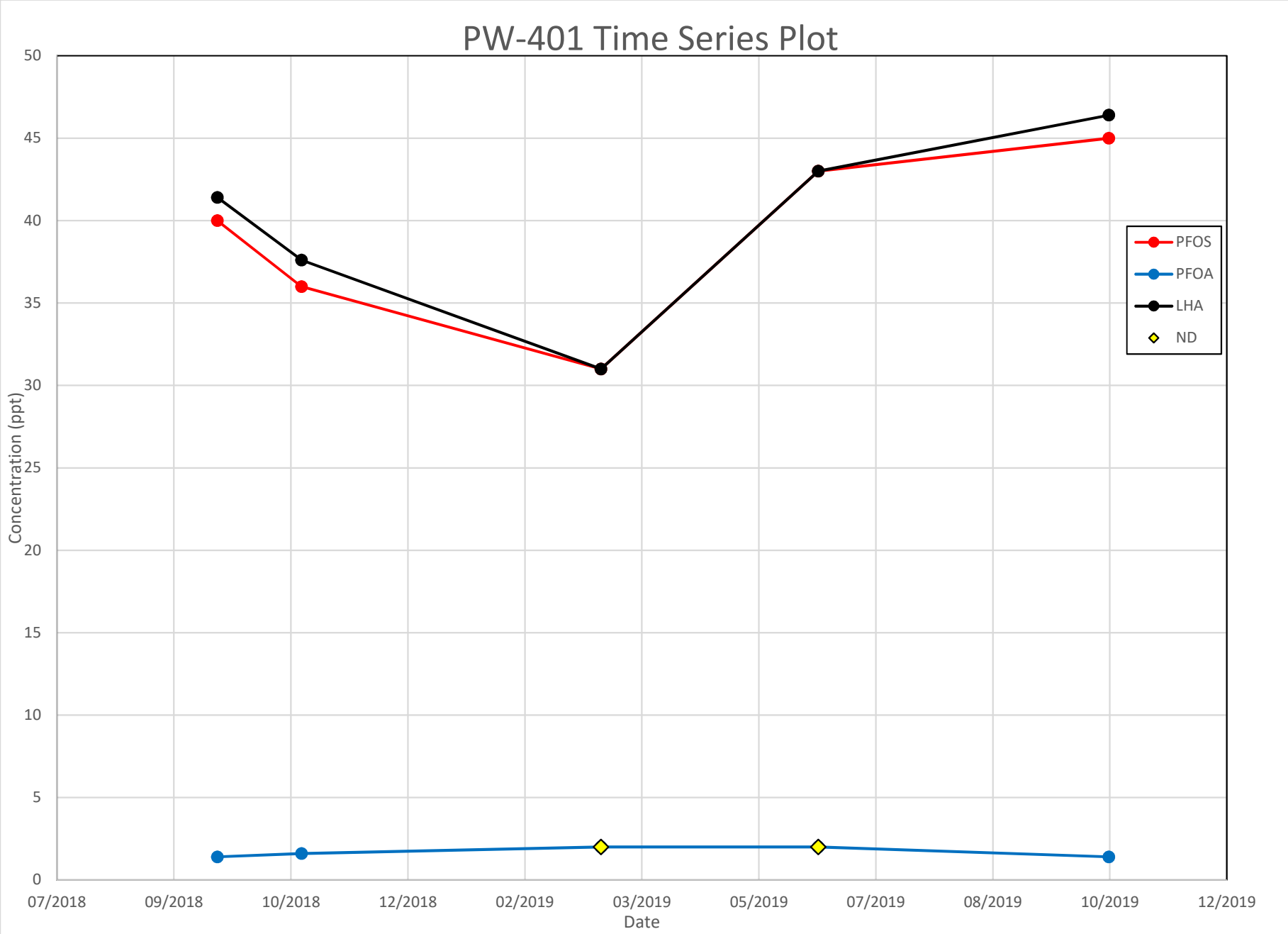
CONTENTS

- NPS Time Series Plot
- PW-011 Time Series Plot
- PW-012 Time Series Plot
- PW-401 Time Series Plot


NPS Time Series Plot
30
25
20
15
10
5
0
Concentration (ppt)
07/2018
09/2018
10/2018
12/2018
02/2019
03/2019
05/2019
07/2019
08/2019
10/2019
12/2019
Date
PFOS
PFOA
LHA
ND


PW-011 Time Series Plot
120
100
80
60
40
20
0
Concentration (ppt)
07/2018
09/2018
10/2018
12/2018
02/2019
03/2019
05/2019
07/2019
Date
PFOS
PFOA
LHA
ND


PW-012 Time Series Plot
Concentration (ppt)
30
25
20
15
10
5
0
07/2018
09/2018
10/2018
12/2018
02/2019
03/2019
05/2019
07/2019
08/2019
10/2019
12/2019
Date
PFOS
PFOA
LHA
ND


PW-401 Time Series Plot
Concentration (ppt)
50
45
40
35
30
25
20
15
10
5
0
07/2018
09/2018
10/2018
12/2018
02/2019
03/2019
05/2019
07/2019
08/2019
10/2019
12/2019
Date
PFOS
PFOA
LHA
ND

IMPORTANT INFORMATION

Important Information

About Your Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining

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your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

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being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

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