



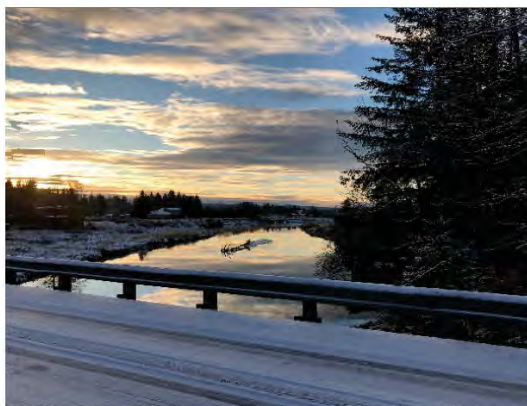
SUBMITTED TO:
Alaska Department of
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SUMMARY REPORT
August 2018 to November 2018
Private Well Sampling - Revision 1
GUSTAVUS, ALASKA



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Submitted To: Alaska Department of Administration's Division of Risk Management
333 Willoughby Avenue
Juneau, Alaska 99807
Attn: Contact Name

Subject: SUMMARY REPORT, AUGUST 2018 TO NOVEMBER 2018 PRIVATE WELL
SAMPLING - REVISION 1, GUSTAVUS, ALASKA

Shannon & Wilson prepared this report and participated in this project as a consultant to Alaska Department of Transportation and Public Facilities (DOT&PF) and Alaska Department of Administration's Division of Risk Management (DRM). Our scope of services was specified in our letter titled *Confirmation of Authorization to Proceed with Environmental Support Services, Gustavus Airport PFAS Assessment, Gustavus, Alaska* with Alaska Department of Administration Division of Risk Management dated August 23, 2018. This report presents a summary of our services from August 2018 through December 2018 and was prepared by the undersigned.

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.



Digitally signed by Craig
Alan Beebe
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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film-forming foam
bgs	below ground surface
°C	degrees Celsius
cfs	cubic feet per second
COC	chain of custody
DEC	Alaska Department of Environmental Conservation
DHSS	Alaska Department of Health and Social Services
DNR	Alaska Department of Natural Resources
DOA	Alaska Department of Administration
DOT&PF	Alaska Department of Environmental Conservation
DRM	Alaska Department of Administration Division of Risk Management
EPA	U.S. Environmental Protection Agency
GST	Gustavus Airport Terminal
LHA	Lifetime Health Advisory
ng/L	nanograms per liter
NPS	National Park Service
PFAS	per- and polyfluoroalkyl substance
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perfluorohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PFNA	perfluorononanoic acid
POE	point of entry
ppt	parts per trillion
QA	quality assurance
QC	quality control
SGS	SGS North America, Inc.
TestAmerica	TestAmerica Laboratories, Inc.
UCMR	Unregulated Contaminant Monitoring Rule
USGS	U.S. Geological Survey
WELTS	Well Log Tracking System
WO	work order
YSI	multiprobe water quality meter

1 INTRODUCTION

Shannon & Wilson, Inc. has prepared this report to document our well-search and private-well sampling effort near the Gustavus Airport (GST) in Gustavus, Alaska. This report covers August 2018 to December 2018 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 (PFASs) in groundwater and surface water (File Number 1507.38.017, Hazard ID 26904).

This report was prepared for the Alaska Department of Administration's Division of Risk Management (DRM). A copy has also been submitted to the Alaska Department of Transportation & Public Facilities (DOT&PF) in accordance with the terms and conditions of our contract with DOT&PF, 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 private water-supply wells. Our objectives were to identify private water-supply wells in neighborhoods near the Gustavus Airport and collect private-well samples from 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 58.4252778, longitude -135.7074167.

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 include the DOT&PF Crash and Fire Rescue building, near the intersection of runways one and two and near the end of runway one on the southeast side (Figure 1, Well Search Extent). The precise timeline and locations of AFFF use at the GST is unknown.

AFFF contains PFASs, a category of persistent organic compounds considered emerging contaminants. Perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA) are two PFASs 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. The DEC Contaminated Sites Program published groundwater-cleanup levels for PFOS and PFOA in November 2016. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS. On August 20, 2018, the DEC published a Technical Memorandum outlining new action levels for PFAS in water. The action levels proposed in the Technical Memorandum have been submitted as proposed regulation; the regulations are still pending at this time. However, statewide projects have adopted the proposed regulatory action levels. These action levels for PFAS are summarized in Section 1.4, Contaminants of Concern and Regulatory Levels.

In March 14, 2018 DEC requested DOT&PF collect PFAS samples during the next groundwater sampling event from monitoring wells already being monitored for petroleum contamination. On June 27, 2018, DOT&PF sampled the airport terminal well and the National Park Service (NPS) Water System well for the presence of PFAS. The analytical results were received on July 30, 2018. The airport terminal well had levels of PFAS exceeding both the EPA's health advisory levels and the DEC proposed action levels. The NPS well had detections of several PFAS but were below the EPA's health advisory levels and the DEC proposed action levels.

DOT&PF and DRM contacted Shannon & Wilson regarding the Gustavus results. In an email from Scott Jordan on August 14, 2018, we received confirmation to proceed with collecting samples in Gustavus. We provided DRM with a document titled 'Confirmation of Authorization to Proceed with Environmental Support Services, Gustavus Airport PFAS Assessment, Gustavus, Alaska' on August 23, 2018. We began the private-well search and sampling efforts described herein on August 27, 2019.

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. Fluvial deposits are found with increasing frequency near the shoreline. Due to a high rate of glacial isostatic rebound, higher concentrations of silt are also observed closer to the shoreline.

Our knowledge of hydrology in the sampling area is limited and we were unable to obtain well-drilling or -construction logs for the private wells sampled in Gustavus. Bruce Smith was responsible for drilling large portion of the drinking-water wells in Gustavus. According to Mr. Smith, wells in the area range between ten and forty feet below ground surface (bgs). Through most of the town, sand is found for the first twenty to forty feet bgs,

followed by a clay layer of unknown thickness. Gravel lenses are found intermittently throughout the layer of sand.

1.4 Contaminants of Concern and Action Levels

The primary contaminants of concern are PFOS, PFOA, perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and perfluorobutanesulfonic acid (PFBS).

On August 20, 2018, DEC published a Technical Memorandum describing a new state action level for PFAS in drinking water. The action level is 70 parts per trillion (ppt) for the sum of five compounds: PFOS, PFOA, PFHpA, PFHxS, and PFNA. Following DEC guidance, we consider combined concentrations greater than or equal to 65 ppt to be exceedances of the action level. Additionally, the Technical Memorandum set an action level of 2,000 ppt for PFBS. On October 1, 2018, DEC issued proposed PFAS groundwater-cleanup levels that match the Technical Memorandum action levels. The current drinking-water action levels based on the technical memorandum and the current groundwater cleanup levels for PFOS and PFOA are summarized below in Exhibit 1-1.

Exhibit 1-1: Applicable Regulatory and Action Levels

Media	Compound	Level
Drinking water	PFOS + PFOA + PFHpA + PFHxS + PFNA	70 ppt
Drinking water	PFBS	2,000 ppt
Groundwater	PFOS	400 ppt
Groundwater	PFOA	400 ppt

Notes:

- 1 Drinking-water action levels are reported in ug/L in DEC Technical Memorandum. Results are compared to 65 ppt.
- 2 DEC groundwater-cleanup level is reported in micrograms per liter (ug/L) in Table C in 18 AAC 75.345, Table C.

1.5 Scope of Services

Our scope of services summarized in this report includes private well searches, sampling efforts in seven geographic search areas (Figure 1, Well Search Extent), and public-outreach support. Our purpose was to evaluate the potential for human exposure to PFAS-containing water in private wells near GST. The objective was to identify private wells in the sampling area and collect water samples. Please note this project is ongoing; planned future work is summarized in Section 4.4.

This report summarizes well search and sampling efforts performed between August 2018 and December 2018. Our well search sought to identify private wells, well use, and well details, where available. The initial well search included Areas 1 and 3 (Figure 1). In September and October/November 2018, we expanded our well search/sample area to include Areas 3 through 5, followed by Areas 6 and 7 (Figure 1). This report also includes data from a sampling event in December 2018 conducted for Barr Engineering for purposes of designing point-of-entry (POE) systems. POE design will not be discussed in this report.

This report was prepared for the exclusive use of the DRM and 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 we 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, we 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.

2 FIELD ACTIVITIES

This section summarizes activities performed between August 27, 2018 and December 9, 2018.

2.1 Well Search

The private well search began by obtaining an Autocad® file from DOT&PF that included geographical locations of parcels in Gustavus, Alaska. This Autocad® file was converted into a shapefile and used in tandem with available satellite imagery to identify possible structures prior to arriving in Gustavus. We also referenced the Alaska Department of

Natural Resources (DNR) Well Log Tracking System (WELTS) and subsurface water rights files listed on the DNR Water Estate Map.

We visited each parcel in the defined door-to-door well search areas (Figure 1) to ascertain if a well was present. We made a reasonable attempt to contact each owner or occupant in the search areas. If occupants were not present at the time we visited the property, we left a personalized door tag with information about how to contact a Shannon & Wilson representative. We also used public telephone and business records, made multiple visits to the property, and/or asked neighbors for information. Additionally, we spoke with local DOT&PF representative, Jeff Jarvis, regarding DOT&PF GST lease properties.

For the purposes of this project, a private well is defined as a privately-owned water-supply well. Please note this definition of private 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).

We completed a *Private Well Inventory Survey Form* for each identified private well. A copy of each completed Survey Form is included in Appendix A, Field Notes. We 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.

We requested to sample each category 1, 2, 3 and 4 well identified during our well search. During sampling we provided additional education materials, including a list of project contacts and five-page drinking water advisory level fact sheet published by the EPA, and *Private Well Inventory Survey Form* (Appendix B). Properties with removed or decommissioned wells are not considered to have a well.

Well search activities began in Search Areas 1 and 2 (Figure 1) on August 27, 2018 following the public meeting hosted by various employees of the State of Alaska. In coordination with

the DRM, DOT&PF and DEC, we expanded the well search and sampling area to include Areas 3 through 7 in September and October/November 2018. Areas 3 and 6 are located on the west end of the runway and east of the Salmon River. Area 4 is located east of the airport. Area 5 is located near the northwest corner of airport property along Wilson Road. Area 7 is located on the west side of the Salmon River and north of Gustavus Road

The results of our August 2018 through December 2018 well search are summarized below. We were unable to contact all the owners and occupants in Areas 1 through 7 during the well search attempts. Parcels classified as “unknown – probable well” are those we were unable to reach as part of the well search described herein. Some of these parcels appeared unoccupied or abandoned. Parcels classified as “unknown - possible well” and “unknown - improbable well” will be included in our planned future well search efforts.

Exhibit 2-1: Well Summary by Parcel

Well present	120
Unknown – probable well	1
Unknown – possible well	3
Unknown – improbable well	2
No well	33
Total	159

2.2 Private Well Sampling

We conducted multiple private-well sampling events between August 27, 2018 and December 9, 2018. The following Shannon & Wilson personnel collected analytical water samples for this project. These individuals are State of Alaska Qualified Samplers per 18 AAC 75.333[b] and 18 AAC 78.088[b].

- Amber Masters, Environmental Scientist
- Marcy Nadel, Geologist
- Kristen Freiburger, Chemist
- Craig Beebe, Geologist
- Adam Wyborny, Environmental Engineer

We sampled 101 different private-wells during the reporting period; some wells were sampled multiples times, as requested. We collected private-well samples from a location in the 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 2.8, Alterations. For the purposes of this project we do not consider small (i.e., less than 18 inches in height) particulate filters to be treatment systems.

We purged the systems prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. We measured these parameters using a multiprobe water quality meter (YSI) and recorded pH, temperature, and conductivity 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 ($^{\circ}\text{C}$) temperature, and ± 3 percent conductivity.

We discharged purge water to an indoor sink or to the ground surface. In most cases, indoor plumbing leads to a private septic system. Following parameter stabilization, we collected PFAS water samples using laboratory-supplied containers. Copies of the *Private Well Sampling Logs* are included in Appendix A, Field Notes.



Exhibit 2-2: Photographs of some Private Well Purge and Sample Locations in Gustavus, Alaska.

We are aware of the potential for cross-contamination of PFAS water samples from numerous everyday household items. We 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.

2.3 Surface Water Sampling

Five surface water analytical samples and a field duplicate were collected during the August and September sampling events. The first two samples were taken from a slough and a stormwater diversion ditch on each side of the southern end of runway two (SW-2001 and SW-2000, respectively). The third surface water sample (SW-2002) was taken from a drainage ditch near the old fire training pit. The fourth sample (SW-2004) was collected east of the airport from an open excavation in Area 4; the excavation was dug by a homeowner in the area to observe the groundwater levels. We were unable to collect private-well samples in Area 4 and opted to collect a surface water sample from the open excavation to determine if this area may be impacted by PFAS. The fifth sample (SW-2003) was obtained from an open excavation near the center of Area 3. A homeowner in Area 3 dug a hole where he believes an old drainage ditch flows into the slough. A clearing of trees near this excavation provided further evidence the excavation was in the area of the old drainage ditch; however, we cannot be certain of the old drainage ditch exact location. The old drainage ditch is notable as it used to drain water from the airport to the Salmon River. The sample was collected per the owner's request.

2.4 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 we 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 as necessary to prevent bottle breakage. We applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

We shipped sample coolers to TestAmerica Laboratories, Inc. (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. Private-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. We requested an expedited, five-business-day turnaround time for first work order only.

We also shipped sample coolers to SGS North America Inc. (SGS) in Anchorage, Alaska on December 10, 2018 to analyze samples collected for Barr Engineering POE system design; samples were shipped from Juneau, Alaska using Goldstreak.

Each laboratory report is included in Appendix C.

2.5 Notification of Results

Following our review of the analytical data, we prepared analytical-data tables for the project team. We then called property owners and occupants to notify them of the results of PFAS water testing.

We 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;
- comparison of analytical results to DEC's proposed 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, we e-mailed results letters to owners and/or occupants.

2.6 Alternative Water Sources

On September 17, 2018, the DOT&PF began offering and delivering bottled water to properties where the private-well sample showed results above the proposed DEC action levels

The DOT&PF is exploring various options to provide affected residents with an alternative water source. These may include but are not limited to POE systems, constructing a community well outside of the affected area, rain catchment systems and installing cisterns.

2.7 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 B includes an example from November 20, 2018.

On August 27, 2018, the DOT&PF hosted a public meeting at the Gustavus School with representatives from the DOT&PF, DEC, Alaska Department of Health and Social Services

(DHSS) and the Alaska Department of Administration (DOA). Invitations for the public meeting were sent to all Gustavus Post Office (PO) Box holders. The invitations included the invitation letter, the public meeting flyer, a project summary and contact sheet as well as a figure displaying search areas 1 and 2. A copy of the public-meeting invitation and health fact sheet are included in Appendix B.

On October 30, 2018, the DOT&PF hosted a second public meeting at the Gustavus School. DOT&PF sent invitations to all Gustavus PO Box holders, and individuals whose wells were sampled. Representatives from the DOT&PF, DEC, DHSS, DRM, the Agency for Toxic Substances and Disease Registry (ATSDR), and Shannon & Wilson gave brief presentations. Questions from residents were answered throughout the meeting, as well as following presentations. The question and answer session was followed by an open house where representatives were available to answer questions one-on-one.

2.8 Deviations

In general, we conducted our 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 Sections 2.1 and 2.2 made throughout the project:

- The following samples were or may have been 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-031, PW-216, PW-431, NPS-Post, PW-006 Post* and *PW-011-Post*.
- Our sampling protocol includes stabilization of parameters; however, the following were collected from handpump wells and parameters were not measured: *PW-015* and *PW-209*.
- Our sampling protocol includes sampling directly from a spigot or port within the plumbing system. The following samples were taken through a hose fused to the only spigot before treatment began: *PW-001, PW-232* and *PW-233*.
- Sample *PW-275* was taken with the use of a non-dedicated pump (Exhibit 2-3).
- Upon discussion with DRM, we collected twelve water samples from private wells outside Areas 1 through 7: *PW-231, PW-234, PW-235, PW-239, PW-247, PW-248, PW-255, PW-400, PW-413, PW-440, PW-460* and *PW-461*.



Exhibit 2-3: Non-dedicated pump at PW-275

3 ANALYTICAL RESULTS

We submitted the initial drinking-water samples to TestAmerica for determination of six PFASs 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.

We submitted the POE analytical water samples to SGS for determination of twenty-four PFAS and twenty-three other analytes. The analytical methods used were EPA 537M by ID, EPA 1664B, EPA 300.0, EP 200.8, SM 5310B, SM21 2540C, SM21 2540D, SM21 4500-H B, SM21 2320B, SM21 2340B, SM21 2510B, SM21 4500-NH3 G, SM21 4500NO3-F, SM23 4500S D and SOP BAL-4100. The results of these are summarized in Table 4.

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

3.1 Initial Private Well Samples

Table 1 summarizes the concentrations of PFAS in the first sample collected from a given private well sampled between August 2018 and December 2018. For the purposes of this report, we compare the PFAS results to the sum of 5 action level of 70 ppt. The PFAS results for the sum of 5 PFAS range from not detected to 6,729 ppt for PFAS contamination associated with GST. Additionally, our sampling efforts identified a separate PFAS-affected area near PW-006; the sum of 5 result for this well was 47,636 ppt.

Table 2 summarizes the concentrations of PFAS in samples collected from previously-sampled wells. With the exception of PW-006, results are generally comparable to the initial sampling event.

3.2 Quality Assurance/Quality Control

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

The laboratory applies the letter 'J' to a detection less than the limit of quantitation but greater than the detection limit; this "flagged" datum is considered an estimated concentration. We reviewed the data using the current DEC Laboratory Data Review Checklist and applied a standardized set of flags to data brought into question during the review. During our QC review we apply flags indicating estimated data or analytical bias as applicable. Our QC review did not encounter QA/QC errors resulting in flags.

We reviewed analytical sample results (TestAmerica WOs 42647, 42653, 42821, 43691, 44967 and 46041, and SGS WO 1186919) for this project. The laboratory reports, including case narratives describing laboratory QA results, along with completed DEC data-review, are included in Appendix C. Laboratory QC procedures included evaluating surrogate recovery, performing continuing calibration checks, analyzing method blanks, and checking laboratory control samples to assess accuracy. Please refer to Appendix C for details regarding the results of our QA review for these six WOs.

By working in general accordance with our proposed scope of services, we consider the samples we 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.

4 DISCUSSION AND RECOMMENDATIONS

We present here our discussion relevant to PFASs in groundwater at and near the GST property.

4.1 Comparison to Action Levels

Of the 101 private-well samples collected from August to December 2018, there are 16 category 1 and 2 wells with combined concentrations exceeding the action level of 65 ppt, excluding PW-006. Of these, 14 are category 1 wells and two are category 2 wells. Two category 4 wells also exceeded the action level.

Six private well exceedances are located in Area 1 (Figure 1), excluding PW-006. Ten private-well exceedances are located on and near Wilson Road in Area 3 (Figure 1). Within Area 1, the majority of the exceedances are located near the airport terminal. These wells are shown in red in Figure 2 and summarized in Tables 1 and 2. There are no properties with private well exceedances in Areas 2, 4, 5, 6 or 7.

For the purposes of project planning, we propose a working definition of the plume-impacted area based on the PFOS, PFOA, PFHxS, PFNA and PFHpA combined results for private wells. We define the impacted area as Areas 1 and 3. The boundaries are based on our interpretation of private well samples collected from August 2018 to December 2018 and should not be construed as a precise plume boundary.

PW-006, located at [REDACTED] in Area 1, contains the highest concentration of five out of the six PFAS's tested. We understand contamination in this area is due to a release by the City of Gustavus fire department, and DEC is working with the City of Gustavus to characterize this site.

There were three private wells and one surface-water sample within the impacted area that exceeded the DEC groundwater-cleanup level for PFOS, in addition to the action level. PW-006 has been excluded from this count due to reasons discussed in the previous paragraph. These locations are depicted with dark red halos in Figure 2. They are located in the northern portion of Area 1 close to the Alaska DOT&PF Crash and Fire Rescue building.

PFOS was most frequently the highest detected PFAS in private 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 (Figures 1 and 3).

4.2 Planned Future Work

Shannon & Wilson will be continuing the well search to target properties not yet sampled in the search areas. This work will be completed through our statewide contract with DOT&PF. The outcomes of our ongoing well and sampling efforts will be reported separately.

Quarterly sampling will take place in March 2019 and quarterly thereafter throughout 2019. The results of ongoing quarterly sampling will be reported separately. We will evaluate seasonal and temporal trends after we have sampled these wells for four quarters.

Through coordination with the DOT&PF, we established the well monitoring network criteria prior to the March 2019 sampling event. Wells are included in the network if:

- they are active category 1 and 2 wells whose maximum combined PFOS, PFHpA, PFNA, PFHxS and PFOA concentration was greater than or equal to 35 ppt; or
- they are active category 1 and 2 wells within 500 lateral feet of wells whose combined PFOS, PFHpA, PFNA, PFHxS and PFOA concentration was greater than or equal to 35 ppt.

Lateral distance was measured from the GIS points collected during the initial round of sampling. As of January 24, there are 30 wells that meet these concentration- and location-based criteria. Quarterly well monitoring locations are shown in light and dark blue in Figure 3. PW-006 and subsequently PW-003 and PW-074 (within 500 lateral feet of PW-006) were excluded from the well monitoring network due to reasons discussed above. We understand DEC is working with the City of Gustavus to characterize this area.

Additionally, we will be preparing a site-characterization work plan for the Gustavus airport. We will provide the work plan to DOT&PF and DEC for review, comment and approval. After the workplan and funding has been approved by both DOT&PF and DEC, we will implement the work plan.

4.3 Recommendations

Based on our private well search and sampling effort completed between August 2018 and December 2018, we recommend the DOT&PF continue to:

- attempt to identify wells at properties where well status is unknown, per Exhibit 2-1: Well Summary by Parcel as of December 9, 2018;
- sample wells in the quarterly well monitoring network, as discussed in Section 4.4, Future Work;
- work with the DEC and DHSS to educate the public regarding the potential health effects of exposure to PFAS-containing water; and
- refrain from discharging PFAS-containing AFFF to the ground, surface water bodies or groundwater from ARFF training, equipment testing, or emergency response.

We recommend annual resampling of active wells (i.e., categories 1 through 4) within areas east of the Salmon River with a detected sum of 5 PFAS compounds (PFOS, PFNA, PFHxS, PFOA, and PFHpA) concentration above 17.5 ppt and within 500 lateral feet of these locations. Due to its proximity to the runway and a lack of groundwater data in the area, we recommend PW-201 also be included in the annual monitoring network. There are four locations that meet this criterion in addition to the quarterly monitoring network as of the results included in this report. Proposed annual monitoring locations are shown in purple on Figure 3. PW-006 has been excluded from the well monitoring network due to previously discussed reasons. PW-043 and PW-074 have been excluded from the well monitoring network due to its proximity to PW-006. We further recommend that the DOT&PF assess the lateral and vertical extent of the PFOS and PFOA groundwater plume.

Our recommendations are based on:

- Offsite groundwater conditions inferred through private well analytical water samples collected from August 27, 2018 through December 9, 2018.
- The results of testing performed on water samples we collected from the private wells on, near, and downgradient from the GST.
- Publicly available literature and data we reviewed for this project, including USGS, 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. We have prepared and included in the Appendix D, "Important Information about your Geotechnical/Environmental Report," to assist you and others in understanding the use and limitations of this report.

5 REFERENCES

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TABLE 1
SUMMARY OF FIRST TIME PRIVATE WELL ANALYTICAL RESULTS

SHANNON & WILSON, INC.

Analyte					Perfluoro- butane- sulfonic acid (PFBS)	Perfluoro- heptanoic acid (PFHpA)	Perfluoro- octanoic acid (PFOA)	Perfluoro- nonanoic acid (PFNA)	Perfluoro- hexansulfoni c acid (PFHxS)	Perfluoro- octane sulfonate (PFOS)	Sum of 5 PFAS _s
Action Level					2,000	70§					70§
Sample Name	PW-ID	Latitude	Longitude	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
Airport Terminal	Airport Terminal	58.4208	-135.7035	8/27/2018	4.5	5.7	4.3	<2.0	31	250	291 ‡
City Hall	City Hall	58.4134	-135.7391	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
Firehouse	Firehouse	58.4128	-135.7402	9/27/2018	<2.0	<2.0	<2.0	<2.0	2.3	<2.0	2.3 ‡
NPS Well	NPS Well	58.4180	-135.7088	8/27/2018	1.3 J	1.8 J	4.6	<2.0	12	23	41 J‡
PW-001	PW-001	58.4221	-135.7124	8/28/2018	20	13	19	3.0	350	2300	2685
PW-002	PW-002	58.4162	-135.7255	8/28/2018	2.2	4.4	3.0	<2.0	32	160	199 ‡
PW-003	PW-003	58.4139	-135.7063	8/28/2018	<2.0	<2.0	1.4 J	<2.0	<2.0	<2.0	1.4 J‡
PW-004	PW-004	58.4136	-135.7051	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-005	PW-005	58.4138	-135.7046	8/28/2018	<2.0	<2.0	0.90 J	<2.0	<2.0	<2.0	0.90 J‡
PW-006	PW-006	58.4150	-135.7080	8/28/2018	160	48	240	48	7400	39000	46736
PW-106	PW-006 (DUP)	58.4150	-135.7080	8/28/2018	170	48	240	48	7300	40000	47636
PW-007	PW-007	58.4123	-135.7096	8/28/2018	<2.0	<2.0	1.2 J	<2.0	<2.0	5.6	6.8 J‡
PW-008	PW-008	58.4112	-135.7089	8/28/2018	<2.0	<2.0	1.3 J	<2.0	<2.0	<2.0	1.3 J‡
PW-009	PW-009	58.4136	-135.7090	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-010	PW-010	58.4131	-135.7278	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-011	PW-011	58.4161	-135.7304	8/29/2018	2.9	3.4	3.3	<2.0	30	93	130 ‡
PW-012	PW-012	58.4177	-135.7324	8/29/2018	1.8 J	0.81 J	0.77 J	<2.0	8.9	7.7	18 J‡
PW-013	PW-013	58.4220	-135.7132	8/29/2018	57	230	130	8.9	860	5500	6729
PW-014	PW-014	58.4120	-135.7139	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-015	PW-015	58.4094	-135.7135	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-016	PW-016	58.4128	-135.7206	8/30/2018	<2.0	<2.0	1.3 J	<2.0	1.7 J	<2.0	3.0 J‡
PW-017	PW-017	58.4096	-135.7130	8/30/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-018	PW-018	58.4118	-135.7120	8/30/2018	<2.0	<2.0	<2.0	<2.0	1.2 J	2.5	3.7 J‡
PW-019	PW-019	58.4127	-135.7129	8/30/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-020	PW-020	58.4124	-135.7131	8/30/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-021	PW-021	58.4105	-135.7079	8/30/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-022	PW-022	58.4194	-135.7075	8/30/2018	6.4	4.8	6.9	<2.0	58	520	590 ‡
PW-031	PW-031	58.4176	-135.6997	8/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-032	PW-032	58.4178	-135.7058	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-033	PW-033	58.4125	-135.7080	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-034	PW-034	58.4185	-135.7118	8/28/2018	<2.0	<2.0	<2.0	<2.0	1.1 J	1.5 J	2.6 J‡

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SHANNON & WILSON, INC.

Analyte					Perfluoro- butane- sulfonic acid (PFBS)	Perfluoro- heptanoic acid (PFHpA)	Perfluoro- octanoic acid (PFOA)	Perfluoro- nonanoic acid (PFNA)	Perfluoro- hexansulfoni c acid (PFHxS)	Perfluoro- octane sulfonate (PFOS)	Sum of 5 PFAS _s
Action Level					2,000	70§					70§
Sample Name	PW-ID			Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
PW-036	PW-036	58.4135	-135.7123	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-037	PW-037	58.4197	-135.7053	8/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-038	PW-038	58.4196	-135.7048	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-138	PW-038 (DUP)	58.4196	-135.7048	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-039	PW-039	58.4199	-135.7036	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-139	PW-039 (DUP)	58.4199	-135.7036	8/29/2018	<2.0	<2.0	0.79 J	<2.0	<2.0	<2.0	0.79 J‡
PW-040	PW-040	58.4196	-135.7033	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-041	PW-041	58.4152	-135.7054	8/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-042	PW-042	58.4125	-135.7068	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-043	PW-043	58.4130	-135.7047	8/29/2018	<2.0	0.94 J	7.6	<2.0	<2.0	6.6	15 J‡
PW-044	PW-044	58.4123	-135.7104	8/29/2018	<2.0	<2.0	1.3 J	<2.0	<2.0	2.0	3.3 J‡
PW-045	PW-045	58.4131	-135.7261	8/29/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-046	PW-046	58.4226	-135.7117	8/30/2018	120	29	82	<2.0	1900	83	2094 ‡
PW-146	PW-046 (DUP)	58.4226	-135.7117	8/30/2018	110	27	77	<2.0	1700	79	1883 ‡
PW-047	PW-047	58.4184	-135.7038	8/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-048	PW-048	58.4218	-135.7080	8/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-059	PW-059	58.4183	-135.7310	8/29/2018	<2.0	<2.0	<2.0	<2.0	1.2 J	<2.0	1.2 J‡
PW-061	PW-061	58.4168	-135.7058	8/27/2018	<2.0	1.3 J	3.8	<2.0	1.3 J	1.4 J	7.8 J‡
PW-066	PW-066	58.4112	-135.7120	12/8/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-070	PW-070	58.4114	-135.7097	8/31/2018	1.8 J	<2.0	1.0 J	<2.0	1.4 J	<2.0	2.4 J‡
PW-074	PW-074	58.4160	-135.7071	9/25/2018	<2.0	<2.0	<2.0	<2.0	1.1 J	<2.0	1.1 J‡
PW-174	PW-074 (DUP)	58.4160	-135.7071	9/25/2018	<2.0	<2.0	<2.0	<2.0	1.1 J	<2.0	1.1 J‡
PW-075	PW-075	58.4140	-135.7008	8/31/2018	<2.0	<2.0	1.4 J	<2.0	<2.0	<2.0	1.4 J‡
PW-200	PW-200	58.4141	-135.7313	9/24/2018	3.4	3.7	3.1	<2.0	37	92	136 ‡
PW-300	PW-200 (DUP)	58.4141	-135.7313	9/24/2018	3.2	3.6	3.1	<2.0	36	89	132 ‡
PW-201	PW-201	58.4336	-135.7278	9/25/2018	<2.0	<2.0	<2.0	<2.0	1.7 J	1.4 J	3.1 J‡
PW-202	PW-202	58.4152	-135.7335	9/25/2018	2.1	2.7	3.1	<2.0	20	68	94 ‡
PW-203	PW-203	58.4188	-135.7325	9/25/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-204	PW-204	58.4139	-135.7338	9/25/2018	<2.0	0.93 J	<2.0	<2.0	3.3	5.4	9.6 J‡
PW-206	PW-206	58.4175	-135.7381	9/28/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-209	PW-209	58.4156	-135.7322	9/26/2018	2.2	3.0	3.3	<2.0	26	100	132 ‡

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SHANNON & WILSON, INC.

Analyte					Perfluoro- butane- sulfonic acid (PFBS)	Perfluoro- heptanoic acid (PFHpA)	Perfluoro- octanoic acid (PFOA)	Perfluoro- nonanoic acid (PFNA)	Perfluoro- hexansulfoni c acid (PFHxS)	Perfluoro- octane sulfonate (PFOS)	Sum of 5 PFAS _s
Action Level					2,000	70§					70§
Sample Name	PW-ID			Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
PW-210	PW-210	58.4167	-135.7321	9/26/2018	2.7	3.0	2.8	<2.0	32	95	133 ‡
PW-310	PW-210 (DUP)	58.4167	-135.7321	9/26/2018	2.5	3.1	2.6	<2.0	30	92	128 ‡
PW-211	PW-211	58.4192	-135.7283	9/26/2018	<2.0	3.3	15	<2.0	1.1 J	9.1	29 J‡
PW-212	PW-212	58.4186	-135.7344	9/26/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-213	PW-213	58.4177	-135.7310	11/1/2018	3.2	2.2	2.3	<2.0	24	51	80 ‡
PW-214	PW-214	58.4195	-135.7345	9/27/2018	<2.0	<2.0	<2.0	<2.0	0.88 J	<2.0	0.88 J‡
PW-216	PW-216	58.4196	-135.7321	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-218	PW-218	58.4194	-135.7295	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-219	PW-219	58.4196	-135.7279	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-319	PW-219 (DUP)	58.4196	-135.7279	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-221	PW-221	58.4131	-135.7277	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-230	PW-230	58.4118	-135.7310	10/31/2018	<2.0	<2.0	1.1 J	<2.0	1.2 J	<2.0	2.3 J‡
PW-231	PW-231	58.4061	-135.7330	10/31/2018	<2.0	0.96 J	1.1 J	<2.0	2.6	<2.0	4.7 J‡
PW-232	PW-232	58.4096	-135.7306	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-233	PW-233	58.4099	-135.7286	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-234	PW-234	58.4164	-135.7454	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-235	PW-235	58.4229	-135.7274	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-236	PW-236	58.4110	-135.7291	10/31/2018	<2.0	<2.0	<2.0	<2.0	1.0 J	<2.0	1.0 J‡
PW-336	PW-236 (DUP)	58.4110	-135.7291	10/31/2018	<2.0	<2.0	<2.0	<2.0	0.96 J	<2.0	0.96 J‡
PW-237	PW-237	58.4103	-135.7304	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-238	PW-238	58.4109	-135.7312	11/1/2018	<2.0	<2.0	0.77 J	<2.0	3.5	2.0	6.3 J‡
PW-239	PW-239	58.4023	-135.7144	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-240	PW-240	58.4123	-135.7348	11/1/2018	<2.0	<2.0	<2.0	<2.0	3.3	<2.0	3.3 ‡
PW-241	PW-241	58.4123	-135.7300	11/1/2018	<2.0	<2.0	0.89 J	<2.0	6.1	2.7	9.7 J‡
PW-341	PW-241 (DUP)	58.4123	-135.7300	11/1/2018	<2.0	<2.0	0.98 J	<2.0	5.8	2.9	9.7 J‡
PW-247	PW-247	58.4142	-135.7452	11/2/2018	<2.0	<2.0	1.1 J	<2.0	2.7	<2.0	3.8 J‡
PW-248	PW-248	58.4071	-135.7302	11/2/2018	<2.0	<2.0	0.97 J	<2.0	6.3	1.8 J	9.1 J‡
PW-249	PW-249	58.4164	-135.7405	11/2/2018	<2.0	<2.0	0.84 J	<2.0	1.4 J	1.3 J	3.5 J‡
PW-349	PW-249 (DUP)	58.4164	-135.7405	11/2/2018	<2.0	<2.0	<2.0	<2.0	1.5 J	1.4 J	2.9 J‡
PW-255	PW-255	58.4176	-135.7424	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-275	PW-275	58.4128	-135.7298	12/9/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A

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Action Level					2,000	70§					70§
Sample Name	PW-ID			Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
PW-375	PW-275 (DUP)	58.4128	-135.7298	12/9/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-400	PW-400	58.4209	-135.7282	9/25/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-401	PW-401	58.4139	-135.7285	9/25/2018	2.4	1.6 J	1.4 J	<2.0	18	40	61 J‡
PW-402	PW-402	58.4153	-135.7304	9/25/2018	3.7	3.3	3.4	<2.0	36	72	115 ‡
PW-403	PW-403	58.4168	-135.7332	9/25/2018	5.7	3.4	3.3	<2.0	41	83	131 ‡
PW-405	PW-405	58.4146	-135.7337	9/25/2018	3.8	4.1	3.9	<2.0	44	86	138 ‡
PW-406	PW-406	58.4171	-135.7280	9/25/2018	2.6	5.2	3.3	<2.0	36	150	195 ‡
PW-408	PW-408	58.4160	-135.7278	9/26/2018	2.1	4.8	2.5	<2.0	30	130	167 ‡
PW-413	PW-413	58.4199	-135.7357	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-418	PW-418	58.4142	-135.7291	9/27/2018	3.9	4.1	3.4	<2.0	40	74	122 ‡
PW-430	PW-430	58.4094	-135.7348	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-530	PW-430 (DUP)	58.4094	-135.7348	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-431	PW-431	58.4083	-135.7312	11/2/2018	<2.0	<2.0	<2.0	<2.0	5.4	6.1	12 ‡
PW-432	PW-432	58.4105	-135.7349	10/31/2018	<2.0	<2.0	<2.0	<2.0	2.5	2.0	4.5 ‡
PW-434	PW-434	58.4117	-135.7357	10/31/2018	<2.0	0.82 J	0.85 J	<2.0	4.6	2.8	9.1 J‡
PW-435	PW-435	58.4131	-135.7130	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-436	PW-436	58.4123	-135.7287	10/31/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-440	PW-440	58.4025	-135.7135	11/1/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
PW-442	PW-442	58.4147	-135.7414	12/7/2018	<2.0	<2.0	<2.0	<2.0	1.1 J	<2.0	1.1 J‡
PW-460	PW-460	58.4071	-135.7282	11/2/2018	1.4 J	<2.0	<2.0	<2.0	1.7 J	<2.0	1.7 J‡
PW-461	PW-461	58.4170	-135.7452	11/2/2018	<2.0	1.6 J	1.2 J	<2.0	1.4 J	1.3 J	5.5 J‡

ppt parts per trillion, equivalent to nanograms per liter

§ Sum of 5 PFAS is equal to the sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA. ADEC action level is 70 ppt; results are compared to 65 ppt.

— Action level not established

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.

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 or Sum of 5 PFAS concentration includes one or more result that is not detected greater than the MDL.

N/A Not applicable. The sum of 5 PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

TABLE 2
SUMMARY OF PRIVATE WELL RESAMPLE ANALYTICAL RESULTS

SHANNON & WILSON, INC.

Analyte					Perfluoro- butane- sulfonic acid (PFBS)	Perfluoro- heptanoic acid (PFHpA)	Perfluoro- octanoic acid (PFOA)	Perfluoro- nonanoic acid (PFNA)	Perfluoro- hexansulfoni c acid (PFHxS)	Perfluoro- octane sulfonate (PFOS)	Sum of 5 PFAS§
Action Level					2,000	70§					70§
Sample Name	PW-ID	Latitude	Longitude	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
NPS Well-POST	NPS Well	58.4180	-135.7088	9/25/2018	1.2 J	1.7 J	4.2	<2.0	11	20	37 J‡
NPSWELL-PRE	NPS Well	58.4180	-135.7088	9/25/2018	1.2 J	1.7 J	4.3	<2.0	11	22	39 J‡
PW-006	PW-006	58.4150	-135.7080	9/26/2018	9.0	1.4 J	2.3	<2.0	110	210	324 J‡
PW-006-Berkey	PW-006	58.4150	-135.7080	9/26/2018	<2.0	<2.0	<2.0	<2.0	0.90 J	5.6	6.5 J‡
PW-006-Cistern	PW-006	58.4150	-135.7080	9/26/2018	9.4	4.3	19	5.2	590	4100	4719
PW-006-POST	PW-006	58.4150	-135.7080	9/26/2018	9.6	1.4 J	2.4	<2.0	120	360	484 J‡
PW-011	PW-011	58.4161	-135.7304	9/25/2018	3.2	3.1	3.1	<2.0	34	80	120 ‡
PW-011-POST	PW-011	58.4161	-135.7304	9/25/2018	2.9	2.8	2.9	<2.0	31	86	123 ‡
PW-401	PW-401	58.4139	-135.7285	10/31/2018	2.3	1.7 J	1.6 J	<2.0	20	36	59 J‡

ppt parts per trillion, equivalent to nanograms per liter

§ Sum of 5 PFAS is equal to the sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA. ADEC action level is 70 ppt; results are compared to 65 ppt.

— Action level not established

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.

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 or Sum of 5 PFAS concentration includes one or more result that is not detected greater than the MDL.

N/A Not applicable. The sum of 5 PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

TABLE 3
SUMMARY OF SURFACE WATER ANALYTICAL RESULTS

SHANNON & WILSON, INC.

Analyte					Perfluoro- butane- sulfonic acid (PFBS)	Perfluoro- heptanoic acid (PFHpA)	Perfluoro- octanoic acid (PFOA)	Perfluoro- nonanoic acid (PFNA)	Perfluoro- hexansulfonic acid (PFHxS)	Perfluoro- octane sulfonate (PFOS)	Sum of 5 PFAS§
Action Level					2,000				70§		70§
Name	PW-ID	Latitude	Longitude	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
SW-2000	SW-2000	58.418	-135.721	8/29/2018	1.7 J	3.7	2.6	<2.0	26	110	142 ‡
SW-2100	SW-2000 (DUP)	58.418	-135.721	8/29/2018	1.6 J	3.6	2.6	<2.0	27	110	143 ‡
SW-2001	SW-2001	58.420	-135.722	8/29/2018	4.7	3.1	5.9	<2.0	120	200	329 ‡
SW-2002	SW-2002	58.419	-135.689	8/29/2018	8.2	8.8	9.9	1.2 J	70	410	500 J
SW-2003	SW-2003	58.416	-135.734	9/26/2018	<2.0	0.89 J	1.3 J	<2.0	5.1	6.3	14 J‡
SW-2004	SW-2004	58.425	-135.657	9/27/2018	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A

ppt parts per trillion, equivalent to nanograms per liter

§ Sum of 5 PFAS is equal to the sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA. ADEC action level is 70 ppt; results are compared to 65 ppt.

— Action level not established

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.

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 or Sum of 5 PFAS concentration includes one or more result that is not detected greater than the MDL.

N/A Not applicable. The sum of 5 PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

TABLE 4
SUMMARY OF PRIVATE WELL POE ANALYTICAL RESULTS

SHANNON & WILSON, INC.

Analytical Method	Analyte	Units	PW-200		PW-202		PW-405 / PW-505**		PW-406		PW-408	
			Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude	Latitude	Longitude
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	
	Perfluorobutane-sulfonic acid (PFBS)	ng/L	2.18 J		2.51 J		2.19 J		1.96 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	
	Calcium	mg/L	64.9		96		71.5		64.1		65.8	
EP200.8	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	

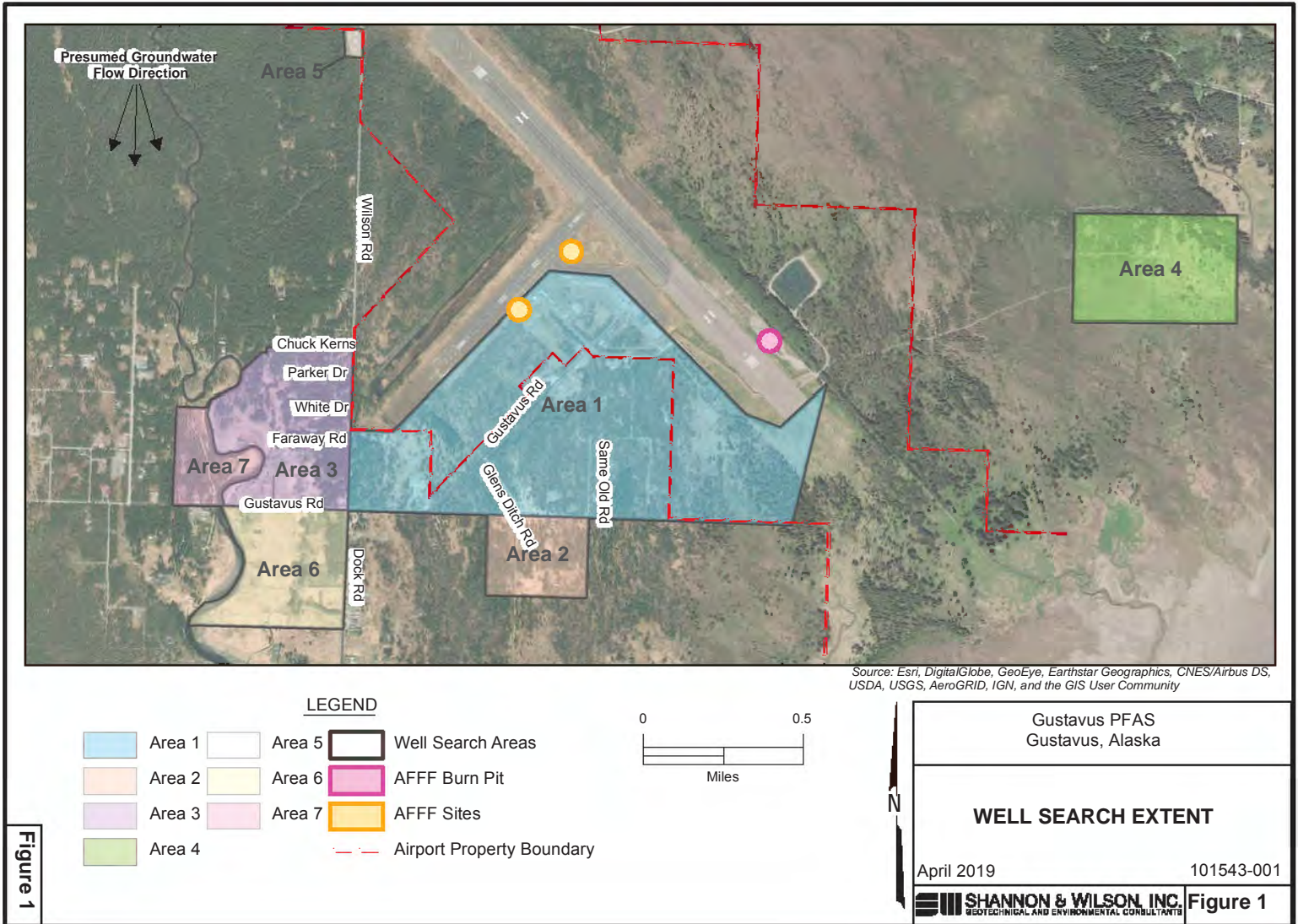
TABLE 4
SUMMARY OF PRIVATE WELL POE ANALYTICAL RESULTS

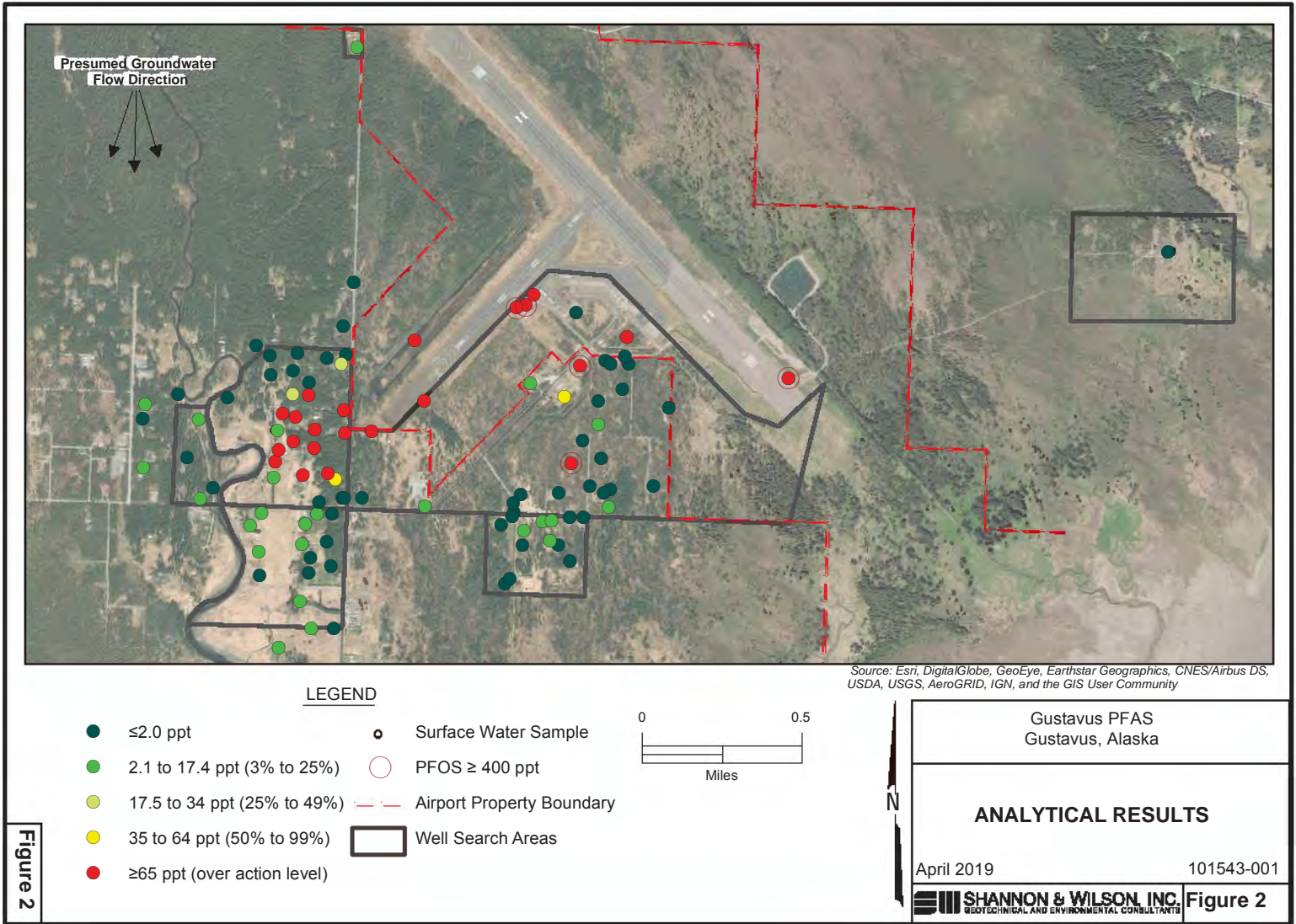
SHANNON & WILSON, INC.

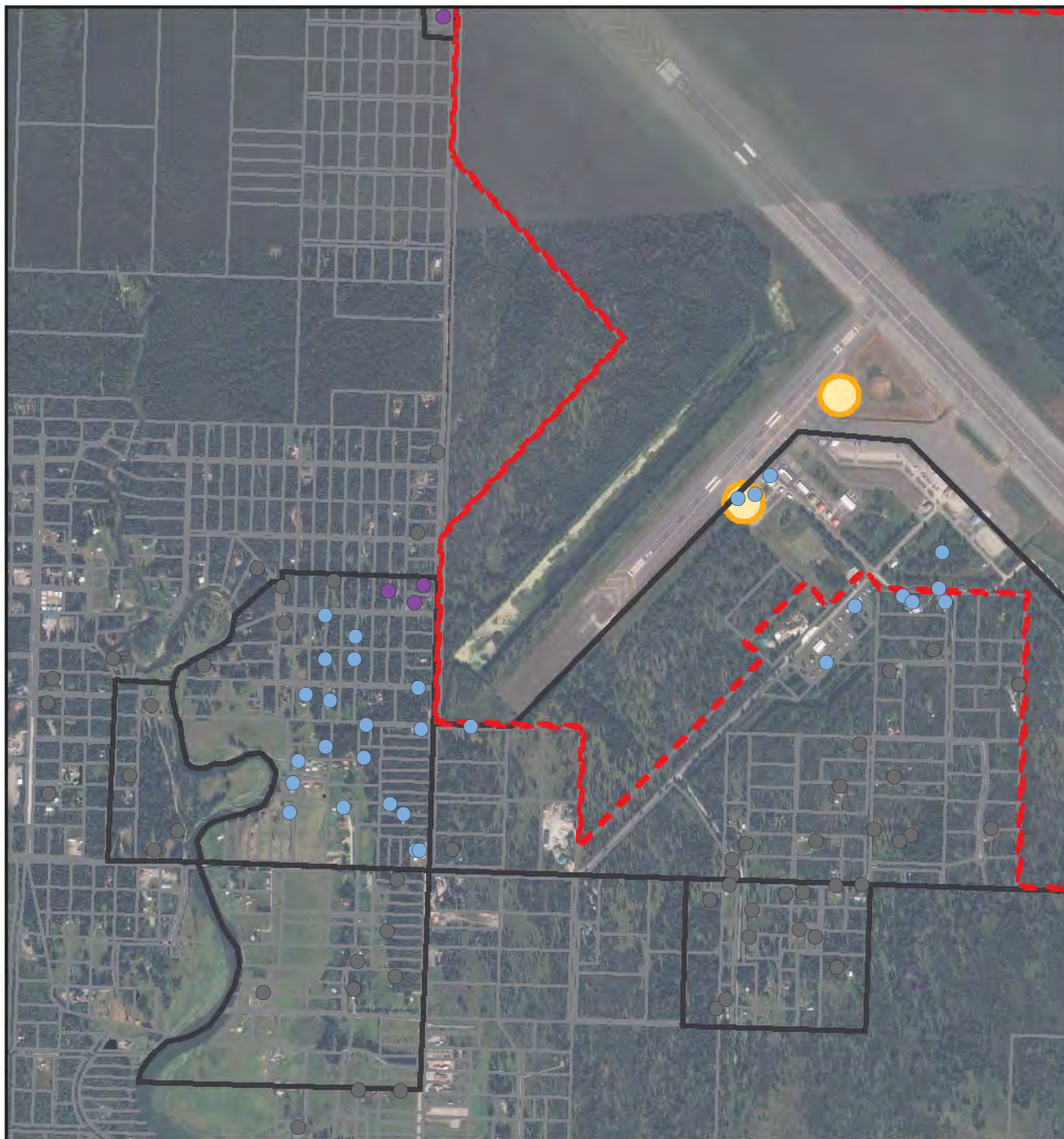
Notes:

- Analytical results reported from SGS North America, Inc. laboratory report 1186919.
- ** Reported highest value where primary and duplicate sample results were not identical.
- EPA Environmental Protection Agency
- mg/L milligram per liter
- µg/L microgram per liter
- ng/L nanogram 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 (QC) 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. (*)
- JL* Estimated concentration, biased low 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. (*)

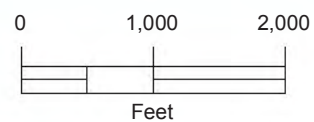
To B







Map adapted from aerial and satellite imagery provided through the Alaska Department of Natural Resources. (Satellite Imagery: Spot 5 © CNES, SPOT 6 & 7 © Airbus DS)



LEGEND

- | | |
|--------------------------------|-------------------------------|
| Well Monitoring Network: | --- Airport Property Boundary |
| ● Quarterly (February) | ▭ Well Search Areas |
| ● Annual monitoring (proposed) | ● AFFF Sites |
| ● Not Included | — Property Lines |



Gustavus Airport
Gustavus, Alaska

QUARTERLY AND ANNUAL WELL MONITORING NETWORK

April 2019

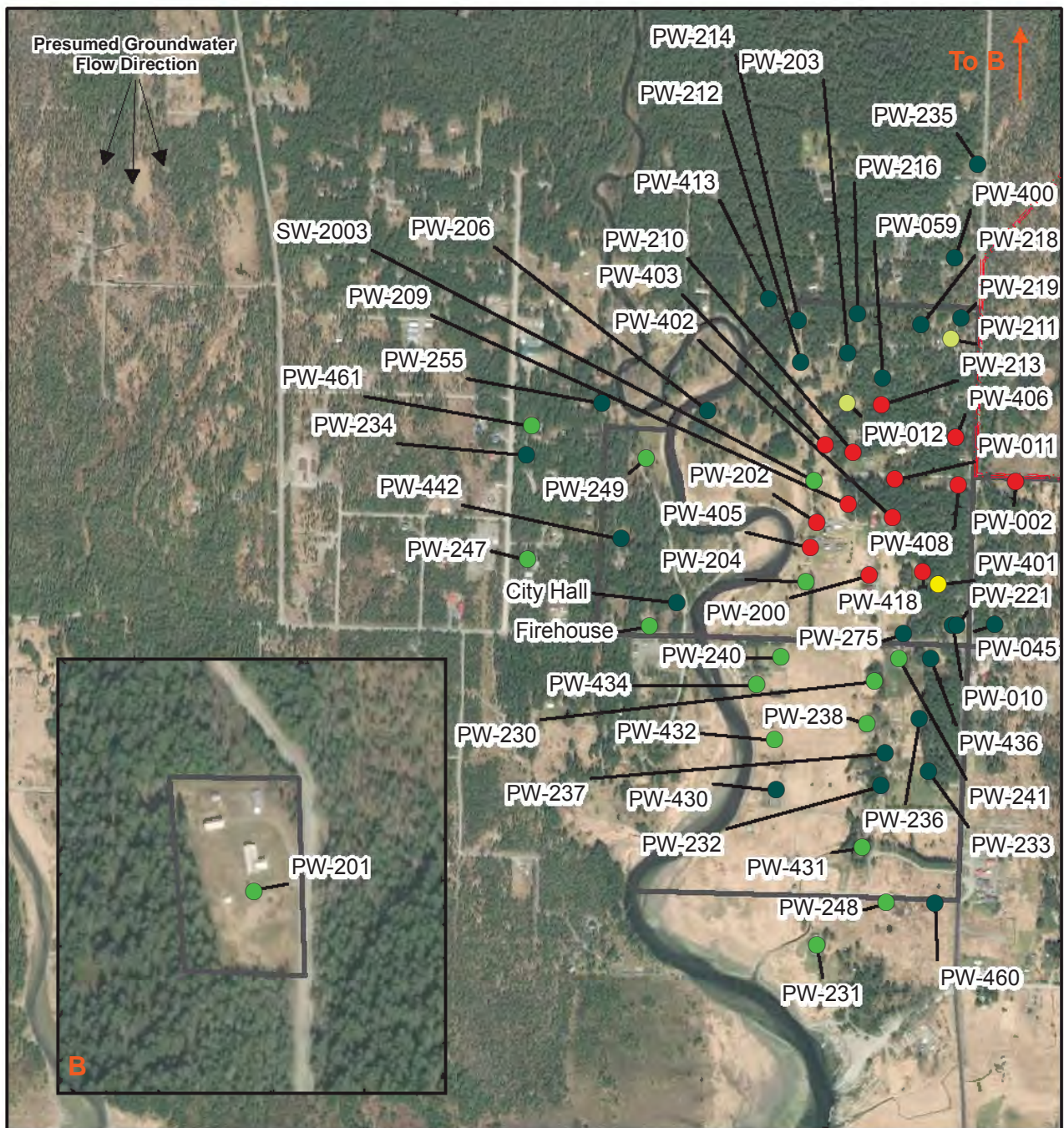
101543-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3



Figure 4

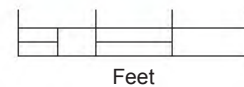


Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

LEGEND

- | | |
|-------------------------------|-------------------------------|
| ● ≤2.0 ppt | ● Surface Water Sample |
| ● 2.1 to 17.4 ppt (3% to 25%) | ○ PFOS ≥ 400 ppt |
| ● 17.5 to 34 ppt (25% to 49%) | --- Airport Property Boundary |
| ● 35 to 64 ppt (50% to 99%) | □ Well Search Areas |
| ● ≥65 ppt (over action level) | |

0 500 1,000 1,500



Gustavus PFAS
Gustavus, Alaska

ANALYTICAL RESULTS WEST

April 2019

101543-001

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 5

Appendix A

FIELD LOGS

CONTENTS

- Private well surveys
- Private well sampling logs

Please note, surveys and sampling logs have been removed for privacy reasons

Appendix B

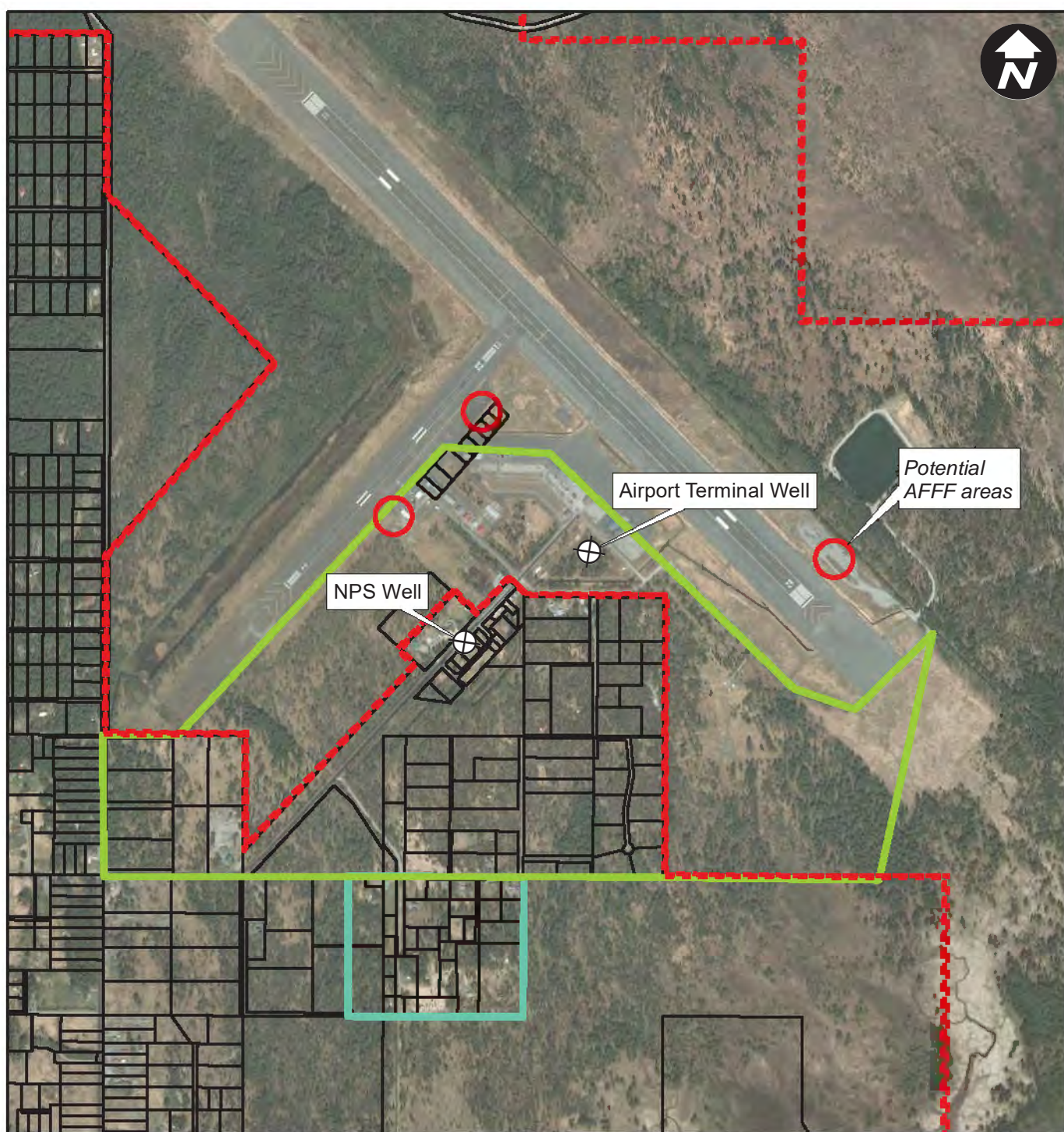
PUBLIC INFORMATION

CONTENTS

- Shannon & Wilson, Inc. maps and templates
- DOT&PF fliers, notices, letters and presentations
- ATSDR fliers
- EPA flier
- DHSS presentation

PUBLIC INFORMATION

Shannon & Wilson, Inc. maps and templates



Property lines and buildings information obtained from ADOT; 2012 information. Map source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community.

Legend



Public Wells



Airport Property Boundary



Property Lines

Search Areas



Area 1



Area 2

0 500 1,000 1,500



Feet

Gustavus Airport
Gustavus, Alaska

PFAS SAMPLING AREA

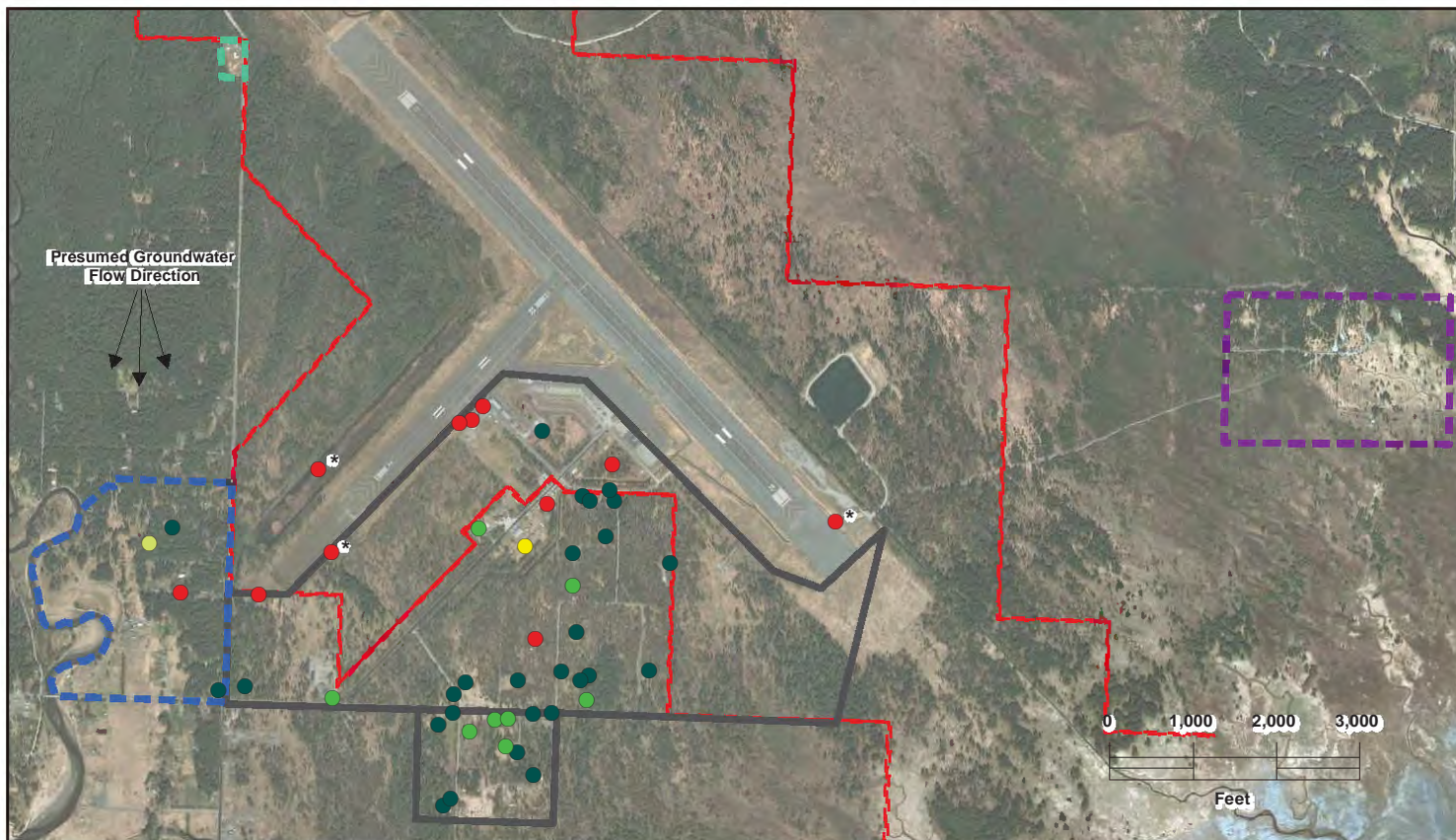
August 2018

101543



SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



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

LEGEND

Sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA results (ADEC action level)

- ≤2.0 ppt
- 2.1 to 17.4 ppt (3% to 25%)
- 17.5 to 34 ppt (25% to 49%)
- 35 to 64 ppt (50% to 99%)
- ≥65 ppt (over action level)

- ▭ Areas 1 and 2
- ▭ Area 3
- ▭ Area 4
- ▭ Area 5
- - - Airport Property Boundary
- * Surface Water Sample

N

Gustavus Airport
Gustavus, Alaska

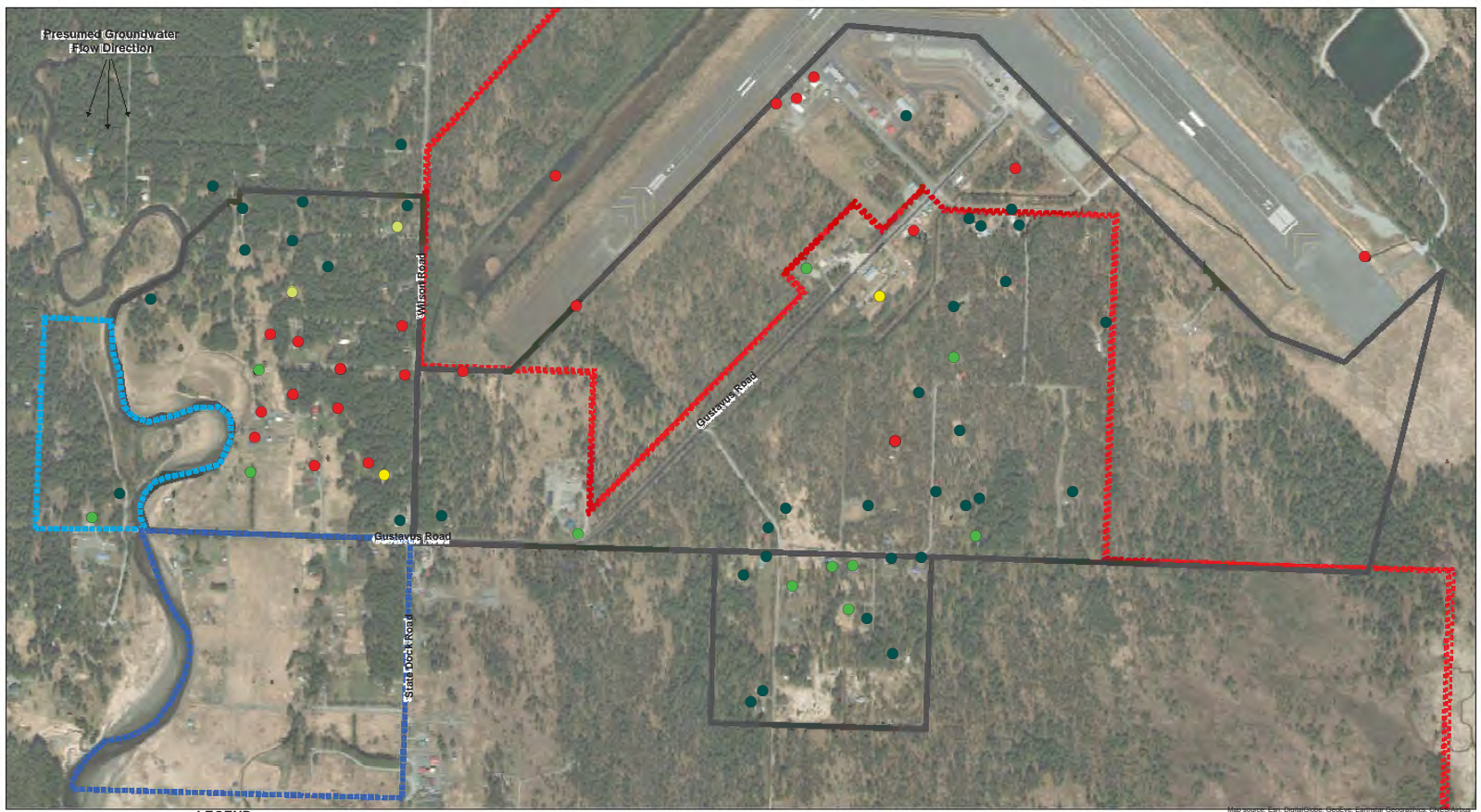
PROPOSED SEARCH AREAS 3 - 5

September 2018

101543

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure



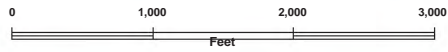
LEGEND

Latest Result as of Oct 18, 2018

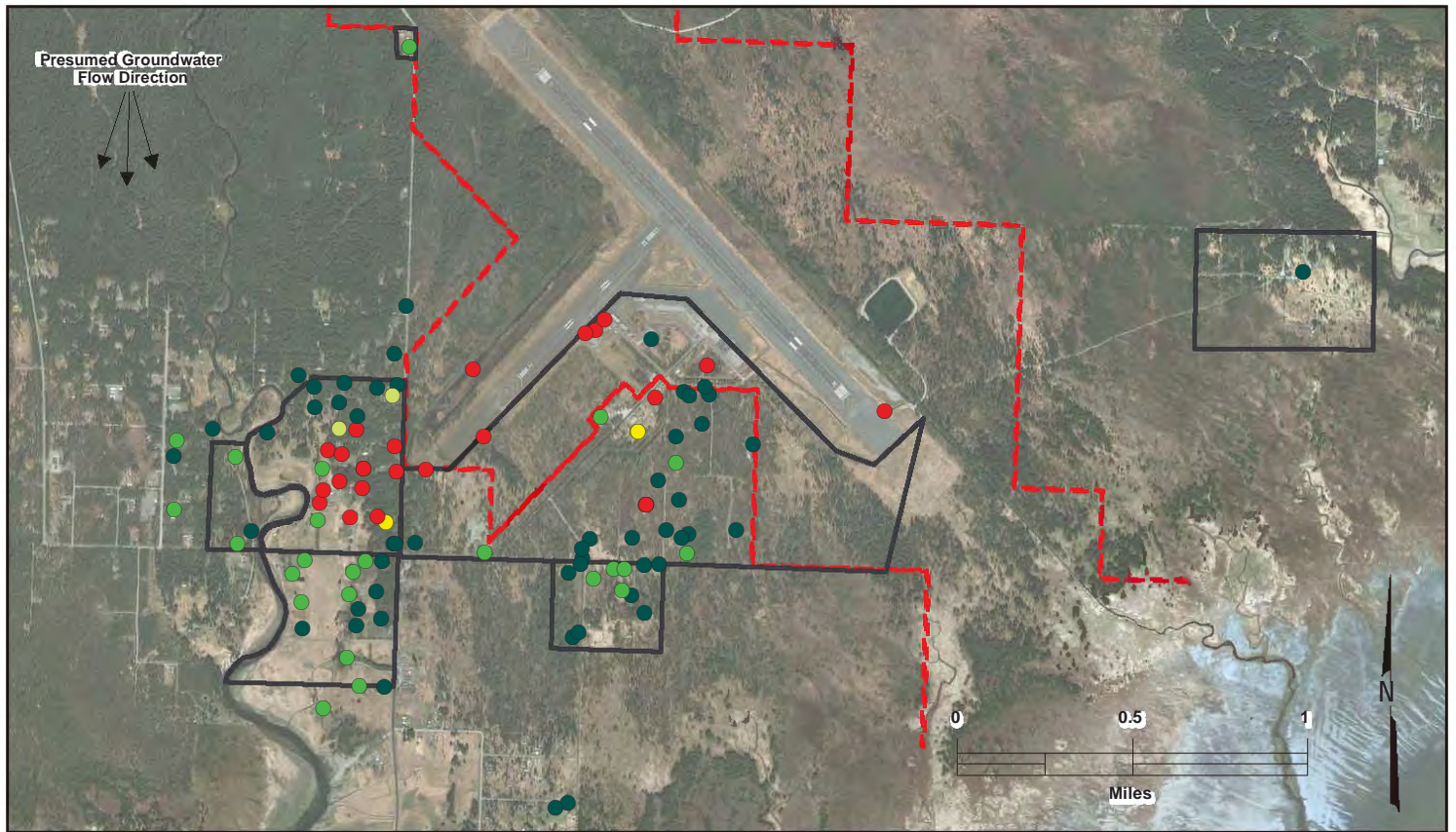
- ≤2.0 ppt
- 2.1 to 17.4 ppt (3% to 25%)
- 17.5 to 34 ppt (25% to 49%)
- 35 to 64 ppt (50% to 99%)
- ≥65 ppt (over action level)

- Surface Water Sample
- Areas 1 - 5
- Area 6
- Area 7
- Airport Property Boundary

Notes:
ppt - parts per trillion
Results compiled based on sum of
PFOS, PFOA, PFHxS, PFHpA, PFNA.



Gustavus Airport Gustavus, Alaska	
PROPOSED SEARCH AREAS 6 & 7	
October 2018	101543
SHANNON & WILSON, INC.	Figure



LEGEND

- ≤2.0 ppt
- 2.1 to 17.4 ppt (3% to 25%)
- 17.5 to 34 ppt (25% to 49%)
- 35 to 64 ppt (50% to 99%)
- ≥65 ppt (over action level)
- Surface Water Sample
- Sampling Boundaries
- - - Airport Property Boundary

Notes:

ppt - parts per trillion
 Results compiled based on sum of PFOS, PFOA, PFHxS, PFHpA, PFNA.
 Where multiple samples have been collected, the map shows the highest result.

Gustavus Airport
 Gustavus, Alaska

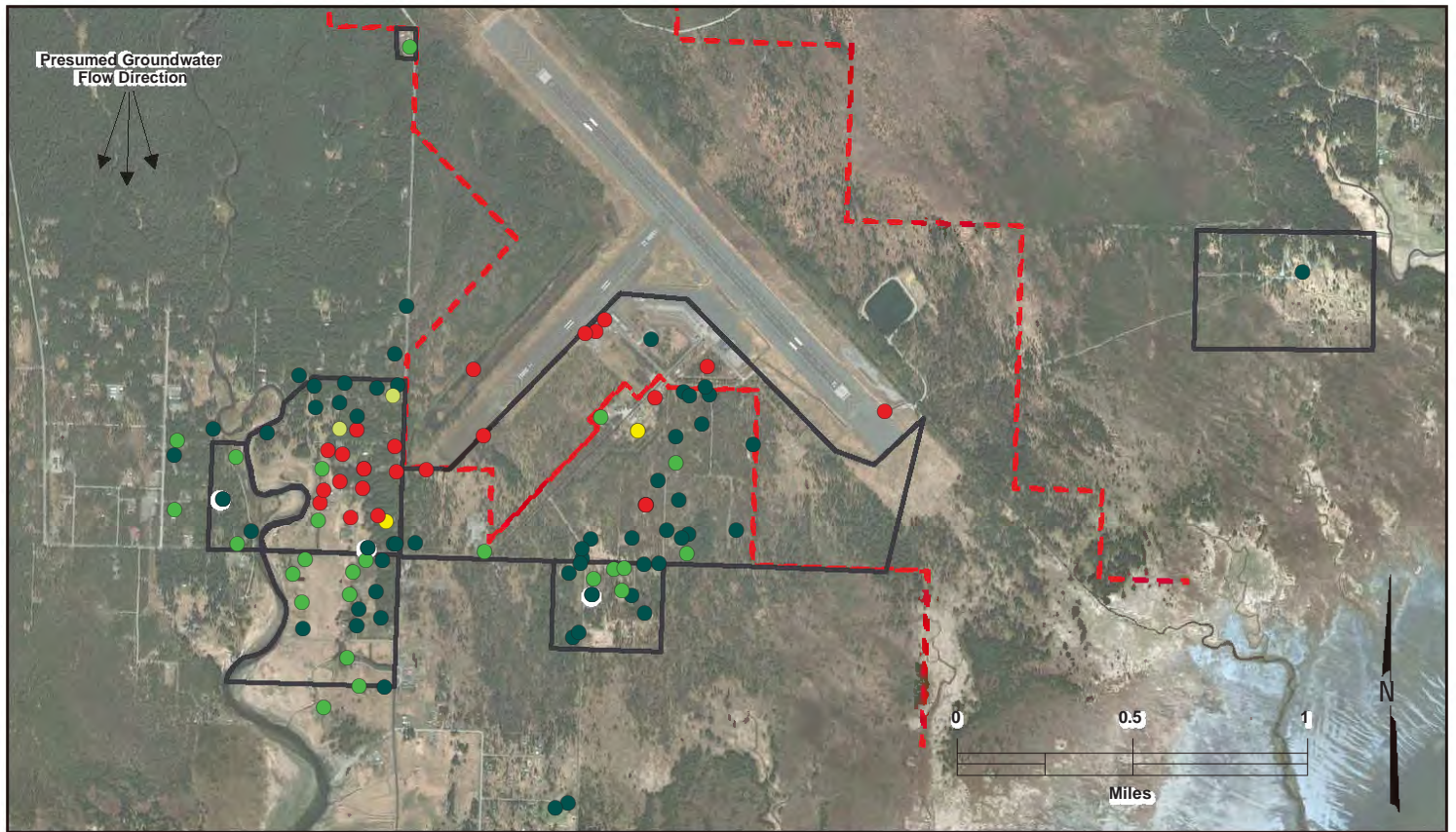
ANALYTICAL RESULTS

November 20, 2018

101543

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



LEGEND

- ≤2.0 ppt
- 2.1 to 17.4 ppt (3% to 25%)
- 17.5 to 34 ppt (25% to 49%)
- 35 to 64 ppt (50% to 99%)
- ≥65 ppt (over action level)
- Surface Water Sample
- Sampling Boundaries
- - - Airport Property Boundary

Notes:

ppt - parts per trillion
 Results compiled based on sum of PFOS, PFOA, PFHxS, PFHpA, PFNA.
 Where multiple samples have been collected, the map shows the highest result.
 Results from the most recent sampling event are shown with a white halo.

Gustavus Airport
 Gustavus, Alaska

ANALYTICAL RESULTS

December 19, 2018

101543

SHANNON & WILSON, INC.
 GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



We are conducting a door-to-door survey in this neighborhood on behalf of the Gustavus Airport, to confirm if your house is on a private well. This information will be used as part of our groundwater monitoring program.

Please contact me at

to confirm your household water source/s. If you are using a private well we may request a water sample. Thank you,

Shannon & Wilson Inc.

More information:
www.alaska.gov/go/C732

Private Well Inventory Survey Form

Date: _____

Physical Address: _____

Name (Owner): _____

☐ Legal owner

☐ Trust or Estate

Name (Occupant): _____

Mailing Address (owner): _____

Mailing address (occupant): _____

Email: Owner: _____ Occupant: _____

Contact Phone: Owner: _____ Occupant: _____

Preferred method of contact(circle): Email ☐ Phone ☐

Number of persons residing at this location: Adults (18 and over) _____

Teenagers (13 to 17) _____

Children (12 and under) _____

Years at this residence: _____ Full-Time ☐ Seasonal ☐

1) From where do you obtain your drinking water?

a) Residential (private) Well ☐

b) Community well ☐

c) Bottled water ☐

d) Other ☐ _____

2) If you have a private well, please answer the following questions:

a) Where is the well located on the property? _____

b) Is the well in use? Yes ☐ No ☐

3) If no, is the well usable, unusable, or properly abandoned?

Usable ☐ Unusable ☐ Abandoned ☐ Method _____

If yes, please check all that apply regarding the usage of your well water:

☐ Drinking

☐ Vegetable/grain Gardening

☐ Cooking/ food preparation

-Size of Garden _____ sq.feet/acres

☐ Other _____

-Average watering frequency using well water? (daily, weekly, etc.) _____

a) When was the well installed? _____

b) What is the well depth? _____

c) What is the well diameter? _____

d) What is the well type? ☐ Dug Well

☐ Driven

☐ Drilled

☐ Unknown

e) Do you have any treatment on your well (e.g. water softener)? Please describe. _____

4) Sample Permission

Does Shannon & Wilson, Inc. have permission to sample your private water well?

☐ Yes ☐ No

Signature _____

Date _____

MONTH X, 2018

NAME

MAILING ADDRESS

Gustavus, AK 99826

RE: RESULTS OF AUGUST 2018 PFAS PRIVATE WELL SAMPLING, GUSTAVUS AIRPORT

Dear Mr. and Ms. XXXX,

Thank you for participating in our private-well sampling program to evaluate the potential presence of per- and polyfluoroalkyl substances (PFAS) in groundwater near the Gustavus Airport (GST). Shannon & Wilson, Inc. collected a water sample on August X, 2018, from the well at your residence/business. Enclosed are the analytical results for the sample from your residential/commercial well water-supply well at PHYSICAL ADDRESS. We have prepared an identical letter for your tenant/s NAME.

The well-water sample was analyzed for six PFAS. Currently, the Alaska Department of Environmental Conservation (ADEC) action level for drinking water is 70 parts per trillion (ppt) for the sum of five compounds: PFOS, PFOA, PFHpA, PFHxS, and PFNA. However, results are rounded from 65 ppt for the purposes of supplying alternate drinking water.

Results of the analysis conducted by TestAmerica Laboratories, Inc. indicate that PFOS was not/was detected at X ppt, PFOA was not/was detected at X ppt, and PFHxS was not/was detected at X ppt [list three largest values /or/ the five PFAS compounds were not detected] in the water sample collected from your well. The sum of these five compounds is less than/greater than the ADEC action level. The portions of the original laboratory report that apply to your well (sample number XXXXXX and field-duplicate sample XXXXXX) are enclosed for your records. After coordinating with the ADEC and/or ADOT we may request to sample your well again.

The Alaska Department of Transportation will provide alternative drinking water to the occupants of homes and businesses whose well water exceeds the ADEC action level, and who use their water for drinking or cooking. In accordance with DEC guidelines, we will monitor

NAME
Business
MONTH X, 2018
Page 2

locations with results between 35 ppt and 65 ppt on a quarterly sampling schedule; and locations with results between 17 ppt and 34 ppt on an annual sampling schedule.

We have sampled approximately 100 private water-supply wells in Gustavus. As results are received we will update the PFAS sample results map on the Alaska Department of Transportation (ADOT) website.

Please see the enclosed PFAS fact sheet for a link to the ADOT website, and feel free to contact us if you have questions regarding your results.

Sincerely,

SHANNON & WILSON, INC.

Amber Masters
Environmental Scientist

Enc: Select Pages of Test America Laboratory Report No. 320-XXXXXX
Gustavus Airport PFAS Fact Sheet

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

DOT&PF fliers, notices, letters and presentations



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

Southcoast Region
6860 Glacier Highway
P.O. Box 112506
Juneau, AK 99811-2506
Main: (907)465-1763
Fax: (907)465-3124
dot.alaska.gov

August 22, 2018

Dear Property Owner:

The Gustavus Airport was recently alerted to concentrations of Per- and Polyfluoroalkyl substances (PFAS) in groundwater at the airport. The Gustavus Airport used Aqueous Film Forming Foam (AFFF), a standard firefighting agent that contains PFAS, to extinguish hydrocarbon fires during training exercises, testing, and emergency events.

The Alaska Department of Transportation and Public Facilities (DOT&PF) and Alaska Department of Administration Division of Risk Management are working with an environmental consulting firm, Shannon & Wilson Inc., and the Alaska Department of Environmental Conservation (DEC) to identify and sample private water wells near and downgradient (south) of the Gustavus airport. Samples will determine if PFAS are present above recommended levels. PFAS are emerging contaminants, and research into the health effects of exposure to PFAS is ongoing.

Results of PFAS water testing will be shared with property owners and residents. If private wells are found to have PFAS levels at concentrations higher than advised, DOT&PF will provide an alternate drinking water source.

DOT&PF, along with representatives from Shannon & Wilson, Inc., and the Alaska Departments of Health and Social Services, Environmental Conservation and Administration will be hosting an informational meeting. We encourage all interested parties to attend. We will summarize the actions taken to date and the plan for further PFAS water testing.

Meeting Location: Gustavus Public Library
 14 Gustavus Road

Meeting Date & Time: Monday, August 27, 2018
 5:30 p.m. – 7:00 p.m.

Shannon & Wilson, Inc. will be collecting water samples from **Tuesday, August 28 to Friday, August 31**. If you have an active well and are located within the attached search areas, please attend the upcoming meeting or contact Shannon & Wilson's project manager, Kristen Freiburger, at (907) 750-0679 to schedule a sampling appointment.

For more information prior to the meeting, please visit www.alaska.gov/go/C732 or contact DOT&PF directly. We appreciate your patience as we work through this process and look forward to speaking with you.

Aurah Landau, Public Information Officer
Alaska Department of Transportation & Public Facilities, Southcoast Region
airportwater@alaska.gov
(907) 465-4503

"Keep Alaska Moving through service and infrastructure."



Gustavus Airport Firefighting Testing Area PFAS Factsheet

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been 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.

DOT&PF was alerted in late July 2018 to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in the groundwater at Gustavus Airport. The presumed source of PFAS in groundwater at the Gustavus Airport is the Federal Aviation Administration-mandated use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) testing areas.

The Alaska Department of Environmental Conservation (DEC) groups five similar compounds into a combined PFAS action level of 70 parts per trillion. Out of caution, DEC will require the provision of alternative drinking water to affected properties with levels above 65 parts per trillion.

PFAS discovered in the Gustavus Airport terminal well are reported in concentrations above DEC action levels. Concentrations at a nearby well which serves the National Park Service water system are below DEC action levels.

DOT&PF is working with an environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation (DEC) to identify and sample private water wells south of the airport as well as retest the two previously sampled wells beginning Monday, August 27, 2018. Test results from the samples are expected to be available by the end of September.

DOT&PF Public Informational Meeting

Monday, August 27, 2018, 5:30-7pm, at Gustavus Library

- The Alaska Departments of Transportation, Environmental Conservation, Health and Social Services, and Administration will attend and provide information.
- Shannon & Wilson, will attend to schedule sampling times for properties south of the airport.

Website: www.alaska.gov/go/C732

For questions about testing & study:

Shannon & Wilson, Inc.
Kristen Freiburger, Project Manager
Phone: 907-479-0600
Email: krf@shanwil.com

For regulatory questions:

Alaska Department of Environmental Conservation
Contaminated Site Program
Danielle Duncan, Environmental Program Specialist
Phone: 907-465-5207
Email: danielle.duncan@alaska.gov

For questions about PFAS health effects:

Alaska Department of Health & Social Services
Kristin Bridges, Public Health Scientist
Phone: 907-269-8028
Email: kristin.bridges@alaska.gov

**For questions about Gustavus Airport
Firefighting training area and all other inquiries:**

Alaska Department of Transportation and Public Facilities, Southcoast Region
Aurah Landau, Public Information Officer
Phone: 907-465-4503
Email: airportwater@alaska.gov



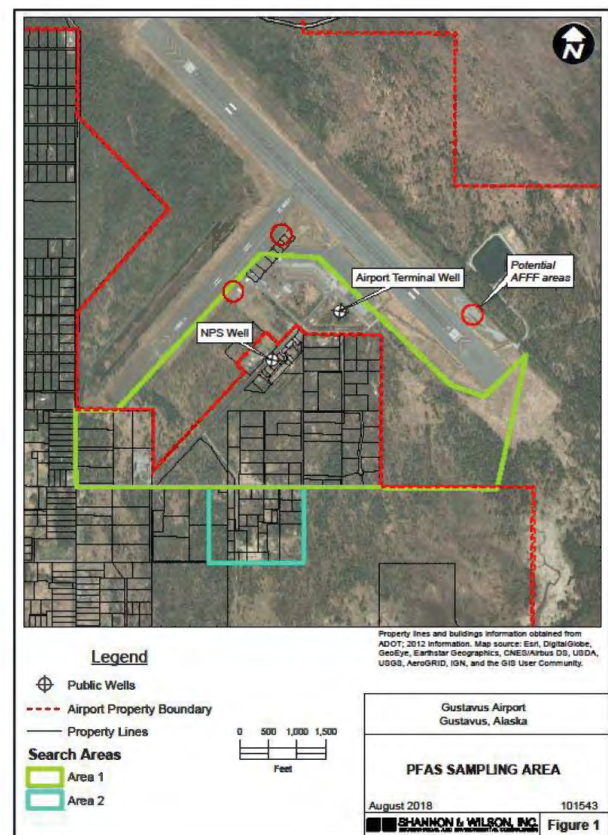
PUBLIC MEETING NOTICE DRINKING WATER

DOT&PF was recently alerted to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in the groundwater at Gustavus Airport. The presumed source of PFAS in groundwater at the Gustavus Airport is the Federal Aviation Administration-mandated use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) testing areas.

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been 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.

PFAS discovered in the Gustavus Airport well serving Alaska Airlines and Alaska Seaplanes terminals are reported in concentrations above Alaska Department of Environmental Conservation (DEC) action levels. Concentrations at the well which serves the National Park Service water system are below DEC action levels.

DOT&PF is working with an environmental consulting firm, Shannon & Wilson, Inc., and DEC to identify and sample private water wells south of the airport as well as retest the two previously sampled wells beginning Monday, August 27, 2018. Test results from the samples are expected to be available by the end of September.



Public Information Meeting

Monday, August 27, 2018, 5:30-7pm, at Gustavus Library

- The Alaska Departments of Transportation, Environmental Conservation, Health and Social Services, and Administration will provide information.
- Shannon & Wilson, will attend to schedule sampling times for properties south of the airport.



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Transportation and Public Facilities

Southcoast Region
6860 Glacier Highway
P.O. Box 112506
Juneau, AK 99811-2506
Main: (907)465-1763
Fax: (907)465-3124
dot.alaska.gov

FOR IMMEDIATE RELEASE: Aug. 24, 2018

Contact: Aurah Landau, (907) 465-4503, airportwater@alaska.gov

PFAS Discovered in Groundwater Near Gustavus Airport Firefighting Foam Discharge Areas

(Juneau, Alaska) – The Alaska Department of Transportation and Public Facilities (DOT&PF) was recently alerted to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in two wells at and near the Gustavus Airport. The PFAS discovered in an airport terminal well are in concentrations higher than Alaska Department of Environmental Conservation (DEC) action levels. Concentrations at a nearby well are lower than DEC action levels. DOT&PF is working with an environmental consulting firm, Shannon & Wilson, Inc., and DEC to identify and sample private water wells south of the airport beginning Monday, Aug. 27, 2018.

“The safety of Gustavus residents is paramount. As soon as PFAS were discovered, DOT&PF initiated the process of notifying the community and testing neighboring properties. We will share test results with residents as soon they become available,” said Marc Luiken, DOT&PF Commissioner.

PFAS are commonly used in products for fire suppression, resistance to wear, and repelling oil, stains, grease, and water. PFAS can be found in carpets, upholstery, apparel, paper, non-stick cookware, food packaging, personal care products, and in firefighting aqueous film forming foams (AFFF). The use of AFFF during firefighting equipment testing at the Gustavus Airport is the presumed source of PFAS contamination in the affected wells. PFAS are considered emerging contaminants and the health effects are not yet well characterized.

Further well testing will start next week. Residents in sampling areas can contact Shannon & Wilson, Inc. at 479-0600 to schedule a testing appointment. A graphic of the sampling area is below.

DOT&PF will hold an informational public meeting in Gustavus to discuss PFAS and groundwater testing. The meeting is scheduled for Monday, August 27, 2018, at the Gustavus Library, from 5:30-7pm. DEC, the Alaska Department of Health and Human Services, and Alaska Department of Administration will also attend and provide information.

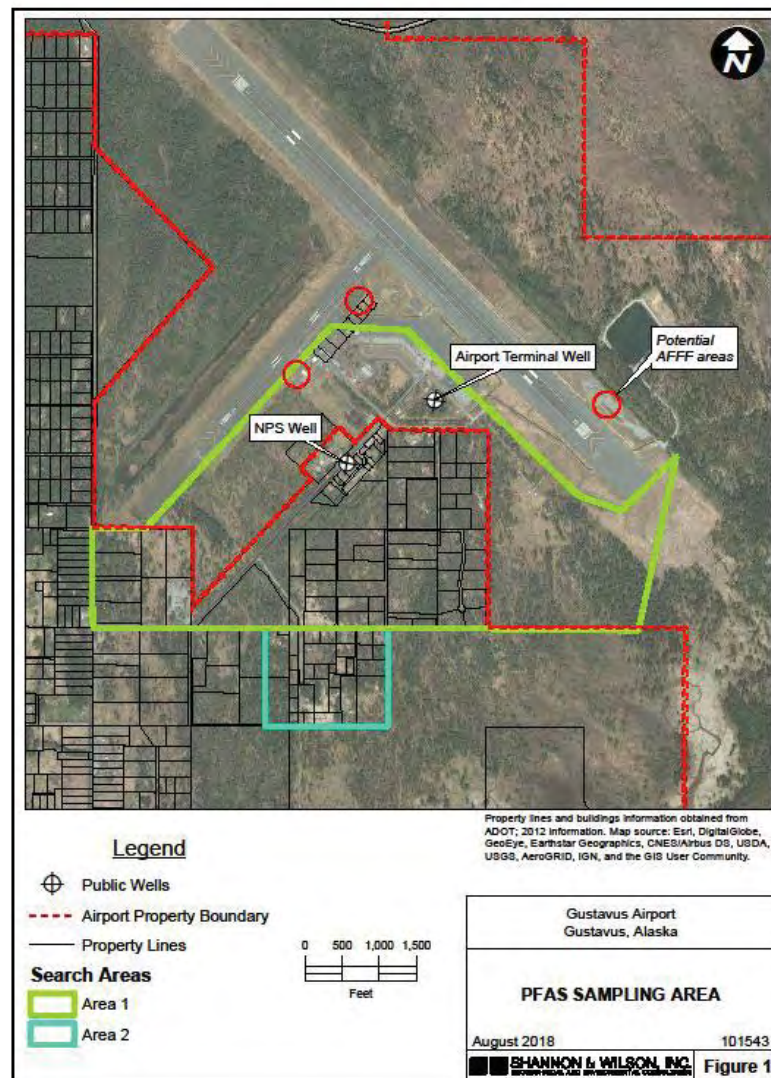
For more information, visit www.alaska.gov/go/C732 or contact Aurah Landau, (907) 465-4503, airportwater@alaska.gov

-more-

To learn more about PFAS, visit the following websites:

- Department of Health and Social Services- Environmental Public Health Program:
<http://dhss.alaska.gov/dph/Epi/eph>
- Department of Environmental Conservation: <http://dec.alaska.gov/spar/csp/pfas-contaminants/>

Gustavus PFAS Well Sample Area – August 2018



The Alaska Department of Transportation and Public Facilities oversees 239 airports, 10 ferries serving 35 communities, over 5,600 miles of highway and 731 public facilities throughout the state of Alaska. The mission of the department is to "**Keep Alaska Moving** through service and infrastructure."

###



PFAS in Drinking Water - Safety Information

Can my family drink our well water?

Do not drink your well water or use it to prepare baby formula if the sum concentration of the five PFAS of concern (i.e., PFOS, PFOA, PFNA, PFHxS, and PFHpA) is above the Department of Environmental Conservation's (DEC) action level of 70 parts per trillion (ppt). You should also find an alternative water source for pets and other animals.

Is it safe to cook with my well water?

You should not use your well water when cooking or washing food if the sum concentration of the five PFAS of concern is 70 ppt or more. Heating or boiling water doesn't remove PFAS.

Can I clean, wash dishes and wash clothes with my well water?

If your well water is contaminated with PFAS, it is safe to use well water to clean your house, wash dishes, and do laundry.

Is it safe to brush my teeth and shower with my well water?

If your well water is contaminated with PFAS, you can reduce exposure by using an alternative (or treated) water source for brushing teeth or any other activity that might result in inadvertent ingestion of water. This is especially true for young children who may swallow water during bathing or brushing teeth. However, it is very unlikely that showering or taking baths with well water will cause any health problems for the following reasons:

- Your skin does not absorb PFAS very well
- PFAS are not skin irritants
- PFAS do not easily move from water to air, so it is highly unlikely that you will inhale much PFAS while showering

Can I breastfeed my child if I have been drinking my well water?

It is recommended that nursing mothers continue to breastfeed. This is because breastfeeding provides a number of health benefits for both infants and mothers, which outweigh any known risk associated with transfer of PFAS through breast milk.

Is it safe to water my vegetable garden with my well water?

Some people may feel more comfortable using an alternative water source (which includes rainwater) for their vegetable gardens. Some studies show that certain types of vegetables may absorb small amounts of PFAS through their roots (which can be distributed throughout the

plant), but the amount taken up depends on many different factors, which include the level of PFAS in the water, the frequency of watering, the type of PFAS in the water, and the type of produce grown. However, these studies also note that the health benefits of eating fresh vegetables outweigh the health risks associated with exposure to the small amounts of PFAS that may be present in vegetables. Ultimately, your exposure to PFAS through garden vegetables is not likely to be significant compared to other primary exposure routes such as drinking contaminated water.

If you are concerned about the PFAS content of your soil, produce can either be grown in raised beds with clean soil, or clean compost can be added to the soil to reduce the uptake of PFAS. Regardless of which options you select, we recommend you wash your vegetables with clean water and peel root vegetables.

Where can I get more information?

Helpful Phone Numbers:

State of Alaska EPHP at 907-269-8028 to learn more about health effects of PFAS

State of Alaska DEC at 907-451-2153 to learn more about testing for PFAS

Helpful Links:

EPHP's PFAS website: <http://dhss.alaska.gov/dph/Epi/eph/Pages/default.aspx>

DEC's PFAS website: <http://dec.alaska.gov/spar/csp/pfas-contaminants/>



Gustavus Airport Firefighting Testing Area PFAS Factsheet
Updated Sept. 20, 2018

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been 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.

DOT&PF was alerted in late July 2018 to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in the groundwater at Gustavus Airport. The presumed source of PFAS in groundwater at the Gustavus Airport is the Federal Aviation Administration-mandated use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) testing areas.

The Alaska Department of Environmental Conservation (DEC) groups five similar compounds into a combined PFAS action level of 70 parts per trillion. Out of caution, DEC will require the provision of alternative drinking water to affected properties with levels above 65 parts per trillion.

DOT&PF worked with an environmental consulting firm, Shannon & Wilson, Inc., and the Alaska Department of Environmental Conservation (DEC) to identify and sample private water wells south of the airport as well as retest the two previously sampled wells beginning Monday, August 27, 2018. Based on those sample results, DOT&PF is conducting further sampling west of the airport beginning the week of September 24, 2018.

PFAS discovered in several wells on the Gustavus Airport property and 3 private wells off property are reported in concentrations above DEC action levels. Concentrations at most private wells and the well which serving the National Park Service water system are below DEC action levels.

Generalized sample results and the additional sampling area is available at www.alaska.gov/go/C732.

Website: www.alaska.gov/go/C732

For questions about testing & study:

Shannon & Wilson, Inc.
Kristen Freiburger, Project Manager
Phone: 907-479-0600
Email: krf@shanwil.com

For regulatory questions:

Alaska Department of Environmental Conservation
Contaminated Site Program
Danielle Duncan, Environmental Program Specialist
Phone: 907-465-5207
Email: danielle.duncan@alaska.gov

For questions about PFAS health effects:

Alaska Department of Health & Social Services
Kristin Bridges, Public Health Scientist
Phone: 907-269-8028
Email: kristin.bridges@alaska.gov

For questions about claims:

Alaska Department of Administration
Scott Jordan, Risk Management Director
Phone: 907-465-5723
Email: scott.jordan@alaska.gov

For questions about Gustavus Airport Firefighting training area and all other inquiries:

Alaska Department of Transportation and Public
Facilities, Southcoast Region
Aurah Landau, Public Information Officer
Phone: 907-465-4503
Email: airportwater@alaska.gov



PUBLIC MEETING NOTICE DRINKING WATER

DOT&PF was alerted in late July 2018 to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in the groundwater at Gustavus Airport.

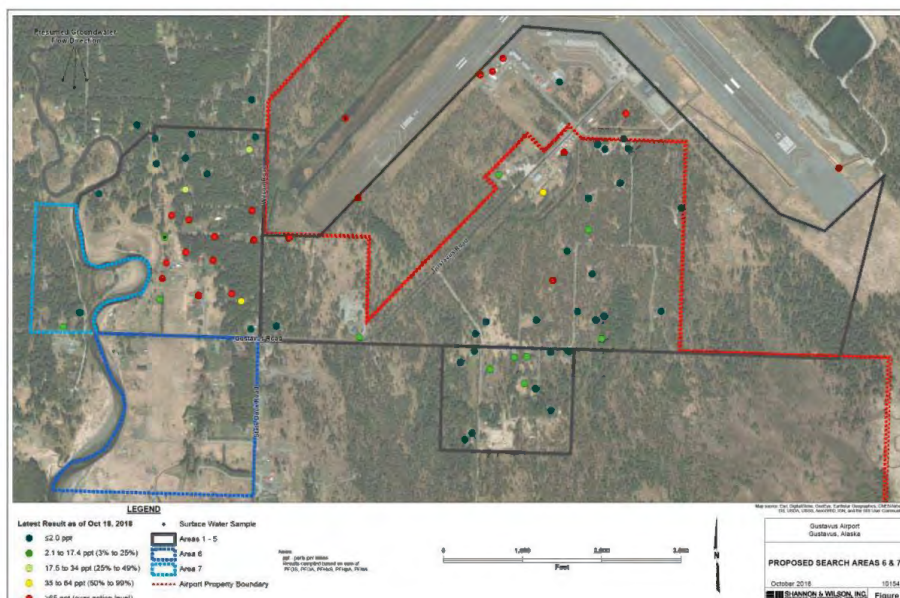
Since then, DOT&PF has worked with an environmental consulting firm, Shannon & Wilson, Inc., to identify and sample private water wells around the airport. Sampling was conducted in August, September, and early October 2018.

Based on those samples, PFAS in several wells on the Gustavus Airport property and a number of private wells off property are reported in concentrations above DEC action levels. Concentrations at many private wells and the well which serves the National Park Service water system are below DEC action levels. Many sampled private wells show negligible PFAS levels.

Shannon & Wilson, Inc. will be conducting further sampling west of the airport beginning October 31, 2018.

If you are in sampling areas 6 and 7 (in blue and purple in the map above), please call Kristen Freiburger, with Shannon & Wilson, Inc. at 907-479-0600 to schedule well sampling.

DOT&PF is providing alternative drinking water to homes with PFAS levels over DEC action levels. Together with DEC and engineering consultants, DOT&PF is beginning to assess options for long-term solution to provide clean drinking water.



Public Information Meeting

Tuesday, October 30, 2018, 5-6:30pm, at the school

- The Alaska Departments of Transportation, Environmental Conservation, Health and Social Services, and Administration will provide information.
- Shannon & Wilson, Inc. will attend to schedule sampling times for properties in the new sample areas.
- Feel free to email in questions ahead of time that you'd like publicly addressed: airportwater@alaska.com
- Questions? <http://www.alaska.gov/go/c732>; (907) 465-4503; airportwater@alaska.gov



Gustavus Airport Firefighting Testing Area PFAS Factsheet
Updated Oct 23, 2018

Per- and Polyfluoroalkyl substances (PFAS) are a group of manmade chemicals that have been 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.

DOT&PF was alerted in late July 2018 to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in the groundwater at Gustavus Airport. The presumed source of PFAS in groundwater at the Gustavus Airport is the Federal Aviation Administration-mandated use of fire-fighting foams at Aircraft Rescue and Firefighting (ARFF) testing areas.

The Alaska Department of Environmental Conservation (DEC) groups five similar compounds into a combined PFAS action level of 70 parts per trillion. Out of caution, DEC will require the provision of alternative drinking water to affected properties with levels above 65 parts per trillion.

DOT&PF has worked with an environmental consulting firm, Shannon & Wilson, Inc., to identify and sample private water wells around the airport. Sampling was conducted in August 2018 and late September / early October 2018.

Based on those samples, PFAS in several wells on the Gustavus Airport property and a number of private wells off property are reported in concentrations above DEC action levels. Concentrations at many private wells and the well which serves the National Park Service water system are below DEC action levels. Many sampled private wells show negligible PFAS levels. The northern and eastern edges of the plume are defined. Shannon & Wilson, Inc. will be conducting further sampling west of the airport beginning October 31, 2018.

DOT&PF is providing alternative drinking water to homes with PFAS levels over DEC action levels. Together with DEC, the Alaska Department of Administration, and engineering consultants, DOT&PF is beginning to assess options for long-term solution to provide clean drinking water.

Website: www.alaska.gov/go/C732

For questions about testing & study:

Shannon & Wilson, Inc.
Kristen Freiburger, Project Manager
Phone: 907-479-0600
Email: krf@shanwil.com

For regulatory questions:

Alaska Department of Environmental Conservation
Contaminated Site Program
Danielle Duncan, Environmental Program Specialist
Phone: 907-465-5207
Email: danielle.duncan@alaska.gov

For questions about PFAS health effects:

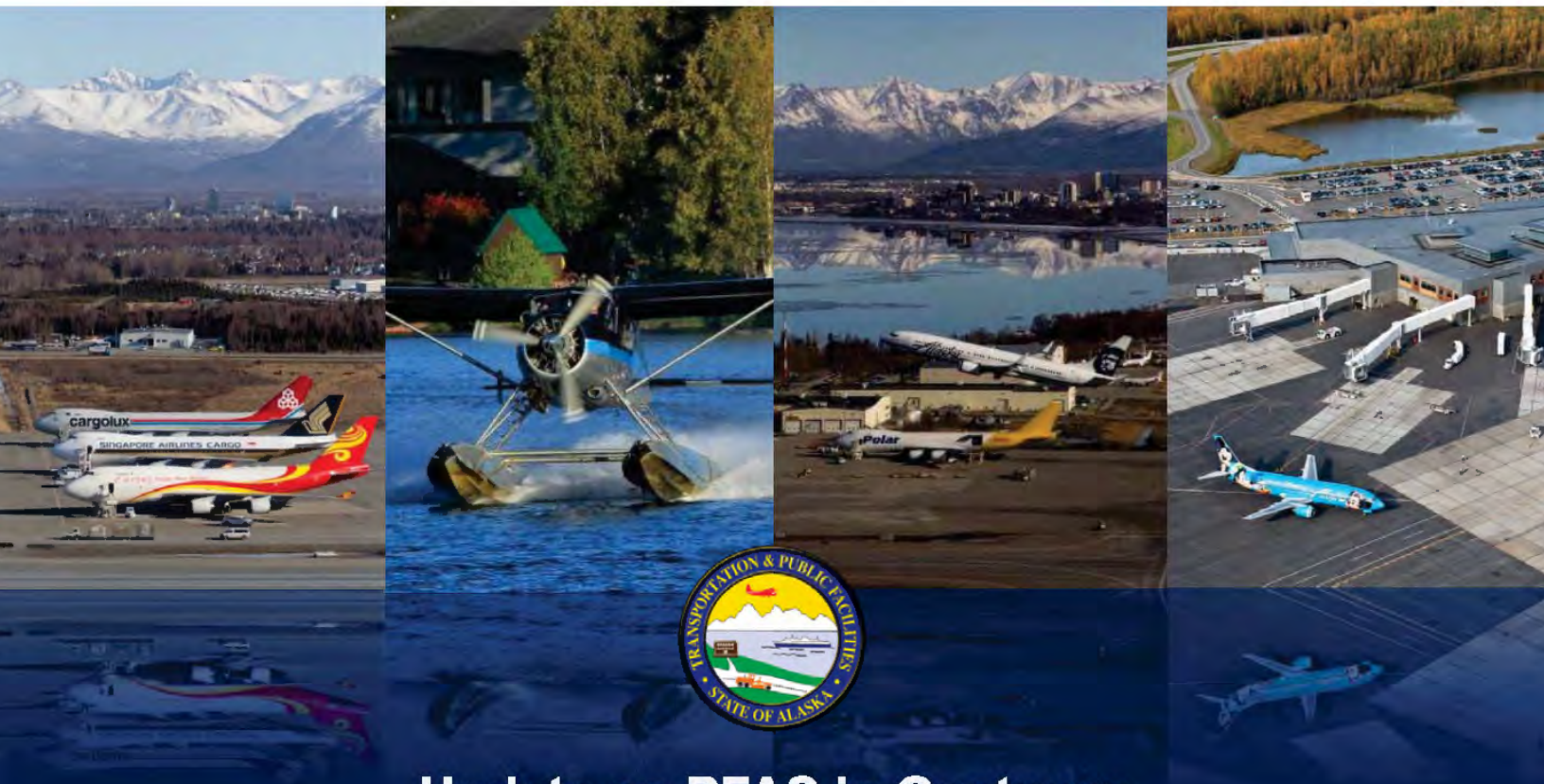
Alaska Department of Health & Social Services
Kristin Bridges, Public Health Scientist
Phone: 907-269-8028
Email: kristin.bridges@alaska.gov

For questions about claims:

Alaska Department of Administration
Scott Jordan, Risk Management Director
Phone: 907-465-5723
Email: scott.jordan@alaska.gov

For questions about Gustavus Airport Firefighting training area and all other inquiries:

Alaska Department of Transportation and Public Facilities, Southcoast Region
Aurah Landau, Public Information Officer
Phone: 907-465-4503
Email: airportwater@alaska.gov



Update on PFAS in Gustavus

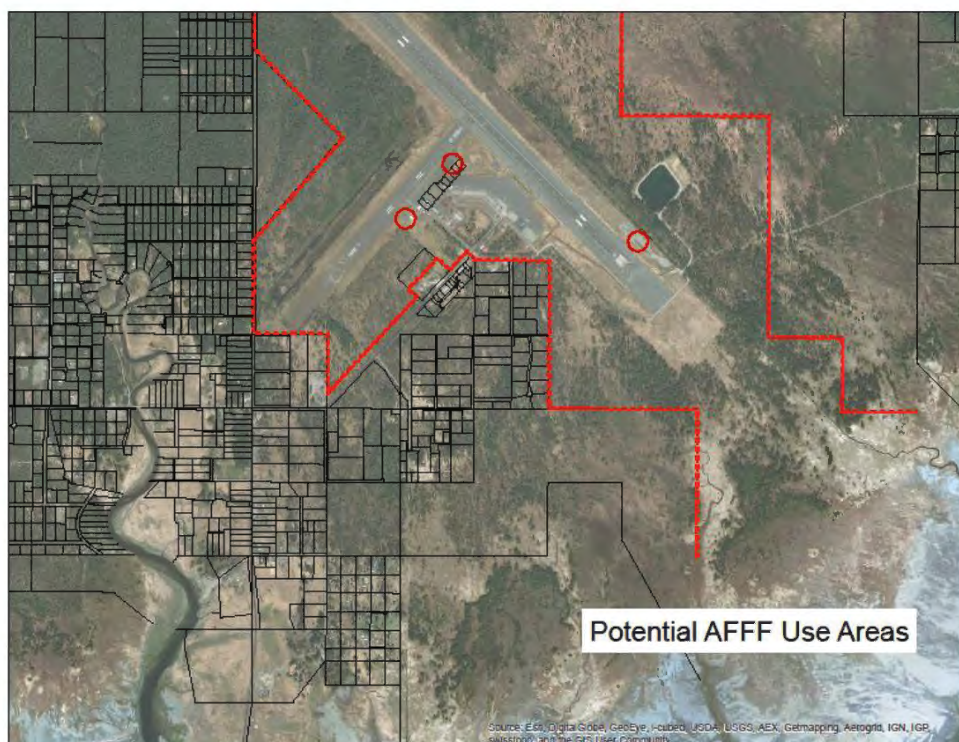
Aurah Landau
Public Information Officer
DOT&PF Southcoast Region

October 30, 2018

Integrity · ~~To keep Alaska flying and thriving~~



GST Airport & AFFF Use Areas



Why have PFAS been used at airports?

PFAS have been used at Gustavus Airport in AFFF for required FAA training exercises, equipment testing, and any needed emergency fire response.

The Federal Aviation Administration (FAA) mandates¹:

- “testing of firefighting foam equipment on aircraft rescue and firefighting vehicles is done in accordance to NFPA 412: Standard for Evaluating Aircraft Rescue and Fire-Fighting Foam Equipment”

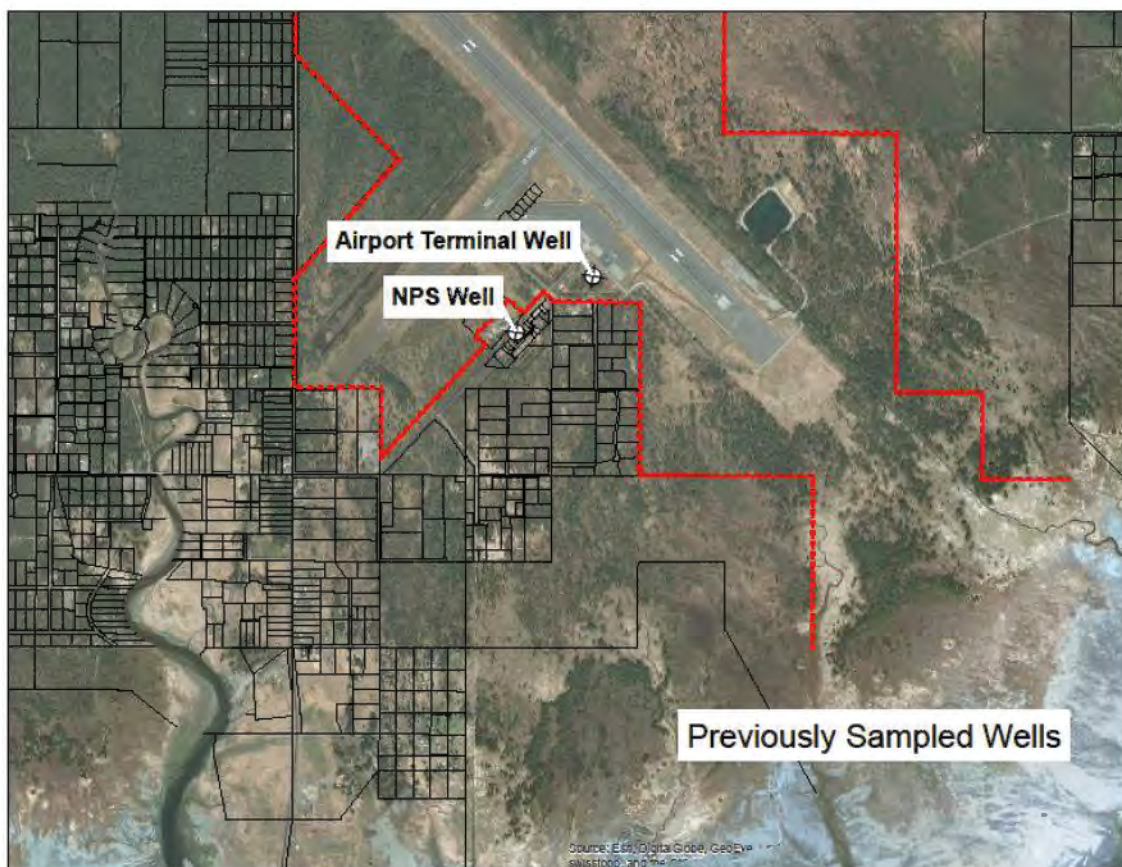
Simplified summary of NFPA 412²:

- Foams shall be flowed annually to insure expansion ratio and drainage criteria are met.

The use of AFFF at the Gustavus Airport prompted testing of monitoring and testing wells for PFAS presence (sampled summer 2018)

Sources: ¹*Use and Potential Impacts of AFFF Containing PFASs at Airports*,
²*National Fire Protection Association Standard 412*

Preliminary PFAS Sampling Results



Timeline

- Burn pit last used 2014
- AFFF used at Gustavus Airport for certification testing only (\approx 10 seconds per year) \approx 2015 – Current
- Gustavus preliminary water sampling June 27, 2018
- DOT&PF received preliminary sampling test results July 30, 2018



Response Actions

Short-term - Done

- Using water for training
- Directed Alaska Airlines & Alaska Seaplanes to continue to use alternate water (coincidentally begun in May 2018 due to surface water intrusion)
- Assign multi-agency group to assist
- Contract independent environmental consultant to sample

Short-Term – Ongoing

- Community outreach & collaboration with city, school, Park Service
- Determine plume

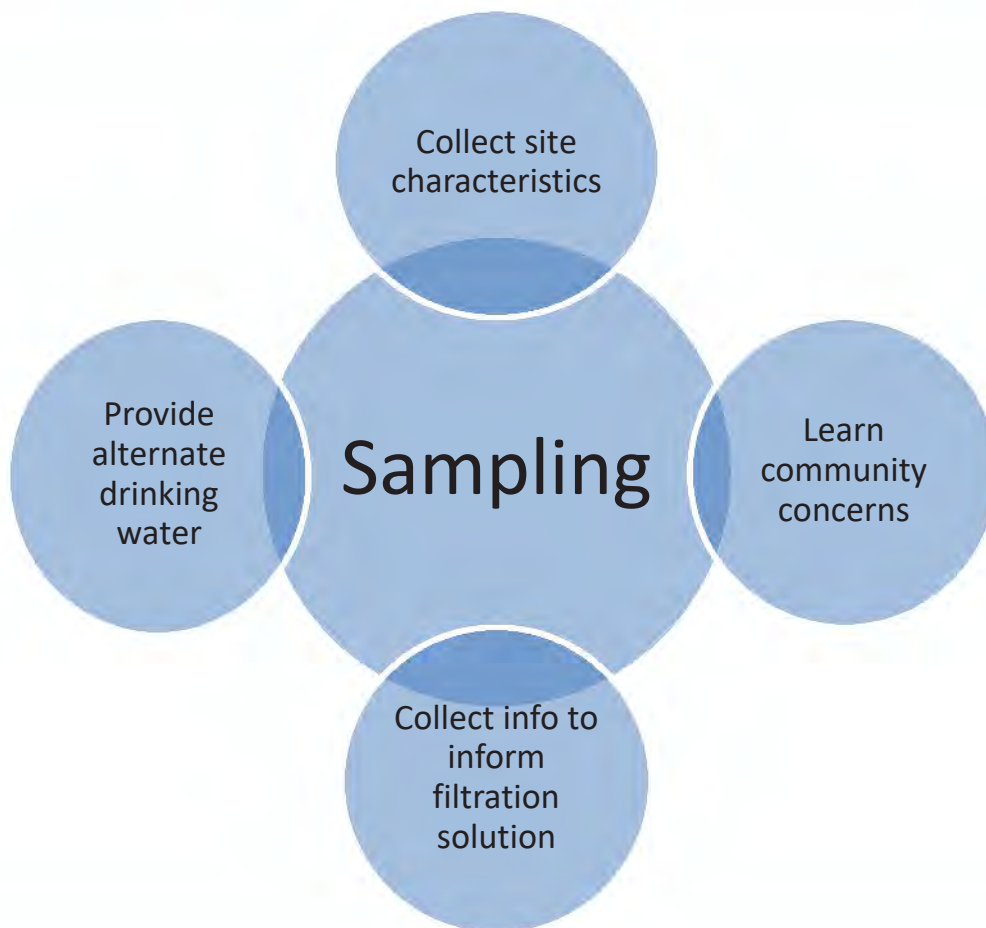
Long-Term – Beginning

- Determine appropriate water filtration options & scale
- Find alternative foams or containment systems for FAA-required foam tests

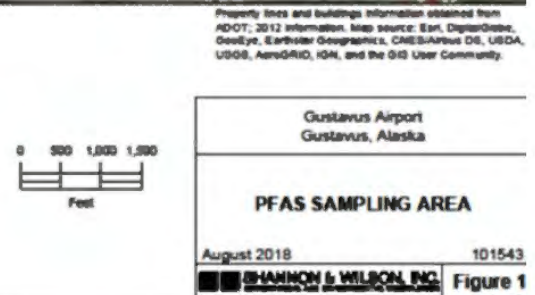
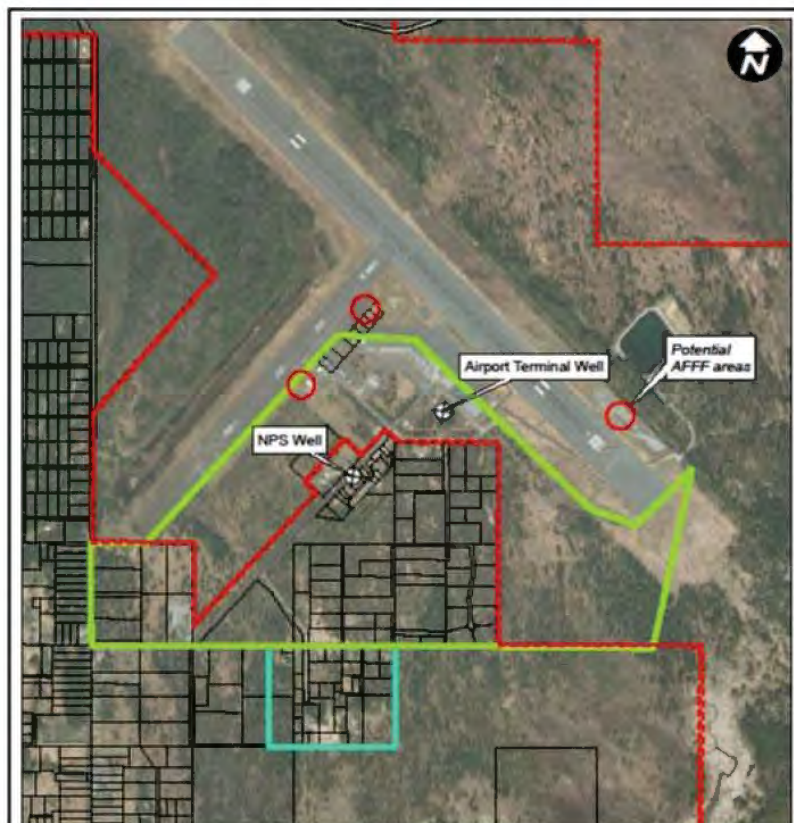
Timeline

- Burn pit last used 2014
- AFFF used at Gustavus Airport for certification testing only (≈10 seconds per year) ≈2015 – Current
- Gustavus preliminary water sampling June 27, 2018
- DOT&PF received preliminary sampling test results July 30, 2018
- Inter-agency coordination begun Early August, 2018
- State of Alaska contracted Shannon & Wilson, Inc. August 16, 2018
- Well sampling begins August 27, 2018
- Inter-agency teams begins investigating long-term water source options September 2018

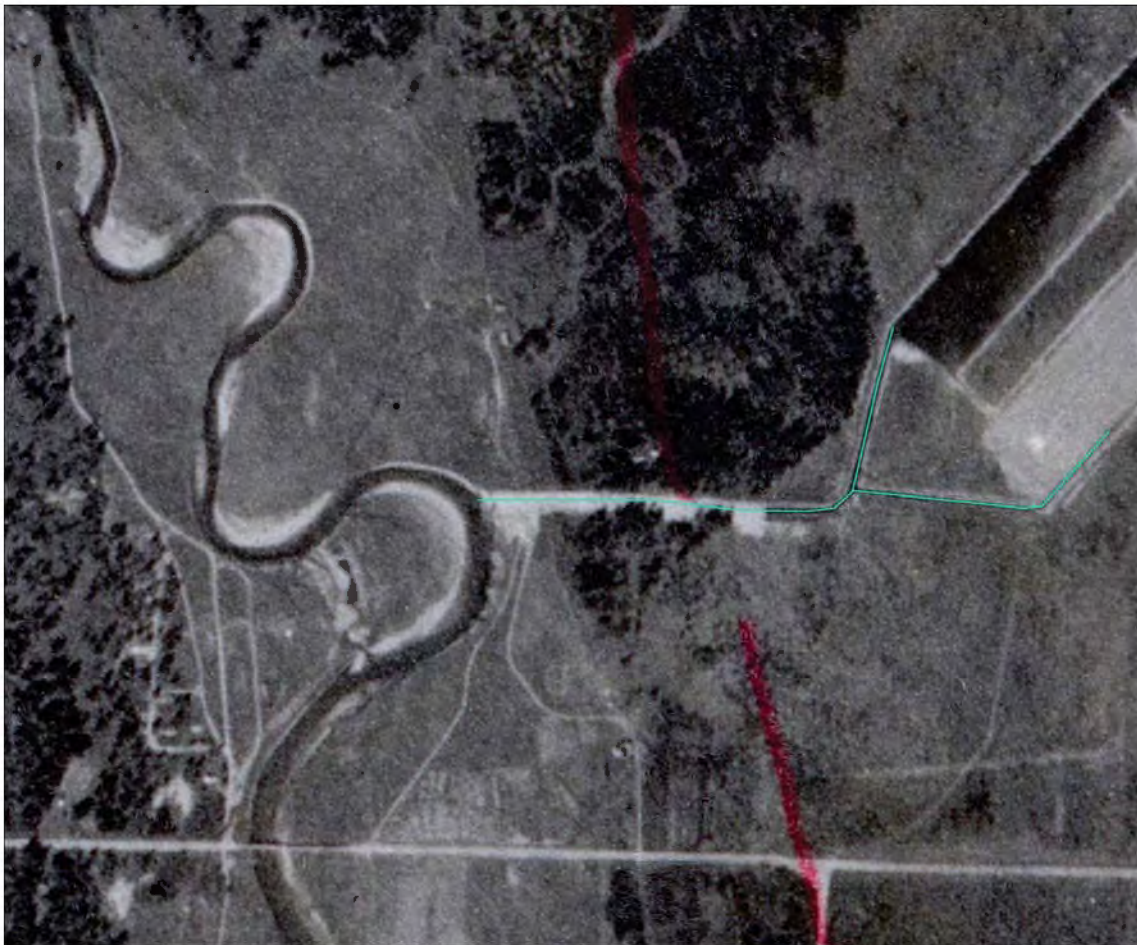
Water Sampling



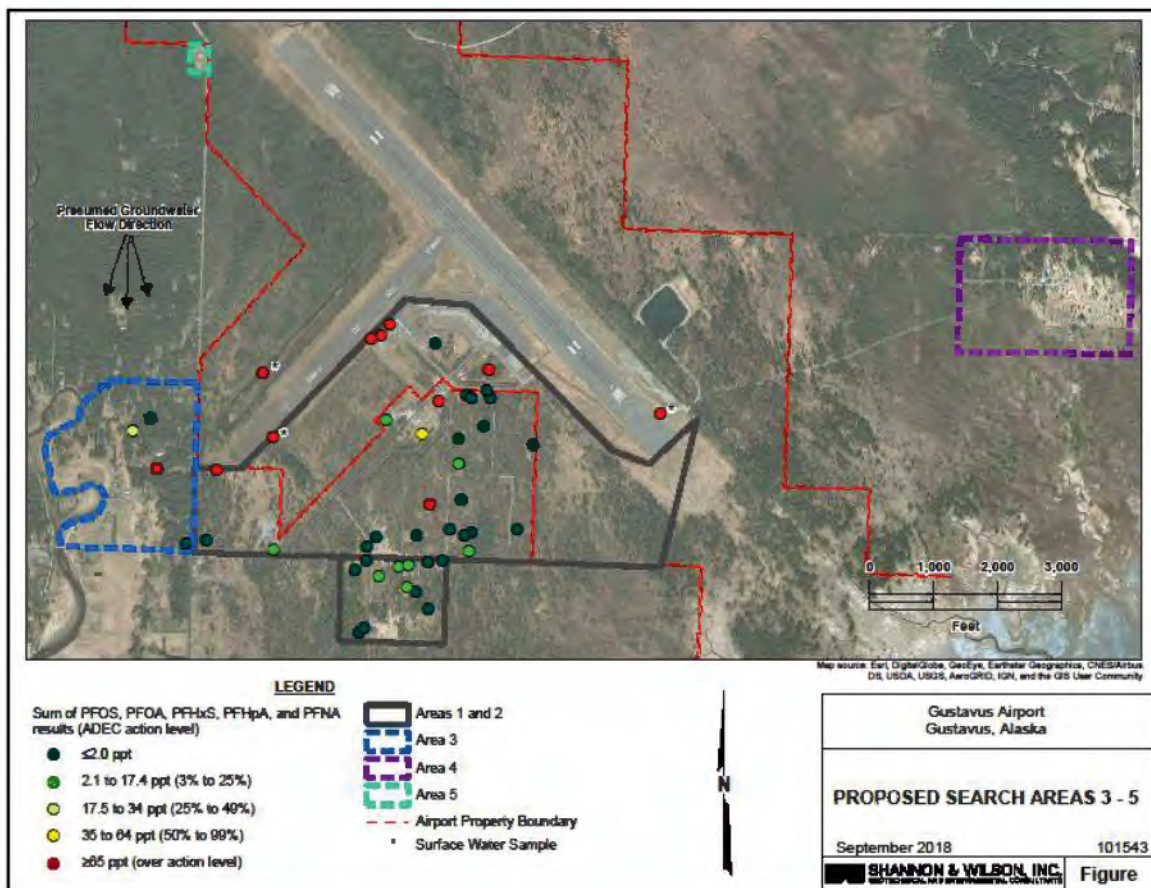
1st Sampling Area: Previously Sampled Wells, Airport Wells & Residences



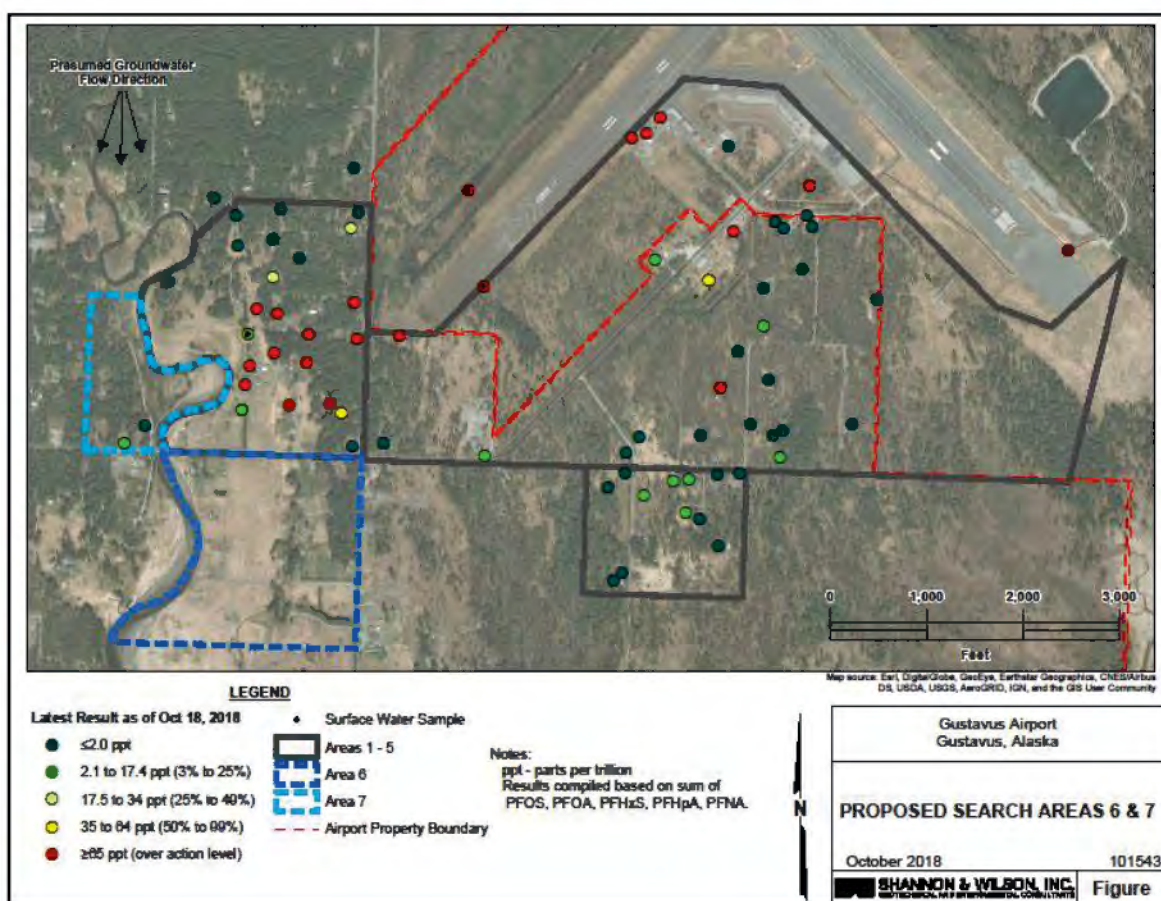
Info Provided Changed Sampling Plan



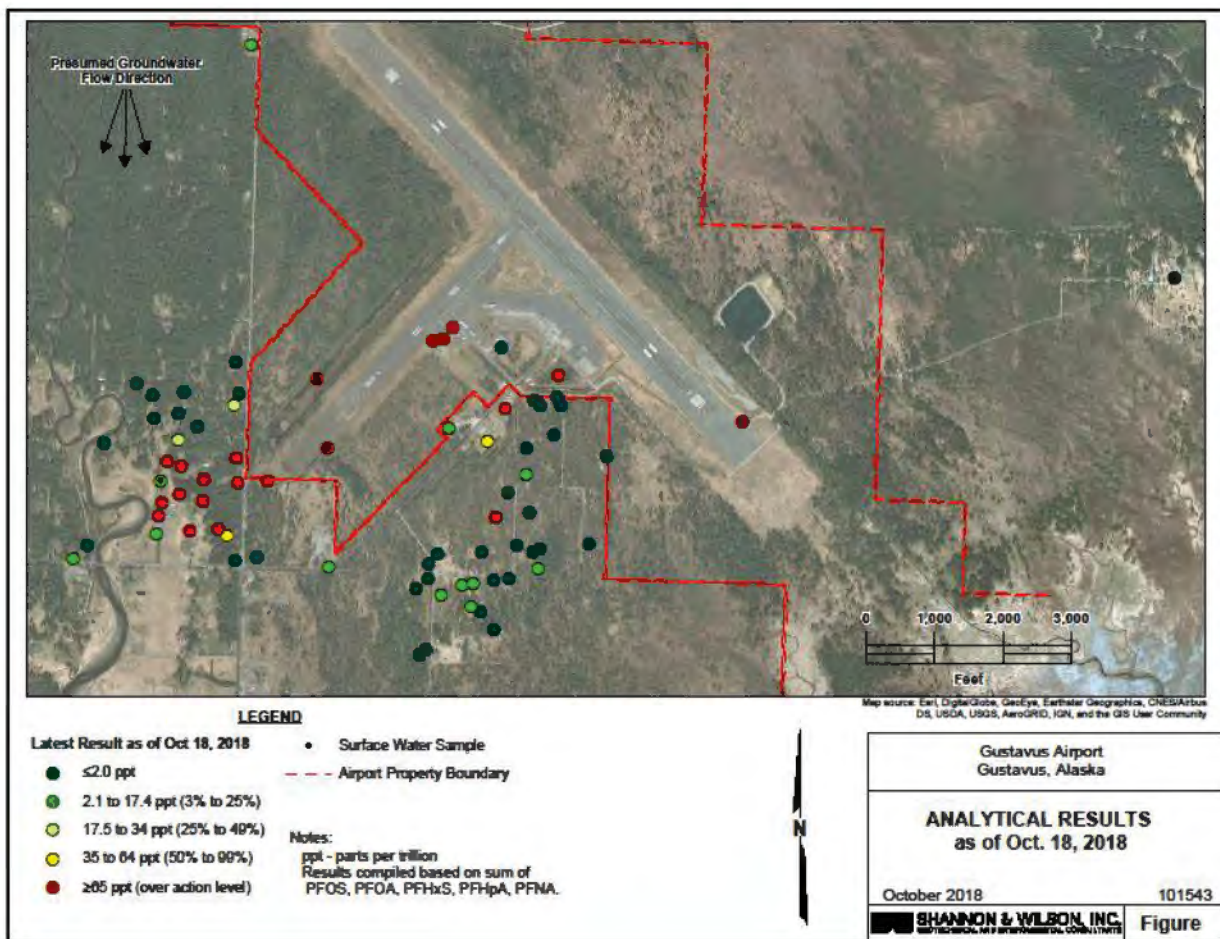
2nd Sampling Area: Tracking Old Drainage Ditch



3rd Sampling Area: Determining W & S Plume Edges



Results to Date



Work Moving Forward

PFAS sampling results determine scope of action

- For wells testing above 65ppt – provide alternative drinking water source and develop permanent source of drinking water
- For wells testing 35-70ppt – retest quarterly
- For wells testing 17.5-35ppt – retest annually
- Sampling may include source area delineation and groundwater monitoring

Future action may involve on-site and off-site projects, including:

- Determine extent of PFAS plume
- Site characterization (e.g., extent of contamination, identifying sources and dates)
- Provide long-term source of alternative drinking water if necessary

Risk Management



The Division of Risk Management administers the self-insurance program for each State agency, handling all third party claims.

For more information please visit:
<http://doa.alaska.gov/drm/>

Risk Management

All residents who believe they are impacted by the contamination may contact Risk Management to receive claim filing instructions.

For claim filing instructions contact:
Alaska Department of Administration
Division of Risk Management
Sheri Gray, Risk Manager
PO Box 110218
Juneau, AK 99811-0218
Phone: 907-465-5724
Fax: 907-465-3690
Email: sheri.gray@Alaska.gov

Additional contacts:

Scott Jordan - Director
907-465-5723

Community Outreach

DOT&PF is committed to being open and transparent

Press Releases:

- Sign up for GovDelivery
- <https://public.govdelivery.com/accounts/AKDOT/subscriber/new>

Website:

- Alaska.gov/go/C732

Email:

- airportwater@alaska.gov
- Subject – sign up

Contact:

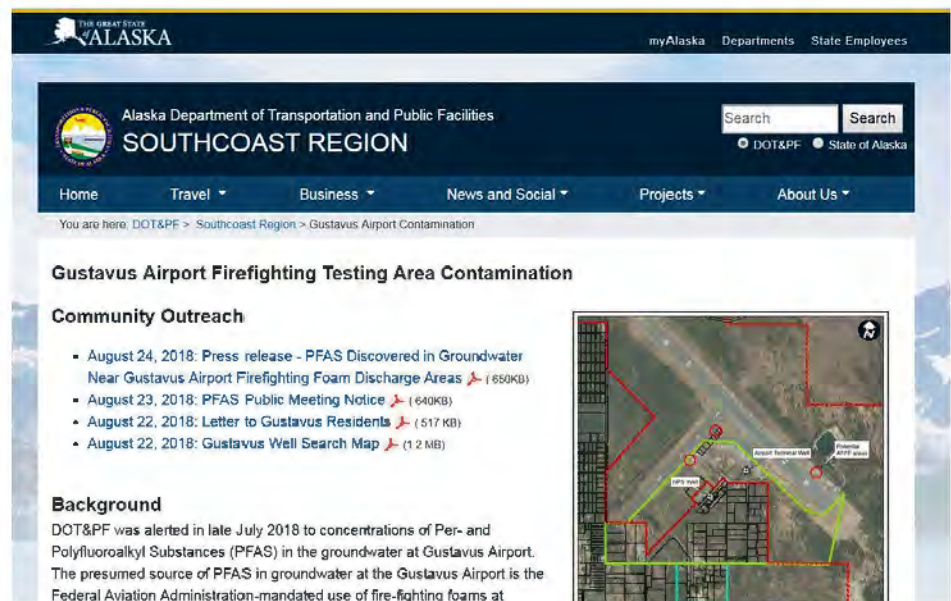
Aurah Landau

Public Information Officer

Southcoast Region, DOT&PF

O: 907-465-4503

C: 907-500-2100





Questions?

PUBLIC INFORMATION

ATSDR fliers

Talking to Your Doctor about Exposure to PFAS

8/18/17

If you have been exposed to perfluoroalkyl and polyfluoroalkyl substances (PFAS) and are concerned about your health, you can tell your doctor.

You can share this fact sheet with your doctor to help start a conversation about how PFAS can affect your health.



1. Can exposure to PFAS cause health problems?

- Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful.
- Some (but not all) PFAS build up in the body. The levels of some PFAS go down slowly over time once exposure stops. Scientists are studying how different amounts of PFAS in the body over time may affect health.
- More research is needed, but some studies in people have shown that certain PFAS may:
 - » affect growth, learning, and behavior of infants and older children
 - » lower a woman's chance of getting pregnant
 - » interfere with the body's natural hormones
 - » increase cholesterol levels
 - » affect the immune system
 - » increase the risk of cancer

If you have any of these conditions and have been exposed to PFAS, you can tell your doctor.

2. Should my family and I be tested for any of the health conditions possibly linked to PFAS exposure?

- Laboratory test results can't tell you if PFAS exposure has caused your health condition.
- Some of the health effects possibly linked to PFAS exposure, like high cholesterol, can be checked as part of your annual physical. It is important to have regular check-ups and screenings.
- You can tell your doctor about any exposure to PFAS and any symptoms you have.

3. Should my family and I get a blood test for PFAS if we have been exposed to PFAS?

- PFAS blood test results can tell you the amount of PFAS in your blood. However, test results won't tell you how PFAS will affect your health now or in the future.
- Blood testing for PFAS is not a regular test offered by doctors or health departments.
- If you want or need to know your PFAS blood levels, you can talk to
 - » your doctor or health care provider
 - » other health professionals (for example, for concerns about babies and children contact your regional Pediatric Environmental Health Specialty Unit or PEHSU: <http://www.pehsu.net/findhelp.html>).
- **Remember** that test results will only tell you and your health care provider if you have been exposed to PFAS.
- Keep in mind that most people in the United States have one or more specific PFAS in their blood, especially PFOS and PFOA.

4. Could exposure to PFAS in drinking water harm my health in the future?

We don't know if exposure to PFAS may cause health problems in the future. You can tell your doctor if you have been exposed to PFAS and ask if you need to be monitored for symptoms or conditions that may be caused by PFAS exposure (see list in question #1) in the future.

5. How will exposure to PFAS in drinking water affect my pregnancy?

Exposure to PFAS in drinking water at levels above the EPA Lifetime Health Advisory has been associated with pregnancy-induced high blood pressure. This complication can include not only high blood pressure, but also signs of damage to other organ systems, most often the liver and kidneys.

Tell your doctor if you have been exposed to PFAS so that he/she can provide appropriate medical care. Checking for high blood pressure should be part of your routine prenatal care. It is important to go to all of your prenatal checkups and discuss with the doctor or nurse any health concerns.

6. Can I breastfeed my baby if I've been exposed to PFAS in drinking water?

Nursing mothers should continue to breastfeed.

- While we do not know a lot about the health effects of exposure to PFAS in breast milk, we do know that the benefits of breastfeeding are well documented.
- PFAS in a mother's body can move from her blood into her unborn child and from her breastmilk into her breastfed baby. However, based on current science, the benefits of breastfeeding appear to outweigh the risks for infants exposed to PFAS in breast milk.
- Breastfeeding is good for the health of both infants and mothers.
- Scientists continue to do research in this area.
- If you have concerns, talk to your doctor.
- For more information about the benefits of breastfeeding, please visit:
<https://www.womenshealth.gov/breastfeeding/breastfeeding-benefits.html>.

7. How can I learn more about PFAS?

- Contact **1-800-CDC-INFO** for updated information on PFAS.
- Visit the following websites:
 - » ATSDR website:
<http://www.atsdr.cdc.gov/pfc/index.html>
 - » ATSDR's PFAS Clinician Factsheet:
https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf
 - » Environmental Protection Agency website:
<https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas>
- Contact your state health department.
- Contact the Consumer Product Safety Commission at **(800)-638-2772** if you have questions about the products you use in your home.

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) in the U.S. Population

Most people in the United States have been exposed to PFAS and have PFAS in their blood, especially perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA).

Since 1999, the National Health and Nutrition Examination Survey (NHANES) has measured blood PFAS in the U.S. population. NHANES is a program of studies designed by the Centers for Disease Control and Prevention (CDC) to evaluate the health and nutrition of adults and children in the United States.

Since 2002, production and use of PFOS and PFOA in the United States have declined. As the use of some PFAS has declined, some blood PFAS levels have gone down as well.

- From 1999 – 2014, blood PFOS levels have declined by more than 80%.
- From 1999 – 2014, blood PFOA levels have declined by more than 60%.

However, as PFOS and PFOA are phased out and replaced, people may be exposed to other PFAS.

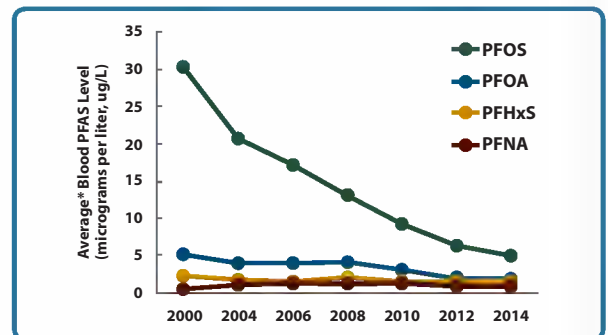
Blood PFAS levels decreased in people exposed to PFAS in drinking water after a water filtration system was installed.

In the mid-2000s, water sampling found PFAS contamination in municipal drinking water sources east of St. Paul, Minnesota. In 2006, a water filtration system was installed to reduce PFAS levels. PFOS and PFOA were reduced in the drinking water below the current EPA lifetime health advisory level for PFOS+PFOA of 70 parts per trillion.

In 2008, 2010, and 2014, the Minnesota Department of Health measured blood PFAS levels in people who had been exposed to PFAS in their drinking water before installation of the filtration system.

- PFOS, PFOA, and PFHxS blood levels went down in long-term residents after a water filtration system was installed.

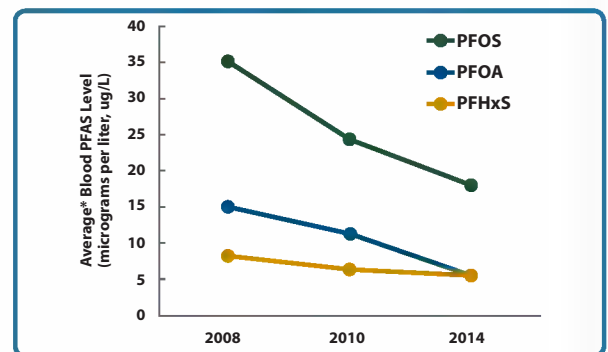
Blood Levels of the Most Common PFAS in People in the United States from 2000-2014



* Average = geometric mean

Data Source: Centers for Disease Control and Prevention. Fourth Report on Human Exposure to Environmental Chemicals, Updated Tables, (January 2017). Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Average Blood Level of Some PFAS after Installing a Water Filtration System



* Data shown are geometric means

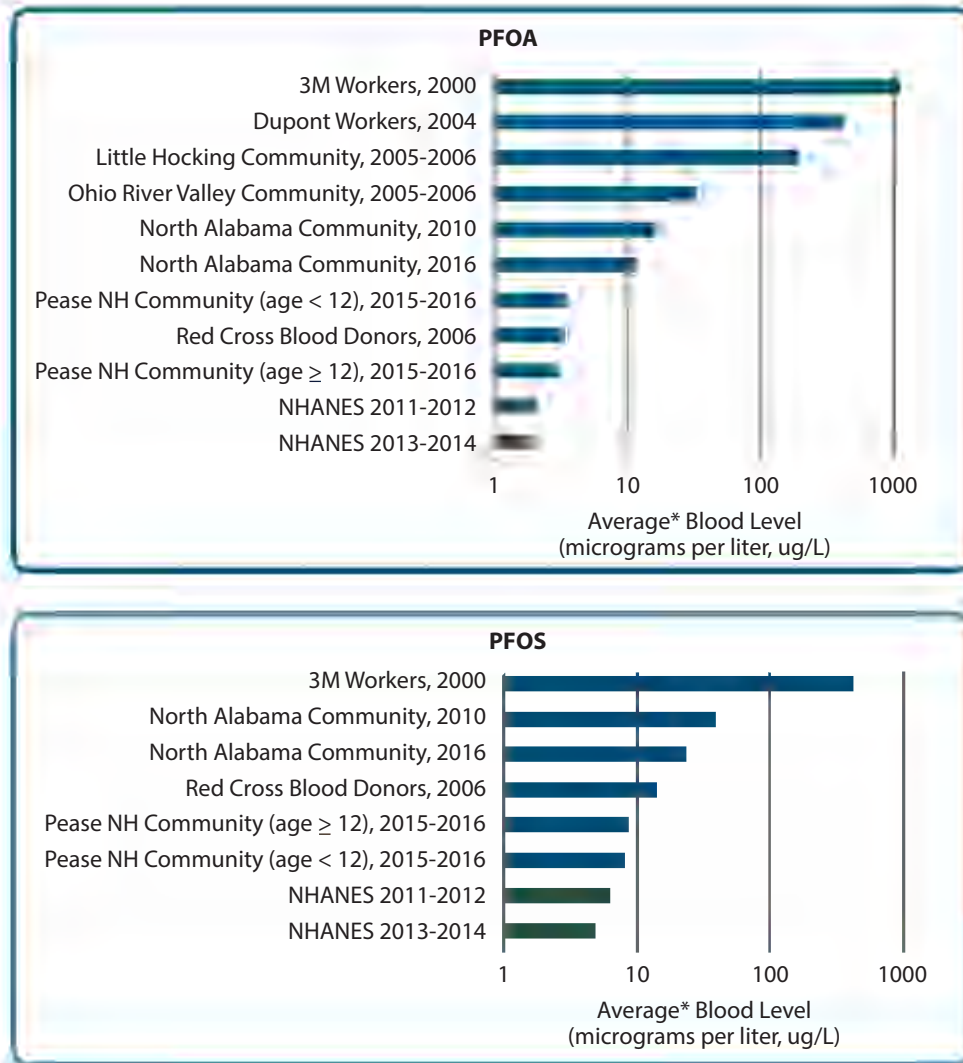
Data Source: Minnesota Department of Health, Environmental Tracking and Biomonitoring. East Metro PFC3 Biomonitoring Project, December 2015 Report to the Community.

Biomonitoring Studies have measured PFAS levels in other groups:

- Workers in PFAS manufacturing facilities,
- Communities with contaminated drinking water, and
- The general U.S. population.

The figures below show PFOA and PFOS levels measured in different exposed populations, compared to levels CDC measured in the general U.S. population in 2011-2012 and 2013-2014.

Blood Levels in People Who Were Exposed to PFAS



* Average = geometric mean

References:

www.cdc.gov/exposurereport
<http://www.health.state.mn.us/divs/hpcd/tracking/biomonitoring/projects/PFC3CommunityReport.pdf>
<http://www.health.state.mn.us/divs/hpcd/tracking/biomonitoring/projects/pfc3comrpt2009.pdf>
https://www.atsdr.cdc.gov/HAC/pha/BiologicalSampling/Biological_Sampling_of_Substances_in_Alabama_EI%20-Report_11-28-2016_508.pdf
<http://www.dhhs.nh.gov/dphs/documents/pease-pfc-blood-testing.pdf>

PFOS – Perfluorooctane sulfonic acid

PFOA – Perfluorooctanoic acid

PFHxS – Perfluorohexane sulfonic acid

PFNA – Perfluorononanoic acid

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

Frequently Asked Questions

What are PFAS?

Perfluoroalkyl and polyfluoroalkyl substances (PFAS) are a large group of man-made chemicals that have been used in industry and consumer products worldwide since the 1950s.

- PFAS do not occur naturally, but are widespread in the environment.
- PFAS are found in people, wildlife and fish all over the world.
- Some PFAS can stay in people's bodies a long time.
- Some PFAS do not break down easily in the environment.

How can I be exposed to PFAS?

PFAS contamination may be in drinking water, food, indoor dust, some consumer products, and workplaces. Most non worker exposures occur through drinking contaminated water or eating food that contains PFAS.

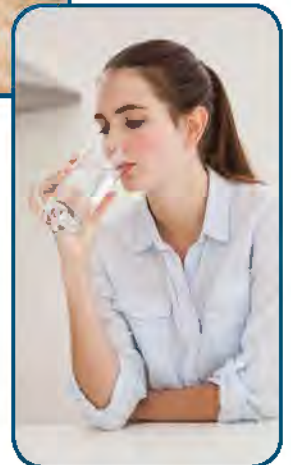
Although some types of PFAS are no longer used, some products may still contain PFAS:

- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics

How can I reduce my exposure to PFAS?

PFAS are present at low levels in some food products and in the environment (air, water, soil etc.), so you probably cannot prevent PFAS exposure altogether. However, if you live near known sources of PFAS contamination, you can take steps to reduce your risk of exposure.

- If your drinking water contains PFAS above the EPA Lifetime Health Advisory, consider using an alternative or treated water source for any activity in which you might swallow water:
 - » drinking
 - » food preparation
 - » cooking
 - » brushing teeth, and
 - » preparing infant formula
- Check for fish advisories for water bodies where you fish.
 - » Follow fish advisories that tell people to stop or limit eating fish from waters contaminated with PFAS or other compounds.
 - » Research has shown the benefits of eating fish, so continue to eat fish from safe sources as part of your healthy diet.
- Read consumer product labels and avoid using those with PFAS.



How can PFAS affect people's health?

Some scientific studies suggest that certain PFAS may affect different systems in the body. NCEH/ATSDR is working with various partners to better understand how exposure to PFAS might affect people's health—especially how exposure to PFAS in water and food may be harmful. Although more research is needed, some studies in people have shown that certain PFAS may:

- affect growth, learning, and behavior of infants and older children
- lower a woman's chance of getting pregnant
- interfere with the body's natural hormones
- increase cholesterol levels
- affect the immune system and
- increase the risk of cancer

At this time, scientists are still learning about the health effects of exposures to mixtures of PFAS.

How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
 - » CDC Info: <https://www.cdc.gov/cdc-info/>, or (800) 232-4636.
 - » www.atsdr.cdc.gov/pfc/index.html
 - » <https://www.cdc.gov/exposurereport/index.html>
- **Environmental Protection Agency (EPA):**
<https://www.epa.gov/chemical-research/research-and-polyfluoroalkyl-substances-pfas>
- **Food and Drug Administration:**
<https://www.fda.gov/food/newsevents/constituentupdates/ucm479465.htm>
- **National Toxicology Program:**
<https://ntp.niehs.nih.gov/pubhealth/hat/noms/pfoa/index.html>

If you have questions about the products you use in your home, please contact the **Consumer Product Safety Commission (CPSC)** at (800) 638-2772.

List of Common PFAS and Their Abbreviations:

Abbreviation	Chemical name
PFOS	Perfluorooctane sulfonic acid
PFOA (or C8)	Perfluorooctanoic acid
PFNA	Perfluorononanoic acid
PFDA	Perfluorodecanoic acid
PFOSA (or FOSA)	Perfluorooctane sulfonamide
MeFOSAA (aka Me-PFOSA-AcOH)	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
Et-FOSAA (aka Et-PFOSA-AcOH)	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
PFHxS	Perfluorohexane sulfonic acid

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

EPA flier

Overview

EPA has established health advisories for PFOA and PFOS based on the agency's assessment of the latest peer-reviewed science to provide drinking water system operators, and state, tribal and local officials who have the primary responsibility for overseeing these systems, with information on the health risks of these chemicals, so they can take the appropriate actions to protect their residents. EPA is committed to supporting states and public water systems as they determine the appropriate steps to reduce exposure to PFOA and PFOS in drinking water. As science on health effects of these chemicals evolves, EPA will continue to evaluate new evidence.

Background on PFOA and PFOS

PFOA and PFOS are fluorinated organic chemicals that are part of a larger group of chemicals referred to as perfluoroalkyl substances (PFASs). PFOA and PFOS have been the most extensively produced and studied of these chemicals. They have been used to make carpets, clothing, fabrics for furniture, paper packaging for food and other materials (e.g., cookware) that are resistant to water, grease or stains. They are also used for firefighting at airfields and in a number of industrial processes.

Because these chemicals have been used in an array of consumer products, most people have been exposed to them. Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer. In 2006, eight major companies voluntarily agreed to phase out their global production of PFOA and PFOA-related chemicals, although there are a limited number of ongoing uses. Scientists have found PFOA and PFOS in the blood of nearly all the people they tested, but these studies show that the levels of PFOA and PFOS in blood have been decreasing. While consumer products and food are a large source of exposure to these chemicals for most people, drinking water can be an additional source in the small percentage of communities where these chemicals have contaminated water supplies. Such contamination is typically localized and associated with a specific facility, for example, an industrial facility where these chemicals were produced or used to manufacture other products or an airfield at which they were used for firefighting.

EPA's 2016 Lifetime Health Advisories

EPA develops health advisories to provide information on contaminants that can cause human health effects and are known or anticipated to occur in drinking water. EPA's health advisories are non-enforceable and non-regulatory and provide technical information to states agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. In 2009, EPA published provisional health advisories for PFOA and PFOS based on the evidence available at that time. The science has evolved since then and EPA is now replacing the 2009 provisional advisories with new, lifetime health advisories.

FACT SHEET

PFOA & PFOS Drinking Water Health Advisories

EPA's 2016 Lifetime Health Advisories, continued

To provide Americans, including the most sensitive populations, with a margin of protection from a lifetime of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion. When both PFOA and PFOS are found in drinking water, the combined concentrations of PFOA and PFOS should be compared with the 70 parts per trillion health advisory level. This health advisory level offers a margin of protection for all Americans throughout their life from adverse health effects resulting from exposure to PFOA and PFOS in drinking water.

How the Health Advisories were developed

EPA's health advisories are based on the best available peer-reviewed studies of the effects of PFOA and PFOS on laboratory animals (rats and mice) and were also informed by epidemiological studies of human populations that have been exposed to PFASs. These studies indicate that exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes).

EPA's health advisory levels were calculated to offer a margin of protection against adverse health effects to the most sensitive populations: fetuses during pregnancy and breastfed infants. The health advisory levels are calculated based on the drinking water intake of lactating women, who drink more water than other people and can pass these chemicals along to nursing infants through breastmilk.

Recommended Actions for Drinking Water Systems

Steps to Assess Contamination

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should quickly undertake additional sampling to assess the level, scope and localized source of contamination to inform next steps

Steps to Inform

If water sampling results confirm that drinking water contains PFOA and PFOS at individual or combined concentrations greater than 70 parts per trillion, water systems should promptly notify their State drinking water safety agency (or with EPA in jurisdictions for which EPA is the primary drinking water safety agency) and consult with the relevant agency on the best approach to conduct additional sampling.

Drinking water systems and public health officials should also promptly provide consumers with information about the levels of PFOA and PFOS in their drinking water. This notice should include specific information on the risks to fetuses during pregnancy and breastfed and formula-fed infants from exposure to drinking water with an individual or combined concentration of PFOA and PFOS above EPA's health advisory level of 70 parts per trillion. In addition, the notification should include actions they are taking and identify options that consumers may consider to reduce risk such as seeking an alternative drinking water source, or in the case of parents of formula-fed infants, using formula that does not require adding water.

FACT SHEET

PFOA & PFOS Drinking Water Health Advisories

Recommended Actions for Drinking Water Systems, continued

Steps to Limit Exposure

A number of options are available to drinking water systems to lower concentrations of PFOA and PFOS in their drinking water supply. In some cases, drinking water systems can reduce concentrations of perfluoroalkyl substances, including PFOA and PFOS, by closing contaminated wells or changing rates of blending of water sources. Alternatively, public water systems can treat source water with activated carbon or high pressure membrane systems (e.g., reverse osmosis) to remove PFOA and PFOS from drinking water. These treatment systems are used by some public water systems today, but should be carefully designed and maintained to ensure that they are effective for treating PFOA and PFOS. In some communities, entities have provided bottled water to consumers while steps to reduce or remove PFOA or PFOS from drinking water or to establish a new water supply are completed.

Many home drinking water treatment units are certified by independent accredited third party organizations against American National Standards Institute (ANSI) standards to verify their contaminant removal claims. NSF International (NSF®) has developed a protocol for NSF/ANSI Standards 53 and 58 that establishes minimum requirements for materials, design and construction, and performance of point-of-use (POU) activated carbon drinking water treatment systems and reverse osmosis systems that are designed to reduce PFOA and PFOS in public water supplies. The protocol has been established to certify systems (e.g., home treatment systems) that meet the minimum requirements. The systems are evaluated for contaminant reduction by challenging them with an influent of $1.5 \pm 30\%$ µg/L (total of both PFOA and PFOS) and must reduce this concentration by more than 95% to 0.07 µg/L or less (total of both PFOA and PFOS) throughout the manufacturer's stated life of the treatment system. Product certification to this protocol for testing home treatment systems verifies that devices effectively reduces PFOA and PFOS to acceptable levels.

Other Actions Relating to PFOA and PFOS

Between 2000 and 2002, PFOS was voluntarily phased out of production in the U.S. by its primary manufacturer, 3M. EPA also issued regulations to limit future manufacturing, including importation, of PFOS and its precursors, without first having EPA review the new use. A limited set of existing uses for PFOS (fire resistant aviation hydraulic fluids, photography and film products, photomicro lithography process to produce semiconductors, metal finishing and plating baths, component of an etchant) was excluded from these regulations because these uses were ongoing and alternatives were not available.

In 2006, EPA asked eight major companies to commit to working toward the elimination of their production and use of PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. All eight companies have indicated that they have phased out PFOA, and chemicals that degrade to PFOA, from emissions and products by the end of 2015. Additionally, PFOA is included in EPA's proposed Toxic Substance Control Act's Significant New Use Rule (SNUR) issued in January 2015 which will ensure that EPA has an opportunity to review any efforts to reintroduce the chemical into the marketplace and take action, as necessary, to address potential concerns.

FACT SHEET

PFOA & PFOS Drinking Water Health Advisories

Other Actions Relating to PFOA and PFOS, continued

EPA has not established national primary drinking water regulations for PFOA and PFOS. EPA is evaluating PFOA and PFOS as drinking water contaminants in accordance with the process required by the Safe Drinking Water Act (SDWA). To regulate a contaminant under SDWA, EPA must find that it: (1) may have adverse health effects; (2) occurs frequently (or there is a substantial likelihood that it occurs frequently) at levels of public health concern; and (3) there is a meaningful opportunity for health risk reduction for people served by public water systems.

EPA included PFOA and PFOS among the list of contaminants that water systems are required to monitor under the third Unregulated Contaminant Monitoring Rule (UCMR 3) in 2012. Results of this monitoring effort are updated regularly and can be found on the publicly-available National Contaminant Occurrence Database (NCOD) (<https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule#3>). In accordance with SDWA, EPA will consider the occurrence data from UCMR 3, along with the peer reviewed health effects assessments supporting the PFOA and PFOS Health Advisories, to make a regulatory determination on whether to initiate the process to develop a national primary drinking water regulation.

In addition, EPA plans to begin a separate effort to determine the range of PFAS for which an Integrated Risk Information System (IRIS) assessment is needed. The IRIS Program identifies and characterizes the health hazards of chemicals found in the environment. IRIS assessments inform the first two steps of the risk assessment process: hazard identification, and dose-response. As indicated in the 2015 IRIS Multi-Year Agenda, the IRIS Program will be working with other EPA offices to determine the range of PFAS compounds and the scope of assessment required to best meet Agency needs. More about this effort can be found at <https://www.epa.gov/iris/iris-agenda>.

Non-Drinking Water Exposure to PFOA and PFOS

These health advisories only apply to exposure scenarios involving drinking water. They are not appropriate for use, in identifying risk levels for ingestion of food sources, including: fish, meat produced from livestock that consumes contaminated water, or crops irrigated with contaminated water.

The health advisories are based on exposure from drinking water ingestion, not from skin contact or breathing. The advisory values are calculated based on drinking water consumption and household use of drinking water during food preparation (e.g., cooking or to prepare coffee, tea or soup). To develop the advisories, EPA considered non-drinking water sources of exposure to PFOA and PFOS, including: air, food, dust, and consumer products. In January 2016 the Food and Drug Administration amended its regulations to no longer allow PFOA and PFOS to be added in food packaging, which will likely decrease one source of non-drinking water exposure.

Where Can I Learn More?

- EPA's Drinking Water Health Advisories for PFOA and PFOS can be found at: <https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos>
- PFOA and PFOS data collected under EPA's Unregulated Contaminant Monitoring Rule are available: <https://www.epa.gov/dwucmr/occurrence-data-unregulated-contaminant-monitoring-rule>
- EPA's stewardship program for PFAS related to TSCA: <https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/and-polyfluoroalkyl-substances-pfass-under-tsca>
- EPA's research activities on PFASs can be found at: <http://www.epa.gov/chemical-research/perfluorinated-chemical-pfc-research>
- The Agency for Toxic Substances and Disease Registry's Perfluorinated Chemicals and Your Health webpage at: <http://www.atsdr.cdc.gov/PFC/>



APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

DHSS presentation

HEALTH EFFECTS OF PFAS

DR. KRISTIN BRIDGES, PHD

PUBLIC HEALTH SCIENTIST

ENVIRONMENTAL PUBLIC HEALTH PROGRAM

ALASKA DEPARTMENT OF HEALTH AND SOCIAL SERVICES



PFAS

PER- AND POLY-FLUOROALKYL SUBSTANCES

- HUMAN-MADE CLASS OF CHEMICALS WITH A WIDE VARIETY OF APPLICATIONS



Oil



Heat



Water

- EXTREMELY STABLE IN THE ENVIRONMENT → WIDELY DISTRIBUTED

Contaminated water



Firefighting foams



Contaminated food



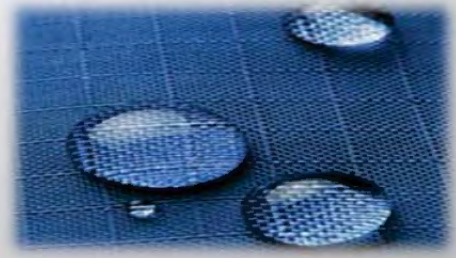
HOW CAN I BE EXPOSED TO PFAS?



Hand to mouth transfer



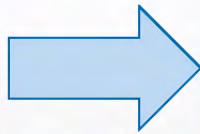
Maternal Transfer



PFAS treated fabrics

WHAT IF I'M EXPOSED?

Globally Distributed



Human Exposure

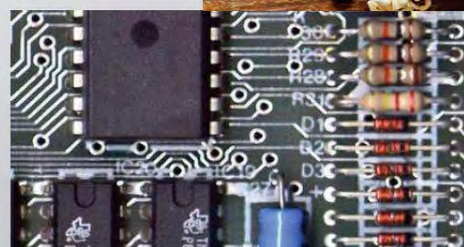
NHANES survey found
PFAS present in the
blood of nearly every
person tested (> 2,000
people)

EXPOSURE DOESN'T ALWAYS LEAD TO HEALTH EFFECTS!



PFAS Use in products

- Fire Fighting Foams
- Cookware, pizza boxes, fast food wrappers, popcorn bags...
- Stain repellants for carpets, clothing, furniture...
- Personal care products – shampoo, conditioner, toothpaste, floss...
- Polishes, waxes, and paints
- Electronics manufacturing





Contaminated Site Regulatory Process

Site Discovery

- Spill occurs and is reported
- Contamination discovered
- Compounds found to be harmful

Characterization

- What is it
- Where is it
- How did it get there
- Where is it going
- Who and what may be effected

Evaluate
Cleanup
Options

Cleanup and Mitigation

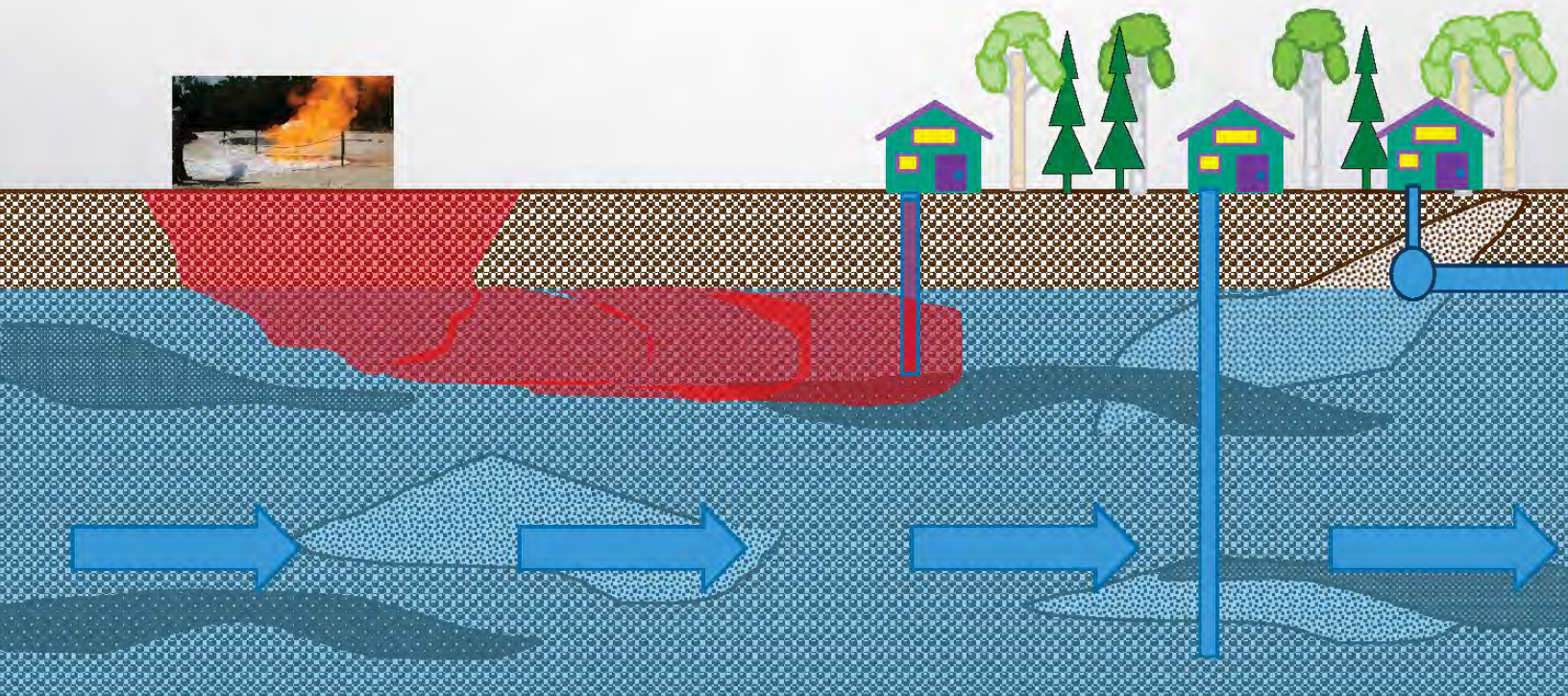
- Interim actions
(e.g., provide water)
- Long-term Solution

Site Closure



Contaminant Transport in Groundwater

- Soluble contaminants can be transported in groundwater
- As groundwater moves, it will carry dissolved substances with it
- If an ongoing source exists, plume will expand





PFAS AWARENESS

2012-2015

- Third Unregulated Contaminant Monitoring Rule (UCRM3)

2016

- EPA Lifetime Health Advisory level 70 ppt PFOA+PFOS
- DEC groundwater cleanup 400 ppt PFOA and 400 ppt PFOS

2018

- DEC action level 70 ppt for five PFAS



DEC PFAS ACTION LEVELS (Aug 2018)

Contaminant	
perfluorooctanesulfonic acid (PFOS)	Summed Action Level 70 ppt
perfluorooctanoic acid (PFOA)	
perfluorononanoic acid (PFNA)	
perfluorohexanesulfonic acid (PFHxS)	
perfluoroheptanoic acid (PFHpA)	
perfluorobutanesulfonic acid (PFBS)	Action Level 2000 ppt



GUSTAVUS WATER WELL SAMPLES TO DATE

SUMMARY OF INITIAL GUSTAVUS SAMPLE RESULTS - REVISED

Analyte			Perluoro-butane sulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonate (PFOS)	Sum of 5 PFAS§
ADEC Action Level			2,000	70§					70§
Sample Name	Well Owner	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
Alaska Airlines Well AE20399	ADOT&PF	6/27/18	3.7 JH*	7.4 JH*	0.39 JL*	26 JL*	3.1 JL*	250 JL*	287 J*
Gustavus Water Plant AE20398	NPS	6/27/18	<1.9 B*	8.0 JH*	0.41 JL*	14 JL*	5.5 JL*	16 JL*	44 J*

ppt parts per trillion, equivalent to nanograms per liter

ADEC Alaska Department of Environmental Conservation

ADOT&PF Alaska Department of Transportation & Public Facilities

NPS National Park Service

§ Sum of 5 PFAS is equal to the sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA. Action level is 70 ppt; results are compared to 65 ppt. ADEC technical memorandum issued August 20, 2018.

Bold Concentration exceeds action level.

< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.

B* Result considered non-detect due to method blank contamination. Listed as less than the reporting limit. Flag applied by Shannon & Wilson, Inc.

JH* Estimated concentration, biased high, due to method blank contamination. Flag applied by Shannon & Wilson, Inc.

JL* Estimated concentration, biased low, due to extraction outside the specified holding time. Flag applied by Shannon & Wilson, Inc.

The background of the slide features a light gray gradient. In the upper left and lower right corners, there are clusters of realistic water droplets of various sizes, some with highlights and shadows. A faint, large, circular, textured pattern, resembling a globe or a complex network, is centered in the background.

**WHAT ARE THE POTENTIAL HEALTH
EFFECTS?**

WHAT DOES THE SCIENCE SAY?

- PFAS ARE AN “EMERGING” CONTAMINANT
 - SCIENCE IS STILL EVOLVING
 - CURRENT GUIDANCE BASED OFF OF:
 - EPIDEMIOLOGICAL STUDIES
 - EVIDENCE FROM ANIMAL TOXICITY TESTS
- STUDIES OF HIGHLY EXPOSED COMMUNITIES SHOW A PROBABLE LINK BETWEEN EXPOSURE TO CERTAIN TYPES OF PFAS AND EFFECTS ON:
 - GASTROINTESTINAL SYSTEM- ULCERATIVE COLITIS
 - LIVER- LIVER DAMAGE, ABNORMAL FAT METABOLISM, HIGH CHOLESTEROL
 - KIDNEY- KIDNEY CANCER AND CHRONIC KIDNEY DISEASE
 - CARDIOVASCULAR SYSTEM- PREGNANCY-INDUCED HYPERTENSION
 - IMMUNE SYSTEM- DECREASED RESPONSE TO VACCINES
 - REPRODUCTIVE SYSTEM- TESTICULAR CANCER AND DECREASED FERTILITY
 - ENDOCRINE SYSTEM- THYROID DISEASE
 - DEVELOPMENT- REDUCED BIRTH WEIGHT



LIMITATIONS OF EXISTING DATA

EPIDEMIOLOGICAL STUDIES

- CONFOUNDING VARIABLES
- IS THERE ANOTHER POSSIBLE EXPLANATION FOR EFFECTS?
 - PRESENCE OF OTHER CONTAMINANTS
 - GENETICS, AGE, GENDER
 - SOCIOECONOMIC AND NUTRITION STATUS

ANIMALS EXPOSURES

- HIGHER EXPOSURE LEVELS
- DIFFERENCES IN PHYSIOLOGY BETWEEN SPECIES AFFECT:
 - ABSORPTION, DISTRIBUTION, METABOLISM, EXCRETION
 - SENSITIVITY TO CONTAMINANT EXPOSURE

Scientists are still uncertain how long-term, chronic PFAS exposure to may impact human health.

ANYTHING ELSE?

Developing embryos and children through age 18 are considered to be “susceptible populations” according to the U.S. Agency for Toxic Substances and Disease Registry toxicological profile for PFAS

- THIS IS BECAUSE OF:
 - TRANSFER FROM MOTHER TO CHILD DURING PREGNANCY AND BREASTFEEDING
 - HAND-TO-MOUTH TRANSFER AFTER HANDLING OBJECTS/CRAWLING
 - HIGHER CONCENTRATION PER KG OF BODY WEIGHT
 - CONTAMINANTS THAT CAUSE DEVELOPMENTAL AND ENDOCRINE EFFECTS CAN HAVE PERMANENT EFFECTS AT LOWER CONCENTRATIONS IN CHILDREN
- THE BENEFITS OF BREASTFEEDING OUTWEIGH THE POTENTIAL RISKS
 - WE RECOMMEND YOU CONTINUE BREASTFEEDING,
 - IT IS ESSENTIAL THAT PREGNANT AND NURSING WOMEN DO NOT CONTINUE TO DRINK PFAS-CONTAMINATED WATER



Questions About:

HUMAN HEALTH EFFECTS

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CONTAMINATED SITES

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DHSS RECOMMENDATIONS

IF PFAS EXCEEDS DEC'S 70 PPT ACTION LEVEL, YOU SHOULD:

FIND AN ALTERNATIVE WATER SOURCE FOR



Drinking



Giving to pets



Brushing your teeth

YOU CAN CONTINUE USING THE WATER FOR



Showering/Bathing



General cleaning



Laundry

Appendix C

ANALYTICAL RESULTS

CONTENTS

- Analytical lab reports
- LDC Checklists

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-40832-1

Client Project/Site: PFAS, Commercial

Revision: 2

For:

Admiralty Environmental, LLC

641 W. Willoughby Ave

Suite 301

Juneau, Alaska 99801

Attn: Hope Oneill

Cesar C Cortes

Authorized for release by:

8/22/2018 5:22:11 PM

Cesar Cortes, Project Management Assistant I

(916)373-5600

cesar.cortes@testamericainc.com

LINKS

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Have a Question?



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The
Expert**

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www.testamericainc.com

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

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

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

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Definitions/Glossary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Qualifiers

LCMS

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

Case Narrative

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Job ID: 320-40832-1

Laboratory: TestAmerica Sacramento

Narrative

Revision 2 - August 22, 2018

Final report revised to include all data (analyte PFOA was missing re-extracted results in 320-40832-1 Revision 1).

Revision 1 - August 22, 2018

This report has been revised to report additional analytes.

Receipt

The samples were received on 7/3/2018 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.8° C.

Method 537 (modified)

The method blank contained Perfluorooctanoic acid (PFOA) greater than one-half the Reporting Limit and Perfluorooctane Sulfonic Acid (PFOS) greater than the RL, preparation batch 320-233425 and analytical batch 320-236310. Samples Gustavus Water Plant AE20398 (320-40832-1) and Alaska Airlines Well AE20399 (320-40832-2) were re-extracted outside of hold time. Both sets of data are reported.

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

Detection Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Client Sample ID: Gustavus Water Plant AE20398

Lab Sample ID: 320-40832-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.4	J B	1.9	0.19	ng/L	1			537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	8.0	B	1.9	0.23	ng/L	1			537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	13	B	1.9	0.16	ng/L	1			537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	4.0	B	1.9	0.25	ng/L	1			537 (modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	15	B	1.9	0.51	ng/L	1			537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	11	B	1.9	0.80	ng/L	1			537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	14	H B	1.9	0.16	ng/L	1			537 (modified)	Total/NA
- RE										
Perfluorononanoic acid (PFNA) - RE	0.41	J H	1.9	0.25	ng/L	1			537 (modified)	Total/NA
Perfluorooctane Sulfonate (PFOS) - RE	16	H	1.9	0.51	ng/L	1			537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	5.5	H	1.9	0.79	ng/L	1			537 (modified)	Total/NA

Client Sample ID: Alaska Airlines Well AE20399

Lab Sample ID: 320-40832-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.7	B	1.8	0.18	ng/L	1			537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.4	B	1.8	0.23	ng/L	1			537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	25	B	1.8	0.16	ng/L	1			537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	4.5	B	1.8	0.25	ng/L	1			537 (modified)	Total/NA
Perfluorooctane Sulfonate (PFOS)	200	B	1.8	0.50	ng/L	1			537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.9	B	1.8	0.78	ng/L	1			537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	26	H B	1.8	0.16	ng/L	1			537 (modified)	Total/NA
- RE										
Perfluorononanoic acid (PFNA) - RE	0.39	J H	1.8	0.25	ng/L	1			537 (modified)	Total/NA
Perfluorooctane Sulfonate (PFOS) - RE	250	H	1.8	0.49	ng/L	1			537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA) - RE	3.1	H	1.8	0.78	ng/L	1			537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Client Sample ID: Gustavus Water Plant AE20398

Date Collected: 06/27/18 07:45

Date Received: 07/03/18 09:30

Lab Sample ID: 320-40832-1

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.4	J B	1.9	0.19	ng/L		07/11/18 12:04	07/28/18 09:57	1
Perfluoroheptanoic acid (PFHpA)	8.0	B	1.9	0.23	ng/L		07/11/18 12:04	07/28/18 09:57	1
Perfluorohexanesulfonic acid (PFHxS)	13	B	1.9	0.16	ng/L		07/11/18 12:04	07/28/18 09:57	1
Perfluorononanoic acid (PFNA)	4.0	B	1.9	0.25	ng/L		07/11/18 12:04	07/28/18 09:57	1
Perfluorooctane Sulfonate (PFOS)	15	B	1.9	0.51	ng/L		07/11/18 12:04	07/28/18 09:57	1
Perfluorooctanoic acid (PFOA)	11	B	1.9	0.80	ng/L		07/11/18 12:04	07/28/18 09:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	110		25 - 150				07/11/18 12:04	07/28/18 09:57	1
13C4 PFOS	111		25 - 150				07/11/18 12:04	07/28/18 09:57	1
18O2 PFHxS	109		25 - 150				07/11/18 12:04	07/28/18 09:57	1
13C3-PFBS	115		25 - 150				07/11/18 12:04	07/28/18 09:57	1
13C5 PFNA	106		25 - 150				07/11/18 12:04	07/28/18 09:57	1
13C4-PFHpa	107		25 - 150				07/11/18 12:04	07/28/18 09:57	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	14	H B	1.9	0.16	ng/L		07/26/18 17:38	07/27/18 23:39	1
Perfluorononanoic acid (PFNA)	0.41	J H	1.9	0.25	ng/L		07/26/18 17:38	07/27/18 23:39	1
Perfluorooctane Sulfonate (PFOS)	16	H	1.9	0.51	ng/L		07/26/18 17:38	07/27/18 23:39	1
Perfluorooctanoic acid (PFOA)	5.5	H	1.9	0.79	ng/L		07/26/18 17:38	07/27/18 23:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	99		25 - 150				07/26/18 17:38	07/27/18 23:39	1
13C4 PFOS	98		25 - 150				07/26/18 17:38	07/27/18 23:39	1
18O2 PFHxS	98		25 - 150				07/26/18 17:38	07/27/18 23:39	1
13C5 PFNA	104		25 - 150				07/26/18 17:38	07/27/18 23:39	1

Client Sample ID: Alaska Airlines Well AE20399

Date Collected: 06/27/18 08:05

Date Received: 07/03/18 09:30

Lab Sample ID: 320-40832-2

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.7	B	1.8	0.18	ng/L		07/11/18 12:04	07/25/18 12:53	1
Perfluoroheptanoic acid (PFHpA)	7.4	B	1.8	0.23	ng/L		07/11/18 12:04	07/25/18 12:53	1
Perfluorohexanesulfonic acid (PFHxS)	25	B	1.8	0.16	ng/L		07/11/18 12:04	07/25/18 12:53	1
Perfluorononanoic acid (PFNA)	4.5	B	1.8	0.25	ng/L		07/11/18 12:04	07/25/18 12:53	1
Perfluorooctane Sulfonate (PFOS)	200	B	1.8	0.50	ng/L		07/11/18 12:04	07/25/18 12:53	1
Perfluorooctanoic acid (PFOA)	4.9	B	1.8	0.78	ng/L		07/11/18 12:04	07/25/18 12:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	92		25 - 150				07/11/18 12:04	07/25/18 12:53	1
13C4 PFOS	87		25 - 150				07/11/18 12:04	07/25/18 12:53	1
18O2 PFHxS	91		25 - 150				07/11/18 12:04	07/25/18 12:53	1
13C3-PFBS	89		25 - 150				07/11/18 12:04	07/25/18 12:53	1
13C5 PFNA	87		25 - 150				07/11/18 12:04	07/25/18 12:53	1
13C4-PFHpa	89		25 - 150				07/11/18 12:04	07/25/18 12:53	1

TestAmerica Sacramento

Client Sample Results

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Client Sample ID: Alaska Airlines Well AE20399

Lab Sample ID: 320-40832-2

Date Collected: 06/27/18 08:05

Matrix: Water

Date Received: 07/03/18 09:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	26	H B	1.8	0.16	ng/L		07/26/18 17:38	07/27/18 23:47	1
Perfluorononanoic acid (PFNA)	0.39	J H	1.8	0.25	ng/L		07/26/18 17:38	07/27/18 23:47	1
Perfluorooctane Sulfonate (PFOS)	250	H	1.8	0.49	ng/L		07/26/18 17:38	07/27/18 23:47	1
Perfluorooctanoic acid (PFOA)	3.1	H	1.8	0.78	ng/L		07/26/18 17:38	07/27/18 23:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	100		25 - 150				07/26/18 17:38	07/27/18 23:47	1
13C4 PFOS	95		25 - 150				07/26/18 17:38	07/27/18 23:47	1
18O2 PFHxS	100		25 - 150				07/26/18 17:38	07/27/18 23:47	1
13C5 PFNA	96		25 - 150				07/26/18 17:38	07/27/18 23:47	1

TestAmerica Sacramento

Isotope Dilution Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFOA (25-150)	PFOS (25-150)	PFHxS (25-150)	3C3-PFBs (25-150)	PFNA (25-150)	PFHpA (25-150)
320-40832-1 - RE	Gustavus Water Plant AE20398	99	98	98		104	
320-40832-1	Gustavus Water Plant AE20398	110	111	109	115	106	107
320-40832-2	Alaska Airlines Well AE20399	92	87	91	89	87	89
320-40832-2 - RE	Alaska Airlines Well AE20399	100	95	100		96	
LCS 320-233425/2-A	Lab Control Sample	83	82	89	85	83	85
LCS 320-236289/2-A	Lab Control Sample	106	113	114	116	115	110
LCSD 320-233425/3-A	Lab Control Sample Dup	100	94	103	105	91	98
LCSD 320-236289/3-A	Lab Control Sample Dup	101	106	105	104	110	102
MB 320-233425/1-A	Method Blank	103	96	97	94	98	99
MB 320-236289/1-A	Method Blank	101	106	105	101	106	102

Surrogate Legend

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

QC Sample Results

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-233425/1-A

Matrix: Water

Analysis Batch: 236310

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 233425

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.585	J	2.0	0.20	ng/L		07/11/18 12:04	07/26/18 12:22	1
Perfluoroheptanoic acid (PFHpA)	1.17	J	2.0	0.25	ng/L		07/11/18 12:04	07/26/18 12:22	1
Perfluorohexanesulfonic acid (PFHxS)	2.88		2.0	0.17	ng/L		07/11/18 12:04	07/26/18 12:22	1
Perfluorononanoic acid (PFNA)	2.96		2.0	0.27	ng/L		07/11/18 12:04	07/26/18 12:22	1
Perfluorooctane Sulfonate (PFOS)	23.9		2.0	0.54	ng/L		07/11/18 12:04	07/26/18 12:22	1
Perfluorooctanoic acid (PFOA)	1.21	J	2.0	0.85	ng/L		07/11/18 12:04	07/26/18 12:22	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	103		25 - 150	07/11/18 12:04	07/26/18 12:22	1
13C4 PFOS	96		25 - 150	07/11/18 12:04	07/26/18 12:22	1
18O2 PFHxS	97		25 - 150	07/11/18 12:04	07/26/18 12:22	1
13C3-PFBS	94		25 - 150	07/11/18 12:04	07/26/18 12:22	1
13C5 PFNA	98		25 - 150	07/11/18 12:04	07/26/18 12:22	1
13C4-PFHpa	99		25 - 150	07/11/18 12:04	07/26/18 12:22	1

Lab Sample ID: LCS 320-233425/2-A

Matrix: Water

Analysis Batch: 235347

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 233425

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	33.9		ng/L		96	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	40.1		ng/L		100	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.4	31.3		ng/L		86	63 - 123
Perfluorononanoic acid (PFNA)	40.0	39.1		ng/L		98	68 - 128
Perfluorooctane Sulfonate (PFOS)	37.1	43.2		ng/L		116	67 - 127
Perfluorooctanoic acid (PFOA)	40.0	39.2		ng/L		98	64 - 124

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	83		25 - 150
13C4 PFOS	82		25 - 150
18O2 PFHxS	89		25 - 150
13C3-PFBS	85		25 - 150
13C5 PFNA	83		25 - 150
13C4-PFHpa	85		25 - 150

Lab Sample ID: LCSD 320-233425/3-A

Matrix: Water

Analysis Batch: 235347

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 233425

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	28.9		ng/L		82	73 - 133	16	30
Perfluoroheptanoic acid (PFHpA)	40.0	48.8		ng/L		122	66 - 126	19	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	28.7		ng/L		79	63 - 123	9	30
Perfluorononanoic acid (PFNA)	40.0	40.3		ng/L		101	68 - 128	3	30

TestAmerica Sacramento

QC Sample Results

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

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

Lab Sample ID: LCSD 320-233425/3-A

Matrix: Water

Analysis Batch: 235347

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 233425

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctane Sulfonate (PFOS)	37.1	37.5		ng/L		101	67 - 127	14	30
Perfluorooctanoic acid (PFOA)	40.0	39.7		ng/L		99	64 - 124	1	30
Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits						
13C4 PFOA	100		25 - 150						
13C4 PFOS	94		25 - 150						
18O2 PFHxS	103		25 - 150						
13C3-PFBS	105		25 - 150						
13C5 PFNA	91		25 - 150						
13C4-PFHpa	98		25 - 150						

Lab Sample ID: MB 320-236289/1-A

Matrix: Water

Analysis Batch: 236645

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 236289

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		07/26/18 10:27	07/27/18 23:15	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		07/26/18 10:27	07/27/18 23:15	1
Perfluorohexanesulfonic acid (PFHxS)	0.286	J	2.0	0.17	ng/L		07/26/18 10:27	07/27/18 23:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		07/26/18 10:27	07/27/18 23:15	1
Perfluorooctane Sulfonate (PFOS)	ND		2.0	0.54	ng/L		07/26/18 10:27	07/27/18 23:15	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		07/26/18 10:27	07/27/18 23:15	1
Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac			
13C4 PFOA	101		25 - 150	07/26/18 10:27	07/27/18 23:15	1			
13C4 PFOS	106		25 - 150	07/26/18 10:27	07/27/18 23:15	1			
18O2 PFHxS	105		25 - 150	07/26/18 10:27	07/27/18 23:15	1			
13C3-PFBS	101		25 - 150	07/26/18 10:27	07/27/18 23:15	1			
13C5 PFNA	106		25 - 150	07/26/18 10:27	07/27/18 23:15	1			
13C4-PFHpa	102		25 - 150	07/26/18 10:27	07/27/18 23:15	1			

Lab Sample ID: LCS 320-236289/2-A

Matrix: Water

Analysis Batch: 236645

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 236289

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	33.8		ng/L		96	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	38.9		ng/L		97	66 - 126
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.1		ng/L		88	63 - 123
Perfluorononanoic acid (PFNA)	40.0	36.5		ng/L		91	68 - 128
Perfluorooctane Sulfonate (PFOS)	37.1	37.8		ng/L		102	67 - 127
Perfluorooctanoic acid (PFOA)	40.0	36.8		ng/L		92	64 - 124
Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits				
13C4 PFOA	106		25 - 150				
13C4 PFOS	113		25 - 150				

TestAmerica Sacramento

QC Sample Results

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

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

Lab Sample ID: LCS 320-236289/2-A

Matrix: Water

Analysis Batch: 236645

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 236289

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	114		25 - 150
13C3-PFBS	116		25 - 150
13C5 PFNA	115		25 - 150
13C4-PFHpA	110		25 - 150

Lab Sample ID: LCSD 320-236289/3-A

Matrix: Water

Analysis Batch: 236645

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 236289

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	35.4		ng/L		100	73 - 133	5	30
Perfluoroheptanoic acid (PFHpA)	40.0	40.4		ng/L		101	66 - 126	4	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.9		ng/L		90	63 - 123	3	30
Perfluorononanoic acid (PFNA)	40.0	36.4		ng/L		91	68 - 128	1	30
Perfluorooctane Sulfonate (PFOS)	37.1	38.2		ng/L		103	67 - 127	1	30
Perfluorooctanoic acid (PFOA)	40.0	36.8		ng/L		92	64 - 124	0	30

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFOA	101		25 - 150
13C4 PFOS	106		25 - 150
18O2 PFHxS	105		25 - 150
13C3-PFBS	104		25 - 150
13C5 PFNA	110		25 - 150
13C4-PFHpA	102		25 - 150

TestAmerica Sacramento

QC Association Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

LCMS

Prep Batch: 233425

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40832-1	Gustavus Water Plant AE20398	Total/NA	Water	3535	
320-40832-2	Alaska Airlines Well AE20399	Total/NA	Water	3535	
MB 320-233425/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-233425/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-233425/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 235347

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-233425/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	233425
LCSD 320-233425/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	233425

Analysis Batch: 236249

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40832-2	Alaska Airlines Well AE20399	Total/NA	Water	537 (modified)	233425

Prep Batch: 236289

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40832-1 - RE	Gustavus Water Plant AE20398	Total/NA	Water	3535	
320-40832-2 - RE	Alaska Airlines Well AE20399	Total/NA	Water	3535	
MB 320-236289/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-236289/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-236289/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 236310

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-233425/1-A	Method Blank	Total/NA	Water	537 (modified)	233425

Analysis Batch: 236645

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40832-1 - RE	Gustavus Water Plant AE20398	Total/NA	Water	537 (modified)	236289
320-40832-2 - RE	Alaska Airlines Well AE20399	Total/NA	Water	537 (modified)	236289
MB 320-236289/1-A	Method Blank	Total/NA	Water	537 (modified)	236289
LCS 320-236289/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	236289
LCSD 320-236289/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	236289

Analysis Batch: 236715

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-40832-1	Gustavus Water Plant AE20398	Total/NA	Water	537 (modified)	233425

Lab Chronicle

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Client Sample ID: Gustavus Water Plant AE20398

Lab Sample ID: 320-40832-1

Date Collected: 06/27/18 07:45

Matrix: Water

Date Received: 07/03/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		267.3 mL	10.00 mL	236289	07/26/18 17:38	TWL	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			236645	07/27/18 23:39	AAR	TAL SAC
Total/NA	Prep	3535			266.2 mL	10.0 mL	233425	07/11/18 12:04	KMK	TAL SAC
Total/NA	Analysis	537 (modified)		1			236715	07/28/18 09:57	AAR	TAL SAC

Client Sample ID: Alaska Airlines Well AE20399

Lab Sample ID: 320-40832-2

Date Collected: 06/27/18 08:05

Matrix: Water

Date Received: 07/03/18 09:30

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	RE		273.4 mL	10.00 mL	236289	07/26/18 17:38	TWL	TAL SAC
Total/NA	Analysis	537 (modified)	RE	1			236645	07/27/18 23:47	AAR	TAL SAC
Total/NA	Prep	3535			271.4 mL	10.0 mL	233425	07/11/18 12:04	KMK	TAL SAC
Total/NA	Analysis	537 (modified)		1			236249	07/25/18 12:53	ABH	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Laboratory: TestAmerica Sacramento

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
537 (modified)	3535	Water	Perfluorobutanesulfonic acid (PFBS)
537 (modified)	3535	Water	Perfluoroheptanoic acid (PFHpA)
537 (modified)	3535	Water	Perfluorohexanesulfonic acid (PFHxS)
537 (modified)	3535	Water	Perfluorononanoic acid (PFNA)
537 (modified)	3535	Water	Perfluorooctane Sulfonate (PFOS)
537 (modified)	3535	Water	Perfluorooctanoic acid (PFOA)

Method Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

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

Protocol References:

EPA = US Environmental Protection Agency

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

Laboratory References:

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

Sample Summary

Client: Admiralty Environmental, LLC
Project/Site: PFAS, Commercial

TestAmerica Job ID: 320-40832-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-40832-1	Gustavus Water Plant AE20398	Water	06/27/18 07:45	07/03/18 09:30
320-40832-2	Alaska Airlines Well AE20399	Water	06/27/18 08:05	07/03/18 09:30

[illegible]

Login Sample Receipt Checklist

Client: Admiralty Environmental, LLC

Job Number: 320-40832-1

Login Number: 40832

List Source: TestAmerica Sacramento

List Number: 1

Creator: Nelson, Kym D

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	187341, 187342
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 $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed By:

Kristen Freiburger

Title:

Senior Chemist

Date:

August 21, 2018

CS Report Name:

Gustavus Airport

Report Date:

August 21, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-40832-1 (reissue)

ADEC File Number:

Hazard Identification Number:

1. Laboratory

- a. Did an ADEC CS approved laboratory receive and
- perform
- all of the submitted sample analyses?

☐ Yes☐ No

Comments:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample cooler was recorded at 1.61° C and 5.8° C upon receipt at the laboratory receiving office and Test America, respectively.

- b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☐ Yes☐ No

Comments:

Analysis of PFASs does not require a preservative other than temperature control.

- 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability is not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 5.8° C.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD).

The case narrative also notes PFOA and PFOS detections in the method blank associated with the original run. PFOS was detected in the method blank at concentrations greater than ten times the reporting limit. For the purposes of this data set, the second batch of samples will be reported with the appropriate qualifier for extraction outside of hold time.

Please note, the case narrative does not provide additional information for the four additional analytes.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

The laboratory re-extracted the PFOS and PFOA samples due to the method blank detection (PFHxS as well, but it is not noted).

- 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 noted the samples were re-extracted outside of hold time due to contamination in the method blank associated with the original batch. For the purposes of this data set, the out of hold time data will be reported.

- 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 applicable EPA lifetime drinking water health advisory levels and ADEC groundwater cleanup levels for PFOS and PFOA.

- e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The out-of-hold time results, where available (PFOS, PFOA, and PFHxS), will be used for the purposes of reporting this data set. The results will be flagged, "JL" and are considered estimated, biased low, due to hold time exceedance.

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:

The following analytes were detected in the method blank associated with the original batch:

- PFOA at 1.21 J ppt (re-extracted due to detection)
- PFOS at 23.9 ppt (re-extracted due to detection)
- PFHxS at 2.88 ppt (re-extracted due to detection)
- PFBS at 0.585 J ppt (not re-extracted, only the original batch result exists for the analyte)
- PFHpA at 1.17 J ppt (not re-extracted, only the original batch result exists for the analyte)
- PFNA at 2.96 ppt (not re-extracted, only the original batch result exists for the analyte)

Additionally, PFHxS was detected in the re-extracted batch at 0.286 J ppt.

iii. If above LOQ, what samples are affected?

Comments:

Project sample results within 5 times the MB concentration are considered non-detect, flagged with a "UB". Project sample results greater than 5 times the MB concentration and less than 10 times the MB concentration are considered estimated, biased high, flagged with a "JH".

The re-extracted results will be used for the purposes of reporting data associated with this sample set for PFOS, PFOA, and PFHxS; these results are not considered to be affected by the MB detections.

The following samples are affected by method blank detections.

- Samples within 5-10 times the MB concentration are: PFHpA (both samples) and sample *AK Air Well* for PFBS.
- Samples less than 5 times the MB concentration are: PFNA (both samples) and sample *Gustavus Water Plant* for PFBS.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No

Comments:

Yes; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were affected by the method blanks; 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:

Metals and 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:

N/A; analytical accuracy and precision were 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 usability were 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:

PFASs 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 usability were 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 sample was not submitted with this work order.

ii. Submitted blind to lab?

☒ Yes ☒ No

Comments:

N/A; a field duplicate was not submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

☒ Yes ☒ No

Comments:

N/A; a field duplicate was not 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 usability were not affected.

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.

ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

☒ Yes ☐ No

Comments:

Please note the laboratory has applied “B” flags and “H” flags that are not appropriate, based on our QA/QC review. These will not be used for the purposes of reporting. Flags will only be applied where noted above.

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: 320-42647-1

Client Project/Site: Gustavus DOT

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

9/7/2018 1:59:52 PM

David Alltucker, Project Manager I

(916)374-4383

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-42647-1

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

Case Narrative

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

TestAmerica Job ID: 320-42647-1

Job ID: 320-42647-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-42647-1

Receipt

The samples were received on 8/30/2018 11:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.0° C and 5.8° C.

Receipt Exceptions

The container label for the following samples did not match the information listed on the Chain-of-Custody (COC): PW-031 (320-42647-3) and PW-061 (320-42647-6). Sample#3 container label list ID as 031, while COC list PW-031. Sample#6 container label list ID as 061, while COC list PW-061. Labeled according to COC.

LCMS

No analytical or quality issues were noted, other than those described 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 320-243729.

Method(s) PFAS Prep: The samples are brown in color and have brown sediment at the bottom of the containers: NPS Well (320-42647-1) and PW-034 (320-42647-4).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243730.

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: 320-42647-1

Client Sample ID: NPS Well

Lab Sample ID: 320-42647-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.3	J	2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	4.6		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: Airport Terminal

Lab Sample ID: 320-42647-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.5		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	31		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.7		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	4.3		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-031

Lab Sample ID: 320-42647-3

No Detections.

Client Sample ID: PW-034

Lab Sample ID: 320-42647-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.5	J	2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-038

Lab Sample ID: 320-42647-5

No Detections.

Client Sample ID: PW-061

Lab Sample ID: 320-42647-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	J	2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-008

Lab Sample ID: 320-42647-7

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-008 (Continued)

Lab Sample ID: 320-42647-7

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

Client Sample ID: PW-010

Lab Sample ID: 320-42647-8

No Detections.

Client Sample ID: SW-2000

Lab Sample ID: 320-42647-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.7	J	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)	3.7		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-012

Lab Sample ID: 320-42647-10

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)	8.9		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.81	J	2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	0.77	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: NPS Well

Date Collected: 08/27/18 13:25

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.3	J	2.0	0.92	ng/L		09/04/18 13:07	09/05/18 22:07	1
Perfluorohexanesulfonic acid (PFHxS)	12		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 22:07	1
Perfluoroheptanoic acid (PFHpA)	1.8	J	2.0	0.80	ng/L		09/04/18 13:07	09/05/18 22:07	1
Perfluorooctanoic acid (PFOA)	4.6		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 22:07	1
Perfluorooctanesulfonic acid (PFOS)	23		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 22:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 22:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/04/18 13:07	09/05/18 22:07	1
13C4-PFHpa	109		25 - 150				09/04/18 13:07	09/05/18 22:07	1
13C4 PFOA	125		25 - 150				09/04/18 13:07	09/05/18 22:07	1
13C4 PFOS	111		25 - 150				09/04/18 13:07	09/05/18 22:07	1
13C5 PFNA	124		25 - 150				09/04/18 13:07	09/05/18 22:07	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: Airport Terminal

Date Collected: 08/27/18 12:40

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.5		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 22:26	1
Perfluorohexanesulfonic acid (PFHxS)	31		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 22:26	1
Perfluoroheptanoic acid (PFHpA)	5.7		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 22:26	1
Perfluorooctanoic acid (PFOA)	4.3		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 22:26	1
Perfluorooctanesulfonic acid (PFOS)	250		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 22:26	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 22:26	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/04/18 13:07	09/05/18 22:26	1
13C4-PFHpA	108		25 - 150				09/04/18 13:07	09/05/18 22:26	1
13C4 PFOA	126		25 - 150				09/04/18 13:07	09/05/18 22:26	1
13C4 PFOS	106		25 - 150				09/04/18 13:07	09/05/18 22:26	1
13C5 PFNA	129		25 - 150				09/04/18 13:07	09/05/18 22:26	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-031

Date Collected: 08/27/18 16:05

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 22:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 22:44	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 22:44	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 22:44	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 22:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 22:44	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150				09/04/18 13:07	09/05/18 22:44	1
13C4-PFHpA	105		25 - 150				09/04/18 13:07	09/05/18 22:44	1
13C4 PFOA	127		25 - 150				09/04/18 13:07	09/05/18 22:44	1
13C4 PFOS	109		25 - 150				09/04/18 13:07	09/05/18 22:44	1
13C5 PFNA	134		25 - 150				09/04/18 13:07	09/05/18 22:44	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-034

Date Collected: 08/28/18 14:10

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 23:02	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2.0	0.87	ng/L		09/04/18 13:07	09/05/18 23:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 23:02	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 23:02	1
Perfluorooctanesulfonic acid (PFOS)	1.5	J	2.0	1.3	ng/L		09/04/18 13:07	09/05/18 23:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 23:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	104		25 - 150				09/04/18 13:07	09/05/18 23:02	1
13C4-PFHpA	113		25 - 150				09/04/18 13:07	09/05/18 23:02	1
13C4 PFOA	127		25 - 150				09/04/18 13:07	09/05/18 23:02	1
13C4 PFOS	110		25 - 150				09/04/18 13:07	09/05/18 23:02	1
13C5 PFNA	139		25 - 150				09/04/18 13:07	09/05/18 23:02	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-038

Date Collected: 08/28/18 13:32

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 23:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/04/18 13:07	09/05/18 23:21	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/05/18 23:21	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 23:21	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/04/18 13:07	09/05/18 23:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 23:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103		25 - 150				09/04/18 13:07	09/05/18 23:21	1
13C4-PFHpA	105		25 - 150				09/04/18 13:07	09/05/18 23:21	1
13C4 PFOA	126		25 - 150				09/04/18 13:07	09/05/18 23:21	1
13C4 PFOS	105		25 - 150				09/04/18 13:07	09/05/18 23:21	1
13C5 PFNA	128		25 - 150				09/04/18 13:07	09/05/18 23:21	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-061

Date Collected: 08/27/18 16:12

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/05/18 23:57	1
Perfluorohexanesulfonic acid (PFHxS)	1.3	J	2.0	0.87	ng/L		09/04/18 13:07	09/05/18 23:57	1
Perfluoroheptanoic acid (PFHpA)	1.3	J	2.0	0.80	ng/L		09/04/18 13:07	09/05/18 23:57	1
Perfluorooctanoic acid (PFOA)	3.8		2.0	0.75	ng/L		09/04/18 13:07	09/05/18 23:57	1
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2.0	1.3	ng/L		09/04/18 13:07	09/05/18 23:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/05/18 23:57	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	101		25 - 150				09/04/18 13:07	09/05/18 23:57	1
13C4-PFHpA	115		25 - 150				09/04/18 13:07	09/05/18 23:57	1
13C4 PFOA	121		25 - 150				09/04/18 13:07	09/05/18 23:57	1
13C4 PFOS	110		25 - 150				09/04/18 13:07	09/05/18 23:57	1
13C5 PFNA	133		25 - 150				09/04/18 13:07	09/05/18 23:57	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-008

Date Collected: 08/28/18 14:28

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/06/18 00:16	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/04/18 13:07	09/06/18 00:16	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/06/18 00:16	1
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L		09/04/18 13:07	09/06/18 00:16	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/04/18 13:07	09/06/18 00:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/06/18 00:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	102		25 - 150				09/04/18 13:07	09/06/18 00:16	1
13C4-PFHpA	109		25 - 150				09/04/18 13:07	09/06/18 00:16	1
13C4 PFOA	127		25 - 150				09/04/18 13:07	09/06/18 00:16	1
13C4 PFOS	106		25 - 150				09/04/18 13:07	09/06/18 00:16	1
13C5 PFNA	122		25 - 150				09/04/18 13:07	09/06/18 00:16	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-010

Date Collected: 08/29/18 09:28

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/04/18 13:07	09/06/18 00:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/04/18 13:07	09/06/18 00:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/04/18 13:07	09/06/18 00:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/04/18 13:07	09/06/18 00:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/04/18 13:07	09/06/18 00:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:07	09/06/18 00:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103		25 - 150				09/04/18 13:07	09/06/18 00:34	1
13C4-PFHpA	109		25 - 150				09/04/18 13:07	09/06/18 00:34	1
13C4 PFOA	125		25 - 150				09/04/18 13:07	09/06/18 00:34	1
13C4 PFOS	109		25 - 150				09/04/18 13:07	09/06/18 00:34	1
13C5 PFNA	125		25 - 150				09/04/18 13:07	09/06/18 00:34	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: SW-2000

Date Collected: 08/29/18 09:40

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.7	J	2.0	0.92	ng/L		09/04/18 13:13	09/06/18 11:16	1
Perfluorohexanesulfonic acid (PFHxS)	26		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 11:16	1
Perfluoroheptanoic acid (PFHpA)	3.7		2.0	0.80	ng/L		09/04/18 13:13	09/06/18 11:16	1
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L		09/04/18 13:13	09/06/18 11:16	1
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 11:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 11:16	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	113		25 - 150				09/04/18 13:13	09/06/18 11:16	1
13C4-PFHpA	115		25 - 150				09/04/18 13:13	09/06/18 11:16	1
13C4 PFOA	131		25 - 150				09/04/18 13:13	09/06/18 11:16	1
13C4 PFOS	116		25 - 150				09/04/18 13:13	09/06/18 11:16	1
13C5 PFNA	125		25 - 150				09/04/18 13:13	09/06/18 11:16	1

Client Sample Results

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-012

Date Collected: 08/29/18 13:21

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-10

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		09/04/18 13:13	09/06/18 11:34	1
Perfluorohexanesulfonic acid (PFHxS)	8.9		2.0	0.87	ng/L		09/04/18 13:13	09/06/18 11:34	1
Perfluoroheptanoic acid (PFHpA)	0.81	J	2.0	0.80	ng/L		09/04/18 13:13	09/06/18 11:34	1
Perfluorooctanoic acid (PFOA)	0.77	J	2.0	0.75	ng/L		09/04/18 13:13	09/06/18 11:34	1
Perfluorooctanesulfonic acid (PFOS)	7.7		2.0	1.3	ng/L		09/04/18 13:13	09/06/18 11:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/04/18 13:13	09/06/18 11:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/04/18 13:13	09/06/18 11:34	1
13C4-PFHpA	106		25 - 150				09/04/18 13:13	09/06/18 11:34	1
13C4 PFOA	126		25 - 150				09/04/18 13:13	09/06/18 11:34	1
13C4 PFOS	115		25 - 150				09/04/18 13:13	09/06/18 11:34	1
13C5 PFNA	126		25 - 150				09/04/18 13:13	09/06/18 11:34	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-42647-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-42647-1	NPS Well	108	109	125	111	124
320-42647-2	Airport Terminal	108	108	126	106	129
320-42647-3	PW-031	104	105	127	109	134
320-42647-4	PW-034	104	113	127	110	139
320-42647-5	PW-038	103	105	126	105	128
320-42647-6	PW-061	101	115	121	110	133
320-42647-7	PW-008	102	109	127	106	122
320-42647-8	PW-010	103	109	125	109	125
320-42647-9	SW-2000	113	115	131	116	125
320-42647-10	PW-012	108	106	126	115	126
LCS 320-243729/2-A	Lab Control Sample	98	117	118	104	121
LCS 320-243730/2-A	Lab Control Sample	105	105	118	113	128
LCSD 320-243729/3-A	Lab Control Sample Dup	100	114	119	108	117
LCSD 320-243730/3-A	Lab Control Sample Dup	107	110	121	114	123
MB 320-243729/1-A	Method Blank	101	115	114	106	118
MB 320-243730/1-A	Method Blank	101	98	117	112	116

Surrogate Legend

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

QC Sample Results

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

TestAmerica Job ID: 320-42647-1

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

Lab Sample ID: MB 320-243729/1-A

Matrix: Water

Analysis Batch: 243992

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 243729

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d 2	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d 7	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1
Per.luroheptanoic aci9 gPLHpA5	f D		2d	0d 0	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1
Per.lurooctanoic aci9 gPLOA5	f D		2d	0d B	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1
Per.lurooctanesul.onic aci9 gPLOS5	f D		2d	1d	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0d B	nF/N		0 (/04/1) 13:0B	0 (/0B/1) 17:14	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	101		25 - 150	09/0: /18 17305	09/05/18 1431:	1
17C: -PFHpA	115		25 - 150	09/0: /18 17305	09/05/18 1431:	1
17C: PFOA	11:		25 - 150	09/0: /18 17305	09/05/18 1431:	1
17C: PFOS	10N		25 - 150	09/0: /18 17305	09/05/18 1431:	1
17C5 PF6A	118		25 - 150	09/0: /18 17305	09/05/18 1431:	1

Lab Sample ID: LCS 320-243729/2-A

Matrix: Water

Analysis Batch: 243992

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 243729

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Per.lurobutanesul.onic aci9 gPL8S5	17d	22d		nF/N		126	72 - 1B1
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	22d		nF/N		124	73 - 1B7
Per.luroheptanoic aci9 gPLHpA5	20d	23d		nF/N		11B	71 - 13)
Per.lurooctanoic aci9 gPLOA5	20d	23d		nF/N		117	70 - 140
Per.lurooctanesul.onic aci9 gPLOS5	1) d	20d		nF/N		112	6(- 144
Per.lurononanoic aci9 gPLf A5	20d	23d		nF/N		116	73 - 147

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	98		25 - 150
17C: -PFHpA	114		25 - 150
17C: PFOA	118		25 - 150
17C: PFOS	10:		25 - 150
17C5 PF6A	121		25 - 150

Lab Sample ID: LCSD 320-243729/3-A

Matrix: Water

Analysis Batch: 243992

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243729

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.lurobutanesul.onic aci9 gPL8S5	17d	21d		nF/N		120	72 - 1B1	B	30
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	21d		nF/N		120	73 - 1B7	3	30
Per.luroheptanoic aci9 gPLHpA5	20d	23d		nF/N		116	71 - 13)	1	30
Per.lurooctanoic aci9 gPLOA5	20d	23d		nF/N		11)	70 - 140	1	30
Per.lurooctanesul.onic aci9 gPLOS5	1) d	20d		nF/N		10)	6(- 144	4	30
Per.lurononanoic aci9 gPLf A5	20d	24d		nF/N		124	73 - 147	6	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42647-1

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	100		25 - 150
17C: -PFHpA	111		25 - 150
17C: PFOA	119		25 - 150
17C: PFOS	108		25 - 150
17C5 PF6A	114		25 - 150

Lab Sample ID: MB 320-243730/1-A

Matrix: Water

Analysis Batch: 244213

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 243730

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d 2	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d 7	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1
Per.luroheptanoic aci9 gPLHpA5	f D		2d	0d 0	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1
Per.lurooctanoic aci9 gPLOA5	f D		2d	0d B	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1
Per.lurooctanesul.onic aci9 gPLOS5	f D		2d	1d	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0d B	nF/N		0(/04/1) 13:13	0(/06/1) 07:36	1

Isotope Dilution	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	101		25 - 150	09/0:/18 17317	09/0N18 043N	1
17C: -PFHpA	98		25 - 150	09/0:/18 17317	09/0N18 043N	1
17C: PFOA	114		25 - 150	09/0:/18 17317	09/0N18 043N	1
17C: PFOS	112		25 - 150	09/0:/18 17317	09/0N18 043N	1
17C5 PF6A	11N		25 - 150	09/0:/18 17317	09/0N18 043N	1

Lab Sample ID: LCS 320-243730/2-A

Matrix: Water

Analysis Batch: 244213

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 243730

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Per.lurobutanesul.onic aci9 gPL8S5	17d	20d		nF/N		114	72 - 1B1
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	21d		nF/N		11)	73 - 1B7
Per.luroheptanoic aci9 gPLHpA5	20d	23d		nF/N		117	71 - 13)
Per.lurooctanoic aci9 gPLOA5	20d	24d		nF/N		123	70 - 140
Per.lurooctanesul.onic aci9 gPLOS5	1) d	20d		nF/N		110	6(- 144
Per.lurononanoic aci9 gPLf A5	20d	23d		nF/N		116	73 - 147

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	105		25 - 150
17C: -PFHpA	105		25 - 150
17C: PFOA	118		25 - 150
17C: PFOS	117		25 - 150
17C5 PF6A	128		25 - 150

Lab Sample ID: LCSD 320-243730/3-A

Matrix: Water

Analysis Batch: 244213

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243730

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.lurobutanesul.onic aci9 gPL8S5	17d	21d		nF/N		11(	72 - 1B1	4	30
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	22d		nF/N		121	73 - 1B7	3	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42647-1

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

Lab Sample ID: LCSD 320-243730/3-A

Matrix: Water

Analysis Batch: 244213

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243730

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.fluoroheptanoic aci9 gPLHpA5	20d	22dB		nF/N		113	71 - 13)	4	30
Per.fluorooctanoic aci9 gPLOA5	20d	24d#		nF/N		122	70 - 140	1	30
Per.fluorooctanesul.onic aci9 gPLOS5	1) d	20d7		nF/N		111	6(- 144	1	30
Per.fluorononanoic aci9 gPLf A5	20d	23d8		nF/N		117	73 - 147	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	104		25 - 150
17C: -PFHpA	110		25 - 150
17C: PFOA	121		25 - 150
17C: PFOS	11:		25 - 150
17C5 PF6A	127		25 - 150

QC Association Summary

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

TestAmerica Job ID: 320-42647-1

LCMS

Prep Batch: 243729

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42647-1	NPS Well	Total/NA	Water	PFAS Prep	
320-42647-2	Airport Terminal	Total/NA	Water	PFAS Prep	
320-42647-3	PW-031	Total/NA	Water	PFAS Prep	
320-42647-4	PW-034	Total/NA	Water	PFAS Prep	
320-42647-5	PW-038	Total/NA	Water	PFAS Prep	
320-42647-6	PW-061	Total/NA	Water	PFAS Prep	
320-42647-7	PW-008	Total/NA	Water	PFAS Prep	
320-42647-8	PW-010	Total/NA	Water	PFAS Prep	
MB 320-243729/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-243729/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-243729/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 243730

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42647-9	SW-2000	Total/NA	Water	PFAS Prep	
320-42647-10	PW-012	Total/NA	Water	PFAS Prep	
MB 320-243730/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-243730/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-243730/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 243992

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42647-1	NPS Well	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-2	Airport Terminal	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-3	PW-031	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-4	PW-034	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-5	PW-038	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-6	PW-061	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-7	PW-008	Total/NA	Water	WS-LC-0025 At1	243729
320-42647-8	PW-010	Total/NA	Water	WS-LC-0025 At1	243729
MB 320-243729/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	243729
LCS 320-243729/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	243729
LCSD 320-243729/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	243729

Analysis Batch: 244213

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42647-9	SW-2000	Total/NA	Water	WS-LC-0025 At1	243730
320-42647-10	PW-012	Total/NA	Water	WS-LC-0025 At1	243730
MB 320-243730/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	243730

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-42647-1

LCMS (Continued)

Analysis Batch: 244213 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-243730/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	243730
LCSD 320-243730/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	243730

Lab Chronicle

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: NPS Well

Date Collected: 08/27/18 13:25

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-1

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 22:07	S1M	TAL SAC

Client Sample ID: Airport Terminal

Date Collected: 08/27/18 12:40

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-2

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 22:26	S1M	TAL SAC

Client Sample ID: PW-031

Date Collected: 08/27/18 16:05

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-3

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 22:44	S1M	TAL SAC

Client Sample ID: PW-034

Date Collected: 08/28/18 14:10

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-4

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 23:02	S1M	TAL SAC

Client Sample ID: PW-038

Date Collected: 08/28/18 13:32

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-5

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 23:21	S1M	TAL SAC

Client Sample ID: PW-061

Date Collected: 08/27/18 16:12

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-6

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/05/18 23:57	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-42647-1

Client Sample ID: PW-008

Date Collected: 08/28/18 14:28

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-7

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/06/18 00:16	S1M	TAL SAC

Client Sample ID: PW-010

Date Collected: 08/29/18 09:28

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-8

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	243729	09/04/18 13:07	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			243992	09/06/18 00:34	S1M	TAL SAC

Client Sample ID: SW-2000

Date Collected: 08/29/18 09:40

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-9

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	243730	09/04/18 13:13	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244213	09/06/18 11:16	D1R	TAL SAC

Client Sample ID: PW-012

Date Collected: 08/29/18 13:21

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42647-10

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	243730	09/04/18 13:13	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			244213	09/06/18 11:34	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 DOT

TestAmerica Job ID: 320-42647-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	11-06-18
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

Method Summary

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

TestAmerica Job ID: 320-42647-1

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 DOT

TestAmerica Job ID: 320-42647-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42647-1	NPS Well	Water	08/27/18 13:25	08/30/18 11:25
320-42647-2	Airport Terminal	Water	08/27/18 12:40	08/30/18 11:25
320-42647-3	PW-031	Water	08/27/18 16:05	08/30/18 11:25
320-42647-4	PW-034	Water	08/28/18 14:10	08/30/18 11:25
320-42647-5	PW-038	Water	08/28/18 13:32	08/30/18 11:25
320-42647-6	PW-061	Water	08/27/18 16:12	08/30/18 11:25
320-42647-7	PW-008	Water	08/28/18 14:28	08/30/18 11:25
320-42647-8	PW-010	Water	08/29/18 09:28	08/30/18 11:25
320-42647-9	SW-2000	Water	08/29/18 09:40	08/30/18 11:25
320-42647-10	PW-012	Water	08/29/18 13:21	08/30/18 11:25

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn: David Albrecht

Analytical Methods (include preservative if used)

Turn Around Time:
☐ Normal ☒ Rush
5-day
Please Specify

Quote No:
J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
NPS Well		1325	8/27/18	X						2	Gravel
Airport Terminal		1240		X						2	
PW-031		1605		X						2	
PW-034		1410	8/28/18	X						2	
PW-038		1332		X						2	
PW-061		1612	8/27/18	X						2	
PW-008		1428	8/28/18	X						2	
PW-010		0928	8/29/18	X						2	
SW-2000		0940		X						2	Surface water
PW-012		1321		X						2	Gravel



320-42647 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: <u>101543</u>	Total No. of Containers: <u>20</u>	COC Seals/Intact? Y/N/NA		Signature: <u>[Signature]</u>	Time: <u>11:15</u>	Signature: _____	Time: _____	Signature: _____	Time: _____
Name: <u>NO Gustavus DOT</u>	Received Good Cond./Cold	Printed Name: <u>Kristen Freiburger</u>	Date: <u>9/29/18</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: <u>KRF/MDN/ARH</u>	Temp:	Company: <u>Shannon & Wilson, Inc</u>		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: <u>Goldstream</u>								
Sampler: <u>KRF/MDN/ARH</u>									
Notes:		Received By: 1.		Received By: 2.		Received By: 3.			
<u>Request 5-day rush please put these samples on their own workorder</u>		Signature: <u>[Signature]</u>	Time: <u>11:25</u>	Signature: _____	Time: _____	Signature: _____	Time: _____		
		Printed Name: <u>David H</u>	Date: <u>6/30/11</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____		
		Company: <u>TH-Sac</u>		Company: _____		Company: _____			

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

* Sample label ID listed as "031" 8/20/18 C.8c
* Sample label ID listed as "031" 8/20/18 C.8c

No. 35608

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-42647-1

Login Number: 42647

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.	False	IDs on containers do not match the COC. Logged in per COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed By:

Kristen Freiburger

Title:

Senior Chemist

Date:

September 8, 2018

CS Report Name:

Gustavus Airport

Report Date:

September 7, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-42647-1

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample coolers were recorded at 5.0 and 5.8° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☐ Yes☐ No

Comments:

The sample receipt form notes 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 laboratory notes the following sample jars did not match the COC: sample *PW-031* listed “031” on the sample jars and sample *PW-061* listed “061” on the samples jars. The laboratory logged the samples in per the COC. The results are not affected.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes

☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes

☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 5.0° C and 5.8° C.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) with preparation batches 320-243729 and 320-243730. It also notes two samples were observed to have a brown color and sediment in the bottom.

- c. Were all corrective actions documented?

☒ Yes

☐ No

Comments:

There were no corrective actions 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 applicable EPA lifetime drinking water health advisory levels and ADEC groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 ^{13}C -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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☒ No

Comments:

This packet contains some samples that are part of a field-duplicate pair; however, due to rushing the results and the associated costs, the field-duplicates were not submitted together. RPDs will be calculated during the data review process of the laboratory packet where the duplicate sample is reported.

ii. Submitted blind to lab?

☒ Yes ☒ No

Comments:

N/A; a field duplicate was not submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

☒ Yes ☒ No

Comments:

N/A; a field duplicate was not 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 usability were not affected.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

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: 320-42821-1

Client Project/Site: GusAirport PFAs

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

9/14/2018 2:59:53 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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

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

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

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.
--------------	-----------------------------------------------------------------------------

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

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Job ID: 320-42821-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-42821-1

Receipt

The samples were received on 9/5/2018 1:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.5° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-244977.

Method(s) PFAS Prep: The samples have brown sediment at the bottom of the container and are brown in color: PW-075 (320-42821-1), PW-017 (320-42821-4), PW-018 (320-42821-6), PW-020 (320-42821-7), PW-019 (320-42821-9), PW-015 (320-42821-12), PW-014 (320-42821-13), PW-039 (320-42821-15) and PW-139 (320-42821-16).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-245067.

Method(s) PFAS Prep: The samples have brown sediment at the bottom of the containers: PW-047 (320-42821-19), PW-037 (320-42821-20) and PW-048 (320-42821-21).

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: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-075

Lab Sample ID: 320-42821-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-070

Lab Sample ID: 320-42821-2

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)	1.4	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-022

Lab Sample ID: 320-42821-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.4		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	58		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)	6.9		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	520		20	13	ng/L	10			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-017

Lab Sample ID: 320-42821-4

No Detections.

Client Sample ID: PW-016

Lab Sample ID: 320-42821-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.7	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-018

Lab Sample ID: 320-42821-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.5		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-020

Lab Sample ID: 320-42821-7

No Detections.

Client Sample ID: PW-021

Lab Sample ID: 320-42821-8

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-019

Lab Sample ID: 320-42821-9

No Detections.

Client Sample ID: PW-046

Lab Sample ID: 320-42821-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	120		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	29		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	82		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	83		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1900		40	17	ng/L	20			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-146

Lab Sample ID: 320-42821-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	110		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	27		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	77		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	79		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	1700		40	17	ng/L	20			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-015

Lab Sample ID: 320-42821-12

No Detections.

Client Sample ID: PW-014

Lab Sample ID: 320-42821-13

No Detections.

Client Sample ID: PW-044

Lab Sample ID: 320-42821-14

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)	2.0		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-039

Lab Sample ID: 320-42821-15

No Detections.

Client Sample ID: PW-139

Lab Sample ID: 320-42821-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.79	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-059

Lab Sample ID: 320-42821-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-045

Lab Sample ID: 320-42821-18

No Detections.

Client Sample ID: PW-047

Lab Sample ID: 320-42821-19

No Detections.

Client Sample ID: PW-037

Lab Sample ID: 320-42821-20

No Detections.

Client Sample ID: PW-048

Lab Sample ID: 320-42821-21

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-075

Date Collected: 08/31/18 12:57

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-1

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		09/11/18 10:10	09/11/18 15:05	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 15:05	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 15:05	1
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.75	ng/L		09/11/18 10:10	09/11/18 15:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 15:05	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 15:05	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/11/18 10:10	09/11/18 15:05	1
13C4-PFHxS	108		25 - 150				09/11/18 10:10	09/11/18 15:05	1
13C4 PFOA	102		25 - 150				09/11/18 10:10	09/11/18 15:05	1
13C4 PFOS	104		25 - 150				09/11/18 10:10	09/11/18 15:05	1
13C5 PFNA	97		25 - 150				09/11/18 10:10	09/11/18 15:05	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-070

Date Collected: 08/31/18 18:00

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.8	J	2.0	0.92	ng/L		09/11/18 15:33	09/12/18 05:46	1
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	2.0	0.87	ng/L		09/11/18 15:33	09/12/18 05:46	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 15:33	09/12/18 05:46	1
Perfluorooctanoic acid (PFOA)	1.0	J	2.0	0.75	ng/L		09/11/18 15:33	09/12/18 05:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 15:33	09/12/18 05:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 15:33	09/12/18 05:46	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
18O2 PFHxS	106		25 - 150				09/11/18 15:33	09/12/18 05:46	1
13C4-PFHpA	107		25 - 150				09/11/18 15:33	09/12/18 05:46	1
13C4 PFOA	102		25 - 150				09/11/18 15:33	09/12/18 05:46	1
13C4 PFOS	104		25 - 150				09/11/18 15:33	09/12/18 05:46	1
13C5 PFNA	97		25 - 150				09/11/18 15:33	09/12/18 05:46	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-022

Date Collected: 08/30/18 15:45

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.4		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 15:23	1
Perfluorohexanesulfonic acid (PFHxS)	58		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 15:23	1
Perfluoroheptanoic acid (PFHpA)	4.8		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 15:23	1
Perfluorooctanoic acid (PFOA)	6.9		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 15:23	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 15:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150				09/11/18 10:10	09/11/18 15:23	1
13C4-PFHpA	112		25 - 150				09/11/18 10:10	09/11/18 15:23	1
13C4 PFOA	108		25 - 150				09/11/18 10:10	09/11/18 15:23	1
13C4 PFOS	101		25 - 150				09/11/18 10:10	09/11/18 15:23	1
13C5 PFNA	93		25 - 150				09/11/18 10:10	09/11/18 15:23	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	520		20	13	ng/L		09/11/18 10:10	09/13/18 05:02	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	115		25 - 150				09/11/18 10:10	09/13/18 05:02	10

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-017

Date Collected: 08/30/18 10:14

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 15:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 15:41	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 15:41	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 15:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 15:41	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 15:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	106		25 - 150				09/11/18 10:10	09/11/18 15:41	1
13C4-PFHpA	109		25 - 150				09/11/18 10:10	09/11/18 15:41	1
13C4 PFOA	100		25 - 150				09/11/18 10:10	09/11/18 15:41	1
13C4 PFOS	105		25 - 150				09/11/18 10:10	09/11/18 15:41	1
13C5 PFNA	98		25 - 150				09/11/18 10:10	09/11/18 15:41	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-016

Date Collected: 08/30/18 09:18

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 16:00	1
Perfluorohexanesulfonic acid (PFHxS)	1.7	J	2.0	0.87	ng/L		09/11/18 10:10	09/11/18 16:00	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 16:00	1
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L		09/11/18 10:10	09/11/18 16:00	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 16:00	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 16:00	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103		25 - 150				09/11/18 10:10	09/11/18 16:00	1
13C4-PFHpa	104		25 - 150				09/11/18 10:10	09/11/18 16:00	1
13C4 PFOA	96		25 - 150				09/11/18 10:10	09/11/18 16:00	1
13C4 PFOS	102		25 - 150				09/11/18 10:10	09/11/18 16:00	1
13C5 PFNA	89		25 - 150				09/11/18 10:10	09/11/18 16:00	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-018

Date Collected: 08/30/18 11:50

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 16:18	1
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L		09/11/18 10:10	09/11/18 16:18	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 16:18	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 16:18	1
Perfluorooctanesulfonic acid (PFOS)	2.5		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 16:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 16:18	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
18O2 PFHxS	106		25 - 150				09/11/18 10:10	09/11/18 16:18	1
13C4-PFHxS	105		25 - 150				09/11/18 10:10	09/11/18 16:18	1
13C4 PFOA	99		25 - 150				09/11/18 10:10	09/11/18 16:18	1
13C4 PFOS	105		25 - 150				09/11/18 10:10	09/11/18 16:18	1
13C5 PFNA	92		25 - 150				09/11/18 10:10	09/11/18 16:18	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-020

Date Collected: 08/30/18 13:10

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 16:36	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 16:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 16:36	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 16:36	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 16:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 16:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/11/18 10:10	09/11/18 16:36	1
13C4-PFHpA	113		25 - 150				09/11/18 10:10	09/11/18 16:36	1
13C4 PFOA	103		25 - 150				09/11/18 10:10	09/11/18 16:36	1
13C4 PFOS	108		25 - 150				09/11/18 10:10	09/11/18 16:36	1
13C5 PFNA	99		25 - 150				09/11/18 10:10	09/11/18 16:36	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-021

Date Collected: 08/30/18 13:56

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 16:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 16:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 16:55	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 16:55	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 16:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 16:55	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	106		25 - 150				09/11/18 10:10	09/11/18 16:55	1
13C4-PFHpA	110		25 - 150				09/11/18 10:10	09/11/18 16:55	1
13C4 PFOA	102		25 - 150				09/11/18 10:10	09/11/18 16:55	1
13C4 PFOS	103		25 - 150				09/11/18 10:10	09/11/18 16:55	1
13C5 PFNA	100		25 - 150				09/11/18 10:10	09/11/18 16:55	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-019

Date Collected: 08/30/18 12:40

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 17:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 17:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 17:31	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 17:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 17:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 17:31	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150	09/11/18 10:10	09/11/18 17:31	1
13C4-PFHpA	109		25 - 150	09/11/18 10:10	09/11/18 17:31	1
13C4 PFOA	98		25 - 150	09/11/18 10:10	09/11/18 17:31	1
13C4 PFOS	106		25 - 150	09/11/18 10:10	09/11/18 17:31	1
13C5 PFNA	100		25 - 150	09/11/18 10:10	09/11/18 17:31	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-046

Date Collected: 08/30/18 11:33

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-10

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	120		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 17:50	1
Perfluoroheptanoic acid (PFHpA)	29		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 17:50	1
Perfluorooctanoic acid (PFOA)	82		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 17:50	1
Perfluorooctanesulfonic acid (PFOS)	83		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 17:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 17:50	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	92		25 - 150				09/11/18 10:10	09/11/18 17:50	1
13C4-PFHpA	86		25 - 150				09/11/18 10:10	09/11/18 17:50	1
13C4 PFOA	102		25 - 150				09/11/18 10:10	09/11/18 17:50	1
13C4 PFOS	105		25 - 150				09/11/18 10:10	09/11/18 17:50	1
13C5 PFNA	97		25 - 150				09/11/18 10:10	09/11/18 17:50	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1900		40	17	ng/L		09/11/18 10:10	09/13/18 05:20	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 150				09/11/18 10:10	09/13/18 05:20	20

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-146

Date Collected: 08/30/18 11:35

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-11

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	110		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 18:08	1
Perfluoroheptanoic acid (PFHpA)	27		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 18:08	1
Perfluorooctanoic acid (PFOA)	77		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 18:08	1
Perfluorooctanesulfonic acid (PFOS)	79		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 18:08	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 18:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	87		25 - 150				09/11/18 10:10	09/11/18 18:08	1
13C4-PFHpA	84		25 - 150				09/11/18 10:10	09/11/18 18:08	1
13C4 PFOA	102		25 - 150				09/11/18 10:10	09/11/18 18:08	1
13C4 PFOS	106		25 - 150				09/11/18 10:10	09/11/18 18:08	1
13C5 PFNA	96		25 - 150				09/11/18 10:10	09/11/18 18:08	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	1700		40	17	ng/L		09/11/18 10:10	09/13/18 05:38	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		25 - 150				09/11/18 10:10	09/13/18 05:38	20

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-015

Date Collected: 08/29/18 16:43

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-12

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 18:27	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 18:27	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 18:27	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 18:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 18:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 18:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	109		25 - 150				09/11/18 10:10	09/11/18 18:27	1
13C4-PFHpA	112		25 - 150				09/11/18 10:10	09/11/18 18:27	1
13C4 PFOA	107		25 - 150				09/11/18 10:10	09/11/18 18:27	1
13C4 PFOS	105		25 - 150				09/11/18 10:10	09/11/18 18:27	1
13C5 PFNA	100		25 - 150				09/11/18 10:10	09/11/18 18:27	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-014

Date Collected: 08/29/18 16:11

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-13

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 18:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 18:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 18:45	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 18:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 18:45	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 18:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	109		25 - 150				09/11/18 10:10	09/11/18 18:45	1
13C4-PFHpA	114		25 - 150				09/11/18 10:10	09/11/18 18:45	1
13C4 PFOA	107		25 - 150				09/11/18 10:10	09/11/18 18:45	1
13C4 PFOS	112		25 - 150				09/11/18 10:10	09/11/18 18:45	1
13C5 PFNA	107		25 - 150				09/11/18 10:10	09/11/18 18:45	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-044

Date Collected: 08/29/18 13:36

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-14

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 19:03	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 19:03	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 19:03	1
Perfluorooctanoic acid (PFOA)	1.3	J	2.0	0.75	ng/L		09/11/18 10:10	09/11/18 19:03	1
Perfluorooctanesulfonic acid (PFOS)	2.0		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 19:03	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 19:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150				09/11/18 10:10	09/11/18 19:03	1
13C4-PFHxS	115		25 - 150				09/11/18 10:10	09/11/18 19:03	1
13C4 PFOA	109		25 - 150				09/11/18 10:10	09/11/18 19:03	1
13C4 PFOS	111		25 - 150				09/11/18 10:10	09/11/18 19:03	1
13C5 PFNA	103		25 - 150				09/11/18 10:10	09/11/18 19:03	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-039

Date Collected: 08/29/18 14:38

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-15

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 19:22	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 19:22	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 19:22	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 19:22	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 19:22	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 19:22	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	101		25 - 150				09/11/18 10:10	09/11/18 19:22	1
13C4-PFHpA	111		25 - 150				09/11/18 10:10	09/11/18 19:22	1
13C4 PFOA	101		25 - 150				09/11/18 10:10	09/11/18 19:22	1
13C4 PFOS	104		25 - 150				09/11/18 10:10	09/11/18 19:22	1
13C5 PFNA	95		25 - 150				09/11/18 10:10	09/11/18 19:22	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-139

Date Collected: 08/29/18 14:40

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-16

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		09/11/18 10:10	09/11/18 19:40	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 19:40	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 19:40	1
Perfluorooctanoic acid (PFOA)	0.79	J	2.0	0.75	ng/L		09/11/18 10:10	09/11/18 19:40	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 19:40	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 19:40	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 150				09/11/18 10:10	09/11/18 19:40	1
13C4-PFHpA	113		25 - 150				09/11/18 10:10	09/11/18 19:40	1
13C4 PFOA	110		25 - 150				09/11/18 10:10	09/11/18 19:40	1
13C4 PFOS	109		25 - 150				09/11/18 10:10	09/11/18 19:40	1
13C5 PFNA	105		25 - 150				09/11/18 10:10	09/11/18 19:40	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-059

Date Collected: 08/29/18 15:52

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-17

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 19:58	1
Perfluorohexanesulfonic acid (PFHxS)	1.2	J	2.0	0.87	ng/L		09/11/18 10:10	09/11/18 19:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 19:58	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 19:58	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 19:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 19:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	103		25 - 150				09/11/18 10:10	09/11/18 19:58	1
13C4-PFHpA	108		25 - 150				09/11/18 10:10	09/11/18 19:58	1
13C4 PFOA	102		25 - 150				09/11/18 10:10	09/11/18 19:58	1
13C4 PFOS	102		25 - 150				09/11/18 10:10	09/11/18 19:58	1
13C5 PFNA	98		25 - 150				09/11/18 10:10	09/11/18 19:58	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-045

Date Collected: 08/29/18 16:48

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-18

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		09/11/18 10:10	09/11/18 20:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 10:10	09/11/18 20:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 20:17	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 10:10	09/11/18 20:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 20:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 10:10	09/11/18 20:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	107		25 - 150				09/11/18 10:10	09/11/18 20:17	1
13C4-PFHpA	106		25 - 150				09/11/18 10:10	09/11/18 20:17	1
13C4 PFOA	103		25 - 150				09/11/18 10:10	09/11/18 20:17	1
13C4 PFOS	104		25 - 150				09/11/18 10:10	09/11/18 20:17	1
13C5 PFNA	99		25 - 150				09/11/18 10:10	09/11/18 20:17	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-047

Date Collected: 08/31/18 11:54

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-19

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		09/11/18 15:33	09/12/18 06:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 15:33	09/12/18 06:04	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 15:33	09/12/18 06:04	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 15:33	09/12/18 06:04	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 15:33	09/12/18 06:04	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 15:33	09/12/18 06:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	107		25 - 150				09/11/18 15:33	09/12/18 06:04	1
13C4-PFHpA	105		25 - 150				09/11/18 15:33	09/12/18 06:04	1
13C4 PFOA	106		25 - 150				09/11/18 15:33	09/12/18 06:04	1
13C4 PFOS	105		25 - 150				09/11/18 15:33	09/12/18 06:04	1
13C5 PFNA	103		25 - 150				09/11/18 15:33	09/12/18 06:04	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-037

Date Collected: 08/31/18 13:40

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-20

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 15:33	09/12/18 06:23	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 15:33	09/12/18 06:23	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 15:33	09/12/18 06:23	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 15:33	09/12/18 06:23	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 15:33	09/12/18 06:23	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 15:33	09/12/18 06:23	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				09/11/18 15:33	09/12/18 06:23	1
13C4-PFHpA	112		25 - 150				09/11/18 15:33	09/12/18 06:23	1
13C4 PFOA	103		25 - 150				09/11/18 15:33	09/12/18 06:23	1
13C4 PFOS	109		25 - 150				09/11/18 15:33	09/12/18 06:23	1
13C5 PFNA	100		25 - 150				09/11/18 15:33	09/12/18 06:23	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: PW-048

Date Collected: 08/31/18 16:28

Date Received: 09/05/18 13:20

Lab Sample ID: 320-42821-21

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		09/11/18 15:33	09/12/18 06:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		09/11/18 15:33	09/12/18 06:41	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/11/18 15:33	09/12/18 06:41	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		09/11/18 15:33	09/12/18 06:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 15:33	09/12/18 06:41	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		09/11/18 15:33	09/12/18 06:41	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	105		25 - 150				09/11/18 15:33	09/12/18 06:41	1
13C4-PFHpA	108		25 - 150				09/11/18 15:33	09/12/18 06:41	1
13C4 PFOA	107		25 - 150				09/11/18 15:33	09/12/18 06:41	1
13C4 PFOS	113		25 - 150				09/11/18 15:33	09/12/18 06:41	1
13C5 PFNA	100		25 - 150				09/11/18 15:33	09/12/18 06:41	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-42821-1	PW-075	108	108	102	104	97
320-42821-2	PW-070	106	107	102	104	97
320-42821-3	PW-022	111	112	108	101	93
320-42821-3 - DL	PW-022				115	
320-42821-4	PW-017	106	109	100	105	98
320-42821-5	PW-016	103	104	96	102	89
320-42821-6	PW-018	106	105	99	105	92
320-42821-7	PW-020	108	113	103	108	99
320-42821-8	PW-021	106	110	102	103	100
320-42821-9	PW-019	111	109	98	106	100
320-42821-10	PW-046	92	86	102	105	97
320-42821-10 - DL	PW-046	112				
320-42821-11	PW-146	87	84	102	106	96
320-42821-11 - DL	PW-146	117				
320-42821-12	PW-015	109	112	107	105	100
320-42821-13	PW-014	109	114	107	112	107
320-42821-14	PW-044	111	115	109	111	103
320-42821-15	PW-039	101	111	101	104	95
320-42821-16	PW-139	112	113	110	109	105
320-42821-17	PW-059	103	108	102	102	98
320-42821-18	PW-045	107	106	103	104	99
320-42821-19	PW-047	107	105	106	105	103
320-42821-20	PW-037	108	112	103	109	100
320-42821-21	PW-048	105	108	107	113	100
LCS 320-244977/2-A	Lab Control Sample	99	101	92	99	89
LCS 320-245067/2-A	Lab Control Sample	114	111	116	114	101
LCSD 320-244977/3-A	Lab Control Sample Dup	103	109	93	107	87
LCSD 320-245067/3-A	Lab Control Sample Dup	105	105	102	110	96
MB 320-244977/1-A	Method Blank	98	102	92	95	79
MB 320-245067/1-A	Method Blank	103	115	107	115	100

Surrogate Legend

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

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

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

Lab Sample ID: MB 320-244977/1-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244977

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 10:09	09/11/18 14:10	1
Perfluoroheptanesulfonic acid (PFx 7S)	ND		2.0	0.85	ng/L		09/11/18 10:09	09/11/18 14:10	1
Perfluoroheptanoic acid (PFx pA)	ND		2.0	0.80	ng/L		09/11/18 10:09	09/11/18 14:10	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.5H	ng/L		09/11/18 10:09	09/11/18 14:10	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 10:09	09/11/18 14:10	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.6H	ng/L		09/11/18 10:09	09/11/18 14:10	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	08		25 - 159	90/11/18 19:30	90/11/18 14:39	1
1: 7 4-PFHQp	192		25 - 159	90/11/18 19:30	90/11/18 14:39	1
1: 7 4 PFOp	02		25 - 159	90/11/18 19:30	90/11/18 14:39	1
1: 7 4 PFOS	05		25 - 159	90/11/18 19:30	90/11/18 14:39	1
1: 7 5 PFNp	A0		25 - 159	90/11/18 19:30	90/11/18 14:39	1

Lab Sample ID: LCS 320-244977/2-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244977

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorobutanesulfonic acid (PFBS)	15.5	19.0		ng/L		108	52 - 1H1
Perfluoroheptanesulfonic acid (PFx 7S)	18.2	18.4		ng/L		101	53 - 1H5
Perfluoroheptanoic acid (PFx pA)	20.0	19.5		ng/L		98	51 - 138
Perfluorooctanoic acid (PFOA)	20.0	18.9		ng/L		94	50 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	16.H		ng/L		89	69 - 144
Perfluorononanoic acid (PFNA)	20.0	19.2		ng/L		96	53 - 145

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	00		25 - 159
1: 7 4-PFHQp	191		25 - 159
1: 7 4 PFOp	02		25 - 159
1: 7 4 PFOS	00		25 - 159
1: 7 5 PFNp	80		25 - 159

Lab Sample ID: LCSD 320-244977/3-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 244977

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	15.5	18.6		ng/L		10H	52 - 1H1	3	30
Perfluoroheptanesulfonic acid (PFx 7S)	18.2	18.8		ng/L		103	53 - 1H5	2	30
Perfluoroheptanoic acid (PFx pA)	20.0	19.2		ng/L		96	51 - 138	2	30
Perfluorooctanoic acid (PFOA)	20.0	19.6		ng/L		98	50 - 140	4	30
Perfluorooctanesulfonic acid (PFOS)	18.6	16.6		ng/L		89	69 - 144	0	30
Perfluorononanoic acid (PFNA)	20.0	19.5		ng/L		98	53 - 145	3	30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	19:		25 - 159
1: 7 4-PFHQp	190		25 - 159
1: 7 4 PFOp	0:		25 - 159
1: 7 4 PFOS	19A		25 - 159
1: 7 5 PFNp	8A		25 - 159

Lab Sample ID: MB 320-245067/1-A

Matrix: Water

Analysis Batch: 245099

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 245067

Analyte	MB	MB							
	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/11/18 1H33	09/12/18 04:H1	1
Perfluoroheptanesulfonic acid (PFx 7S)	ND		2.0	0.85	ng/L		09/11/18 1H33	09/12/18 04:H1	1
Perfluoroheptanoic acid (PFx pA)	ND		2.0	0.80	ng/L		09/11/18 1H33	09/12/18 04:H1	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.5H	ng/L		09/11/18 1H33	09/12/18 04:H1	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/11/18 1H33	09/12/18 04:H1	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.6H	ng/L		09/11/18 1H33	09/12/18 04:H1	1

	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	19:		25 - 159				90/11/18 153 :	90/12/18 94:31	1
1: 7 4-PFHQp	115		25 - 159				90/11/18 153 :	90/12/18 94:31	1
1: 7 4 PFOp	19A		25 - 159				90/11/18 153 :	90/12/18 94:31	1
1: 7 4 PFOS	115		25 - 159				90/11/18 153 :	90/12/18 94:31	1
1: 7 5 PFNp	199		25 - 159				90/11/18 153 :	90/12/18 94:31	1

Lab Sample ID: LCS 320-245067/2-A

Matrix: Water

Analysis Batch: 245099

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 245067

Analyte	Spike	LCS	LCS						
	Added	Result	Qualifier	Unit	D	%Rec	Limits	%Rec.	
Perfluorobutanesulfonic acid (PFBS)	15.5	16.9		ng/L		96	52 - 1H1		
Perfluoroheptanesulfonic acid (PFx 7S)	18.2	15.5		ng/L		95	53 - 1H5		
Perfluoroheptanoic acid (PFx pA)	20.0	19.1		ng/L		9H	51 - 138		
Perfluorooctanoic acid (PFOA)	20.0	15.1		ng/L		86	50 - 140		
Perfluorooctanesulfonic acid (PFOS)	18.6	16.9		ng/L		91	69 - 144		
Perfluorononanoic acid (PFNA)	20.0	19.6		ng/L		98	53 - 145		

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	114		25 - 159
1: 7 4-PFHQp	111		25 - 159
1: 7 4 PFOp	116		25 - 159
1: 7 4 PFOS	114		25 - 159
1: 7 5 PFNp	191		25 - 159

Lab Sample ID: LCSD 320-245067/3-A

Matrix: Water

Analysis Batch: 245099

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 245067

Analyte	Spike	LCSD	LCSD							
	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	RPD	Limit
Perfluorobutanesulfonic acid (PFBS)	15.5	18.1		ng/L		102	52 - 1H1	5		30
Perfluoroheptanesulfonic acid (PFx 7S)	18.2	15.8		ng/L		98	53 - 1H5	0		30

TestAmerica Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

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

Lab Sample ID: LCSD 320-245067/3-A

Matrix: Water

Analysis Batch: 245099

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 245067

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluoroheptanoic acid (PFx pA)	20.0	18.6		ng/L		93	51 - 138	2	30
Perfluorooctanoic acid (PFOA)	20.0	19.4		ng/L		95	50 - 140	12	30
Perfluorooctanesulfonic acid (PFOS)	18.6	1H9		ng/L		86	69 - 144	6	30
Perfluorononanoic acid (PFNA)	20.0	19.8		ng/L		99	53 - 145	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits
18O2 PFHxS	195		25 - 159
1: 7 4-PFHQp	195		25 - 159
1: 7 4 PFOp	192		25 - 159
1: 7 4 PFOS	119		25 - 159
1: 7 5 PFNp	06		25 - 159

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

LCMS

Prep Batch: 244977

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-1	PW-075	Total/NA	Water	PFAS Prep	
320-42821-3	PW-022	Total/NA	Water	PFAS Prep	
320-42821-3 - DL	PW-022	Total/NA	Water	PFAS Prep	
320-42821-4	PW-017	Total/NA	Water	PFAS Prep	
320-42821-5	PW-016	Total/NA	Water	PFAS Prep	
320-42821-6	PW-018	Total/NA	Water	PFAS Prep	
320-42821-7	PW-020	Total/NA	Water	PFAS Prep	
320-42821-8	PW-021	Total/NA	Water	PFAS Prep	
320-42821-9	PW-019	Total/NA	Water	PFAS Prep	
320-42821-10 - DL	PW-046	Total/NA	Water	PFAS Prep	
320-42821-10	PW-046	Total/NA	Water	PFAS Prep	
320-42821-11 - DL	PW-146	Total/NA	Water	PFAS Prep	
320-42821-11	PW-146	Total/NA	Water	PFAS Prep	
320-42821-12	PW-015	Total/NA	Water	PFAS Prep	
320-42821-13	PW-014	Total/NA	Water	PFAS Prep	
320-42821-14	PW-044	Total/NA	Water	PFAS Prep	
320-42821-15	PW-039	Total/NA	Water	PFAS Prep	
320-42821-16	PW-139	Total/NA	Water	PFAS Prep	
320-42821-17	PW-059	Total/NA	Water	PFAS Prep	
320-42821-18	PW-045	Total/NA	Water	PFAS Prep	
MB 320-244977/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-244977/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-244977/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 245045

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-1	PW-075	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-3	PW-022	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-4	PW-017	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-5	PW-016	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-6	PW-018	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-7	PW-020	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-8	PW-021	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-9	PW-019	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-10	PW-046	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-11	PW-146	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-12	PW-015	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-13	PW-014	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-14	PW-044	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-15	PW-039	Total/NA	Water	WS-LC-0025 At1	244977

TestAmerica Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

LCMS (Continued)

Analysis Batch: 245045 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-16	PW-139	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-17	PW-059	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-18	PW-045	Total/NA	Water	WS-LC-0025 At1	244977
MB 320-244977/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	244977
LCS 320-244977/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	244977
LCSD 320-244977/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	244977

Prep Batch: 245067

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-2	PW-070	Total/NA	Water	PFAS Prep	
320-42821-19	PW-047	Total/NA	Water	PFAS Prep	
320-42821-20	PW-037	Total/NA	Water	PFAS Prep	
320-42821-21	PW-048	Total/NA	Water	PFAS Prep	
MB 320-245067/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-245067/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-245067/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 245099

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-2	PW-070	Total/NA	Water	WS-LC-0025 At1	245067
320-42821-19	PW-047	Total/NA	Water	WS-LC-0025 At1	245067
320-42821-20	PW-037	Total/NA	Water	WS-LC-0025 At1	245067
320-42821-21	PW-048	Total/NA	Water	WS-LC-0025 At1	245067
MB 320-245067/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	245067
LCS 320-245067/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	245067
LCSD 320-245067/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	245067

Analysis Batch: 245370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42821-3 - DL	PW-022	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-10 - DL	PW-046	Total/NA	Water	WS-LC-0025 At1	244977
320-42821-11 - DL	PW-146	Total/NA	Water	WS-LC-0025 At1	244977

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: NP W20

Date Collected: 378 1817 14:02

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 15:05	S1M	TAL SAC

Client Sample ID: NP W23

Date Collected: 378 1817 17:33

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	245067	09/11/18 15:33	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245099	09/12/18 05:46	S1M	TAL SAC

Client Sample ID: NP W44

Date Collected: 378 3817 10:60

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 15:23	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			245370	09/13/18 05:02	D1R	TAL SAC

Client Sample ID: NP W12

Date Collected: 378 3817 13:16

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 15:41	S1M	TAL SAC

Client Sample ID: NP W19

Date Collected: 378 3817 3R:17

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 16:00	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: NP W17

Date Collected: 378 3817 11:03

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 16:18	S1M	TAL SAC

Client Sample ID: NP W43

Date Collected: 378 3817 1-:13

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 16:36	S1M	TAL SAC

Client Sample ID: NP W41

Date Collected: 378 3817 1-:09

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 16:55	S1M	TAL SAC

Client Sample ID: NP W1R

Date Collected: 378 3817 14:63

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 17:31	S1M	TAL SAC

Client Sample ID: NP W69

Date Collected: 378 3817 11:-

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W3

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 17:50	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	20			245370	09/13/18 05:20	D1R	TAL SAC

Client Sample ID: NP W69

Date Collected: 378 3817 11:- 0

Date / ecei5ed: 3R80817 1-:43

Lab Sample ID: -43W4741W1

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nprepared or BnalTued	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: NP W69

Date Collected: 378 3817 11:- 0

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W1

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 18:08	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	20			245370	09/13/18 05:38	D1R	TAL SAC

Client Sample ID: NP W10

Date Collected: 378 3817 19:6-

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W4

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 18:27	S1M	TAL SAC

Client Sample ID: NP W16

Date Collected: 378 3817 19:11

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W-

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 18:45	S1M	TAL SAC

Client Sample ID: NP W66

Date Collected: 378 3817 1:- : 9

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W6

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 19:03	S1M	TAL SAC

Client Sample ID: NP W- R

Date Collected: 378 3817 16:- 7

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W0

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 19:22	S1M	TAL SAC

Client Sample ID: NP W- R

Date Collected: 378 3817 16:63

Date / ecei5ed: 3R80817 1:- :43

Lab Sample ID: - 43W4741W9

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 19:40	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Client Sample ID: NP W0R

Date Collected: 378 R17 10:04

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: - 43W4741W2

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 19:58	S1M	TAL SAC

Client Sample ID: NP W60

Date Collected: 378 R17 19:67

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: - 43W4741W7

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244977	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245045	09/11/18 20:17	S1M	TAL SAC

Client Sample ID: NP W62

Date Collected: 378 R17 11:06

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: - 43W4741WR

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	245067	09/11/18 15:33	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245099	09/12/18 06:04	S1M	TAL SAC

Client Sample ID: NP W- 2

Date Collected: 378 R17 1- :63

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: - 43W4741W3

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	245067	09/11/18 15:33	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245099	09/12/18 06:23	S1M	TAL SAC

Client Sample ID: NP W67

Date Collected: 378 R17 19:47

Date / ecei5ed: 3R80817 1- :43

Lab Sample ID: - 43W4741W1

Matrix: P ater

Nrep vTpe	yatch vTpe	yatch Method	/ sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	Nrepared or BnalTue	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	245067	09/11/18 15:33	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			245099	09/12/18 06:41	S1M	TAL SAC

LaboratorT / eferenceA:

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

TestAmerica Sacramento

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
 1 roectjSite: / CsAiruort 1 vAs

TestAmerica Job ID: 320-42627-7

Laboratory: TestAmerica Sacramento

All accreQtationsjcertidcations helObf this laboratorf are listeQy . ot all accreQtationsjcertidcations are auulicable to this reuorty

Authority	Program	EPA Region	Identification Number	Expiration Date
AlasNa pk ST(	State 1 ro) ram	70	7U-020	07-20-27
A. Ag	DoD BEA1		E24L6	07-20-27
Ari8ona	State 1 ro) ram	z	A90U06	06-77-7z
ArNansas DBZ	State 1 ro) ram	L	66-0Lz7	0L-7U-7z
Calidørnia	State 1 ro) ram	z	26zU	07-37-7z
ColoraCo	State 1 ro) ram	6	CA00044	06-37-7z
ConnecticQ	State 1 ro) ram	7	1Q-0Lz7	0L-30-7z
vloriCa	. BEA1	4	B6UHU0	0L-30-7z
/ eor) ia	State 1 ro) ram	4	. jA	07-26-7z
QaFaai	State 1 ro) ram	z	. jA	07-2z-7z
Illinois	. BEA1	H	2000L0	03-7U-7z
5ansas	. BEA1	U	B-703UH	70-37-76
EoGsiana	. BEA1	L	30L72	0L-30-7z
waine	State 1 ro) ram	7	CA0004	04-74-20
wichi) an	State 1 ro) ram	H	zz4U	07-37-20
. eKaCa	State 1 ro) ram	z	CA00044	0U-37-7z
. eF Qamushire	. BEA1	7	2zzU	04-76-7z
. eF Jersef	. BEA1	2	CA00H	0L-30-7z
. eF MbrN	. BEA1	2	77LLL	03-37-7z
Yre) on	. BEA1	70	4040	07-2z-7z
1ennsf lKania	. BEA1	3	L6-072U2	03-37-7z
Texas	. BEA1	L	T704U043zz	0H-37-7z
k S vish & WilQidø	veQeral		EB746366-0	0U-37-7z
k SDA	veQeral		1330-76-0023z	07-7U-27
k SB1A k CwR	veQeral	7	CA00044	77-0L-76
k tah	. BEA1	6	CA00044	02-26-7z
Vermont	State 1 ro) ram	7	VT-4040	04-30-7z
Vir) inia	. BEA1	3	4L02U6	03-74-7z
Washin) ton	State 1 ro) ram	70	CH67	0H-0H-7z
West Vir) inia pDW(	State 1 ro) ram	3	zz30C	72-37-76
Wf omin)	State 1 ro) ram	6	6TwS-E	07-26-7z

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

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: GusAirport PFAs

TestAmerica Job ID: 320-42821-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42821-1	PW-075	Water	08/31/18 12:57	09/05/18 13:20
320-42821-2	PW-070	Water	08/31/18 18:00	09/05/18 13:20
320-42821-3	PW-022	Water	08/30/18 15:45	09/05/18 13:20
320-42821-4	PW-017	Water	08/30/18 10:14	09/05/18 13:20
320-42821-5	PW-016	Water	08/30/18 09:18	09/05/18 13:20
320-42821-6	PW-018	Water	08/30/18 11:50	09/05/18 13:20
320-42821-7	PW-020	Water	08/30/18 13:10	09/05/18 13:20
320-42821-8	PW-021	Water	08/30/18 13:56	09/05/18 13:20
320-42821-9	PW-019	Water	08/30/18 12:40	09/05/18 13:20
320-42821-10	PW-046	Water	08/30/18 11:33	09/05/18 13:20
320-42821-11	PW-146	Water	08/30/18 11:35	09/05/18 13:20
320-42821-12	PW-015	Water	08/29/18 16:43	09/05/18 13:20
320-42821-13	PW-014	Water	08/29/18 16:11	09/05/18 13:20
320-42821-14	PW-044	Water	08/29/18 13:36	09/05/18 13:20
320-42821-15	PW-039	Water	08/29/18 14:38	09/05/18 13:20
320-42821-16	PW-139	Water	08/29/18 14:40	09/05/18 13:20
320-42821-17	PW-059	Water	08/29/18 15:52	09/05/18 13:20
320-42821-18	PW-045	Water	08/29/18 16:48	09/05/18 13:20
320-42821-19	PW-047	Water	08/31/18 11:54	09/05/18 13:20
320-42821-20	PW-037	Water	08/31/18 13:40	09/05/18 13:20
320-42821-21	PW-048	Water	08/31/18 16:28	09/05/18 13:20



Page 1 of 3
Laboratory TestAmerica
Attn: D. Allhuck

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please Specify	



320-42821 Chain of Custody

Re Com	Total Number of Containers
-----------	----------------------------

Remarks/Matrix
Composition/Grab?
Sample Containers

Sample Identity	Lab No.	Time	Date Sampled	DF							Total	Composition/Grab? Sample Containers
PW-075		1257	8/31/18	X							2	GROUNDWATER
PW-070		1800	8/31/18	X							2	
PW-022		1545	8/30/18	X							2	
PW-017		1014	8/30/18	X							2	
PW-016		0918	8/30/18	X							2	
PW-018		1150	8/30/18	X							2	
PW-020		1310	8/30/18	X							2	
PW-021		1356	8/30/18	X							2	
PW-019		1240	8/30/18	X							2	
PW-046		1133	8/30/18	X							2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101543-001		Total No. of Containers: 42		Signature: [Signature]	Time: 4:15	Signature:	Time:	Signature:	Time:
Name: Gus Airport + PFAS		COC Seals/Intact? Y/N/NA		Printed Name: [Signature]	Date: 9/4	Printed Name:	Date:	Printed Name:	Date:
Contact: KRF		Received Good Cond./Cold		Signature: Amanda Smith		Signature:		Signature:	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp:		Company: Shannon + Wilson, Inc		Company:		Company:	
Sampler: KRF, MDN, ARM		Delivery Method: Goldstreak							
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature: [Signature]	Time: 1:20	Signature:	Time:	Signature:	Time:
				Printed Name: David [Signature]	Date: 9/15/16	Printed Name:	Date:	Printed Name:	Date:
				Company: J.A. Sec		Company:		Company:	
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file									

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

4.5'

No. 35613

CHAIN-OF-CUSTODY RECORD

Page 2 of 3

Laboratory Testamerica
Attn: D. Alltucker

Analytical Methods (include preservative if used)

Turn Around Time:

☒ Normal ☐ Rush

Please Specify

Quote No:

J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	Analytical Methods (include preservative if used)						Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-146		1135	8/30/18	X						2	Grandwater
PW-015		1643	8/29/18	X						2	
PW-014		1611	8/29/18	X						2	
PW-044		1336	8/29/18	X						2	
PW-039		1438	8/29/18	X						2	
PW-139		1440	8/29/18	X						2	
PW-059		1552	8/29/18	X						2	
PW-045		1648	8/29/18	X						2	
PW-047		1154	8/31/18	X						2	
PW-037		1340	8/31/18	X						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101543-001	Total No. of Containers:	<div> <div>Signature: <u>[Signature]</u> Time: <u>4:15</u></div> <div>Printed Name: <u>Amanda Smith</u> Date: <u>9/4</u></div> <div>Company: <u>Shannon & Wilson</u></div> </div>		Signature: _____ Time: _____		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name: <u>Gustavus Airport</u>	COC Seals/Intact? Y/N/NA			Printed Name: _____ Date: _____		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact: <u>KRF</u>	Received Good Cond./Gold			Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temp: <u>see pg 1</u>	Received By: 1.		Received By: 2.		Received By: 3.			
Sampler: <u>MDN/ARM</u>	Delivery Method:	Signature: <u>[Signature]</u> Time: <u>3:20</u>		Signature: _____ Time: _____		Signature: _____ Time: _____			
Notes:		Printed Name: <u>David Her</u> Date: <u>9/5/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____			
		Company: <u>TH-Sac</u>		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. 35612

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

CHAIN-OF-CUSTODY RECORD

Page 3 of 3
Laboratory Test America
Attn: D. Altmeppen

Analytical Methods (include preservative if used)

Turn Around Time:	
<input type="checkbox"/> Normal	<input type="checkbox"/> Rush
Please Specify	

Quote No:

J-Flags: ☐ Yes ☐ No

[illegible]

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature:	Time: 7:15	Signature:	Time:	Signature:	Time:
Name:		COC Seals/Intact? Y/N/NA		Printed Name:	Date: 7/4	Printed Name:	Date:	Printed Name:	Date:
Contact:		Received Good Cond./Cold		Company:		Company:		Company:	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:							
Sampler:		Delivery Method:							
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature:	Time: 1:20	Signature:	Time:	Signature:	Time:
				Printed Name:	Date: 9/1/15	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

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

No. 35616

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-42821-1

Login Number: 42821

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

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

Laboratory Data Review Checklist

Completed By:

Marcy Nadel

Title:

Geologist

Date:

September 17, 2018

CS Report Name:

Gustavus Airport

Report Date:

September 14, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-42821-1

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample cooler was recorded at 4.5° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 4.5° C. It further notes that several samples contained sediment at the bottom of the containers or were brown in color.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batches 320-244977 and 245067.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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 each sample.

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 applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No

Comments:

Yes, two field duplicates pairs were submitted with this work order.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

Field duplicate pairs *PW-046 / PW-146* and *PW-039 / PW-139* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?

(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

The RPDs, where calculable for detected values, were less than 30% for each analyte. The maximum RPD was 11%.

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.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-42653-1

Client Project/Site: Gustavus DOT

Revision: 1

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

9/17/2018 10:24:42 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

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results through

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Have a Question?



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www.testamericainc.com

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

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-42653-1

Qualifiers

LCMS

Qualifier	Qualifier Description
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J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
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Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
--------------	-----------------------------------------------------------------------------

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

Case Narrative

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

TestAmerica Job ID: 320-42653-1

Job ID: 320-42653-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-42653-1

Receipt

The samples were received on 8/30/2018 11:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.0° C and 5.8° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-243916.

Method(s) PFAS Prep: These samples have black sediment at the bottom of the containers: PW-007 (320-42653-7) and SW-2001 (320-42653-14).

Method(s) PFAS Prep: These samples have brown sediment at the bottom of the containers: PW-001 (320-42653-1), PW-002 (320-42653-2), PW-003 (320-42653-3), PW-007 (320-42653-7), PW-011 (320-42653-9), PW-032 (320-42653-10), PW-043 (320-42653-12), PW-033 (320-42653-16) and PW-041 (320-42653-19).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-243918.

Method(s) PFAS Prep: These samples have brown sediment at the bottom of the containers: PW-138 (320-42653-20) and PW-013 (320-42653-22).

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-244977.

Method(s) PFAS Prep: The sample has black sediment and is black in color: SW-2001 (320-42653-14)

Method(s) PFAS Prep: Due to the matrix, the initial volume(s) used for the following samples deviated from the standard procedure: PW-006 (320-42653-6) and PW-106 (320-42653-21). The reporting limits (RLs) have been adjusted proportionately. Samples were initially prepared at 1x dilutions, but due to high level were re-prepped at 100x dilution to bring high level analytes within calibration range.

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: 320-42653-1

Client Sample ID: PW-001

Lab Sample ID: 320-42653-1

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)	13		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	19		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	3.0		2.0	0.65	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	350		20	8.7	ng/L	10			WS-LC-0025 At1	Total/NA
- DL Perfluorooctanesulfonic acid (PFOS) - DL	2300		20	13	ng/L	10			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-002

Lab Sample ID: 320-42653-2

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)	32		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)	3.0		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-003

Lab Sample ID: 320-42653-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-004

Lab Sample ID: 320-42653-4

No Detections.

Client Sample ID: PW-005

Lab Sample ID: 320-42653-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.90	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-006

Lab Sample ID: 320-42653-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	160		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	48		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	240		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	48		2.0	0.65	ng/L	1			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-42653-1

Client Sample ID: PW-006 (Continued)

Lab Sample ID: 320-42653-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) - DL	7400		2000	870	ng/L	10			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	39000		2000	1300	ng/L	10			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-007

Lab Sample ID: 320-42653-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.6		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-009

Lab Sample ID: 320-42653-8

No Detections.

Client Sample ID: PW-011

Lab Sample ID: 320-42653-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.9		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)	3.4		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.3		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	93		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-032

Lab Sample ID: 320-42653-10

No Detections.

Client Sample ID: PW-042

Lab Sample ID: 320-42653-11

No Detections.

Client Sample ID: PW-043

Lab Sample ID: 320-42653-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.94	J	2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	7.6		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.6		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: SW-2100

Lab Sample ID: 320-42653-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-42653-1

Client Sample ID: SW-2100 (Continued)

Lab Sample ID: 320-42653-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	27		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.6		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: SW-2001

Lab Sample ID: 320-42653-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.7		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	120		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.1		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.9		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	200		2.0	1.3	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: SW-2002

Lab Sample ID: 320-42653-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	8.2		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	70		2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	8.8		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	9.9		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	1.2	J	2.0	0.65	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	410		20	13	ng/L	10			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-033

Lab Sample ID: 320-42653-16

No Detections.

Client Sample ID: PW-036

Lab Sample ID: 320-42653-17

No Detections.

Client Sample ID: PW-040

Lab Sample ID: 320-42653-18

No Detections.

Client Sample ID: PW-041

Lab Sample ID: 320-42653-19

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-42653-1

Client Sample ID: PW-138

Lab Sample ID: 320-42653-20

No Detections.

Client Sample ID: PW-106

Lab Sample ID: 320-42653-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	170		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	48		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	240		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	48		2.0	0.65	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	7300		2000	870	ng/L	10			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	40000		2000	1300	ng/L	10			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-013

Lab Sample ID: 320-42653-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	57		2.0	0.92	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	230		2.0	0.80	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	130		2.0	0.75	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	8.9		2.0	0.65	ng/L	1			WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - DL	860		100	44	ng/L	50			WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	5500		100	64	ng/L	50			WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-001

Date Collected: 08/28/18 10:23

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	20		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 01:20	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 01:20	1
Perfluorooctanoic acid (PFOA)	19		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 01:20	1
Perfluorononanoic acid (PFNA)	3.0		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 01:20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				9/4/18 12:32	9/4/18 9:13	1
107 C-PFHxS	112		25 - 159				9/4/18 12:32	9/4/18 9:13	1
107 C-PFOA	109		25 - 159				9/4/18 12:32	9/4/18 9:13	1
107 5 PFNA	19C		25 - 159				9/4/18 12:32	9/4/18 9:13	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	350		20	8.5	ng/L		09/07/18 12:29	09/09/18 15:03	10
Perfluorooctanesulfonic acid (PFOS)	2300		20	13	ng/L		09/07/18 12:29	09/09/18 15:03	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	19C		25 - 159				9/4/18 12:32	9/4/18 1:30	19
107 C-PFOS	190		25 - 159				9/4/18 12:32	9/4/18 1:30	19

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-002

Date Collected: 08/28/18 09:22

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 01:39	1
Perfluorohexanesulfonic acid (PFHxS)	32		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 01:39	1
Perfluoroheptanoic acid (PFHpA)	4.4		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 01:39	1
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 01:39	1
Perfluorooctanesulfonic acid (PFOS)	160		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 01:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 01:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				9/4/18 12:32/	9/4/18 9:13/	1
107 C-PFHxS	112		25 - 159				9/4/18 12:32/	9/4/18 9:13/	1
107 C-PFOA	128		25 - 159				9/4/18 12:32/	9/4/18 9:13/	1
107 C-PFOS	116		25 - 159				9/4/18 12:32/	9/4/18 9:13/	1
107 5 PFNA	120		25 - 159				9/4/18 12:32/	9/4/18 9:13/	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-003

Date Collected: 08/28/18 11:22

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 01:75	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 01:75	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 01:75	1
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.57	ng/L		09/07/18 12:29	09/05/18 01:75	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 01:75	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 01:75	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	125		25 - 159				9/ / 05/18 12:32/	9/ / 05/18 01:35:	1
107 CPFHpA	121		25 - 159				9/ / 05/18 12:32/	9/ / 05/18 01:35:	1
107 CPFOA	101		25 - 159				9/ / 05/18 12:32/	9/ / 05/18 01:35:	1
107 CPFOS	125		25 - 159				9/ / 05/18 12:32/	9/ / 05/18 01:35:	1
107 5 PFNA	10C		25 - 159				9/ / 05/18 12:32/	9/ / 05/18 01:35:	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-004

Date Collected: 08/28/18 11:59

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 02:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 02:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 02:17	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 02:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 02:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 02:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	121		25 - 159				9/ 45418 1232/	9/ 4: 418 92315	1
107 CPFHpA	128		25 - 159				9/ 45418 1232/	9/ 4: 418 92315	1
107 CPFOA	126		25 - 159				9/ 45418 1232/	9/ 4: 418 92315	1
107 CPFOS	101		25 - 159				9/ 45418 1232/	9/ 4: 418 92315	1
107 5 PFNA	108		25 - 159				9/ 45418 1232/	9/ 4: 418 92315	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-005

Date Collected: 08/28/18 12:23

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 02:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 02:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 02:34	1
Perfluorooctanoic acid (PFOA)	0.90	J	2.0	0.57	ng/L		09/07/18 12:29	09/05/18 02:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 02:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 02:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	126		25 - 159				9/4/18 12:32	9/4/18 9:23C	1
107 CPFHpA	125		25 - 159				9/4/18 12:32	9/4/18 9:23C	1
107 CPFOA	108		25 - 159				9/4/18 12:32	9/4/18 9:23C	1
107 CPFOS	128		25 - 159				9/4/18 12:32	9/4/18 9:23C	1
107 5 PFNA	105		25 - 159				9/4/18 12:32	9/4/18 9:23C	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-006

Date Collected: 08/28/18 12:57

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	160		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 02:72	1
Perfluoroheptanoic acid (PFHpA)	48		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 02:72	1
Perfluorooctanoic acid (PFOA)	240		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 02:72	1
Perfluorononanoic acid (PFNA)	48		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 02:72	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	61		25 - 159				9/ / 4 5 4 1 8 12 3 2 /	9/ / 4 1 8 9 2 3 2	1
107 C-PFHxS	58		25 - 159				9/ / 4 5 4 1 8 12 3 2 /	9/ / 4 1 8 9 2 3 2	1
107 C-PFOA	116		25 - 159				9/ / 4 5 4 1 8 12 3 2 /	9/ / 4 1 8 9 2 3 2	1
107 5 PFNA	51		25 - 159				9/ / 4 5 4 1 8 12 3 2 /	9/ / 4 1 8 9 2 3 2	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	7400		2000	850	ng/L		09/11/18 10:10	09/11/18 21:30	10
Perfluorooctanesulfonic acid (PFOS)	39000		2000	1300	ng/L		09/11/18 10:10	09/11/18 21:30	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	196		25 - 159				9/ / 4 1 14 1 8 19 3 1 9	9/ / 4 1 14 1 8 2 1 3 0 9	19
107 C-PFOS	195		25 - 159				9/ / 4 1 14 1 8 19 3 1 9	9/ / 4 1 14 1 8 2 1 3 0 9	19

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-007

Date Collected: 08/28/18 13:51

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 03:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 03:29	1
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.57	ng/L		09/07/18 12:29	09/05/18 03:29	1
Perfluorooctanesulfonic acid (PFOS)	5.6		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 03:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 03:29	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	120		25 - 159				9/4/18 12:32/	9/4/18 9:03/	1
107 C-PFHxS	129		25 - 159				9/4/18 12:32/	9/4/18 9:03/	1
107 C-PFOA	108		25 - 159				9/4/18 12:32/	9/4/18 9:03/	1
107 C-PFOS	125		25 - 159				9/4/18 12:32/	9/4/18 9:03/	1
107 5 PFNA	102		25 - 159				9/4/18 12:32/	9/4/18 9:03/	1

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-009

Date Collected: 08/28/18 16:40

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-8

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 03:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 03:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 03:45	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 03:45	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 03:45	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 03:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	125		25 - 159				9/05/18 12:32	9/05/18 03:45	1
107 CPFHpA	122		25 - 159				9/05/18 12:32	9/05/18 03:45	1
107 CPFOA	101		25 - 159				9/05/18 12:32	9/05/18 03:45	1
107 CPFOS	126		25 - 159				9/05/18 12:32	9/05/18 03:45	1
107 5 PFNA	105		25 - 159				9/05/18 12:32	9/05/18 03:45	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-011

Date Collected: 08/29/18 10:19

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.9		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 04:06	1
Perfluorohexanesulfonic acid (PFHxS)	30		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 04:06	1
Perfluoroheptanoic acid (PFHpA)	3.4		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 04:06	1
Perfluorooctanoic acid (PFOA)	3.3		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 04:06	1
Perfluorooctanesulfonic acid (PFOS)	93		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 04:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 04:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 159				9/4/18 12:32	9/4/18 9C36	1
107 C-PFHxS	19/		25 - 159				9/4/18 12:32	9/4/18 9C36	1
107 C-PFOA	105		25 - 159				9/4/18 12:32	9/4/18 9C36	1
107 C-PFOS	129		25 - 159				9/4/18 12:32	9/4/18 9C36	1
107 5 PFNA	11/		25 - 159				9/4/18 12:32	9/4/18 9C36	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-032

Date Collected: 08/28/18 09:59

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-10

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 04:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 04:24	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 04:24	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 04:24	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 04:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 04:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	121		25 - 159				9/4/18 12:32	9/4/18 9:32C	1
107 CPFHpA	116		25 - 159				9/4/18 12:32	9/4/18 9:32C	1
107 CPFOA	106		25 - 159				9/4/18 12:32	9/4/18 9:32C	1
107 CPFOS	125		25 - 159				9/4/18 12:32	9/4/18 9:32C	1
107 5 PFNA	102		25 - 159				9/4/18 12:32	9/4/18 9:32C	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-042

Date Collected: 08/29/18 09:28

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-11

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 04:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 04:42	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 04:42	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 04:42	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 04:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 04:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	118		25 - 159				9/4/18 12:32/	9/4/18 9C3C2	1
107 CPFHpA	116		25 - 159				9/4/18 12:32/	9/4/18 9C3C2	1
107 CPFOA	126		25 - 159				9/4/18 12:32/	9/4/18 9C3C2	1
107 CPFOS	121		25 - 159				9/4/18 12:32/	9/4/18 9C3C2	1
107 5 PFNA	125		25 - 159				9/4/18 12:32/	9/4/18 9C3C2	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-043

Date Collected: 08/29/18 10:08

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-12

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 07:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 07:01	1
Perfluoroheptanoic acid (PFHpA)	0.94	J	2.0	0.80	ng/L		09/07/18 12:29	09/05/18 07:01	1
Perfluorooctanoic acid (PFOA)	7.6		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 07:01	1
Perfluorooctanesulfonic acid (PFOS)	6.6		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 07:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 07:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	129		25 - 159				9/4/18 12:32	9/4/18 9:53	1
107 C-PFHpA	122		25 - 159				9/4/18 12:32	9/4/18 9:53	1
107 C-PFOA	105		25 - 159				9/4/18 12:32	9/4/18 9:53	1
107 C-PFOS	122		25 - 159				9/4/18 12:32	9/4/18 9:53	1
107 5 PFNA	10:		25 - 159				9/4/18 12:32	9/4/18 9:53	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: SW-2100

Date Collected: 08/29/18 09:35

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-13

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L		09/07/18 12:29	09/05/18 07:19	1
Perfluorohexanesulfonic acid (PFHxS)	27		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 07:19	1
Perfluoroheptanoic acid (PFHpA)	3.6		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 07:19	1
Perfluorooctanoic acid (PFOA)	2.6		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 07:19	1
Perfluorooctanesulfonic acid (PFOS)	110		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 07:19	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 07:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	116		25 - 159				9/45418 1232/	9/4:418 9531/	1
107 C-PFHxS	12		25 - 159				9/45418 1232/	9/4:418 9531/	1
107 C-PFOA	105		25 - 159				9/45418 1232/	9/4:418 9531/	1
107 C-PFOS	121		25 - 159				9/45418 1232/	9/4:418 9531/	1
107 5 PFNA	128		25 - 159				9/45418 1232/	9/4:418 9531/	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: SW-2001

Date Collected: 08/29/18 09:57

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-14

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	4.7		2.0	0.92	ng/L		09/11/18 10:10	09/11/18 20:73	1
Perfluorohexanesulfonic acid (PFHxS)	120		2.0	0.85	ng/L		09/11/18 10:10	09/11/18 20:73	1
Perfluoroheptanoic acid (PFHpA)	3.1		2.0	0.80	ng/L		09/11/18 10:10	09/11/18 20:73	1
Perfluorooctanoic acid (PFOA)	5.9		2.0	0.57	ng/L		09/11/18 10:10	09/11/18 20:73	1
Perfluorooctanesulfonic acid (PFOS)	200		2.0	1.3	ng/L		09/11/18 10:10	09/11/18 20:73	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/11/18 10:10	09/11/18 20:73	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	199		25 - 159				9/4/14/18 19319	9/4/14/18 29350	1
107 C-PFHxS	192		25 - 159				9/4/14/18 19319	9/4/14/18 29350	1
107 C-PFOA	199		25 - 159				9/4/14/18 19319	9/4/14/18 29350	1
107 C-PFOS	199		25 - 159				9/4/14/18 19319	9/4/14/18 29350	1
107 5 PFNA	/ 1		25 - 159				9/4/14/18 19319	9/4/14/18 29350	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: SW-2002

Date Collected: 08/29/18 10:16

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-15

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	8.2		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 15:76	1
Perfluorohexanesulfonic acid (PFHxS)	70		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 15:76	1
Perfluoroheptanoic acid (PFHpA)	8.8		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 15:76	1
Perfluorooctanoic acid (PFOA)	9.9		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 15:76	1
Perfluorononanoic acid (PFNA)	1.2 J		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 15:76	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	//		25 - 159				9/ / 05 4 18 12 32/	9/ / 05 4 18 1 356	1
107 CPFHpA	191		25 - 159				9/ / 05 4 18 12 32/	9/ / 05 4 18 1 356	1
107 CPFOA	196		25 - 159				9/ / 05 4 18 12 32/	9/ / 05 4 18 1 356	1
107 5 PFNA	/ 8		25 - 159				9/ / 05 4 18 12 32/	9/ / 05 4 18 1 356	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	410		20	13	ng/L		09/07/18 12:29	09/09/18 15:40	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
107 CPFOS	195		25 - 159				9/ / 05 4 18 12 32/	9/ / 05 4 18 1 309	19

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-033

Date Collected: 08/28/18 12:10

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-16

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		09/07/18 12:29	09/05/18 18:14	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 18:14	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 18:14	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 18:14	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 18:14	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 18:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	196		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 18:31C	1
107 CPFHpA	198		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 18:31C	1
107 CPFOA	119		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 18:31C	1
107 CPFOS	190		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 18:31C	1
107 5 PFNA	119		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 18:31C	1

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-036

Date Collected: 08/28/18 11:10

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-17

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:29	09/05/18 18:71	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 18:71	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 18:71	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 18:71	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 18:71	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 18:71	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	196		25 - 159	9/05/18 12:32	9/05/18 18:31	1
107 CPFHpA	/:		25 - 159	9/05/18 12:32	9/05/18 18:31	1
107 CPFOA	19:		25 - 159	9/05/18 12:32	9/05/18 18:31	1
107 CPFOS	199		25 - 159	9/05/18 12:32	9/05/18 18:31	1
107 5 PFNA	190		25 - 159	9/05/18 12:32	9/05/18 18:31	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-040

Date Collected: 08/28/18 15:44

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-18

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		09/07/18 12:29	09/05/18 19:09	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 19:09	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 19:09	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 19:09	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 19:09	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 19:09	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 1/ 3/	1
107 CPFHpA	198		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 1/ 3/	1
107 CPFOA	110		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 1/ 3/	1
107 CPFOS	119		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 1/ 3/	1
107 5 PFNA	19:		25 - 159				9/ 4:54:18 12:32/	9/ 4: 4:18 1/ 3/	1

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-041

Date Collected: 08/28/18 17:09

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-19

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		09/07/18 12:29	09/05/18 19:28	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:29	09/05/18 19:28	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:29	09/05/18 19:28	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:29	09/05/18 19:28	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:29	09/05/18 19:28	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:29	09/05/18 19:28	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	198		25 - 159	9/4/18 12:32	9/4/18 1/38	1
107 CPFHpA	19:		25 - 159	9/4/18 12:32	9/4/18 1/38	1
107 CPFOA	110		25 - 159	9/4/18 12:32	9/4/18 1/38	1
107 CPFOS	196		25 - 159	9/4/18 12:32	9/4/18 1/38	1
107 5 PFNA	110		25 - 159	9/4/18 12:32	9/4/18 1/38	1

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-138

Date Collected: 08/28/18 13:35

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-20

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		09/07/18 12:35	09/05/18 20:79	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.85	ng/L		09/07/18 12:35	09/05/18 20:79	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		09/07/18 12:35	09/05/18 20:79	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.57	ng/L		09/07/18 12:35	09/05/18 20:79	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		09/07/18 12:35	09/05/18 20:79	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.67	ng/L		09/07/18 12:35	09/05/18 20:79	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	19C		25 - 159	9/ 45418 1230	9/ 45418 2935	1
107 CPFHpA	//		25 - 159	9/ 45418 1230	9/ 45418 2935	1
107 CPFOA	19/		25 - 159	9/ 45418 1230	9/ 45418 2935	1
107 CPFOS	199		25 - 159	9/ 45418 1230	9/ 45418 2935	1
107 5 PFNA	190		25 - 159	9/ 45418 1230	9/ 45418 2935	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-106

Date Collected: 08/28/18 12:07

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-21

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	170		2.0	0.92	ng/L		09/07/18 12:35	09/05/18 21:18	1
Perfluoroheptanoic acid (PFHpA)	48		2.0	0.80	ng/L		09/07/18 12:35	09/05/18 21:18	1
Perfluorooctanoic acid (PFOA)	240		2.0	0.57	ng/L		09/07/18 12:35	09/05/18 21:18	1
Perfluorononanoic acid (PFNA)	48		2.0	0.67	ng/L		09/07/18 12:35	09/05/18 21:18	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	56		25 - 159				9/4/18 12:30	9/4/18 21:38	1
107 C-PFHxS	5C		25 - 159				9/4/18 12:30	9/4/18 21:38	1
107 C-PFOA	199		25 - 159				9/4/18 12:30	9/4/18 21:38	1
107 5 PFNA	C5		25 - 159				9/4/18 12:30	9/4/18 21:38	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	7300		2000	850	ng/L		09/11/18 10:10	09/13/18 07:75	10
Perfluorooctanesulfonic acid (PFOS)	40000		2000	1300	ng/L		09/11/18 10:10	09/13/18 07:75	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				9/4/18 19:31	9/4/18 95:35	19
107 C-PFOS	192		25 - 159				9/4/18 19:31	9/4/18 95:35	19

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: PW-013

Date Collected: 08/29/18 15:06

Date Received: 08/30/18 11:25

Lab Sample ID: 320-42653-22

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	57		2.0	0.92	ng/L		09/07/18 12:35	09/05/18 21:36	1
Perfluoroheptanoic acid (PFHpA)	230		2.0	0.80	ng/L		09/07/18 12:35	09/05/18 21:36	1
Perfluorooctanoic acid (PFOA)	130		2.0	0.57	ng/L		09/07/18 12:35	09/05/18 21:36	1
Perfluorononanoic acid (PFNA)	8.9		2.0	0.67	ng/L		09/07/18 12:35	09/05/18 21:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	/ 2		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4: 4 1 8 21:36	1
107 C-PFHpA	8:		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4: 4 1 8 21:36	1
107 C-PFOA	85		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4: 4 1 8 21:36	1
107 5 PFNA	: 6		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4: 4 1 8 21:36	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	860		100	44	ng/L		09/07/18 12:35	09/10/18 11:22	70
Perfluorooctanesulfonic acid (PFOS)	5500		100	64	ng/L		09/07/18 12:35	09/10/18 11:22	70
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	115		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4 1 9 4 1 8 11:32	59
107 C-PFOS	116		25 - 159				9/ / 5 4 1 8 12:30	9/ / 4 1 9 4 1 8 11:32	59

TestAmerica Sacramento

Isotope Dilution Summary

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

TestAmerica Job ID: 320-42673-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-42673-1	PW-001	113	112	130		104
320-42673-1 - D8	PW-001	104			103	
320-42673-2	PW-002	113	112	129	116	123
320-42673-3	PW-003	127	121	131	127	134
320-42673-4	PW-004	121	129	126	131	139
320-42673-7	PW-007	126	127	139	129	137
320-42673-6	PW-006	61	79	116		71
320-42673-6 - D8	PW-006	106			107	
320-42673-5	PW-005	123	120	139	127	132
320-42673-9	PW-00N	127	122	141	126	137
320-42673-N	PW-011	112	10N	137	120	11N
320-42673-10	PW-032	121	116	136	127	132
320-42673-11	PW-042	119	116	126	121	127
320-42673-12	PW-043	120	122	147	122	135
320-42673-13	SW-2100	116	125	137	121	129
320-42673-14	SW-2001	100	102	100	100	N1
320-42673-17	SW-2002	NN	101	106		N9
320-42673-17 - D8	SW-2002				107	
320-42673-16	PW-033	106	109	110	103	110
320-42673-15	PW-036	106	N5	105	100	103
320-42673-19	PW-040	112	109	113	110	105
320-42673-1N	PW-041	109	105	113	106	113
320-42673-20	PW-139	104	NN	10N	100	103
320-42673-21	PW-106	76	74	100		47
320-42673-21 - D8	PW-106	113			102	
320-42673-22	PW-013	N2	95	97		56
320-42673-22 - D8	PW-013	117			116	
8CS 320-243N16/2-A	8ab Control Sample	121	120	127	124	126
8CS 320-243N19/2-A	8ab Control Sample	106	N9	NN	NN	102
8CS 320-244N55/2-A	8ab Control Sample	NN	101	N2	NN	9N
8CSD 320-243N16/3-A	8ab Control Sample Dup	10N	117	12N	119	120
8CSD 320-243N19/3-A	8ab Control Sample Dup	NN	NN	104	102	103
8CSD 320-244N55/3-A	8ab Control Sample Dup	103	10N	N3	105	95
L M320-243N16/1-A	L ethoB Mand	122	124	129	122	126
L M320-243N19/1-A	L ethoB Mand	107	102	112	105	N9
L M320-244N55/1-A	L ethoB Mand	N9	102	N2	N7	5N

Surrogate Legend

PkFHS x 19O2 PkFHS
PkFpA x 13C4-PkFpA
PkOA x 13C4 PkOA
PkOS x 13C4 PkOS
Pk=A x 13C7 Pk=A

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42673-1

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

Lab Sample ID: MB 320-243916/1-A

Matrix: Water

Analysis Batch: 244261

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 243916

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d 2	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d B	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1
Per.luroheptanoic aci9 gPLHpA5	f D		2d	0d 0	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1
Per.lurooctanoic aci9 gPLOA5	f D		2d	0d7	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1
Per.lurooctanesul.onic aci9 gPLOS5	f D		2d	1d8	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0d7	nF/N		0 (/07/1) 12:2	0 (/0B/1) 00:0B	1

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		20 510-	- 9/- 0/18 12:28	- 9/- 4/18 -- 3 4	1
17C: PFHxPA	12:		20 510-	- 9/- 0/18 12:28	- 9/- 4/18 -- 3 4	1
17C: PFOA	128		20 510-	- 9/- 0/18 12:28	- 9/- 4/18 -- 3 4	1
17C: PFOS	122		20 510-	- 9/- 0/18 12:28	- 9/- 4/18 -- 3 4	1
17C0 PF6A	12N		20 510-	- 9/- 0/18 12:28	- 9/- 4/18 -- 3 4	1

Lab Sample ID: LCS 320-243916/2-A

Matrix: Water

Analysis Batch: 244261

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 243916

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Per.lurobutanesul.onic aci9 gPL8S5	1Bd	1Bd7		nF/N		((	B2 - 171
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1) d		nF/N		100	B3 - 17B
Per.luroheptanoic aci9 gPLHpA5	20d	21d		nF/N		107	B1 - 13)
Per.lurooctanoic aci9 gPLOA5	20d	21d		nF/N		10B	B0 - 140
Per.lurooctanesul.onic aci9 gPLOS5	1) d	1Bd		nF/N		(2	6(- 144
Per.lurononanoic aci9 gPLf A5	20d	1(d		nF/N		((	B3 - 14B

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	121		20 510-
17C: PFHxPA	12-		20 510-
17C: PFOA	120		20 510-
17C: PFOS	12:		20 510-
17C0 PF6A	12N		20 510-

Lab Sample ID: LCSD 320-243916/3-A

Matrix: Water

Analysis Batch: 244261

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243916

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.lurobutanesul.onic aci9 gPL8S5	1Bd	1) d		nF/N		107	B2 - 171	6	30
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1(d		nF/N		107	B3 - 17B	7	30
Per.luroheptanoic aci9 gPLHpA5	20d	20d		nF/N		100	B1 - 13)	7	30
Per.lurooctanoic aci9 gPLOA5	20d	20d		nF/N		102	B0 - 140	7	30
Per.lurooctanesul.onic aci9 gPLOS5	1) d	1Bd		nF/N		(7	6(- 144	3	30
Per.lurononanoic aci9 gPLf A5	20d	20d		nF/N		103	B3 - 14B	4	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42673-1

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	1-9		20 510-
17C: PFHxPA	110		20 510-
17C: PFOA	129		20 510-
17C: PFOS	118		20 510-
17C0 PF6A	12-		20 510-

Lab Sample ID: MB 320-243918/1-A

Matrix: Water

Analysis Batch: 244484

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 243918

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d 2	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d B	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1
Per.luroheptanoic aci9 gPLHpA5	f D		2d	0d 0	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1
Per.lurooctanoic aci9 gPLOA5	f D		2d	0d7	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1
Per.lurooctanesul.onic aci9 gPLOS5	f D		2d	1d	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0d7	nF/N		0 (/07/1) 12:3B	0 (/0B/1) 20:04	1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	1-0		20 510-	- 9/- 0/18 12:34	- 9/- 4/18 2- 3 :	1
17C: PFHxPA	1-2		20 510-	- 9/- 0/18 12:34	- 9/- 4/18 2- 3 :	1
17C: PFOA	112		20 510-	- 9/- 0/18 12:34	- 9/- 4/18 2- 3 :	1
17C: PFOS	1-4		20 510-	- 9/- 0/18 12:34	- 9/- 4/18 2- 3 :	1
17C0 PF6A	98		20 510-	- 9/- 0/18 12:34	- 9/- 4/18 2- 3 :	1

Lab Sample ID: LCS 320-243918/2-A

Matrix: Water

Analysis Batch: 244484

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 243918

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Per.lurobutanesul.onic aci9 gPL8S5	1BdB	1BdB		nF/N		()	B2 - 171
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1) d		nF/N		101	B3 - 17B
Per.luroheptanoic aci9 gPLHpA5	20d	20d		nF/N		103	B1 - 13)
Per.lurooctanoic aci9 gPLOA5	20d	21dB		nF/N		10)	B0 - 140
Per.lurooctanesul.onic aci9 gPLOS5	1) dB	1) d		nF/N		(B	6(- 144
Per.lurononanoic aci9 gPLf A5	20d	20d		nF/N		104	B3 - 14B

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	1- N		20 510-
17C: PFHxPA	98		20 510-
17C: PFOA	99		20 510-
17C: PFOS	99		20 510-
17C0 PF6A	1-2		20 510-

Lab Sample ID: LCSD 320-243918/3-A

Matrix: Water

Analysis Batch: 244484

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243918

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Per.lurobutanesul.onic aci9 gPL8S5	1BdB	1(d		nF/N		10)	B2 - 171	10	30
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1(d		nF/N		10B	B3 - 17B	6	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42673-1

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

Lab Sample ID: LCSD 320-243918/3-A

Matrix: Water

Analysis Batch: 244484

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 243918

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.luroheptanoic aci9 gPLHpA5	20d	20d		nF/N		103	B1 - 13)	0	30
Per.lurooctanoic aci9 gPLOA5	20d	21d		nF/N		106	B0 - 140	3	30
Per.lurooctanesul.onic aci9 gPLOS5	1) d	1Bd		nF/N		(6	6(- 144	1	30
Per.lurononanoic aci9 gPLf A5	20d	21d		nF/N		10B	B3 - 14B	2	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	99		20 510-
17C: PFHxPA	99		20 510-
17C: PFOA	1- 2		20 510-
17C: PFOS	1- 2		20 510-
17C0 PF6A	1- 7		20 510-

Lab Sample ID: MB 320-244977/1-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 244977

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d 2	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d B	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1
Per.luroheptanoic aci9 gPLHpA5	f D		2d	0d 0	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1
Per.lurooctanoic aci9 gPLOA5	f D		2d	0d B7	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1
Per.lurooctanesul.onic aci9 gPLOS5	f D		2d	1d	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0d B7	nF/N		0(/11/1) 10:0(	0(/11/1) 14:10	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	98		20 510-	- 9/11/18 1- 3 9	- 9/11/18 1: 31-	1
17C: PFHxPA	1- 2		20 510-	- 9/11/18 1- 3 9	- 9/11/18 1: 31-	1
17C: PFOA	92		20 510-	- 9/11/18 1- 3 9	- 9/11/18 1: 31-	1
17C: PFOS	90		20 510-	- 9/11/18 1- 3 9	- 9/11/18 1: 31-	1
17C0 PF6A	49		20 510-	- 9/11/18 1- 3 9	- 9/11/18 1: 31-	1

Lab Sample ID: LCS 320-244977/2-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244977

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Per.lurobutanesul.onic aci9 gPL8S5	1Bd	1(d		nF/N		10)	B2 - 171
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1) d		nF/N		101	B3 - 17B
Per.luroheptanoic aci9 gPLHpA5	20d	1(d		nF/N		()	B1 - 13)
Per.lurooctanoic aci9 gPLOA5	20d	1) d		nF/N		(4	B0 - 140
Per.lurooctanesul.onic aci9 gPLOS5	1) d	16d		nF/N		) (	6(- 144
Per.lurononanoic aci9 gPLf A5	20d	1(d		nF/N		(6	B3 - 14B

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	99		20 510-
17C: PFHxPA	1- 1		20 510-

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-42673-1

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

Lab Sample ID: LCS 320-244977/2-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 244977

	LCS	LCS	
Isotope Dilution	%Recovery	Qualifier	Limits
17C: PFOA	92		20 510-
17C: PFOS	99		20 510-
17C0 PF6A	89		20 510-

Lab Sample ID: LCSD 320-244977/3-A

Matrix: Water

Analysis Batch: 245045

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 244977

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	Limit
Per.luoobutanesul.onic aci9 gPL8S5	1Bb	1) d		nF/N		107	B2 - 171	3	30
Per.luoohexanesul.onic aci9 gPLHxS5	1) d	1) d		nF/N		103	B3 - 17B	2	30
Per.luoohheptanoic aci9 gPLHpA5	20d	1(d		nF/N		(6	B1 - 13)	2	30
Per.luoooctanoic aci9 gPLOA5	20d	1(d		nF/N		()	B0 - 140	4	30
Per.luoooctanesul.onic aci9 gPLOS5	1) d	16d		nF/N		()	6(- 144	0	30
Per.luoononanoic aci9 gPLf A5	20d	1(d		nF/N		()	B3 - 14B	3	30

	LCSD	LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	1- 7		20 510-
17C: PFHpA	1- 9		20 510-
17C: PFOA	97		20 510-
17C: PFOS	1- 4		20 510-
17C0 PF6A	84		20 510-

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-42673-1

LCMS

Prep Batch: 243916

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-1	PW-001	Total/NA	Water	PFAS Prep	
320-42673-1 - D5	PW-001	Total/NA	Water	PFAS Prep	
320-42673-2	PW-002	Total/NA	Water	PFAS Prep	
320-42673-3	PW-003	Total/NA	Water	PFAS Prep	
320-42673-4	PW-004	Total/NA	Water	PFAS Prep	
320-42673-7	PW-007	Total/NA	Water	PFAS Prep	
320-42673-6	PW-006	Total/NA	Water	PFAS Prep	
320-42673-8	PW-008	Total/NA	Water	PFAS Prep	
320-42673-M	PW-00B	Total/NA	Water	PFAS Prep	
320-42673-B	PW-011	Total/NA	Water	PFAS Prep	
320-42673-10	PW-032	Total/NA	Water	PFAS Prep	
320-42673-11	PW-042	Total/NA	Water	PFAS Prep	
320-42673-12	PW-043	Total/NA	Water	PFAS Prep	
320-42673-13	SW-2100	Total/NA	Water	PFAS Prep	
320-42673-17	SW-2002	Total/NA	Water	PFAS Prep	
320-42673-17 - D5	SW-2002	Total/NA	Water	PFAS Prep	
320-42673-16	PW-033	Total/NA	Water	PFAS Prep	
320-42673-18	PW-036	Total/NA	Water	PFAS Prep	
320-42673-1M	PW-040	Total/NA	Water	PFAS Prep	
320-42673-1B	PW-041	Total/NA	Water	PFAS Prep	
9 d 320-243B16/1-A	9 ethok dlanL	Total/NA	Water	PFAS Prep	
5CS 320-243B16/2-A	5ab Control Sample	Total/NA	Water	PFAS Prep	
5CSD 320-243B16/3-A	5ab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 243918

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-20	PW-13M	Total/NA	Water	PFAS Prep	
320-42673-21	PW-106	Total/NA	Water	PFAS Prep	
320-42673-22	PW-013	Total/NA	Water	PFAS Prep	
320-42673-22 - D5	PW-013	Total/NA	Water	PFAS Prep	
9 d 320-243B1M1-A	9 ethok dlanL	Total/NA	Water	PFAS Prep	
5CS 320-243B1M2-A	5ab Control Sample	Total/NA	Water	PFAS Prep	
5CSD 320-243B1M3-A	5ab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 244261

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-1	PW-001	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-2	PW-002	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-3	PW-003	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-4	PW-004	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-7	PW-007	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-6	PW-006	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-8	PW-008	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-M	PW-00B	Total/NA	Water	WS-5C-0027	243B16
				At1	

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-42673-1

LCMS (Continued)

Analysis Batch: 244261 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-B	PW-011	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-10	PW-032	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-11	PW-042	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-12	PW-043	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-13	SW-2100	Total/NA	Water	WS-5C-0027	243B16
				At1	
9 d 320-243B16/1-A	9 ethok dlanL	Total/NA	Water	WS-5C-0027	243B16
				At1	
5CS 320-243B16/2-A	5ab Control Sample	Total/NA	Water	WS-5C-0027	243B16
				At1	
5CSD 320-243B16/3-A	5ab Control Sample Dup	Total/NA	Water	WS-5C-0027	243B16
				At1	

Analysis Batch: 244484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-17	SW-2002	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-16	PW-033	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-18	PW-036	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-1M	PW-040	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-1B	PW-041	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-20	PW-13M	Total/NA	Water	WS-5C-0027	243B1M
				At1	
320-42673-21	PW-106	Total/NA	Water	WS-5C-0027	243B1M
				At1	
320-42673-22	PW-013	Total/NA	Water	WS-5C-0027	243B1M
				At1	
9 d 320-243B1M1-A	9 ethok dlanL	Total/NA	Water	WS-5C-0027	243B1M
				At1	
5CS 320-243B1M2-A	5ab Control Sample	Total/NA	Water	WS-5C-0027	243B1M
				At1	
5CSD 320-243B1M3-A	5ab Control Sample Dup	Total/NA	Water	WS-5C-0027	243B1M
				At1	

Analysis Batch: 244627

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-1 - D5	PW-001	Total/NA	Water	WS-5C-0027	243B16
				At1	
320-42673-17 - D5	SW-2002	Total/NA	Water	WS-5C-0027	243B16
				At1	

Analysis Batch: 244724

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-22 - D5	PW-013	Total/NA	Water	WS-5C-0027	243B1M
				At1	

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-42673-1

LCMS (Continued)

Prep Batch: 244977

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-6 - D5	PW-006	Total/NA	Water	PFAS Prep	
320-42673-14	SW-2001	Total/NA	Water	PFAS Prep	
320-42673-21 - D5	PW-106	Total/NA	Water	PFAS Prep	
9 d 320-244B88/1-A	9 ethok dlanL	Total/NA	Water	PFAS Prep	
5CS 320-244B88/2-A	5ab Control Sample	Total/NA	Water	PFAS Prep	
5CSD 320-244B88/3-A	5ab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 245045

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-6 - D5	PW-006	Total/NA	Water	WS-5C-0027 At1	244B88
320-42673-14	SW-2001	Total/NA	Water	WS-5C-0027 At1	244B88
9 d 320-244B88/1-A	9 ethok dlanL	Total/NA	Water	WS-5C-0027 At1	244B88
5CS 320-244B88/2-A	5ab Control Sample	Total/NA	Water	WS-5C-0027 At1	244B88
5CSD 320-244B88/3-A	5ab Control Sample Dup	Total/NA	Water	WS-5C-0027 At1	244B88

Analysis Batch: 245370

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-42673-21 - D5	PW-106	Total/NA	Water	WS-5C-0027 At1	244B88

Lab Chronicle

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: NP W32
Date Collectex: 3d8 d&d 23:- 0
Date / ecei5ex: 3d8d3&d 22:- 7

Lab Sample ID: 0- 3W- 670W
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 01:20	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1	DL	10			244625	09/09/18 15:03	D1R	TAL SAC

Client Sample ID: NP W3-
Date Collectex: 3d8 d&d 3F:- -
Date / ecei5ex: 3d8d3&d 22:- 7

Lab Sample ID: 0- 3W- 670W
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 01:39	S1M	TAL SAC

Client Sample ID: NP W30
Date Collectex: 3d8 d&d 22:- -
Date / ecei5ex: 3d8d3&d 22:- 7

Lab Sample ID: 0- 3W- 670W
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 01:75	S1M	TAL SAC

Client Sample ID: NP W34
Date Collectex: 3d8 d&d 22:7F
Date / ecei5ex: 3d8d3&d 22:- 7

Lab Sample ID: 0- 3W- 670W
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 02:17	S1M	TAL SAC

Client Sample ID: NP W37
Date Collectex: 3d8 d&d 2:- - 0
Date / ecei5ex: 3d8d3&d 22:- 7

Lab Sample ID: 0- 3W- 670W
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 02:34	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: NP W36

Date Collectex: 3d8 d8d 2- :79

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 02:72	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		0.01 mL	1.66 mL	244955	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1	DL	10			247047	09/11/18 21:30	S1M	TAL SAC

Client Sample ID: NP W39

Date Collectex: 3d8 d8d 20:72

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 03:29	S1M	TAL SAC

Client Sample ID: NP W3F

Date Collectex: 3d8 d8d 26:43

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 03:45	S1M	TAL SAC

Client Sample ID: NP W22

Date Collectex: 3d8 F8d 23:2F

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 04:06	S1M	TAL SAC

Client Sample ID: NP W0-

Date Collectex: 3d8 d8d 3F:7F

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 04:24	S1M	TAL SAC

Client Sample ID: NP W4-

Date Collectex: 3d8 F8d 3F:- d

Date / ecei5ex: 3d8038d 22:- 7

Lab Sample ID: 0- 3W- 670W

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: NP W4-

Date Collectex: 3d8 F&d 3F:- d

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W2

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 04:42	S1M	TAL SAC

Client Sample ID: NP W40

Date Collectex: 3d8 F&d 23:3d

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W-

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 07:01	S1M	TAL SAC

Client Sample ID: SP W233

Date Collectex: 3d8 F&d 3F:07

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W0

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244261	09/05/18 07:19	S1M	TAL SAC

Client Sample ID: SP W332

Date Collectex: 3d8 F&d 3F:79

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W4

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	244955	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			247047	09/11/18 20:73	S1M	TAL SAC

Client Sample ID: SP W33-

Date Collectex: 3d8 F&d 23:26

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W7

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 15:76	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1	DL	10			244625	09/09/18 15:40	D1R	TAL SAC

Client Sample ID: NP W00

Date Collectex: 3d8 d&d 2- :23

Date / ecei5ex: 3d803&d 22:- 7

Lab Sample ID: 0- 3W- 670W6

1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 18:14	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: NP W06
Date Collectex: 3d8 d8d 22:23
Date / ecei5ex: 3d8d32d 22:- 7

Lab Sample ID: 0- 3W- 670W9
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 18:71	S1M	TAL SAC

Client Sample ID: NP W43
Date Collectex: 3d8 d8d 27:44
Date / ecei5ex: 3d8d32d 22:- 7

Lab Sample ID: 0- 3W- 670Wd
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 19:09	S1M	TAL SAC

Client Sample ID: NP W42
Date Collectex: 3d8 d8d 29:3F
Date / ecei5ex: 3d8d32d 22:- 7

Lab Sample ID: 0- 3W- 670WF
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243916	09/07/18 12:29	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 19:28	S1M	TAL SAC

Client Sample ID: NP W0d
Date Collectex: 3d8 d8d 20:07
Date / ecei5ex: 3d8d32d 22:- 7

Lab Sample ID: 0- 3W- 670W3
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243918	09/07/18 12:35	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 20:79	S1M	TAL SAC

Client Sample ID: NP W36
Date Collectex: 3d8 d8d 2- :39
Date / ecei5ex: 3d8d32d 22:- 7

Lab Sample ID: 0- 3W- 670W2
1 atriM P ater

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243918	09/07/18 12:35	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 21:18	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		0.01 mL	1.66 mL	244955	09/11/18 10:10	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1	DL	10			247350	09/13/18 07:75	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-42673-1

Client Sample ID: NP W20

Lab Sample ID: 0-3W-670W-

Date Collectex: 3d8 F&d 27:36

1 atriM P ater

Date / ecei5ex: 3d803&d 22:- 7

Nrep Rvpe	Tatch Rvpe	Tatch 1 ethox	/ An	Dil uactor	Initial y moAnt	uinal y moAnt	Tatch z Amber	Nreparex or y nalvsex	y nalvEt	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	243918	09/07/18 12:35	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1		1			244484	09/05/18 21:36	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	243918	09/07/18 12:35	QCP	TAL SAC
Total/NA	Analysis	WS-LC-0027 At1	DL	70			244524	09/10/18 11:22	D1R	TAL SAC

Laboratory / eferenceB:

TAL SAC = TestAmerica Sacramento, 880 Riverside Parkway, West Sacramento, CA 97607, TEL (916)353-7600

Accreditation/Certification Summary

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

TestAmerica Job ID: 320-42673-1

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 ProBram	10	1g-020	01-20-21
ANAE	DoD L8AP		8246z	01-20-21
Ari9ona	State ProBram	Z	AQ0g0z	0z-11-1Z
Arkansas DLH	State ProBram	6	zz-06Z1	06-1g-1Z
California	State ProBram	Z	2zZg	01-31-1Z
Colorado	State ProBram	z	CA00044	0z-31-1Z
Connecticut	State ProBram	1	PF-06Z1	06-30-1Z
5lorida	NL 8AP	4	Lzg7g0	06-30-1Z
GeorBia	State ProBram	4	N/A	01-2z-1Z
Fawaii	State ProBram	Z	N/A	01-2Z-1Z
Illinois	NL 8AP	7	200060	03-1g-1Z
Kansas	NL 8AP	g	L-103g7	10-31-1z
8ouisiana	NL 8AP	6	30612	06-30-1Z
Maine	State ProBram	1	CA0004	04-14-20
MichiBan	State ProBram	7	ZZ4g	01-31-20
Nevada	State ProBram	Z	CA00044	0g-31-1Z
New Fampshire	NL 8AP	1	2ZZg	04-1z-1Z
New Jersey	NL 8AP	2	CA007	06-30-1Z
New York	NL 8AP	2	11666	03-31-1Z
OreBon	NL 8AP	10	4040	01-2Z-1Z
Pennsylvania	NL 8AP	3	6z-012g2	03-31-1Z
Texas	NL 8AP	6	T104g043ZZ	07-31-1Z
US 5ish & Wildlife	5ederal		8L 14z3zz-0	0g-31-1Z
USDA	5ederal		P330-1z-0023Z	01-1g-21
USLPA UCMR	5ederal	1	CA00044	11-06-1z
Utah	NL 8AP	z	CA00044	02-2z-1Z
Vermont	State ProBram	1	VT-4040	04-30-1Z
VirBinia	NL 8AP	3	4602gz	03-14-1Z
WashinBton	State ProBram	10	C7z1	07-07-1Z
West VirBinia (DW)	State ProBram	3	ZZ30C	12-31-1z
WyominB	State ProBram	z	zTMS-8	01-2z-1Z

Method Summary

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u pstaFps DL T

TestAmerica Job ID: 320-42813-C

Method	Method Description	Protocol	Laboratory
, h-5l -0021 AtC	diporiSatek Ary=nhpbstaSces	TA5-hAI	TA5 hAI
j dAh j reO	j reQaratioSPDirect IS/ect j dAh	TA5-hAI	TA5 hAI

Protocol References:

TA5-hAI g TestAmerica 5aboratoriesP, est hacrameStoPdaciit=htaSkark L QeratiS. j rocekpreR

Laboratory References:

TA5 hAI g TestAmerica hacrameStoPvv0 wiFersike j ary9 a=P, est hacrameStoPl A 61801PTE5 (6C8)373-1800

Sample Summary

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

TestAmerica Job ID: 320-42653-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-42653-1	PW-001	Water	08/28/18 10:23	08/30/18 11:25
320-42653-2	PW-002	Water	08/28/18 09:22	08/30/18 11:25
320-42653-3	PW-003	Water	08/28/18 11:22	08/30/18 11:25
320-42653-4	PW-004	Water	08/28/18 11:59	08/30/18 11:25
320-42653-5	PW-005	Water	08/28/18 12:23	08/30/18 11:25
320-42653-6	PW-006	Water	08/28/18 12:57	08/30/18 11:25
320-42653-7	PW-007	Water	08/28/18 13:51	08/30/18 11:25
320-42653-8	PW-009	Water	08/28/18 16:40	08/30/18 11:25
320-42653-9	PW-011	Water	08/29/18 10:19	08/30/18 11:25
320-42653-10	PW-032	Water	08/28/18 09:59	08/30/18 11:25
320-42653-11	PW-042	Water	08/29/18 09:28	08/30/18 11:25
320-42653-12	PW-043	Water	08/29/18 10:08	08/30/18 11:25
320-42653-13	SW-2100	Water	08/29/18 09:35	08/30/18 11:25
320-42653-14	SW-2001	Water	08/29/18 09:57	08/30/18 11:25
320-42653-15	SW-2002	Water	08/29/18 10:16	08/30/18 11:25
320-42653-16	PW-033	Water	08/28/18 12:10	08/30/18 11:25
320-42653-17	PW-036	Water	08/28/18 11:10	08/30/18 11:25
320-42653-18	PW-040	Water	08/28/18 15:44	08/30/18 11:25
320-42653-19	PW-041	Water	08/28/18 17:09	08/30/18 11:25
320-42653-20	PW-138	Water	08/28/18 13:35	08/30/18 11:25
320-42653-21	PW-106	Water	08/28/18 12:07	08/30/18 11:25
320-42653-22	PW-013	Water	08/29/18 15:06	08/30/18 11:25

CHAIN-OF-CUSTODY RECORD

Page 1 of 3

Laboratory Test America
Attn: David Altucher

Analytical Methods (include preservative if used)

Turn Around Time:
☒ Normal ☐ Rush
Please Specify

Quote No:

J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers				Remarks/Matrix Composition/Grab? Sample Containers
PW-001		1023	8/28/18	X				2 Grand water
PW-002		0922		X				2
PW-003		1122		X				2
PW-004		1159		X				2
PW-005		1223		X				2
PW-006		1257		X				2
PW-007		1351		X				2
PW-009		1640		X				2
PW-011		1019	8/29/18	X				2
PW-032		0959	8/28/18	X				2



320-42653 Chain of Custody

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: <u>101543</u>		Total No. of Containers: <u>42</u>		Signature: <u>[Signature]</u> Time: <u>1515</u>		Signature: <u>[Signature]</u> Time: <u>0130/18</u>		Signature: _____ Time: _____	
Name: <u>Gustavus DOT</u>		COC Seals/Intact? Y/N/NA		Printed Name: <u>Kristen Freiberger</u> Date: <u>9/21/18</u>		Printed Name: <u>David H</u> Date: <u>1125</u>		Printed Name: _____ Date: _____	
Contact: <u>KRF</u>		Received Good Cond./Cold		Company: <u>Shannon & Wilson, Inc.</u>		Company: <u>TH Sa</u>		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp:		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler: <u>KRF/MDN/ARM</u>		Delivery Method: <u>Goldstream</u>		Signature: <u>[Signature]</u> Time: <u>1125</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Notes: <u>Standard turn around</u>				Printed Name: <u>David H</u> Date: <u>9/13/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>TH Sa</u>		Company: _____		Company: _____	

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

5.90
5.00

No. 35609

CHAIN-OF-CUSTODY RECORD

Page 2 of 3

Laboratory Test America
Attn: David Alltucker

Analytical Methods (include preservative if used)

Turn Around Time:
☒ Normal ☐ Rush
Please Specify

Quote No:

J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	Analytical Methods (include preservative if used)					Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-042 42		0928	8/29/18	X					2	Groundwater
PW-044 43		1008	↓	X					2	↓
SW-2100		0935	↓	X					2	Surface water
SW-2001		0957	↓	X					2	↓
SW-2002		1016	↓	X					2	↓
PW-033		1210	8/29/18	X					2	Groundwater
PW-036		1110	↓	X					2	↓
PW-040		1544	↓	X					2	↓
PW-041		1709	↓	X					2	↓
PW-138		1335	↓	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:

Relinquished By: 1.
Signature: Time: 1515
Printed Name: Kristen Freiburger Date: 8/29/18
Company: Shannon & Wilson, Inc.

Relinquished By: 2.
Signature: Time: 1725
Printed Name: David Alltucker Date: 8/29/18
Company: Test America

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

Notes:
See PJ

Received By: 1.
Signature: Time: 1725
Printed Name: David Alltucker Date: 8/30/18
Company: TP San

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

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

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

No. 35610



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

CHAIN-OF-CUSTODY RECORD

Page 3 of 3
Laboratory Test America
Attn: David Altucher


Analytical Methods (include preservative if used)

Turn Around Time:	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush
Please Specify	

Quote No:

J-Flags: ☒ Yes ☐ No

[illegible]

Project Information	Sample Receipt	
Number:	Total No. of Containers:	
Name:	COC Seals/Intact? Y/N/NA	
Contact:	Received Good Cond./Cold	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>	Temp:	
Sampler:	Delivery Method:	

Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Signature: 	Time: 1:15	Signature: 	Time: 6/24/18	Signature: _____	Time: _____
Printed Name: Kristin Freiburger	Date: 7/24/18	Printed Name: David H. D.H.	Date: 1/25	Printed Name: _____	Date: _____
Company: Shannon & Wilson Inc		Company: TP-Sue		Company: _____	
Received By: 1.		Received By: 2.		Received By: 3.	
Signature: 	Time: 1:25	Signature: _____	Time: _____	Signature: _____	Time: _____
Printed Name: David H. D.H.	Date: 6/23/18	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Company: TP-Sue		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. 35611

Client: Shannon & Wilson, Inc

Job Number: 320-42653-1

Login Number: 42653

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

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

Laboratory Data Review Checklist

Completed By:

Marcy Nadel

Title:

Geologist

Date:

September 17, 2018

CS Report Name:

Gustavus Airport

Report Date:

September 17, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-42653-1 Revised

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample coolers were recorded at 5.0 and 5.8° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory was 5.0° C and 5.8° C. It further notes that several samples contained black or brown sediment at the bottom of the containers, and that sample SW-2001 was black in color.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batches 320-243916, 243918, and 244977.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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:

Sample *PW-138* was initially logged as *PW-0138*. The revised laboratory report includes the correct sample name as listed on the COC.

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 each sample.

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 applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 ^{13}C -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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No

Comments:

Yes, several field duplicates were submitted with this work order. Additionally, this packet contains two field-duplicate samples associated with primary samples from work order 320-42647.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

Field duplicate pair *PW-006* / *PW-106* was submitted with this work order. Duplicate samples *PW-138* and *SW-2100* correspond with samples *PW-038* and *SW-2000* from a previous work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

The RPDs, where calculable for detected values, were less than 30% for each analyte. The maximum RPD was 6%.

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.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

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: 320-43691-1

Client Project/Site: Gustavus Airport

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

10/18/2018 12:54:33 PM

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-43691-1

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.
--------------	-----------------------------------------------------------------------------

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

Case Narrative

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

TestAmerica Job ID: 320-43691-1

Job ID: 320-43691-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-43691-1

Receipt

The samples were received on 9/29/2018 12:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.4° C and 5.8° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-250331.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-250332.

Method(s) PFAS Prep: The following samples are yellow prior to extraction: PW-413 (320-43691-2), PW-418 (320-43691-3), PW-319 (320-43691-4), PW-214 (320-43691-5), PW-219 (320-43691-6), PW-211 (320-43691-9), PW-405 (320-43691-11), PW-401 (320-43691-13), PW-400 (320-43691-14), PW-403 (320-43691-15), PW-006-PRE (320-43691-16), PW-310 (320-43691-17), PW-408 (320-43691-18) and PW-300 (320-43691-19).

Method(s) PFAS Prep: The following samples are yellow with black particulates prior to extraction: PW-406 (320-43691-12) and SW-2003 (320-43691-20). batch 320-250331

Method(s) PFAS Prep: The following samples are a yellow color prior to extraction: PW-210 (320-43691-22), PW-402 (320-43691-25), PW-203 (320-43691-28), PW-011-PRE (320-43691-29), PW-200 (320-43691-30), PW-204 (320-43691-32), NPSWELL-PRE (320-43691-33), PW-174 (320-43691-34) and PW-074 (320-43691-35). batch 320-250332

Method(s) PFAS Prep: The following sample was observed to be light gray in color. PW-406 (320-43691-12)

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-251878.

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 AirPort

TestAmerica Job ID: 320-43671-1

Client Sample ID: SW-2004

Lab Sample ID: 320-43691-1

f o Detectionsd

Client Sample ID: PW-413

Lab Sample ID: 320-43691-2

f o Detectionsd

Client Sample ID: PW-418

Lab Sample ID: 320-43691-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3d		2d	0d2	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	40		2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	4d		2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d		2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	84		2d	1d8	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-319

Lab Sample ID: 320-43691-4

f o Detectionsd

Client Sample ID: PW-214

Lab Sample ID: 320-43691-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorohe5anesul(onic aciF BP) x 5Sg	0dH	J	2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-219

Lab Sample ID: 320-43691-6

f o Detectionsd

Client Sample ID: PW-216

Lab Sample ID: 320-43691-7

f o Detectionsd

Client Sample ID: PW-006-BERKEY

Lab Sample ID: 320-43691-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorohe5anesul(onic aciF BP) x 5Sg	0d0	J	2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	Nd		2d	1d8	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-211

Lab Sample ID: 320-43691-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorohe5anesul(onic aciF BP) x 5Sg	1d	J	2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	3d		2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	1N		2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A

This Detection Summary Does not include radiochemical test resultsd

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-211 (Continued)

Lab Sample ID: 320-43691-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorooctanesul(onic aciF BP) p Sg	7d		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-006-CISTESN

Lab Sample ID: 320-43691-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	7d		2d	0d2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	4d		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	17		2d	0dN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorononanoic aciF BP) f Ag	N2		2d	0dN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	N70		40	18	nL/9	20			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg-D9	4100		40	26	nL/9	20			WS-9C-002N At1	Total/f A

Client Sample ID: PW-405

Lab Sample ID: 320-43691-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3dH		2d	0d2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	44		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	4d		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d7		2d	0dN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	H6		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-406

Lab Sample ID: 320-43691-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2d		2d	0d2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	36		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	N2		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d		2d	0dN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	1N0		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-401

Lab Sample ID: 320-43691-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2d		2d	0d2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	1H		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A

This Detection Summary Does not include raFiochemical test resultsd

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-401 (Continued)

Lab Sample ID: 320-43691-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorohectanoic acid BP) x OAg	1d	J	2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic acid BP) p Ag	1d	J	2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesulonic acid BP) p Sg	40		2d	1d	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-400

Lab Sample ID: 320-43691-14

f o Detectionsd

Client Sample ID: PW-403

Lab Sample ID: 320-43691-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorobutanesulonic acid BP) . Sg	Nd		2d	0d2	nL/9	1		WS-9C-002N At1	Total/f A
Per(luoroheptanesulonic acid BP) x 5Sg	41		2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorohectanoic acid BP) x OAg	3d		2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic acid BP) p Ag	3d		2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesulonic acid BP) p Sg	H3		2d	1d	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-006-PRE

Lab Sample ID: 320-43691-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorobutanesulonic acid BP) . Sg	7d		2d	0d2	nL/9	1		WS-9C-002N At1	Total/f A
Per(luoroheptanesulonic acid BP) x 5Sg	110		2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorohectanoic acid BP) x OAg	1d	J	2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic acid BP) p Ag	2d		2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesulonic acid BP) p Sg	210		2d	1d	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-310

Lab Sample ID: 320-43691-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Per(luorobutanesulonic acid BP) . Sg	2d		2d	0d2	nL/9	1		WS-9C-002N At1	Total/f A
Per(luoroheptanesulonic acid BP) x 5Sg	30		2d	0d8	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorohectanoic acid BP) x OAg	3d		2d	0d0	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanoic acid BP) p Ag	2d		2d	0dN	nL/9	1		WS-9C-002N At1	Total/f A
Per(luorooctanesulonic acid BP) p Sg	72		2d	1d	nL/9	1		WS-9C-002N At1	Total/f A

Client Sample ID: PW-408

Lab Sample ID: 320-43691-18

This Detection Summary Does not include radiochemical test resultsd

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-408 (Continued)

Lab Sample ID: 320-43691-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2dl		2dl	0dl2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	30		2dl	0dl8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x QAg	4dl		2dl	0dl0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	2dl		2dl	0dlN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	130		2dl	1dl	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-300

Lab Sample ID: 320-43691-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3dl		2dl	0dl2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	36		2dl	0dl8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x QAg	3dl		2dl	0dl0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3dl		2dl	0dlN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	H7		2dl	1dl	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: SW-2003

Lab Sample ID: 320-43691-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorohe5anesul(onic aciF BP) x 5Sg	Ndl		2dl	0dl8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x QAg	0dl7	J	2dl	0dl0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	1dl	J	2dl	0dlN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	6dl		2dl	1dl	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-210

Lab Sample ID: 320-43691-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2dl		2dl	0dl2	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	32		2dl	0dl8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x QAg	3dl		2dl	0dl0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	2dl		2dl	0dlN	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	7N		2dl	1dl	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-209

Lab Sample ID: 320-43691-23

This Detection Summary Does not include radiochemical test results

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-209 (Continued)

Lab Sample ID: 320-43691-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2d		2d	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	26		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	3d		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d		2d	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	100		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-212

Lab Sample ID: 320-43691-24

f o Detectionsd										
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Client Sample ID: PW-402

Lab Sample ID: 320-43691-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3d		2d	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	36		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	3d		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d		2d	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	82		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-202

Lab Sample ID: 320-43691-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2d		2d	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	20		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	2d		2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3d		2d	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	6H		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: NPSWELL-POST

Lab Sample ID: 320-43691-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	1d	J	2d	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	11		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	1d	J	2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	4d		2d	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	20		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

This Detection Summary Does not include raFiochemical test resultsd

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-203

Lab Sample ID: 320-43691-28

f o Detectionsd

Client Sample ID: PW-011-PRE

Lab Sample ID: 320-43691-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3d2		2d0	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	34		2d0	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	3dl		2d0	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3dl		2d0	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	H0		2d0	1d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-200

Lab Sample ID: 320-43691-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	3d4		2d0	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	38		2d0	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	3d8		2d0	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	3dl		2d0	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	72		2d0	1d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-011-POST

Lab Sample ID: 320-43691-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorobutanesul(onic aciF BP) . Sg	2d7		2d0	0d72	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorohe5anesul(onic aciF BP) x 5Sg	31		2d0	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	2dH		2d0	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanoic aciF BP) p Ag	2d7		2d0	0d8N	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	H6		2d0	1d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-204

Lab Sample ID: 320-43691-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Per(luorohe5anesul(onic aciF BP) x 5Sg	3d8		2d0	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Per(luoroheQanoic aciF BP) x OAg	0d73 J		2d0	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Per(luorooctanesul(onic aciF BP) p Sg	N4		2d0	1d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: NPSWELL-PRE

Lab Sample ID: 320-43691-33

This Detection Summary Does not include the chemical test results

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: NPSWELL-PRE (Continued)

Lab Sample ID: 320-43691-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS) . Sg	1d	J	2d	0d2	nL/9	1			WS-9C-002N At1	Total/f A
Perfluorohexanesulfonic acid (PFHxS) x 5Sg	11		2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Perfluorooctanoic acid (PFOA) x OAg	1d	J	2d	0d0	nL/9	1			WS-9C-002N At1	Total/f A
Perfluorooctanoic acid (PFPA) p Ag	4d		2d	0dN	nL/9	1			WS-9C-002N At1	Total/f A
Perfluorooctanesulfonic acid (PFOS) p Sg	22		2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-174

Lab Sample ID: 320-43691-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) x 5Sg	1d	J	2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-074

Lab Sample ID: 320-43691-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) x 5Sg	1d	J	2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-201

Lab Sample ID: 320-43691-36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS) x 5Sg	1d	J	2d	0d8	nL/9	1			WS-9C-002N At1	Total/f A
Perfluorooctanesulfonic acid (PFOS) p Sg	1d	J	2d	1d	nL/9	1			WS-9C-002N At1	Total/f A

Client Sample ID: PW-206

Lab Sample ID: 320-43691-37

f o Detectionsd

This Detection Summary Does not include radiochemical test results

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: SW-2004

Date Collected: 09/27/18 10:20

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 16:44	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 16:44	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 16:44	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 16:44	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	10	n /F		10/12/18 16:24	10/14/18 16:44	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 16:44	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159	19/12/18 14:32	19/1/18 14:3	1
17C: PFHpA	127		25 - 159	19/12/18 14:32	19/1/18 14:3	1
17C: PFOA	120		25 - 159	19/12/18 14:32	19/1/18 14:3	1
17C: PFOS	114		25 - 159	19/12/18 14:32	19/1/18 14:3	1
17C5 PFNA	118		25 - 159	19/12/18 14:32	19/1/18 14:3	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-413

Date Collected: 09/27/18 13:30

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 11:02	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 11:02	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n /F		10/12/18 16:24	10/14/18 11:02	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:02	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	100	n /F		10/12/18 16:24	10/14/18 11:02	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:02	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 159	19/12/18 14:32	19/1/18 10:32	1
17C: PFHpA	125		25 - 159	19/12/18 14:32	19/1/18 10:32	1
17C: PFOA	127		25 - 159	19/12/18 14:32	19/1/18 10:32	1
17C: PFOS	199		25 - 159	19/12/18 14:32	19/1/18 10:32	1
17C5 PFNA	117		25 - 159	19/12/18 14:32	19/1/18 10:32	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-418

Date Collected: 09/27/18 16:30

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.9		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Perfluorohexanesulfonic acid (PFHxS)	40		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Perfluoroheptanoic acid (PFHpA)	4.1		2d	0dN0	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Perfluorooctanoic acid (PFOA)	3.4		2d	0d H	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Perfluorooctanesulfonic acid (PFOS)	74		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/12/1N 16:24	10/14/1N 1):21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 159				19/12/18 14:32	19/1:/18 10:31	1
17C: PFHpA	120		25 - 159				19/12/18 14:32	19/1:/18 10:31	1
17C: PFOA	12:		25 - 159				19/12/18 14:32	19/1:/18 10:31	1
17C: PFOS	190		25 - 159				19/12/18 14:32	19/1:/18 10:31	1
17C5 PFNA	11:		25 - 159				19/12/18 14:32	19/1:/18 10:31	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-319

Date Collected: 09/27/18 11:46

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 11:37	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 11:37	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n /F		10/12/18 16:24	10/14/18 11:37	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:37	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	100	n /F		10/12/18 16:24	10/14/18 11:37	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				19/12/18 14:32	19/1/18 10:36	1
17C: PFHpA	12		25 - 159				19/12/18 14:32	19/1/18 10:36	1
17C: PFOA	179		25 - 159				19/12/18 14:32	19/1/18 10:36	1
17C: PFOS	119		25 - 159				19/12/18 14:32	19/1/18 10:36	1
17C5 PFNA	114		25 - 159				19/12/18 14:32	19/1/18 10:36	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-214

Date Collected: 09/27/18 09:27

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-5

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		2d	0d72	n (/F		10/12/18 16:24	10/14/18 11:11	1
Perfluorohexanesulfonic acid (PFHxS)	0.88	J	2d	0dN	n (/F		10/12/18 16:24	10/14/18 11:11	1
Perfluorooctanoic acid gPLx OA5	f D		2d	0dN	n (/F		10/12/18 16:24	10/14/18 11:11	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n (/F		10/12/18 16:24	10/14/18 11:11	1
Perfluorooctanesulfonic acid gPLp S5	f D		2d	1d8	n (/F		10/12/18 16:24	10/14/18 11:11	1
Perfluorononanoic acid gPLf A5	f D		2d	0dH	n (/F		10/12/18 16:24	10/14/18 11:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	129		25 - 159				19/12/18 14:32	19/1/18 10:30	1
17C: PFHpA	129		25 - 159				19/12/18 14:32	19/1/18 10:30	1
17C: PFOA	124		25 - 159				19/12/18 14:32	19/1/18 10:30	1
17C: PFOS	115		25 - 159				19/12/18 14:32	19/1/18 10:30	1
17C5 PFNA	116		25 - 159				19/12/18 14:32	19/1/18 10:30	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-219

Date Collected: 09/27/18 11:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-6

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 11:16	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 11:16	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 11:16	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:16	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	10	n /F		10/12/18 16:24	10/14/18 11:16	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	121		25 - 159	19/12/18 14:32	19/1/18 18:34	1
17C: PFHpA	126		25 - 159	19/12/18 14:32	19/1/18 18:34	1
17C: PFOA	172		25 - 159	19/12/18 14:32	19/1/18 18:34	1
17C: PFOS	111		25 - 159	19/12/18 14:32	19/1/18 18:34	1
17C5 PFNA	121		25 - 159	19/12/18 14:32	19/1/18 18:34	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-216

Date Collected: 09/27/18 10:21

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-7

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 11:34	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 11:34	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n /F		10/12/18 16:24	10/14/18 11:34	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:34	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	100	n /F		10/12/18 16:24	10/14/18 11:34	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 11:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	116		25 - 159				19/12/18 14:32	19/1/18 18:37	1
17C: PFHpA	124		25 - 159				19/12/18 14:32	19/1/18 18:37	1
17C: PFOA	120		25 - 159				19/12/18 14:32	19/1/18 18:37	1
17C: PFOS	112		25 - 159				19/12/18 14:32	19/1/18 18:37	1
17C5 PFNA	127		25 - 159				19/12/18 14:32	19/1/18 18:37	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-006-BERKEY

Lab Sample ID: 320-43691-8

Date Collected: 09/26/18 10:58

Matrix: Water

Date Received: 09/29/18 12:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Perfluorohexanesulfonic acid (PFHxS)	0.90	J	2d	0dN	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Perfluorooctanoic acid gPLx OA5	f D		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Perfluorooctanesulfonic acid (PFOS)	5.6		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Perfluorononanoic acid gPLf A5	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N 17:11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				19/12/18 14:32	19/1:/18 16:31	1
17C: PFHpA	125		25 - 159				19/12/18 14:32	19/1:/18 16:31	1
17C: PFOA	12:		25 - 159				19/12/18 14:32	19/1:/18 16:31	1
17C: PFOS	190		25 - 159				19/12/18 14:32	19/1:/18 16:31	1
17C5 PFNA	114		25 - 159				19/12/18 14:32	19/1:/18 16:31	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-211

Date Collected: 09/26/18 15:11

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-9

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	f D		20	0.02	ng/L		10/12/18 16:24	10/14/18 17:27	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	20	0.01	ng/L		10/12/18 16:24	10/14/18 17:27	1
Perfluoroheptanoic acid (PFHpA)	3.3		20	0.01	ng/L		10/12/18 16:24	10/14/18 17:27	1
Perfluorooctanoic acid (PFOA)	15		20	0.01	ng/L		10/12/18 16:24	10/14/18 17:27	1
Perfluorooctanesulfonic acid (PFOS)	9.1		20	1.0	ng/L		10/12/18 16:24	10/14/18 17:27	1
Perfluorononanoic acid (PFNA)	f D		20	0.01	ng/L		10/12/18 16:24	10/14/18 17:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 159				19/12/18 14:32	19/1/18 16:36	1
17C: PFHpA	126		25 - 159				19/12/18 14:32	19/1/18 16:36	1
17C: PFOA	126		25 - 159				19/12/18 14:32	19/1/18 16:36	1
17C: PFOS	196		25 - 159				19/12/18 14:32	19/1/18 16:36	1
17C5 PFNA	129		25 - 159				19/12/18 14:32	19/1/18 16:36	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-006-CISTESN

Lab Sample ID: 320-43691-10

Date Collected: 09/26/18 10:51

Matrix: Water

Date Received: 09/29/18 12:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.4		20	0.072	n (/F)		10/12/18 16:24	10/14/18 17:4	1
Perfluoroheptanoic acid (PFHpA)	4.3		20	0.000	n (/F)		10/12/18 16:24	10/14/18 17:4	1
Perfluorooctanoic acid (PFOA)	19		20	0.000	n (/F)		10/12/18 16:24	10/14/18 17:4	1
Perfluorononanoic acid (PFNA)	5.2		20	0.000	n (/F)		10/12/18 16:24	10/14/18 17:4	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	119		25 - 159				19/12/18 14:32	19/1/18 16:30	1
17C: PFHpA	115		25 - 159				19/12/18 14:32	19/1/18 16:30	1
17C: PFOA	124		25 - 159				19/12/18 14:32	19/1/18 16:30	1
17C5 PFNA	88		25 - 159				19/12/18 14:32	19/1/18 16:30	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	590		40	1)	n (/F)		10/12/18 16:24	10/14/18 16:24	20
Perfluorooctanesulfonic acid (PFOS)	4100		40	26	n (/F)		10/12/18 16:24	10/14/18 16:24	20
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	126		25 - 159				19/12/18 14:32	19/15/18 14:32	29
17C: PFOS	122		25 - 159				19/12/18 14:32	19/15/18 14:32	29

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-405

Date Collected: 09/25/18 15:32

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-11

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.8		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Perfluorohexanesulfonic acid (PFHxS)	44		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Perfluoroheptanoic acid (PFHpA)	4.1		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Perfluorooctanoic acid (PFOA)	3.9		2d	0d H	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Perfluorooctanesulfonic acid (PFOS)	86		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N20:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	116		25 - 159				19/12/18 14:32	19/1/18 29:34	1
17C: PFHpA	126		25 - 159				19/12/18 14:32	19/1/18 29:34	1
17C: PFOA	120		25 - 159				19/12/18 14:32	19/1/18 29:34	1
17C: PFOS	112		25 - 159				19/12/18 14:32	19/1/18 29:34	1
17C5 PFNA	12:		25 - 159				19/12/18 14:32	19/1/18 29:34	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-406

Date Collected: 09/25/18 16:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-12

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.6		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Perfluorohexanesulfonic acid (PFHxS)	36		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Perfluoroheptanoic acid (PFHpA)	5.2		2d	0dN0	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Perfluorooctanoic acid (PFOA)	3.3		2d	0d H	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Perfluorooctanesulfonic acid (PFOS)	150		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/12/1N 16:24	10/14/1N20:24	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		25 - 159				19/12/18 14:32	19/1/ /18 29:32	1
17C: PFHpA	124		25 - 159				19/12/18 14:32	19/1/ /18 29:32	1
17C: PFOA	124		25 - 159				19/12/18 14:32	19/1/ /18 29:32	1
17C: PFOS	196		25 - 159				19/12/18 14:32	19/1/ /18 29:32	1
17C5 PFNA	127		25 - 159				19/12/18 14:32	19/1/ /18 29:32	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-401

Date Collected: 09/25/18 13:01

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-13

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.4		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Perfluorohexanesulfonic acid (PFHxS)	18		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Perfluoroheptanoic acid (PFHpA)	1.6	J	2d	0dN0	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Perfluorooctanoic acid (PFOA)	1.4	J	2d	0d H	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Perfluorooctanesulfonic acid (PFOS)	40		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/12/1N 16:24	10/14/1N20:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	11:		25 - 159				19/12/18 14:32	19/1:/18 293 2	1
17C: PFHpA	12:		25 - 159				19/12/18 14:32	19/1:/18 293 2	1
17C: PFOA	127		25 - 159				19/12/18 14:32	19/1:/18 293 2	1
17C: PFOS	111		25 - 159				19/12/18 14:32	19/1:/18 293 2	1
17C5 PFNA	110		25 - 159				19/12/18 14:32	19/1:/18 293 2	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-400

Date Collected: 09/25/18 10:42

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-14

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/12/18 16:24	10/14/18 21:01	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 21:01	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N	n /F		10/12/18 16:24	10/14/18 21:01	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 21:01	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	100	n /F		10/12/18 16:24	10/14/18 21:01	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/12/18 16:24	10/14/18 21:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 159				19/12/18 14:32	19/1/18 21:31	1
17C: PFHpA	12		25 - 159				19/12/18 14:32	19/1/18 21:31	1
17C: PFOA	116		25 - 159				19/12/18 14:32	19/1/18 21:31	1
17C: PFOS	191		25 - 159				19/12/18 14:32	19/1/18 21:31	1
17C5 PFNA	116		25 - 159				19/12/18 14:32	19/1/18 21:31	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-403

Date Collected: 09/25/18 14:31

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-15

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	5.7		2d	0d2	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Perfluorohexanesulfonic acid (PFHxS)	41		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Perfluoroheptanoic acid (PFHpA)	3.4		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Perfluorooctanoic acid (PFOA)	3.3		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Perfluorooctanesulfonic acid (PFOS)	83		2d	1d	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N21:17	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 159				19/12/18 14:32	19/1:/18 2136	1
17C: PFHpA	116		25 - 159				19/12/18 14:32	19/1:/18 2136	1
17C: PFOA	126		25 - 159				19/12/18 14:32	19/1:/18 2136	1
17C: PFOS	119		25 - 159				19/12/18 14:32	19/1:/18 2136	1
17C5 PFNA	118		25 - 159				19/12/18 14:32	19/1:/18 2136	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-006-PRE

Lab Sample ID: 320-43691-16

Date Collected: 09/26/18 10:34

Matrix: Water

Date Received: 09/29/18 12:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.0		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Perfluorohexanesulfonic acid (PFHxS)	110		2d	0dN)	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	2d	0dN0	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Perfluorooctanoic acid (PFOA)	2.3		2d	0d H	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Perfluorooctanesulfonic acid (PFOS)	210		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/12/1N 16:24	10/14/1N21:3N	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	198		25 - 159				19/12/18 14:32	19/1:/18 21:38	1
17C: PFHpA	129		25 - 159				19/12/18 14:32	19/1:/18 21:38	1
17C: PFOA	120		25 - 159				19/12/18 14:32	19/1:/18 21:38	1
17C: PFOS	194		25 - 159				19/12/18 14:32	19/1:/18 21:38	1
17C5 PFNA	11:		25 - 159				19/12/18 14:32	19/1:/18 21:38	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-310

Date Collected: 09/26/18 12:34

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-17

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.5		2d	0d2	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Perfluoroheptanoic acid (PFHpA)	3.1		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Perfluorooctanoic acid (PFOA)	2.6		2d	0d H	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Perfluorooctanesulfonic acid (PFOS)	92		2d	1d	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N21:H6	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		25 - 159				19/12/18 14:32	19/1:/18 21:34	1
17C: PFHpA	124		25 - 159				19/12/18 14:32	19/1:/18 21:34	1
17C: PFOA	172		25 - 159				19/12/18 14:32	19/1:/18 21:34	1
17C: PFOS	114		25 - 159				19/12/18 14:32	19/1:/18 21:34	1
17C5 PFNA	124		25 - 159				19/12/18 14:32	19/1:/18 21:34	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-408

Date Collected: 09/26/18 18:03

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-18

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.1		2d	0d2	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Perfluorohexanesulfonic acid (PFHxS)	30		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Perfluoroheptanoic acid (PFHpA)	4.8		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Perfluorooctanoic acid (PFOA)	2.5		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Perfluorooctanesulfonic acid (PFOS)	130		2d	1d	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N 22:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		25 - 159				19/12/18 14:32	19/1/18 22:37	1
17C: PFHpA	118		25 - 159				19/12/18 14:32	19/1/18 22:37	1
17C: PFOA	118		25 - 159				19/12/18 14:32	19/1/18 22:37	1
17C: PFOS	194		25 - 159				19/12/18 14:32	19/1/18 22:37	1
17C5 PFNA	11:		25 - 159				19/12/18 14:32	19/1/18 22:37	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-300

Date Collected: 09/24/18 18:50

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-19

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.2		2d	0d2	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Perfluorohexanesulfonic acid (PFHxS)	36		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Perfluoroheptanoic acid (PFHpA)	3.6		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Perfluorooctanoic acid (PFOA)	3.1		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Perfluorooctanesulfonic acid (PFOS)	89		2d	1d	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N23:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	129		25 - 159				19/12/18 14:32	19/1:/18 27:36	1
17C: PFHpA	126		25 - 159				19/12/18 14:32	19/1:/18 27:36	1
17C: PFOA	175		25 - 159				19/12/18 14:32	19/1:/18 27:36	1
17C: PFOS	110		25 - 159				19/12/18 14:32	19/1:/18 27:36	1
17C5 PFNA	127		25 - 159				19/12/18 14:32	19/1:/18 27:36	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: SW-2003

Date Collected: 09/26/18 11:22

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-20

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8S5	f D		2d	0d72	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Perfluorohexanesulfonic acid (PFHxS)	5.1		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Perfluoroheptanoic acid (PFHpA)	0.89 J		2d	0dN	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Perfluorooctanoic acid (PFOA)	1.3 J		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Perfluorooctanesulfonic acid (PFOS)	6.3		2d	1d8	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Perfluorononanoic acid gPLf A5	f D		2d	0dH	n(/F		10/12/1N 16:24	10/14/1N22:H1	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	122		25 - 159				19/12/18 14:32	19/1:/18 22:31	1
17C: PFHpA	179		25 - 159				19/12/18 14:32	19/1:/18 22:31	1
17C: PFOA	171		25 - 159				19/12/18 14:32	19/1:/18 22:31	1
17C: PFOS	11:		25 - 159				19/12/18 14:32	19/1:/18 22:31	1
17C5 PFNA	122		25 - 159				19/12/18 14:32	19/1:/18 22:31	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-210

Date Collected: 09/26/18 12:37

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-22

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		2d	0d2	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Perfluorohexanesulfonic acid (PFHxS)	32		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Perfluoroheptanoic acid (PFHpA)	3.0		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Perfluorooctanoic acid (PFOA)	2.8		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Perfluorooctanesulfonic acid (PFOS)	95		2d	1d	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N02:3H	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	196		25 - 159				19/98/18 9: 310	19/12/18 92375	1
17C: PFHpA	112		25 - 159				19/98/18 9: 310	19/12/18 92375	1
17C: PFOA	12:		25 - 159				19/98/18 9: 310	19/12/18 92375	1
17C: PFOS	198		25 - 159				19/98/18 9: 310	19/12/18 92375	1
17C5 PFNA	110		25 - 159				19/98/18 9: 310	19/12/18 92375	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-209

Date Collected: 09/26/18 11:11

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-23

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		2d	0d2	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Perfluorohexanesulfonic acid (PFHxS)	26		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Perfluoroheptanoic acid (PFHpA)	3.0		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Perfluorooctanoic acid (PFOA)	3.3		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Perfluorooctanesulfonic acid (PFOS)	100		2d	1d	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N02:H3	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	119		25 - 159				19/98/18 9: 310	19/12/18 92357	1
17C: PFHpA	196		25 - 159				19/98/18 9: 310	19/12/18 92357	1
17C: PFOA	128		25 - 159				19/98/18 9: 310	19/12/18 92357	1
17C: PFOS	111		25 - 159				19/98/18 9: 310	19/12/18 92357	1
17C5 PFNA	122		25 - 159				19/98/18 9: 310	19/12/18 92357	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-212

Date Collected: 09/26/18 15:46

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-24

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n /F		10/0N1N04:1	10/12/1N03:12	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N	n /F		10/0N1N04:1	10/12/1N03:12	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n /F		10/0N1N04:1	10/12/1N03:12	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/0N1N04:1	10/12/1N03:12	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	10	n /F		10/0N1N04:1	10/12/1N03:12	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/0N1N04:1	10/12/1N03:12	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	194		25 - 159	19/98/18 9: 310	19/12/18 97312	1
17C: PFHpA	190		25 - 159	19/98/18 9: 310	19/12/18 97312	1
17C: PFOA	128		25 - 159	19/98/18 9: 310	19/12/18 97312	1
17C: PFOS	115		25 - 159	19/98/18 9: 310	19/12/18 97312	1
17C5 PFNA	116		25 - 159	19/98/18 9: 310	19/12/18 97312	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-402

Date Collected: 09/25/18 13:46

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-25

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.7		2d	0d72	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Perfluorohexanesulfonic acid (PFHxS)	36		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Perfluoroheptanoic acid (PFHpA)	3.3		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Perfluorooctanoic acid (PFOA)	3.4		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Perfluorooctanesulfonic acid (PFOS)	72		2d	1d	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N03:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	119		25 - 159				19/98/18 9: 310	19/12/18 97379	1
17C: PFHpA	119		25 - 159				19/98/18 9: 310	19/12/18 97379	1
17C: PFOA	12:		25 - 159				19/98/18 9: 310	19/12/18 97379	1
17C: PFOS	112		25 - 159				19/98/18 9: 310	19/12/18 97379	1
17C5 PFNA	110		25 - 159				19/98/18 9: 310	19/12/18 97379	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-202

Date Collected: 09/25/18 13:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-26

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.1		2d	0d2	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Perfluorohexanesulfonic acid (PFHxS)	20		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Perfluoroheptanoic acid (PFHpA)	2.7		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Perfluorooctanoic acid (PFOA)	3.1		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Perfluorooctanesulfonic acid (PFOS)	68		2d	1d	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N03:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	190		25 - 159				19/98/18 9: 310	19/12/18 973 6	1
17C: PFHpA	111		25 - 159				19/98/18 9: 310	19/12/18 973 6	1
17C: PFOA	179		25 - 159				19/98/18 9: 310	19/12/18 973 6	1
17C: PFOS	119		25 - 159				19/98/18 9: 310	19/12/18 973 6	1
17C5 PFNA	121		25 - 159				19/98/18 9: 310	19/12/18 973 6	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: NPSWELL-POST

Lab Sample ID: 320-43691-27

Date Collected: 09/25/18 11:34

Matrix: Water

Date Received: 09/29/18 12:45

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2d	0d72	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Perfluorohexanesulfonic acid (PFHxS)	11		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Perfluoroheptanoic acid (PFHpA)	1.7	J	2d	0dN0	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Perfluorooctanoic acid (PFOA)	4.2		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Perfluorooctanesulfonic acid (PFOS)	20		2d	1d8	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/0N1N04:1)	10/12/1N04:0)	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 159				19/98/18 9: 310	19/12/18 9: 30	1
17C: PFHpA	119		25 - 159				19/98/18 9: 310	19/12/18 9: 30	1
17C: PFOA	171		25 - 159				19/98/18 9: 310	19/12/18 9: 30	1
17C: PFOS	112		25 - 159				19/98/18 9: 310	19/12/18 9: 30	1
17C5 PFNA	114		25 - 159				19/98/18 9: 310	19/12/18 9: 30	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-203

Date Collected: 09/25/18 15:43

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-28

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		20	0072	n(/F		10/0N1N04:1)	10/12/1N04:2H	1
Perfluorohexanesulfonic acid gPLx BS5	f D		20	00N)	n(/F		10/0N1N04:1)	10/12/1N04:2H	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n(/F		10/0N1N04:1)	10/12/1N04:2H	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n(/F		10/0N1N04:1)	10/12/1N04:2H	1
Perfluorooctanesulfonic acid gPLp S5	f D		20	100	n(/F		10/0N1N04:1)	10/12/1N04:2H	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n(/F		10/0N1N04:1)	10/12/1N04:2H	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	196		25 - 159	19/98/18 9: 310	19/12/18 9: 325	1
17C: PFHpA	114		25 - 159	19/98/18 9: 310	19/12/18 9: 325	1
17C: PFOA	124		25 - 159	19/98/18 9: 310	19/12/18 9: 325	1
17C: PFOS	111		25 - 159	19/98/18 9: 310	19/12/18 9: 325	1
17C5 PFNA	128		25 - 159	19/98/18 9: 310	19/12/18 9: 325	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-011-PRE

Date Collected: 09/25/18 09:29

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-29

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.2		2d	0d72	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Perfluorohexanesulfonic acid (PFHxS)	34		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Perfluoroheptanoic acid (PFHpA)	3.1		2d	0dN0	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Perfluorooctanoic acid (PFOA)	3.1		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Perfluorooctanesulfonic acid (PFOS)	80		2d	1d8	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/0N1N04:1)	10/12/1N0H02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	190		25 - 159				19/98/18 9: 310	19/12/18 9532	1
17C: PFHpA	194		25 - 159				19/98/18 9: 310	19/12/18 9532	1
17C: PFOA	12:		25 - 159				19/98/18 9: 310	19/12/18 9532	1
17C: PFOS	198		25 - 159				19/98/18 9: 310	19/12/18 9532	1
17C5 PFNA	110		25 - 159				19/98/18 9: 310	19/12/18 9532	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-200

Date Collected: 09/24/18 19:00

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-30

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.4		2d	0d72	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Perfluorohexanesulfonic acid (PFHxS)	37		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Perfluoroheptanoic acid (PFHpA)	3.7		2d	0dN0	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Perfluorooctanoic acid (PFOA)	3.1		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Perfluorooctanesulfonic acid (PFOS)	92		2d	1d8	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/0N1N04:1)	10/12/1N0H20	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	11:		25 - 159				19/98/18 9: 310	19/12/18 95329	1
17C: PFHpA	129		25 - 159				19/98/18 9: 310	19/12/18 95329	1
17C: PFOA	170		25 - 159				19/98/18 9: 310	19/12/18 95329	1
17C: PFOS	110		25 - 159				19/98/18 9: 310	19/12/18 95329	1
17C5 PFNA	12:		25 - 159				19/98/18 9: 310	19/12/18 95329	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-011-POST

Date Collected: 09/25/18 09:26

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-31

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.9		2d	0d2	n(/F		10/0N1N04:1)	10/12/1N0H37	1
Perfluorohexanesulfonic acid (PFHxS)	31		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N0H37	1
Perfluoroheptanoic acid (PFHpA)	2.8		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N0H37	1
Perfluorooctanoic acid (PFOA)	2.9		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0H37	1
Perfluorooctanesulfonic acid (PFOS)	86		2d	1d	n(/F		10/0N1N04:1)	10/12/1N0H37	1
Perfluorononanoic acid (PFNA)	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0H37	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	114		25 - 159	19/98/18 9: 310	19/12/18 95376	1
17C: PFHpA	119		25 - 159	19/98/18 9: 310	19/12/18 95376	1
17C: PFOA	179		25 - 159	19/98/18 9: 310	19/12/18 95376	1
17C: PFOS	190		25 - 159	19/98/18 9: 310	19/12/18 95376	1
17C5 PFNA	121		25 - 159	19/98/18 9: 310	19/12/18 95376	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-204

Date Collected: 09/25/18 16:30

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-32

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8S5	f D		2d	0d72	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Perfluorohexanesulfonic acid (PFHxS)	3.3		2d	0dN	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Perfluoroheptanoic acid (PFHpA)	0.93 J		2d	0dN0	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Perfluorooctanesulfonic acid (PFOS)	5.4		2d	1d8	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Perfluorononanoic acid gPLf A5	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0H(H)	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		25 - 159				19/98/18 9: 310	19/12/18 95350	1
17C: PFHpA	115		25 - 159				19/98/18 9: 310	19/12/18 95350	1
17C: PFOA	172		25 - 159				19/98/18 9: 310	19/12/18 95350	1
17C: PFOS	190		25 - 159				19/98/18 9: 310	19/12/18 95350	1
17C5 PFNA	120		25 - 159				19/98/18 9: 310	19/12/18 95350	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: NPSWELL-PRE

Date Collected: 09/25/18 11:37

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-33

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.2	J	2d	0d72	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Perfluorohexanesulfonic acid (PFHxS)	11		2d	0dN)	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Perfluoroheptanoic acid (PFHpA)	1.7	J	2d	0dN0	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Perfluorooctanoic acid (PFOA)	4.3		2d	0d H	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Perfluorooctanesulfonic acid (PFOS)	22		2d	1d8	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Perfluorononanoic acid (PFNA)	f D		2d	0d6H	n(/F		10/0N1N04:1)	10/12/1N06:1H	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	11:		25 - 159				19/98/18 9: 310	19/12/18 94315	1
17C: PFHpA	110		25 - 159				19/98/18 9: 310	19/12/18 94315	1
17C: PFOA	172		25 - 159				19/98/18 9: 310	19/12/18 94315	1
17C: PFOS	114		25 - 159				19/98/18 9: 310	19/12/18 94315	1
17C5 PFNA	127		25 - 159				19/98/18 9: 310	19/12/18 94315	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-174

Date Collected: 09/25/18 10:19

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-34

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		2d	0d72	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2d	0dN	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Perfluorooctanoic acid gPLx OA5	f D		2d	0dN0	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Perfluorooctanesulfonic acid gPLp S5	f D		2d	1d8	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Perfluorononanoic acid gPLf A5	f D		2d	0d6H	n (/F		10/0N1N04:1)	10/12/1N06:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	116		25 - 159				19/98/18 9: 310	19/12/18 943:	1
17C: PFHpA	110		25 - 159				19/98/18 9: 310	19/12/18 943:	1
17C: PFOA	177		25 - 159				19/98/18 9: 310	19/12/18 943:	1
17C: PFOS	115		25 - 159				19/98/18 9: 310	19/12/18 943:	1
17C5 PFNA	171		25 - 159				19/98/18 9: 310	19/12/18 943:	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-074

Date Collected: 09/25/18 10:29

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-35

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		2d	0d72	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2d	0dN	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Perfluorooctanoic acid gPLx OA5	f D		2d	0dN0	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Perfluorooctanesulfonic acid gPLp S5	f D		2d	1d8	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Perfluorononanoic acid gPLf A5	f D		2d	0d6H	n (/F		10/0N1N04:1)	10/12/1N06:H2	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	11:		25 - 159				19/98/18 9: 310	19/12/18 9432	1
17C: PFHpA	116		25 - 159				19/98/18 9: 310	19/12/18 9432	1
17C: PFOA	177		25 - 159				19/98/18 9: 310	19/12/18 9432	1
17C: PFOS	196		25 - 159				19/98/18 9: 310	19/12/18 9432	1
17C5 PFNA	174		25 - 159				19/98/18 9: 310	19/12/18 9432	1

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-201

Date Collected: 09/25/18 12:37

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-36

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid gPL8 S5	f D		2d	0d72	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Perfluorohexanesulfonic acid (PFHxS)	1.7	J	2d	0dN	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Perfluorooctanoic acid gPLx OA5	f D		2d	0dN	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Perfluorooctanoic acid gPLp A5	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Perfluorooctanesulfonic acid (PFOS)	1.4	J	2d	1d8	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Perfluorononanoic acid gPLf A5	f D		2d	0dH	n(/F		10/0N1N04:1)	10/12/1N0):11	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	115		25 - 159				19/98/18 9: 310	19/12/18 90311	1
17C: PFHpA	110		25 - 159				19/98/18 9: 310	19/12/18 90311	1
17C: PFOA	126		25 - 159				19/98/18 9: 310	19/12/18 90311	1
17C: PFOS	111		25 - 159				19/98/18 9: 310	19/12/18 90311	1
17C5 PFNA	116		25 - 159				19/98/18 9: 310	19/12/18 90311	1

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43671-1

Client Sample ID: PW-206

Date Collected: 09/28/18 14:27

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-37

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulonic acid gPL8 S5	f D		20	0072	n /F		10/0N1N04:1	10/12/1N0):27	1
Perfluorohexanesulonic acid gPLx BS5	f D		20	00N	n /F		10/0N1N04:1	10/12/1N0):27	1
Perfluorooctanoic acid gPLx QA5	f D		20	00N0	n /F		10/0N1N04:1	10/12/1N0):27	1
Perfluorooctanoic acid gPLp A5	f D		20	00H	n /F		10/0N1N04:1	10/12/1N0):27	1
Perfluorooctanesulonic acid gPLp S5	f D		20	10	n /F		10/0N1N04:1	10/12/1N0):27	1
Perfluorononanoic acid gPLf A5	f D		20	00H	n /F		10/0N1N04:1	10/12/1N0):27	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 159	19/98/18 9: 310	19/12/18 90326	1
17C: PFHpA	112		25 - 159	19/98/18 9: 310	19/12/18 90326	1
17C: PFOA	12:		25 - 159	19/98/18 9: 310	19/12/18 90326	1
17C: PFOS	190		25 - 159	19/98/18 9: 310	19/12/18 90326	1
17C5 PFNA	114		25 - 159	19/98/18 9: 310	19/12/18 90326	1

Isotope Dilution Summary

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

TestAmerica Job ID: 320-43691-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-43691-1	SW-2004	117	123	127	116	118
320-43691-2	PW-413	116	125	123	100	113
320-43691-3	PW-418	116	127	124	107	114
320-43691-4	PW-319	117	124	130	110	116
320-43691-5	PW-214	120	120	126	115	119
320-43691-6	PW-219	121	129	132	111	121
320-43691-7	PW-216	119	126	127	112	123
320-43691-8	PW-006-BERKEY	117	125	124	107	116
320-43691-9	PW-211	117	129	129	109	120
320-43691-10	PW-006-CISTESN	110	115	126		88
320-43691-10 - DL	PW-006-CISTESN	129			122	
320-43691-11	PW-405	119	129	127	112	124
320-43691-12	PW-406	113	126	126	109	123
320-43691-13	PW-401	114	124	123	111	117
320-43691-14	PW-400	112	124	119	101	119
320-43691-15	PW-403	116	119	129	110	118
320-43691-16	PW-006-PRE	108	120	127	106	114
320-43691-17	PW-310	122	126	132	116	126
320-43691-18	PW-408	113	118	118	106	114
320-43691-19	PW-300	120	129	135	117	123
320-43691-20	SW-2003	122	130	131	114	122
320-43691-22	PW-210	109	112	124	108	117
320-43691-23	PW-209	110	109	128	111	122
320-43691-24	PW-212	106	107	128	115	119
320-43691-25	PW-402	110	110	124	112	117
320-43691-26	PW-202	107	111	130	110	121
320-43691-27	NPSWELL-POST	111	110	131	112	116
320-43691-28	PW-203	109	116	126	114	128
320-43691-29	PW-011-PRE	107	106	124	108	117
320-43691-30	PW-200	114	120	137	117	124
320-43691-31	PW-011-POST	116	110	130	107	121
320-43691-32	PW-204	112	115	132	107	127
320-43691-33	NPSWELL-PRE	114	117	132	116	123
320-43691-34	PW-174	119	117	133	115	131
320-43691-35	PW-074	114	119	133	109	136
320-43691-36	PW-201	115	117	129	111	119
320-43691-37	PW-206	111	112	124	107	116
LCS 320-250332/2-A	Lab Control Sample	104	111	119	106	120
LCS 320-251878/2-A	Lab Control Sample	110	122	118	109	117
LCSD 320-250332/3-A	Lab Control Sample Dup	108	114	118	112	118
LCSD 320-251878/3-A	Lab Control Sample Dup	108	118	118	100	106
MB 320-250332/1-A	Method Blank	109	115	127	112	122
MB 320-251878/1-A	Method Blank	115	126	116	105	115

Surrogate Legend


PFHxS = 18O2 PFHxS
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFOS = 13C4 PFOS

TestAmerica Sacramento

Isotope Dilution Summary

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

TestAmerica Job ID: 320-43691-1

 PFNA = 13C5 PFNA

1

2

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QC Sample Results

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

TestAmerica Job ID: 320-43671-1

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

Lab Sample ID: MB 320-250332/1-A

Matrix: Water

Analysis Batch: 251336

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 250332

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luroobutanesul.onic aci9 gPL8S5	f D		2d	0d2	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1
Per.luroohexanesul.onic aci9 gPLHxS5	f D		2d	0d B	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1
Per.lurooheQanoic aci9 gPLHOA5	f D		2d	0d 0	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1
Per.luroooctanoic aci9 gPLp A5	f D		2d	0dN	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1
Per.luroooctanesul.onic aci9 gPLp S5	f D		2d	1d8	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1
Per.luroononanoic aci9 gPLf A5	f D		2d	0dN	n(/F		10/0N1) 11:N4	10/12/1) 01:40	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	105		2- g1- 0	10/0- /18 114 3	10/12/18 01480	1
1: 7 3 PFHQp	11-		2- g1- 0	10/0- /18 114 3	10/12/18 01480	1
1: 7 3 PFOp	12A		2- g1- 0	10/0- /18 114 3	10/12/18 01480	1
1: 7 3 PFOS	112		2- g1- 0	10/0- /18 114 3	10/12/18 01480	1
1: 7- PFNp	122		2- g1- 0	10/0- /18 114 3	10/12/18 01480	1

Lab Sample ID: LCS 320-250332/2-A

Matrix: Water

Analysis Batch: 251336

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 250332

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Per.luroobutanesul.onic aci9 gPL8S5	1Bd	1Bd		n(/F		7)	B2 - 1N1
Per.luroohexanesul.onic aci9 gPLHxS5	1) d	16d		n(/F		71	B3 - 1NB
Per.lurooheQanoic aci9 gPLHOA5	20d	17d		n(/F		77	B1 - 13)
Per.luroooctanoic aci9 gPLp A5	20d	1Bd		n(/F		) 7	B0 - 140
Per.luroooctanesul.onic aci9 gPLp S5	1) d	16d		n(/F		71	67 - 144
Per.luroononanoic aci9 gPLf A5	20d	1) d		n(/F		71	B3 - 14B

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	103		2- g1- 0
1: 7 3 PFHQp	111		2- g1- 0
1: 7 3 PFOp	115		2- g1- 0
1: 7 3 PFOS	106		2- g1- 0
1: 7- PFNp	120		2- g1- 0

Lab Sample ID: LCSD 320-250332/3-A

Matrix: Water

Analysis Batch: 251336

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 250332

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
Per.luroobutanesul.onic aci9 gPL8S5	1Bd	1Bd		n(/F		77	B2 - 1N1	1	30
Per.luroohexanesul.onic aci9 gPLHxS5	1) d	1) d		n(/F		77	B3 - 1NB	)	30
Per.lurooheQanoic aci9 gPLHOA5	20d	20d		n(/F		104	B1 - 13)	N	30
Per.luroooctanoic aci9 gPLp A5	20d	20d		n(/F		101	B0 - 140	13	30
Per.luroooctanesul.onic aci9 gPLp S5	1) d	1Bd		n(/F		73	67 - 144	2	30
Per.luroononanoic aci9 gPLf A5	20d	17d		n(/F		77	B3 - 14B	7	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-43671-1

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
18O2 PFHxS	108		2- 91- 0
1: 73 PFHQp	113		2- 91- 0
1: 73 PFOp	118		2- 91- 0
1: 73 PFOS	112		2- 91- 0
1: 7- PFNp	118		2- 91- 0

Lab Sample ID: MB 320-251878/1-A

Matrix: Water

Analysis Batch: 252105

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 251878

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Per.lurobutanesul.onic aci9 gPL8S5	f D		2d	0d2	n(/F		10/12/1) 16:24	10/14/1) 1N47	1
Per.lurohexanesul.onic aci9 gPLHxS5	f D		2d	0d B	n(/F		10/12/1) 16:24	10/14/1) 1N47	1
Per.luroheQanoic aci9 gPLHOA5	f D		2d	0d 0	n(/F		10/12/1) 16:24	10/14/1) 1N47	1
Per.lurooctanoic aci9 gPLp A5	f D		2d	0dN	n(/F		10/12/1) 16:24	10/14/1) 1N47	1
Per.lurooctanesul.onic aci9 gPLp S5	f D		2d	1d	n(/F		10/12/1) 16:24	10/14/1) 1N47	1
Per.lurononanoic aci9 gPLf A5	f D		2d	0dN	n(/F		10/12/1) 16:24	10/14/1) 1N47	1

Isotope Dilution	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
18O2 PFHxS	11-		2- 91- 0	10/12/18 16:23	10/13/18 1- 45	1
1: 73 PFHQp	126		2- 91- 0	10/12/18 16:23	10/13/18 1- 45	1
1: 73 PFOp	116		2- 91- 0	10/12/18 16:23	10/13/18 1- 45	1
1: 73 PFOS	10-		2- 91- 0	10/12/18 16:23	10/13/18 1- 45	1
1: 7- PFNp	11-		2- 91- 0	10/12/18 16:23	10/13/18 1- 45	1

Lab Sample ID: LCS 320-251878/2-A

Matrix: Water

Analysis Batch: 252105

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 251878

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Per.lurobutanesul.onic aci9 gPL8S5	1BdB	1BdB		n(/F		100	B2 - 1N1
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1) d		n(/F		77	B3 - 1NB
Per.luroheQanoic aci9 gPLHOA5	20d	20d		n(/F		102	B1 - 13)
Per.lurooctanoic aci9 gPLp A5	20d	17d		n(/F		7B	B0 - 140
Per.lurooctanesul.onic aci9 gPLp S5	1) d	1BdB		n(/F		73	67 - 144
Per.lurononanoic aci9 gPLf A5	20d	1BdB		n(/F		) 7	B3 - 14B

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
18O2 PFHxS	110		2- 91- 0
1: 73 PFHQp	122		2- 91- 0
1: 73 PFOp	118		2- 91- 0
1: 73 PFOS	105		2- 91- 0
1: 7- PFNp	11A		2- 91- 0

Lab Sample ID: LCSD 320-251878/3-A

Matrix: Water

Analysis Batch: 252105

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 251878

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Per.lurobutanesul.onic aci9 gPL8S5	1BdB	1BdB		n(/F		77	B2 - 1N1	0	30
Per.lurohexanesul.onic aci9 gPLHxS5	1) d	1) d		n(/F		100	B3 - 1NB	1	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-43671-1

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

Lab Sample ID: LCSD 320-251878/3-A

Matrix: Water

Analysis Batch: 252105

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 251878

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanoic acid gPLHQA5	20d	20dB		n(/F		103	B1 - 13)	2	30
Perfluorooctanoic acid gPLp A5	20d	1) d		n(/F		74	B0 - 140	3	30
Perfluorooctanesulfonic acid gPLp S5	1) d	1Bd		n(/F		76	67 - 144	3	30
Perfluorononanoic acid gPLf A5	20d	20dl		n(/F		100	B3 - 14B	12	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	108		2- 91- 0
1: 73 PFHQp	118		2- 91- 0
1: 73 PFOp	118		2- 91- 0
1: 73 PFOS	100		2- 91- 0
1: 7- PFNp	106		2- 91- 0

QC Association Summary

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

TestAmerica Job ID: 320-43691-1

LCMS

Prep Batch: 250332

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-22	PW-210	Total/NA	Water	PFAS Prep	
320-43691-23	PW-209	Total/NA	Water	PFAS Prep	
320-43691-24	PW-212	Total/NA	Water	PFAS Prep	
320-43691-25	PW-402	Total/NA	Water	PFAS Prep	
320-43691-26	PW-202	Total/NA	Water	PFAS Prep	
320-43691-27	NPSWELL-POST	Total/NA	Water	PFAS Prep	
320-43691-28	PW-203	Total/NA	Water	PFAS Prep	
320-43691-29	PW-011-PRE	Total/NA	Water	PFAS Prep	
320-43691-30	PW-200	Total/NA	Water	PFAS Prep	
320-43691-31	PW-011-POST	Total/NA	Water	PFAS Prep	
320-43691-32	PW-204	Total/NA	Water	PFAS Prep	
320-43691-33	NPSWELL-PRE	Total/NA	Water	PFAS Prep	
320-43691-34	PW-174	Total/NA	Water	PFAS Prep	
320-43691-35	PW-074	Total/NA	Water	PFAS Prep	
320-43691-36	PW-201	Total/NA	Water	PFAS Prep	
320-43691-37	PW-206	Total/NA	Water	PFAS Prep	
MB 320-250332/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-250332/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-250332/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 251336

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-22	PW-210	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-23	PW-209	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-24	PW-212	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-25	PW-402	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-26	PW-202	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-27	NPSWELL-POST	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-28	PW-203	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-29	PW-011-PRE	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-30	PW-200	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-31	PW-011-POST	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-32	PW-204	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-33	NPSWELL-PRE	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-34	PW-174	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-35	PW-074	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-36	PW-201	Total/NA	Water	WS-LC-0025 At1	250332
320-43691-37	PW-206	Total/NA	Water	WS-LC-0025 At1	250332

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-43691-1

LCMS (Continued)

Analysis Batch: 251336 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 320-250332/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	250332
LCS 320-250332/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	250332
LCSD 320-250332/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	250332

Prep Batch: 251878

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-1	SW-2004	Total/NA	Water	PFAS Prep	
320-43691-2	PW-413	Total/NA	Water	PFAS Prep	
320-43691-3	PW-418	Total/NA	Water	PFAS Prep	
320-43691-4	PW-319	Total/NA	Water	PFAS Prep	
320-43691-5	PW-214	Total/NA	Water	PFAS Prep	
320-43691-6	PW-219	Total/NA	Water	PFAS Prep	
320-43691-7	PW-216	Total/NA	Water	PFAS Prep	
320-43691-8	PW-006-BERKEY	Total/NA	Water	PFAS Prep	
320-43691-9	PW-211	Total/NA	Water	PFAS Prep	
320-43691-10	PW-006-CISTESN	Total/NA	Water	PFAS Prep	
320-43691-10 - DL	PW-006-CISTESN	Total/NA	Water	PFAS Prep	
320-43691-11	PW-405	Total/NA	Water	PFAS Prep	
320-43691-12	PW-406	Total/NA	Water	PFAS Prep	
320-43691-13	PW-401	Total/NA	Water	PFAS Prep	
320-43691-14	PW-400	Total/NA	Water	PFAS Prep	
320-43691-15	PW-403	Total/NA	Water	PFAS Prep	
320-43691-16	PW-006-PRE	Total/NA	Water	PFAS Prep	
320-43691-17	PW-310	Total/NA	Water	PFAS Prep	
320-43691-18	PW-408	Total/NA	Water	PFAS Prep	
320-43691-19	PW-300	Total/NA	Water	PFAS Prep	
320-43691-20	SW-2003	Total/NA	Water	PFAS Prep	
MB 320-251878/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-251878/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-251878/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 252105

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-1	SW-2004	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-2	PW-413	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-3	PW-418	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-4	PW-319	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-5	PW-214	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-6	PW-219	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-7	PW-216	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-8	PW-006-BERKEY	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-9	PW-211	Total/NA	Water	WS-LC-0025 At1	251878

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-43691-1

LCMS (Continued)

Analysis Batch: 252105 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-10	PW-006-CISTESN	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-11	PW-405	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-12	PW-406	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-13	PW-401	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-14	PW-400	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-15	PW-403	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-16	PW-006-PRE	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-17	PW-310	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-18	PW-408	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-19	PW-300	Total/NA	Water	WS-LC-0025 At1	251878
320-43691-20	SW-2003	Total/NA	Water	WS-LC-0025 At1	251878
MB 320-251878/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	251878
LCS 320-251878/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	251878
LCSD 320-251878/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	251878

Analysis Batch: 252321

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-10 - DL	PW-006-CISTESN	Total/NA	Water	WS-LC-0025 At1	251878

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: SW-2004

Date Collected: 09/27/18 10:20

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-1

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 16:44	S1M	TAL SAC

Client Sample ID: PW-413

Date Collected: 09/27/18 13:30

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-2

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 17:02	S1M	TAL SAC

Client Sample ID: PW-418

Date Collected: 09/27/18 16:30

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-3

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 17:21	S1M	TAL SAC

Client Sample ID: PW-319

Date Collected: 09/27/18 11:46

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-4

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 17:39	S1M	TAL SAC

Client Sample ID: PW-214

Date Collected: 09/27/18 09:27

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-5

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 17:57	S1M	TAL SAC

Client Sample ID: PW-219

Date Collected: 09/27/18 11:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-6

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 18:16	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-216

Date Collected: 09/27/18 10:21

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-7

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 18:34	S1M	TAL SAC

Client Sample ID: PW-006-BERKEY

Date Collected: 09/26/18 10:58

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-8

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 19:11	S1M	TAL SAC

Client Sample ID: PW-211

Date Collected: 09/26/18 15:11

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-9

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 19:29	S1M	TAL SAC

Client Sample ID: PW-006-CISTESN

Date Collected: 09/26/18 10:51

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-10

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 19:47	S1M	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	20			252321	10/15/18 16:24	AAR	TAL SAC

Client Sample ID: PW-405

Date Collected: 09/25/18 15:32

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-11

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 20:06	S1M	TAL SAC

Client Sample ID: PW-406

Date Collected: 09/25/18 16:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-12

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	251878	10/12/18 16:24	DTH	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-406

Date Collected: 09/25/18 16:49

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-12

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 20:24	S1M	TAL SAC

Client Sample ID: PW-401

Date Collected: 09/25/18 13:01

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-13

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 20:42	S1M	TAL SAC

Client Sample ID: PW-400

Date Collected: 09/25/18 10:42

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-14

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 21:01	S1M	TAL SAC

Client Sample ID: PW-403

Date Collected: 09/25/18 14:31

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-15

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 21:19	S1M	TAL SAC

Client Sample ID: PW-006-PRE

Date Collected: 09/26/18 10:34

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-16

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 21:38	S1M	TAL SAC

Client Sample ID: PW-310

Date Collected: 09/26/18 12:34

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-17

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 21:56	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-408

Lab Sample ID: 320-43691-18

Date Collected: 09/26/18 18:03

Matrix: Water

Date Received: 09/29/18 12:45

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 22:33	S1M	TAL SAC

Client Sample ID: PW-300

Lab Sample ID: 320-43691-19

Date Collected: 09/24/18 18:50

Matrix: Water

Date Received: 09/29/18 12:45

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 23:09	S1M	TAL SAC

Client Sample ID: SW-2003

Lab Sample ID: 320-43691-20

Date Collected: 09/26/18 11:22

Matrix: Water

Date Received: 09/29/18 12:45

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	251878	10/12/18 16:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			252105	10/14/18 22:51	S1M	TAL SAC

Client Sample ID: PW-210

Lab Sample ID: 320-43691-22

Date Collected: 09/26/18 12:37

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 02:35	S1M	TAL SAC

Client Sample ID: PW-209

Lab Sample ID: 320-43691-23

Date Collected: 09/26/18 11:11

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 02:53	S1M	TAL SAC

Client Sample ID: PW-212

Lab Sample ID: 320-43691-24

Date Collected: 09/26/18 15:46

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 03:12	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-402

Lab Sample ID: 320-43691-25

Date Collected: 09/25/18 13:46

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 03:30	S1M	TAL SAC

Client Sample ID: PW-202

Lab Sample ID: 320-43691-26

Date Collected: 09/25/18 13:49

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 03:49	S1M	TAL SAC

Client Sample ID: NPSWELL-POST

Lab Sample ID: 320-43691-27

Date Collected: 09/25/18 11:34

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 04:07	S1M	TAL SAC

Client Sample ID: PW-203

Lab Sample ID: 320-43691-28

Date Collected: 09/25/18 15:43

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 04:25	S1M	TAL SAC

Client Sample ID: PW-011-PRE

Lab Sample ID: 320-43691-29

Date Collected: 09/25/18 09:29

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 05:02	S1M	TAL SAC

Client Sample ID: PW-200

Lab Sample ID: 320-43691-30

Date Collected: 09/24/18 19:00

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 05:20	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-011-POST

Lab Sample ID: 320-43691-31

Date Collected: 09/25/18 09:26

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 05:39	S1M	TAL SAC

Client Sample ID: PW-204

Lab Sample ID: 320-43691-32

Date Collected: 09/25/18 16:30

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 05:57	S1M	TAL SAC

Client Sample ID: NPSWELL-PRE

Lab Sample ID: 320-43691-33

Date Collected: 09/25/18 11:37

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 06:15	S1M	TAL SAC

Client Sample ID: PW-174

Lab Sample ID: 320-43691-34

Date Collected: 09/25/18 10:19

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 06:34	S1M	TAL SAC

Client Sample ID: PW-074

Lab Sample ID: 320-43691-35

Date Collected: 09/25/18 10:29

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 06:52	S1M	TAL SAC

Client Sample ID: PW-201

Lab Sample ID: 320-43691-36

Date Collected: 09/25/18 12:37

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 07:11	S1M	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-43691-1

Client Sample ID: PW-206

Lab Sample ID: 320-43691-37

Date Collected: 09/28/18 14:27

Matrix: Water

Date Received: 09/29/18 12:45

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	250332	10/08/18 04:17	MNV	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			251336	10/12/18 07:29	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 320-43691-1

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18 *
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

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

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u pstaFps AirLort

TestAmerica Job ID: 320-4381C-C

Method	Method Description	Protocol	Laboratory
, h-5l -002d AtC	k rporiSatey Ar=Onh pbstaSces	TA5-hAI	TA5 hAI
j kAh j reL	j reLaratioSPDirect IS/ect j kAh	TA5-hAI	TA5 hAI

Protocol References:

TA5-hAI g TestAmerica 5aboratoriesP, est hacrameStoPkaciriitOh taSyary . LeratiSRj roceyprev

Laboratory References:

TA5 hAI g TestAmerica hacrameStoPww0 9iFersiye j ar=6 aQP, est hacrameStoPl A 1d80dPTE5 (1Q8)373-d800

Sample Summary

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

TestAmerica Job ID: 320-43691-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43691-1	SW-2004	Water	09/27/18 10:20	09/29/18 12:45
320-43691-2	PW-413	Water	09/27/18 13:30	09/29/18 12:45
320-43691-3	PW-418	Water	09/27/18 16:30	09/29/18 12:45
320-43691-4	PW-319	Water	09/27/18 11:46	09/29/18 12:45
320-43691-5	PW-214	Water	09/27/18 09:27	09/29/18 12:45
320-43691-6	PW-219	Water	09/27/18 11:49	09/29/18 12:45
320-43691-7	PW-216	Water	09/27/18 10:21	09/29/18 12:45
320-43691-8	PW-006-BERKEY	Water	09/26/18 10:58	09/29/18 12:45
320-43691-9	PW-211	Water	09/26/18 15:11	09/29/18 12:45
320-43691-10	PW-006-CISTESN	Water	09/26/18 10:51	09/29/18 12:45
320-43691-11	PW-405	Water	09/25/18 15:32	09/29/18 12:45
320-43691-12	PW-406	Water	09/25/18 16:49	09/29/18 12:45
320-43691-13	PW-401	Water	09/25/18 13:01	09/29/18 12:45
320-43691-14	PW-400	Water	09/25/18 10:42	09/29/18 12:45
320-43691-15	PW-403	Water	09/25/18 14:31	09/29/18 12:45
320-43691-16	PW-006-PRE	Water	09/26/18 10:34	09/29/18 12:45
320-43691-17	PW-310	Water	09/26/18 12:34	09/29/18 12:45
320-43691-18	PW-408	Water	09/26/18 18:03	09/29/18 12:45
320-43691-19	PW-300	Water	09/24/18 18:50	09/29/18 12:45
320-43691-20	SW-2003	Water	09/26/18 11:22	09/29/18 12:45
320-43691-22	PW-210	Water	09/26/18 12:37	09/29/18 12:45
320-43691-23	PW-209	Water	09/26/18 11:11	09/29/18 12:45
320-43691-24	PW-212	Water	09/26/18 15:46	09/29/18 12:45
320-43691-25	PW-402	Water	09/25/18 13:46	09/29/18 12:45
320-43691-26	PW-202	Water	09/25/18 13:49	09/29/18 12:45
320-43691-27	NPSWELL-POST	Water	09/25/18 11:34	09/29/18 12:45
320-43691-28	PW-203	Water	09/25/18 15:43	09/29/18 12:45
320-43691-29	PW-011-PRE	Water	09/25/18 09:29	09/29/18 12:45
320-43691-30	PW-200	Water	09/24/18 19:00	09/29/18 12:45
320-43691-31	PW-011-POST	Water	09/25/18 09:26	09/29/18 12:45
320-43691-32	PW-204	Water	09/25/18 16:30	09/29/18 12:45
320-43691-33	NPSWELL-PRE	Water	09/25/18 11:37	09/29/18 12:45
320-43691-34	PW-174	Water	09/25/18 10:19	09/29/18 12:45
320-43691-35	PW-074	Water	09/25/18 10:29	09/29/18 12:45
320-43691-36	PW-201	Water	09/25/18 12:37	09/29/18 12:45
320-43691-37	PW-206	Water	09/28/18 14:27	09/29/18 12:45

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

CHAIN-OF-CUSTODY RECORD

Page 1 of 4
Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush
Please Specify	

Quote No: _____

J-Flags: ☐ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	✓	320-43691 Chain of Custody	10/6	Composition/Grab? Sample Containers
SW-2004		1020	9/27/18	X		2	groundwater
City Hall		1253	9/27/18	X			
PW-413		1330	9/27/18	X		2	groundwater
Firehouse		1335	9/27/18				
PW-418		1630	9/27/18	X		2	groundwater
PW-319		1146	9/27/18	X		2	
PW-214		0927	9/27/18	X		2	
PW-219		1149	9/27/18	X		2	
PW-216		1021	9/27/18	X		2	
PW-006-Berkey		1058	9/26/18	X		2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101543	Total No. of Containers: 74	Signature: [Signature]	Time: 15:30	Signature: [Signature]	Time: [Blank]	Signature: [Signature]	Time: [Blank]	Signature: [Signature]	Time: [Blank]
Name: *Gustavus Airport	COC Seals/Intact? Y/N/NA	Printed Name: Kristin Freiburger	Date: 9/28/14	Printed Name: [Blank]	Date: [Blank]	Printed Name: [Blank]	Date: [Blank]	Printed Name: [Blank]	Date: [Blank]
Contact: KRF	Received Good Cond./Cold	Company: Shannon & Wilson		Company: [Blank]		Company: [Blank]		Company: [Blank]	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temp: [Blank]								
Sampler: KRF/ARM	Delivery Method: Galsbreath								
Notes:		Received By: 1. DJ		Received By: 2.		Received By: 3.			
		Signature: [Signature]	Time: 12:45	Signature: [Signature]	Time: [Blank]	Signature: [Signature]	Time: [Blank]	Signature: [Signature]	Time: [Blank]
		Printed Name: David Hor	Date: 9/29/14	Printed Name: [Blank]	Date: [Blank]	Printed Name: [Blank]	Date: [Blank]	Printed Name: [Blank]	Date: [Blank]
		Company: TA-Saw		Company: [Blank]		Company: [Blank]		Company: [Blank]	

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

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

5-60 5-4:

No. 35665

Page 2 of 4

Analytical Methods (include preservative if used)

Turn Around Time:		Quote No:	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Please Specify			

Sample Identity	Lab No.	Time	Date Sampled	UCL							Total	Composition/Grab? Sample Containers
PW-211		1511	9/26/18	X							2	Groundwater
PW-006-Cistern		1051	9/26/18	X							2	
PW-405		1532	9/25/18	X							2	
PW-406		1649	9/25/18	X							2	
PW-401		1301	9/25/18	X							2	
PW-400		1042	9/25/18	X							2	
PW-403		1431	9/25/18	X							2	
PW-006-PRE		1034	9/26/18	X							2	
PW-310		1234	9/26/18	X							2	
PW-408		1803	9/26/18	X							2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature: _____ Time: <u>15:30</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name:		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: <u>9/28/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good/Good/Cold		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:		Company: _____		Company: _____		Company: _____	
Sampler:		Delivery Method:		Company: _____		Company: _____		Company: _____	
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature: _____ Time: <u>12:45</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
				Printed Name: _____ Date: <u>9/29/18</u>		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				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

5.3c 5.4c

No. 35663



Laboratory _____
Attn: _____

Page 3 of 4

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	UCL						Total	Composition/Grab? Sample Containers
PW-300		1850	9/24/18	X						2	groundwater
SW-2003		1122	9/26/18	X						2	
PW-006 POST		1031	9/26/18	X						2	HOLD
PW-210		1237	9/26/18	X						2	
PW-209		1111	9/26/18	X						2	
PW-212		1546	9/26/18	X						2	
PW-402		1346	9/25/18	X						2	
PW-202		1349	9/25/18	X						2	
NPS Well -POST		1134	9/25/18	X						2	
PW-203		1543	9/25/18	X						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature: _____ Time: <u>1530</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name: <u>SEE PAGE 1</u>		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: <u>9/28/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good Cond./Cold		Company: <u>Kristen Freiburger</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp: <u>5</u>		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Sampler:		Delivery Method: <u>1</u>		Received By: 1.		Received By: 2.		Received By: 3.	
Notes:				Signature: _____ Time: <u>19245</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
				Printed Name: <u>D. Walker</u> Date: <u>9/28/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>TA-Sun</u>		Company: _____		Company: _____	

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

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

5.8c 5.4c

No. 35667



Laboratory _____
Attn: _____

Page 4 of 4

Analytical Methods (include preservative if used)

Turn Around Time:	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush
Please Specify	

Quote No: _____

J-Flags: ☒ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	UCM							Total	Composition/Grab? Sample Containers
-PW-011 PRE		0929	9/25/18	X							2	Groundwater
-PW-200		1900	9/24/18	X							2	
-PW-011-POST		0926	9/25/18	X							2	
-PW-204		1630	9/25/18	X							2	
-NPS Well- PRE		1137	9/25/18	X							2	
-PW-174		1019	9/25/18	X							2	
-PW-074		1029	9/25/18	X							2	
-PW-201		1237	9/25/18	X							2	
PW-206		1427	9/28/18	X							2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature:		Signature:		Signature:	
Name:		COC Seals/Intact? Y/N/NA		Time: 1530		Time:		Time:	
Contact:		Received Good Cond./Cold		Printed Name:		Printed Name:		Printed Name:	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:		Date: 1/28/18		Date:		Date:	
Sampler:		Delivery Method:		Company:		Company:		Company:	
Notes:				Kristen Freiburger					
				Shannon & Wilson, Inc.					
				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature:		Signature:		Signature:	
				Time: 1245		Time:		Time:	
				Printed Name:		Printed Name:		Printed Name:	
				Date: 6/24/18		Date:		Date:	
				Company:		Company:		Company:	
				TA. Sam					

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

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

5.6c 5.4c

No. 35666

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10/18/2018

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-43651-1

Login Number: 43691

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

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

Laboratory Data Review Checklist

Completed By:

Kristen Freiburger

Title:

Senior Chemist

Date:

October 18, 2018

CS Report Name:

Gustavus Airport

Report Date:

October 18, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-43691-1

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample coolers were recorded at 5.4 and 5.8° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☐ Yes ☒ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory were 5.4 and 5.8° C. It further notes that several samples were yellow and/or light gray prior to extraction, or contained black particulates.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batches 320-250331 (please note, this batch was not used for the reported results), 320-250332 and 320-251878.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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 each sample.

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 action level for drinking water and proposed ADEC groundwater cleanup levels for PFAS.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No

Comments:

Yes, two field duplicates pairs were submitted with this work order.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

Field duplicate pairs *PW-074 / PW-174*, *PW-219/PW-319* and *PW-200 / PW-300* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

The RPDs, where calculable for detected values, were less than 30% for each analyte.

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.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Sacramento

880 Riverside Parkway

West Sacramento, CA 95605

Tel: (916)373-5600

TestAmerica Job ID: 320-43691-2

Client Project/Site: Gustavus Airport

Revision: 1

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

10/25/2018 2:55:51 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

LINKS

Review your project
results through

TotalAccess

Have a Question?



**Ask
The
Expert**

Visit us at:

www.testamericainc.com

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

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-43691-2

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.
--------------	-----------------------------------------------------------------------------

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

Case Narrative

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

TestAmerica Job ID: 320-43691-2

Job ID: 320-43691-2

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-43691-2

Receipt

The samples were received on 9/29/2018 12:45 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 5.4° C and 5.8° C.

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: The following sample was observed to be yellow in color. PW-006 POST (320-43691-21)

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 AirPort

TestAmerica Job ID: 320-43671-2

Client Sample ID: PW-006 POST

Lab Sample ID: 320-43691-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.6		2.0	0.72	ng/L	1			WS-LC-002N At1	Total/9 A
Perfluorohexanesulfonic acid (PFx 5S)	120		2.0	0.88	ng/L	1			WS-LC-002N At1	Total/9 A
Perfluorooctanoic acid (PFx OA)	1.4	J	2.0	0.10	ng/L	1			WS-LC-002N At1	Total/9 A
Perfluorooctanoic acid (PFp A)	2.4		2.0	0.8N	ng/L	1			WS-LC-002N At1	Total/9 A
Perfluorooctanesulfonic acid (PFp S) - DL	360		20	13	ng/L	10			WS-LC-002N At1	Total/9 A

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

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

TestAmerica Job ID: 320-43691-2

Client Sample ID: PW-006 POST

Date Collected: 09/26/18 10:31

Date Received: 09/29/18 12:45

Lab Sample ID: 320-43691-21

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	9.6		2.0	0.92	ng/L		10/19/18 12:24	10/20/18 20:35	1
Perfluorohexanesulfonic acid (PFHxS)	120		2.0	0.87	ng/L		10/19/18 12:24	10/20/18 20:35	1
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L		10/19/18 12:24	10/20/18 20:35	1
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L		10/19/18 12:24	10/20/18 20:35	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		10/19/18 12:24	10/20/18 20:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	108		25 - 150				10/19/18 12:24	10/20/18 20:35	1
13C4 PFHpA	114		25 - 150				10/19/18 12:24	10/20/18 20:35	1
13C4 PFOA	120		25 - 150				10/19/18 12:24	10/20/18 20:35	1
13C5 PFNA	121		25 - 150				10/19/18 12:24	10/20/18 20:35	1

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	360		20	13	ng/L		10/19/18 12:24	10/22/18 11:40	10
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	100		25 - 150				10/19/18 12:24	10/22/18 11:40	10

TestAmerica Sacramento

Isotope Dilution Summary

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

TestAmerica Job ID: 320-43671-2

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-43671-21	PW-006 P9 ST	108	114	120		121
320-43671-21 - D5	PW-006 P9 ST				100	
5CS 320-2p3414/2-A	5ab Control SamQe	113	11N	122	108	12p
5CSD 320-2p3414/17-A	5ab Control SamQe DuO	113	112	12p	108	124
L M320-2p3414/1-A	L ethoB Mand	111	118	124	108	120

Surrogate Legend

PkFHS x 189 2 PkFHS
PkFOA x 13C4 PkFOA
Pk9 A x 13C4 Pk9 A
Pk9 S x 13C4 Pk9 S
Pk=A x 13Cp Pk=A

QC Sample Results

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

TestAmerica Job ID: 320-43671-2

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

Lab Sample ID: MB 320-253414/1-A

Matrix: Water

Analysis Batch: 253661

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 253414

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Per.luroobutanesul.onic aci9 gPL8S5	f D		2d	0d2	n(/F		10/17/1N 12:24	10/20/1N 17:40	1
Per.lurooheBanesul.onic aci9 gPLx BS5	f D		2d	0dN	n(/F		10/17/1N 12:24	10/20/1N 17:40	1
Per.lurooheQanoic aci9 gPLx OA5	f D		2d	0dN	n(/F		10/17/1N 12:24	10/20/1N 17:40	1
Per.luroooctanoic aci9 gPLp A5	f D		2d	0dH	n(/F		10/17/1N 12:24	10/20/1N 17:40	1
Per.luroooctanesul.onic aci9 gPLp S5	f D		2d	1d8	n(/F		10/17/1N 12:24	10/20/1N 17:40	1
Per.luroononanoic aci9 gPLf A5	f D		2d	0dH	n(/F		10/17/1N 12:24	10/20/1N 17:40	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150	10/19/18 12:24	10/20/18 19:40	1
13C4 PFHpA	118		25 - 150	10/19/18 12:24	10/20/18 19:40	1
13C4 PFOA	124		25 - 150	10/19/18 12:24	10/20/18 19:40	1
13C4 PFOS	108		25 - 150	10/19/18 12:24	10/20/18 19:40	1
13C5 PFNA	120		25 - 150	10/19/18 12:24	10/20/18 19:40	1

Lab Sample ID: LCS 320-253414/2-A

Matrix: Water

Analysis Batch: 253661

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 253414

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Per.luroobutanesul.onic aci9 gPL8S5	1) d	1) dI		n(/F		7)	) 2 - 1H1
Per.lurooheBanesul.onic aci9 gPLx BS5	1N2	1) dI		n(/F		76	) 3 - 1H)
Per.lurooheQanoic aci9 gPLx OA5	20d	20dI		n(/F		101	) 1 - 13N
Per.luroooctanoic aci9 gPLp A5	20d	17d		n(/F		7H	) 0 - 140
Per.luroooctanesul.onic aci9 gPLp S5	1N6	1) dI		n(/F		76	67 - 144
Per.luroononanoic aci9 gPLf A5	20d	1Nj		n(/F		74	) 3 - 14)

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	113		25 - 150
13C4 PFHpA	117		25 - 150
13C4 PFOA	122		25 - 150
13C4 PFOS	108		25 - 150
13C5 PFNA	125		25 - 150

Lab Sample ID: LCSD 320-253414/19-A

Matrix: Water

Analysis Batch: 253661

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 253414

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Per.luroobutanesul.onic aci9 gPL8S5	1) d	1) d		n(/F		100	) 2 - 1H1	3	30
Per.lurooheBanesul.onic aci9 gPLx BS5	1N2	1) d		n(/F		7)	) 3 - 1H)	0	30
Per.lurooheQanoic aci9 gPLx OA5	20d	17d		n(/F		77	) 1 - 13N	2	30
Per.luroooctanoic aci9 gPLp A5	20d	1N0		n(/F		70	) 0 - 140	H	30
Per.luroooctanesul.onic aci9 gPLp S5	1N6	1) d		n(/F		7)	67 - 144	1	30
Per.luroononanoic aci9 gPLf A5	20d	17d		n(/F		76	) 3 - 14)	3	30

TestAmerica Sacramento

QC Sample Results

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

TestAmerica Job ID: 320-43671-2

<i>Isotope Dilution</i>	<i>LCSD</i>		<i>Limits</i>
	<i>%Recovery</i>	<i>Qualifier</i>	
<i>18O2 PFHxS</i>	113		25 - 150
<i>13C4 PFHpA</i>	112		25 - 150
<i>13C4 PFOA</i>	125		25 - 150
<i>13C4 PFOS</i>	108		25 - 150
<i>13C5 PFNA</i>	124		25 - 150

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QC Association Summary

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

TestAmerica Job ID: 320-43691-2

LCMS

Prep Batch: 253414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-21	PW-006 POST	Total/NA	Water	PFAS Prep	
320-43691-21 - DL	PW-006 POST	Total/NA	Water	PFAS Prep	
MB 320-253414/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-253414/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-253414/19-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 253661

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-21	PW-006 POST	Total/NA	Water	WS-LC-0025 At1	253414
MB 320-253414/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	253414
LCS 320-253414/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	253414
LCSD 320-253414/19-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	253414

Analysis Batch: 253899

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-43691-21 - DL	PW-006 POST	Total/NA	Water	WS-LC-0025 At1	253414

Lab Chronicle

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

TestAmerica Job ID: 320-43691-2

Client Sample ID: PW-006 POST

Lab Sample ID: 320-43691-21

Date Collected: 09/26/18 10:31

Matrix: Water

Date Received: 09/29/18 12:45

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	253414	10/19/18 12:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			253661	10/20/18 20:35	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	DL		1.00 mL	1.66 mL	253414	10/19/18 12:24	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	DL	10			253899	10/22/18 11:40	ABH	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 Airport

TestAmerica Job ID: 320-43691-2

Laboratory: TestAmerica Sacramento

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

Authority	Program	EPA Region	Identification Number	Expiration Date
Alaska (UST)	State Program	10	17-020	01-20-21
ANAB	DoD ELAP		L2468	01-20-21
Arizona	State Program	9	AZ0708	08-11-19
Arkansas DEQ	State Program	6	88-0691	06-17-19
California	State Program	9	2897	01-31-19
Colorado	State Program	8	CA00044	08-31-19
Connecticut	State Program	1	PH-0691	06-30-19
Florida	NELAP	4	E87570	06-30-19
Georgia	State Program	4	N/A	01-28-19
Hawaii	State Program	9	N/A	01-29-19
Illinois	NELAP	5	200060	03-17-19
Kansas	NELAP	7	E-10375	10-31-18 *
Louisiana	NELAP	6	30612	06-30-19
Maine	State Program	1	CA0004	04-14-20
Michigan	State Program	5	9947	01-31-20
Nevada	State Program	9	CA00044	07-31-19
New Hampshire	NELAP	1	2997	04-18-19
New Jersey	NELAP	2	CA005	06-30-19
New York	NELAP	2	11666	03-31-19
Oregon	NELAP	10	4040	01-29-19
Pennsylvania	NELAP	3	68-01272	03-31-19
Texas	NELAP	6	T104704399	05-31-19
US Fish & Wildlife	Federal		LE148388-0	07-31-19
USDA	Federal		P330-18-00239	01-17-21
USEPA UCMR	Federal	1	CA00044	12-31-20
Utah	NELAP	8	CA00044	02-28-19
Vermont	State Program	1	VT-4040	04-30-19
Virginia	NELAP	3	460278	03-14-19
Washington	State Program	10	C581	05-05-19
West Virginia (DW)	State Program	3	9930C	12-31-18
Wyoming	State Program	8	8TMS-L	01-28-19

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

TestAmerica Sacramento

Method Summary

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u pstaFps AirLort

TestAmerica Job ID: 320-4381C-2

Method	Method Description	Protocol	Laboratory
, h-5l -002d AtC	k rporiSatey Ar=Onh pbstaSces	TA5-hAI	TA5 hAI
j kAh j reL	j reLaratioSPDirect IS/ect j kAh	TA5-hAI	TA5 hAI

Protocol References:

TA5-hAI g TestAmerica 5aboratoriesP, est hacrameStoPkaciriitOh taSyary . LeratiSRj roceyprev

Laboratory References:

TA5 hAI g TestAmerica hacrameStoPww0 9iFersiye j ar=6 aQP, est hacrameStoPl A 1d80dPTE5 (1Q8)373-d800

Sample Summary

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

TestAmerica Job ID: 320-43691-2

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-43691-21	PW-006 POST	Water	09/26/18 10:31	09/29/18 12:45



Page 1 of 4
Laboratory Test America
Attn:

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush	J-Flags: <input type="checkbox"/> Yes <input type="checkbox"/> No
Please Specify	

USMRPFASx6						320-43691 Chain of Custody	total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
X					2	groundwater		
X					2	groundwater		
X					2	groundwater		
X					2			
X					2			
X					2			
X					2			
X					2			

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number: 101543		Total No. of Containers: 74		Signature: [Signature]	Time: 15:30	Signature:	Time:	Signature:	Time:
Name: *Gustavos Airport		COC Seals/Intact? Y/N/NA		Printed Name: Kristin Freiburger	Date: 9/28/16	Printed Name:	Date:	Printed Name:	Date:
Contact: KRF		Received Good Cond./Cold		Company: Shannon & Wilson		Company:		Company:	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp:							
Sampler: KRF/ARM		Delivery Method: Galsbreath							
Notes:				Received By: 1. [Signature]		Received By: 2.		Received By: 3.	
				Signature: [Signature]	Time: 12:45	Signature:	Time:	Signature:	Time:
				Printed Name: Davelle	Date: 9/29/16	Printed Name:	Date:	Printed Name:	Date:
				Company: TA-Saw		Company:		Company:	

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

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

5-6, 5-9:

No. 35665



Laboratory _____
Attn: _____

Analytical Methods (include preservative if used)

Turn Around Time:		Quote No:	
<input checked="" type="checkbox"/> Normal	<input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Please Specify			

Sample Identity	Lab No.	Time	Date Sampled	UCL							Total	Composition/Grab? Sample Containers
PW-211		1511	9/26/18	X							2	Groundwater
PW-006-Cistern		1051	9/26/18	X							2	
PW-405		1532	9/25/18	X							2	
PW-406		1649	9/25/18	X							2	
PW-401		1301	9/25/18	X							2	
PW-400		1042	9/25/18	X							2	
PW-403		1431	9/25/18	X							2	
PW-006-PRE		1034	9/26/18	X							2	
PW-310		1234	9/26/18	X							2	
PW-408		1803	9/26/18	X							2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature: _____ Time: <u>15:30</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name:		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: <u>9/28/18</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good/Good/Cold		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:		Company: _____		Company: _____		Company: _____	
Sampler:		Delivery Method:		Company: _____		Company: _____		Company: _____	
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature: _____ Time: <u>12:45</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
				Printed Name: _____ Date: <u>9/29/18</u>		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				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

5.3c 5.4c

No. 35663



Laboratory _____
Attn: _____

Page 3 of 4

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	UCL					Total	Composition/Grab? Sample Containers
PW-300		1850	9/24/18	X					2	groundwater
SW-2003		1122	9/26/18	X					2	
PW-006 POST		1031	9/26/18	X					2	HOLD
PW-210		1237	9/26/18	X					2	
PW-209		1111	9/26/18	X					2	
PW-212		1546	9/26/18	X					2	
PW-402		1346	9/25/18	X					2	
PW-202		1349	9/25/18	X					2	
NPS Well - POST		1134	9/25/18	X					2	
PW-203		1543	9/25/18	X					2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature: _____ Time: <u>1530</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name: <u>SEE</u>		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: <u>9/28/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good Cond./Cold		Company: <u>Kristen Freiburger</u>		Company: _____		Company: _____	
Ongoing Project? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		Temp: <u>5</u>		Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____	
Sampler:		Delivery Method: <u>1</u>		Received By: 1.		Received By: 2.		Received By: 3.	
Notes:				Signature: _____ Time: <u>1924</u>		Signature: _____ Time: _____		Signature: _____ Time: _____	
				Printed Name: <u>D. W. Clatter</u> Date: <u>9/14/16</u>		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
				Company: <u>TA-Sun</u>		Company: _____		Company: _____	

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

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

5.80 5.40

No. 35667

Page 17 of 19

10/25/2018 (Rev. 1)



Laboratory _____
Attn: _____

Page 4 of 4**Analytical Methods** (include preservative if used)

Turn Around Time:	Quote No:
<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush	J-Flags: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Please Specify	

Sample Identity	Lab No.	Time	Date Sampled	UCM						Total	Composition/Grab? Sample Containers
PW-011 PRE		0929	9/25/18	X						2	Groundwater
PW-200		1900	9/24/18	X						2	
PW-011-POST		0926	9/25/18	X						2	
PW-204		1630	9/25/18	X						2	
NPS Well- PRE		1137	9/25/18	X						2	
PW-174		1019	9/25/18	X						2	
PW-074		1029	9/25/18	X						2	
PW-201		1237	9/25/18	X						2	
PW-206		1427	9/28/18	X						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature:		Signature:		Signature:	
Name:		COC Seals/Intact? Y/N/NA		Time: 1530		Time:		Time:	
Contact:		Received Good Cond./Cold		Printed Name:		Printed Name:		Printed Name:	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:		Date: 1/28/18		Date:		Date:	
Sampler:		Delivery Method:		Company:		Company:		Company:	
Notes:				Kristen Freiburger					
				Shannon & Wilson, Inc.					
				Received By: 1.		Received By: 2.		Received By: 3.	
				Signature:		Signature:		Signature:	
				Time: 1245		Time:		Time:	
				Printed Name:		Printed Name:		Printed Name:	
				Date: 6/24/18		Date:		Date:	
				Company:		Company:		Company:	
				TA. Sam					

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

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

5-6c 5-4c

No. 35666

Page 18 of 19

10/25/2018 (Rev. 1)

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-43651-2

Login Number: 43691

List Source: TestAmerica Sacramento

List Number: 1

Creator: Hytrek, Cheryl

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

Laboratory Data Review Checklist

Completed By:

Kristen Freiburger

Title:

Senior Chemist

Date:

October 26, 2018

CS Report Name:

Gustavus Airport

Report Date:

October 25, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-43691-2

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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:

- 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory were 5.4 and 5.8° C. It further notes the sample was yellow and/or light gray prior to extraction.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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 each sample.

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 action level for drinking water and proposed ADEC groundwater cleanup levels for PFAS.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No

Comments:

Yes, two field duplicates pairs were submitted with this work order.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

Field duplicate pairs were not submitted with this work order; however, they have been submitted at the proper frequency for the overall project.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
 R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

N/A; see above.

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.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

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: 320-44967-1

Client Project/Site: Gustavus Airport PFAS

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

11/19/2018 2:37:20 PM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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results through

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www.testamericainc.com

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

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-44967-1

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.
--------------	-----------------------------------------------------------------------------

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

Case Narrative

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

TestAmerica Job ID: 320-44967-1

Job ID: 320-44967-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-44967-1

Receipt

The samples were received on 11/5/2018 11:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.5° C and 5.8° C.

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 were observed to be a yellow color: PW-434 (320-44967-3), PW-432 (320-44967-4), PW-401 (320-44967-5), PW-436 (320-44967-7), PW-230 (320-44967-8), PW-232 (320-44967-10), PW-233 (320-44967-11), PW-336 (320-44967-14), PW-236 (320-44967-15), PW-440 (320-44967-16), PW-213 (320-44967-17), PW-218 (320-44967-18) and PW-237 (320-44967-20). preparation batch 320-259145

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-259145.

Method(s) PFAS Prep: The following sample was observed to be an orange color: PW-234 (320-44967-12). preparation batch 320-259145

Method(s) PFAS Prep: The following samples were observed to have floating particulates in the sample containers: PW-435 (320-44967-6) and PW-231 (320-44967-9). preparation batch 320-259145

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-259147.

Method(s) PFAS Prep: The following samples were observed to be a yellow color: PW-238 (320-44967-21), PW-239 (320-44967-22), PW-221 (320-44967-26), PW-431 (320-44967-28), PW-460 (320-44967-29), PW-248 (320-44967-30), PW-247 (320-44967-31), PW-249 (320-44967-32) and PW-349 (320-44967-33). preparation batch 320-259147

Method(s) PFAS Prep: The following samples were observed to be an orange color: PW-341 (320-44967-24) and PW-241 (320-44967-25). preparation batch 320-259147

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

Detection Summary

LineSt: h&aSSoS W, insoSPISc
j ro/ect@ite: u vstaO/s Airf ort j dAh

TestAmerica Job ID: 320-44671-C

Client Sample ID: PW-530

Lab Sample ID: 320-44967-1

(o DetectioSsF

Client Sample ID: PW-430

Lab Sample ID: 320-44967-2

(o DetectioSsF

Client Sample ID: PW-434

Lab Sample ID: 320-44967-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	4F7		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)ef taSoic aci. g dL f A9	0F2	J	2F0	0F0	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0FH	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	2F1		2F0	0F3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-432

Lab Sample ID: 320-44967-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	2FH		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	2F0		2F0	0F3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-401

Lab Sample ID: 320-44967-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvorobvtaSesvnoSic aci. g dph9	2F3		2F0	0F2	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)aSesvnoSic aci. g dL)h9	20		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)ef taSoic aci. g dL f A9	0F1	J	2F0	0F0	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0F7	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	37		2F0	0F3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-435

Lab Sample ID: 320-44967-6

(o DetectioSsF

Client Sample ID: PW-436

Lab Sample ID: 320-44967-7

(o DetectioSsF

Client Sample ID: PW-230

Lab Sample ID: 320-44967-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	0F2	J	2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0FC	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A

T&is DetectioShvmmary . oes Sot iScr. e ra. ioc&emicantest resvntsf

TestAmerica hacrameSto

Detection Summary

Site: h&aSSoS W, insoSPISc
j ro/ectG ite: u vstaO/s Airf ort j dAh

TestAmerica Job ID: 320-44671-C

Client Sample ID: PW-231

Lab Sample ID: 320-44967-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	2F7		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)f taSoic aci. g dL f A9	0F7	J	2F0	0F0	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0F7	J	2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-232

Lab Sample ID: 320-44967-10

(o DetectioSsF

Client Sample ID: PW-233

Lab Sample ID: 320-44967-11

(o DetectioSsF

Client Sample ID: PW-234

Lab Sample ID: 320-44967-12

(o DetectioSsF

Client Sample ID: PW-255

Lab Sample ID: 320-44967-13

(o DetectioSsF

Client Sample ID: PW-336

Lab Sample ID: 320-44967-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	0F7	J	2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-236

Lab Sample ID: 320-44967-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	0F7	J	2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-440

Lab Sample ID: 320-44967-16

(o DetectioSsF

Client Sample ID: PW-213

Lab Sample ID: 320-44967-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvorobvtaSesvnoSic aci. g dph9	3F2		2F0	0F2	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)aSesvnoSic aci. g dL)h9	24		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroe)f taSoic aci. g dL f A9	2F2		2F0	0F0	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	2F3		2F0	0F1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	HC		2F0	0F3	SN3			C	, h-5l -002H AtC	TotalC A

T&is DetectioShvmmary . oes Sot iScr. e ra. ioc&emicantest resvntsf

TestAmerica hacrameSto

Detection Summary

LineSt: h&aSSoS W, insoSPISc
j ro/ect@ite: u vstaO/s Airf ort j dAh

TestAmerica Job ID: 320-44671-C

Client Sample ID: PW-218

Lab Sample ID: 320-44967-18

(o DetectioSsF

Client Sample ID: PW-235

Lab Sample ID: 320-44967-19

(o DetectioSsF

Client Sample ID: PW-237

Lab Sample ID: 320-44967-20

(o DetectioSsF

Client Sample ID: PW-238

Lab Sample ID: 320-44967-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	3FH		2F0	0F1	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0FH	J	2F0	0FH	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	2F0		2F0	0F3	SN3	C		, h-5l -002H AtC	TotalC A

Client Sample ID: PW-239

Lab Sample ID: 320-44967-22

(o DetectioSsF

Client Sample ID: PW-240

Lab Sample ID: 320-44967-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	3F3		2F0	0F1	SN3	C		, h-5l -002H AtC	TotalC A

Client Sample ID: PW-341

Lab Sample ID: 320-44967-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	Hx		2F0	0F1	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0F6x	J	2F0	0FH	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	2F6		2F0	0F3	SN3	C		, h-5l -002H AtC	TotalC A

Client Sample ID: PW-241

Lab Sample ID: 320-44967-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erDvoroe)aSesvnoSic aci. g dL)h9	7FC		2F0	0F1	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSoic aci. g d8 A9	0F6	J	2F0	0FH	SN3	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSesvnoSic aci. g d8 h9	2FH		2F0	0F3	SN3	C		, h-5l -002H AtC	TotalC A

Client Sample ID: PW-221

Lab Sample ID: 320-44967-26

(o DetectioSsF

T&is DetectioShvmmry . oes Sot iScr. e ra. ioc&emicantest resvntsf

TestAmerica hacrameSto

Detection Summary

Site: h&aSSoS W, insoSPISc
 j ro/ectQ ite: u vstaO/s Airf ort j dAh

TestAmerica Job ID: 320-44671-C

Client Sample ID: PW-461

Lab Sample ID: 320-44967-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoro&e)aSesvriDSoic aci. g dL)h9	CF4	J	2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoro&ef taSoic aci. g dL f A9	CF7	J	2F0	0Fx0	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSoic aci. g d8 A9	CF2	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSesvriDSoic aci. g d8 h9	CF3	J	2F0	CF3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-431

Lab Sample ID: 320-44967-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoro&e)aSesvriDSoic aci. g dL)h9	HF4		2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSesvriDSoic aci. g d8 h9	7FC		2F0	CF3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-460

Lab Sample ID: 320-44967-29

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoroobvtaSesvriDSoic aci. g dph9	CF4	J	2F0	0F62	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoro&e)aSesvriDSoic aci. g dL)h9	CF1	J	2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-248

Lab Sample ID: 320-44967-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoro&e)aSesvriDSoic aci. g dL)h9	7F3		2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSoic aci. g d8 A9	0F61	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSesvriDSoic aci. g d8 h9	CFx	J	2F0	CF3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-247

Lab Sample ID: 320-44967-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoro&e)aSesvriDSoic aci. g dL)h9	2F1		2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSoic aci. g d8 A9	CFC	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-249

Lab Sample ID: 320-44967-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
j erDvoro&e)aSesvriDSoic aci. g dL)h9	CF4	J	2F0	0Fx1	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSoic aci. g d8 A9	0F4	J	2F0	0FH	SN3			C	, h-5l -002H AtC	TotalC A
j erDvoroocotaSesvriDSoic aci. g d8 h9	CF3	J	2F0	CF3	SN3			C	, h-5l -002H AtC	TotalC A

Client Sample ID: PW-349

Lab Sample ID: 320-44967-33

T&is DetectioShvmmary . oes Sot iScr. e ra. ioc&emicantest resvrtisF

TestAmerica hacrameSto

Detection Summary

Site: h&aSSoS W, insoSPISc
j ro/ect@ite: u vstaO/s Airf ort j dAh

TestAmerica Job ID: 320-44671-C

Client Sample ID: PW-349 (Continued)

Lab Sample ID: 320-44967-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
j erDvoroe)aSesvriSic aci. g dL)h9	CFH	J	2F0	0F1	SN5	C		, h-5l -002H AtC	TotalC A
j erDvorooctaSesvriSic aci. g d8 h9	CF4	J	2F0	0F3	SN3	C		, h-5l -002H AtC	TotalC A

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -M30

Date Ccllected/ : 10/8/2010 08:20

Date Redeih/ : 11/10/2010 11:40

Lab Sample ID: 320-4481P-V

rtatio: 5 atex

retAc/ : 5 S-LC-002MFtW- klucinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL q 95 hf	dD		2(0	0(62	SFO		00:06	00:06 C4:B1	C
j ergvoro&exaSesvmpSic aciL q 9Hxf	dD		2(0	0() 1	SFO		00:06	00:06 C4:B1	C
j ergvoro&e. taSoic aciL q 9H. Af	dD		2(0	0() 0	SFO		00:06	00:06 C4:B1	C
j ergvoroctaSoic aciL q 9p Af	dD		2(0	0(1B	SFO		00:06	00:06 C4:B1	C
j ergvoroctaSesvmpSic aciL q 9p hf	dD		2(0	Q3	SFO		00:06	00:06 C4:B1	C
j ergvoroSoSaSoic aciL q 9d Af	dD		2(0	0(7B	SFO		00:06	00:06 C4:B1	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	112		20 510-	119/ 9/ 8 1- 4/ 3	119/ 9/ 8 1: 4/	1
17C: PFHpA	113		20 510-	119/ 9/ 8 1- 4/ 3	119/ 9/ 8 1: 4/	1
17C: PFOA	112		20 510-	119/ 9/ 8 1- 4/ 3	119/ 9/ 8 1: 4/	1
17C: PFOS	1-0		20 510-	119/ 9/ 8 1- 4/ 3	119/ 9/ 8 1: 4/	1
17C0 PFNA	111		20 510-	119/ 9/ 8 1- 4/ 3	119/ 9/ 8 1: 4/	1

TestAmerica hacrameSto

Client Sample Results

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -430

Date Ccllected/ : V08VW0 08:34

Date Redeihe/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-2

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL q 95hf	dD		2(0	0(62	SFO		00616) 00:06	00616) 08:C7	C
j ergvoro&exaSesvmpSic aciL q 9Hxhf	dD		2(0	0() 1	SFO		00616) 00:06	00616) 08:C7	C
j ergvoro&e. taSoic aciL q 9H. Af	dD		2(0	0() 0	SFO		00616) 00:06	00616) 08:C7	C
j ergvoroctaSoic aciL q 9p Af	dD		2(0	0(1B	SFO		00616) 00:06	00616) 08:C7	C
j ergvoroctaSesvmpSic aciL q 9p hf	dD		2(0	Q3	SFO		00616) 00:06	00616) 08:C7	C
j ergvoroSoSaSoic aciL q 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) 08:C7	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 8		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 104I 6	1
17C: PFHpA	11/		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 104I 6	1
17C: PFOA	11/		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 104I 6	1
17C: PFOS	1- 2		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 104I 6	1
17C0 PFNA	11:		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 104I 6	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaQ/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -434

Date Ccllected/ : V08VW0 V2:3P

Date Redeihe/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-3

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvnoSic aciL q 95hf	dD		2(0	0(62	SFO		00E1E) 00:06	00E1E) 0B:34	C
7ex(lucxcAeoanesul(cnid adi/	4Jl		2(0	0() 1	SFO		00E1E) 00:06	00E1E) 0B:34	C
σ k) oS.									
7ex(lucxcAeptancid adi/ σ k) pF.	0.92 B		2(0	0() 0	SFO		00E1E) 00:06	00E1E) 0B:34	C
7ex(lucxcddtancid adi/ σ kHF.	0.9M B		2(0	0(1B	SFO		00E1E) 00:06	00E1E) 0B:34	C
7ex(lucxcddtanesul(cnid adi/	2.9		2(0	Q(3	SFO		00E1E) 00:06	00E1E) 0B:34	C
σ kHS.									
j ergvoroSoSaSoic aciL q 9d Af	dD		2(0	0(7B	SFO		00E1E) 00:06	00E1E) 0B:34	C
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	1- 6		20 510-	1191/ 918 1- 413	1191/ 918 1047:	1			
17C: PFHpA	113		20 510-	1191/ 918 1- 413	1191/ 918 1047:	1			
17C: PFOA	118		20 510-	1191/ 918 1- 413	1191/ 918 1047:	1			
17C: PFOS	1- 0		20 510-	1191/ 918 1- 413	1191/ 918 1047:	1			
17C0 PFNA	116		20 510-	1191/ 918 1- 413	1191/ 918 1047:	1			

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Date Collected: 10/8/2018 11:40
 Date Received: 10/10/2018 11:40

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -432

Lab Sample ID: 320-4481P-4

Date Collected: 10/8/2018 11:40

Reference: 5 atex

Date Received: 10/10/2018 11:40

Reference: 5 S-LC-002MFtW- klucxinate/ Flyzl Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	7xepaxel	Finalize	Dil	kad
ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		0001(6) 00:06	0001(6) 00:06	C	
7ex(lucxAcioanesul(cnid adi/	2.M		2(0	0() 1	SFO		0001(6) 00:06	0001(6) 00:06	C	
σ k) oS.										
ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		0001(6) 00:06	0001(6) 00:06	C	
ergvoroocataSoic aciL g 9p Af	dD		2(0	0(1B	SFO		0001(6) 00:06	0001(6) 00:06	C	
7ex(lucxccdtanesul(cnid adi/	2.D		2(0	Q(3	SFO		0001(6) 00:06	0001(6) 00:06	C	
σ kHS.										
ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		0001(6) 00:06	0001(6) 00:06	C	
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac			
18O2 PFHxS	1- 6		20 510-	1191/ 918 1- 413	1191/ 918 10402	1				
17C: PFHpA	118		20 510-	1191/ 918 1- 413	1191/ 918 10402	1				
17C: PFOA	11:		20 510-	1191/ 918 1- 413	1191/ 918 10402	1				
17C: PFOS	1- :		20 510-	1191/ 918 1- 413	1191/ 918 10402	1				
17C0 PFNA	11-		20 510-	1191/ 918 1- 413	1191/ 918 10402	1				

TestAmerica hacrameSto

Client Sample Results

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -40W

Date Ccllected/ : V08VW0 V8:38

Date Redeihel/ : VW0M/V0 VW40

Lab Sample ID: 320-4481P-M

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
7ex(lucxcbutanesul(cnid adi/	2.8		2(0	0(62	SFO		00616) 00:06	00616) 07:00	C
σ k6 S.									
7ex(lucxcAeoanesul(cnid adi/	20		2(0	0() 1	SFO		00616) 00:06	00616) 07:00	C
σ k) oS.									
7ex(lucxcAeptancid adi/ σ k) pF.	WP B		2(0	0() 0	SFO		00616) 00:06	00616) 07:00	C
7ex(lucxcctancid adi/ σ kHF.	WM B		2(0	0(1B	SFO		00616) 00:06	00616) 07:00	C
7ex(lucxcctanesul(cnid adi/	31		2(0	0(3	SFO		00616) 00:06	00616) 07:00	C
σ kHS.									
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) 07:00	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-0		20 510-	1191/ 918 1- 413	1191/ 918 16411	1
17C: PFHpa	11/		20 510-	1191/ 918 1- 413	1191/ 918 16411	1
17C: PFOA	110		20 510-	1191/ 918 1- 413	1191/ 918 16411	1
17C: PFOS	1-7		20 510-	1191/ 918 1- 413	1191/ 918 16411	1
17C0 PFNA	11:		20 510-	1191/ 918 1- 413	1191/ 918 16411	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -43M

Date Collected: 10/8/2010 14:42

Date Received: 10/10/2010 14:40

Lab Sample ID: 320-4481P-1

Ratio: 5 atex

Perfluorinated Alkyl Substances

Sample Name	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
Perfluorobutyl Sulfonate	nd	D	2(0)	0.62	SFON		11/9/918 1-413	11/9/918 16423	1	
Perfluorohexyl Sulfonate	nd	D	2(0)	0.1	SFON		11/9/918 1-413	11/9/918 16423	1	
Perfluoroethyl Sulfonate	nd	D	2(0)	0.0	SFON		11/9/918 1-413	11/9/918 16423	1	
Perfluorooctyl Sulfonate	nd	D	2(0)	0.1B	SFON		11/9/918 1-413	11/9/918 16423	1	
Perfluorooctyl Sulfonate	nd	D	2(0)	0.3	SFON		11/9/918 1-413	11/9/918 16423	1	
Perfluorooctyl Sulfonate	nd	D	2(0)	0.7B	SFON		11/9/918 1-413	11/9/918 16423	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	1-8		20 510-	11/9/918 1-413	11/9/918 16423	1	
17C: PFHpA	11/		20 510-	11/9/918 1-413	11/9/918 16423	1	
17C: PFOA	110		20 510-	11/9/918 1-413	11/9/918 16423	1	
17C: PFOS	33		20 510-	11/9/918 1-413	11/9/918 16423	1	
17C0 PFNA	112		20 510-	11/9/918 1-413	11/9/918 16423	1	

TestAmerica h acrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -431

Date Ccllected/ : W08VW0 WM34

Date Redeihe/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-P

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SF0N		00G1G) 00:06	00G1G) C7:41	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SF0N		00G1G) 00:06	00G1G) C7:41	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SF0N		00G1G) 00:06	00G1G) C7:41	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SF0N		00G1G) 00:06	00G1G) C7:41	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SF0N		00G1G) 00:06	00G1G) C7:41	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SF0N		00G1G) 00:06	00G1G) C7:41	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 8		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 164 /	1
17C: PFHpA	122		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 164 /	1
17C: PFOA	118		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 164 /	1
17C: PFOS	1- 7		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 164 /	1
17C0 PFNA	11/		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 164 /	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -230

Date Ccllected/ : ~~W08VW0~~ 08:30

Date Redeihe/ : ~~VW0MW0~~ VW40

Lab Sample ID: 320-4481P-9

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SF0N		00G1G) 00:06	00G1G) C1:24	C
7ex(lucxcAeoanesul(cnid adi/	W0 B		2(0	0() 1	SF0N		00G1G) 00:06	00G1G) C1:24	C
0 k) oS.									
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SF0N		00G1G) 00:06	00G1G) C1:24	C
7ex(lucxcddtancid adi/ 0 kHF.	VW B		2(0	0(1B	SF0N		00G1G) 00:06	00G1G) C1:24	C
j ergvoroocataSesvmpSic aciL g 9p hf	dD		2(0	0(3	SF0N		00G1G) 00:06	00G1G) C1:24	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SF0N		00G1G) 00:06	00G1G) C1:24	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-8		20 510-	1191/ 918 1- 413	1191/ 918 1/ 42:	1
17C: PFHpa	128		20 510-	1191/ 918 1- 413	1191/ 918 1/ 42:	1
17C: PFOA	116		20 510-	1191/ 918 1- 413	1191/ 918 1/ 42:	1
17C: PFOS	1-:		20 510-	1191/ 918 1- 413	1191/ 918 1/ 42:	1
17C0 PFNA	121		20 510-	1191/ 918 1- 413	1191/ 918 1/ 42:	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -23W

Date Collected: 10/8/2010 10:39

Date Received: 10/10/2010 10:40

Lab Sample ID: 320-4481P-8

Ratio: 5 atex

Reference: 5 S-LC-002MFtW- klucinate/ Flyzl Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	7xepaxel	Finalize	Dil kad
ergvorobvtaSesvopSic acil g 95hf	dD		2(0	0(62	SFO		00616) 00:06	00616) C1:42	C
7ex(lucxcAeoanesul(cnid adi/	2Jl		2(0	0() 1	SFO		00616) 00:06	00616) C1:42	C
Ok) oS.									
7ex(lucxcAeptancid adi/ Ok) pF.	0J81 B		2(0	0() 0	SFO		00616) 00:06	00616) C1:42	C
7ex(lucxcAeptancid adi/ Ok) pF.	WW B		2(0	0(1B	SFO		00616) 00:06	00616) C1:42	C
ergvoroctaSesvopSic acil g 9p hf	dD		2(0	Q3	SFO		00616) 00:06	00616) C1:42	C
ergvoroSoSaSoic acil g 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) C1:42	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-3		20 510-	1191/ 918 1- 413	1191/ 918 1/ 4 2	1
17C: PFHpA	121		20 510-	1191/ 918 1- 413	1191/ 918 1/ 4 2	1
17C: PFOA	122		20 510-	1191/ 918 1- 413	1191/ 918 1/ 4 2	1
17C: PFOS	1-0		20 510-	1191/ 918 1- 413	1191/ 918 1/ 4 2	1
17C0 PFNA	127		20 510-	1191/ 918 1- 413	1191/ 918 1/ 4 2	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -232

Date Ccllected/ : V08VW0 WV28

Date Redeihe/ : WV0MW0 WV40

Lab Sample ID: 320-4481P-W0

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SFO		00616) 00:06	00616) C):0C	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00616) 00:06	00616) C):0C	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00616) 00:06	00616) C):0C	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00616) 00:06	00616) C):0C	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00616) 00:06	00616) C):0C	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) C):0C	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 0		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184 1	1
17C: PFHpA	12:		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184 1	1
17C: PFOA	127		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184 1	1
17C: PFOS	1- 7		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184 1	1
17C0 PFNA	118		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184 1	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -233

Date Ccllected/ : V08VW0 V2:0P

Date Redeihe/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-W

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SFO		00G1G) 00:06	00G1G) C):06	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00G1G) 00:06	00G1G) C):06	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00G1G) 00:06	00G1G) C):06	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00G1G) 00:06	00G1G) C):06	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00G1G) 00:06	00G1G) C):06	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00G1G) 00:06	00G1G) C):06	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 6		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184I 3	1
17C: PFHpA	120		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184I 3	1
17C: PFOA	118		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184I 3	1
17C: PFOS	1- 0		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184I 3	1
17C0 PFNA	127		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 184I 3	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -234

Date Ccllected/ : V08VW0 V8:20

Date Redeihe/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-V2

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SFO		00616) 00:06	00616) C):31	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00616) 00:06	00616) C):31	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00616) 00:06	00616) C):31	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00616) 00:06	00616) C):31	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00616) 00:06	00616) C):31	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) C):31	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- /		20 510-	119I/ 9I8 1- 4I3	119I/ 9I8 184I/	1
17C: PFHpA	17-		20 510-	119I/ 9I8 1- 4I3	119I/ 9I8 184I/	1
17C: PFOA	12:		20 510-	119I/ 9I8 1- 4I3	119I/ 9I8 184I/	1
17C: PFOS	1- 3		20 510-	119I/ 9I8 1- 4I3	119I/ 9I8 184I/	1
17C0 PFNA	128		20 510-	119I/ 9I8 1- 4I3	119I/ 9I8 184I/	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -2MM

Date Ccllected/ : W08VW0 W:30

Date Redeih/ : VW0MW0 VW40

Lab Sample ID: 320-4481P-V8

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SF0N		00G1G) 00:06	00G1G) C):B7	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SF0N		00G1G) 00:06	00G1G) C):B7	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SF0N		00G1G) 00:06	00G1G) C):B7	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SF0N		00G1G) 00:06	00G1G) C):B7	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SF0N		00G1G) 00:06	00G1G) C):B7	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SF0N		00G1G) 00:06	00G1G) C):B7	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 6		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 18406	1
17C: PFHpA	122		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 18406	1
17C: PFOA	12-		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 18406	1
17C: PFOS	1- 0		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 18406	1
17C0 PFNA	12-		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 18406	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -331

Date Collected: 10/8/2010

Date Received: 10/10/2010

Lab Sample ID: 320-4481P-W

Ratio: 5 atex

Test Results for 5 S-LC-002MFtW- klucinate/ Flyz Substances

Sample Name	Result	Qualifier	RL	DL	Unit	D	Prepared	Analyzed	Dil	Fac
1. 1,2-dichloroethane	0.02	B	2(0)	0(62)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	
2. 1,1-dichloroethane	0.01	B	2(0)	0(1)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	
3. 1,1,1-trichloroethane	0.01		2(0)	0(0)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	
4. 1,1,2-trichloroethane	0.01		2(0)	0(1B)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	
5. 1,2-dichlorobenzene	0.03		2(0)	0(3)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	
6. 1,2,4-trichlorobenzene	0.07		2(0)	0(7B)	SF01		11/9/98 1-4/3	11/9/98 134/1	1	

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil	Fac
18O2 PFHxS	1--		20 510-	11/9/98 1-4/3	11/9/98 134/1	1	
17C: PFHpA	11:		20 510-	11/9/98 1-4/3	11/9/98 134/1	1	
17C: PFOA	11/		20 510-	11/9/98 1-4/3	11/9/98 134/1	1	
17C: PFOS	1-1		20 510-	11/9/98 1-4/3	11/9/98 134/1	1	
17C0 PFNA	110		20 510-	11/9/98 1-4/3	11/9/98 134/1	1	

TestAmerica hacraneSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -231

Lab Sample ID: 320-4481P-WW

Date Collected: 10/18/2018

Rate: 5 atex

Date Redeemed: 10/18/2018

Reference: 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Finalize	Result	Qualifier	RL	r DL	Qnit	D	7xepaxel	Finalize	Dil kad
ergvorobvtaSesvmpSic acil g 95hf	dD		2(0	0(62	SFO		00:06 00:06	00:06 06:32	C
7ex(lucxAcsoanesul(cnid adi/	WD B		2(0	0() 1	SFO		00:06 00:06	00:06 06:32	C
ergvoro&e. taSoic acil g 9H. Af	dD		2(0	0() 0	SFO		00:06 00:06	00:06 06:32	C
ergvoroocataSoic acil g 9p Af	dD		2(0	0(1B	SFO		00:06 00:06	00:06 06:32	C
ergvoroocataSesvmpSic acil g 9p hf	dD		2(0	Q3	SFO		00:06 00:06	00:06 06:32	C
ergvoroSoSaSoic acil g 9d Af	dD		2(0	0(7B	SFO		00:06 00:06	00:06 06:32	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-0		20 510-	1191/ 918 1- 413	1191/ 918 13472	1
17C: PFHpA	121		20 510-	1191/ 918 1- 413	1191/ 918 13472	1
17C: PFOA	12:		20 510-	1191/ 918 1- 413	1191/ 918 13472	1
17C: PFOS	1-:		20 510-	1191/ 918 1- 413	1191/ 918 13472	1
17C0 PFNA	113		20 510-	1191/ 918 1- 413	1191/ 918 13472	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -440

Date Collected: ~~WWWW~~ W:38

Date Received: ~~WWMM~~ WW40

Lab Sample ID: 320-4481P-W

Ratio: 5 atex

retAc/ : 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SFO		00616) 00:06	00616) 06:BC	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00616) 00:06	00616) 06:BC	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00616) 00:06	00616) 06:BC	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00616) 00:06	00616) 06:BC	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00616) 00:06	00616) 06:BC	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00616) 00:06	00616) 06:BC	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	36		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 134I 1	1
17C: PFHpA	117		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 134I 1	1
17C: PFOA	117		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 134I 1	1
17C: PFOS	3/		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 134I 1	1
17C0 PFNA	112		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 134I 1	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Date Collected: 11/19/2018 9:40 AM

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -2V8

Date Collected: 11/19/2018 9:40 AM

Date Received: 11/19/2018 9:40 AM

Lab Sample ID: 320-4481P-WP

Reference: 5 atex

Results for: 5 S-LC-002MFtW- klucinate/ Flyzl Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	7xepaxel	Finalize	Dil kad
7x(lucx)butanesul(cnid adi/ 0 k6 S.	3.2		2(0	0(62	SF0		0001(0) 00:06	0001(0) 20:06	C
7x(lucx)Aeoanesul(cnid adi/ 0 k) oS.	24		2(0	0() 1	SF0		0001(0) 00:06	0001(0) 20:06	C
7x(lucx)Aeptancid adi/ 0 k) pF.	2.2		2(0	0() 0	SF0		0001(0) 00:06	0001(0) 20:06	C
7x(lucx)cdtancid adi/ 0 kHF.	2.3		2(0	0(1B	SF0		0001(0) 00:06	0001(0) 20:06	C
7x(lucx)cdtanesul(cnid adi/ 0 kHS.	MW		2(0	0(3	SF0		0001(0) 00:06	0001(0) 20:06	C
7x(lucx)cdtanesul(cnid adi/ 0 kHS.			2(0	0(7B	SF0		0001(0) 00:06	0001(0) 20:06	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-8		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 3	1
17C: PFHpa	12-		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 3	1
17C: PFOA	121		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 3	1
17C: PFOS	1-6		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 3	1
17C0 PFNA	113		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 3	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -2V0

Date Collected: 11/19/2018

Date Received: 11/19/2018

Lab Sample ID: 320-4481P-V0

Matrix: 5 atex

Target: 5 S-LC-002MFtW-klucinate/ Flyz Substances

Finalize	Result	Qualifier	RL	DL	Unit	D	Prepared	Finalize	Dilution
ergvorbvtaSesvmpSic aciL q 95 hf	dD		2(0	0(62	SF0N		00616) 00:06	00616) 20:47	C
ergvoro&exaSesvmpSic aciL q 9Hxf	dD		2(0	0() 1	SF0N		00616) 00:06	00616) 20:47	C
ergvoro&e. taSoic aciL q 9H. Af	dD		2(0	0() 0	SF0N		00616) 00:06	00616) 20:47	C
ergvoroctaSoic aciL q 9p Af	dD		2(0	0(1B	SF0N		00616) 00:06	00616) 20:47	C
ergvoroctaSesvmpSic aciL q 9p hf	dD		2(0	Q3	SF0N		00616) 00:06	00616) 20:47	C
ergvoroSoSaSoic aciL q 9d Af	dD		2(0	0(7B	SF0N		00616) 00:06	00616) 20:47	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution
18O2 PFHxS	1- 2		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 6	1
17C: PFHpA	11/		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 6	1
17C: PFOA	113		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 6	1
17C: PFOS	1- -		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 6	1
17C0 PFNA	12-		20 510-	1191/ 918 1- 413	1191/ 918 2- 4 6	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -23M

Date Collected: 11/19/2018 08:2M

Date Received: 11/19/2018 11:40

Lab Sample ID: 320-4481P-V8

Reference: 5 atex

Reference: 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Finalize	Result	Qualifier	RL	DL	Unit	D	Prepared	Finalize	Dilution
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04
1,2-dichlorobenzene	0.05	D	2.0	0.062	SF01		11/19/2018 11:43	0.05	2C:04

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dilution
18O2 PFHxS	3/		20 510-	11/19/2018 11:43	11/19/2018 21:4	1
17C: PFHpA	1-/		20 510-	11/19/2018 11:43	11/19/2018 21:4	1
17C: PFOA	1-8		20 510-	11/19/2018 11:43	11/19/2018 21:4	1
17C: PFOS	33		20 510-	11/19/2018 11:43	11/19/2018 21:4	1
17C0 PFNA	111		20 510-	11/19/2018 11:43	11/19/2018 21:4	1

TestAmerica hachameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -23P

Date Ccllected/ : ~~WWWW~~ ~~WW~~20

Date Redeihe/ : ~~WWMM~~ ~~WW~~40

Lab Sample ID: 320-4481P-20

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SFO		00(1(00:06	00(1(2C:22	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00(1(00:06	00(1(2C:22	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00(1(00:06	00(1(2C:22	C
j ergvoroocataSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00(1(00:06	00(1(2C:22	C
j ergvoroocataSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00(1(00:06	00(1(2C:22	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00(1(00:06	00(1(2C:22	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 2		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 21422	1
17C: PFHpA	116		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 21422	1
17C: PFOA	11/		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 21422	1
17C: PFOS	33		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 21422	1
17C0 PFNA	118		20 510-	119I/ 9I 8 1- 4I 3	119I/ 9I 8 21422	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Date Collected: 11/19/2018 13:40
 Date Received: 11/19/2018 14:40

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -239

Lab Sample ID: 320-4481P-2V

Date Collected: 11/19/2018 13:40

Reference: 5 atex

Date Received: 11/19/2018 14:40

Reference: 5 S-LC-002MFtW- klucinate/ Flyz Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	Prepared	Finalize	Dil	Fac
18O2 PFHxS	30		20 510-	119/ 9/18 1-4/	119/ 9/18 2240:		1			
17C: PFHpA	111		20 510-	119/ 9/18 1-4/	119/ 9/18 2240:		1			
17C: PFOA	11-		20 510-	119/ 9/18 1-4/	119/ 9/18 2240:		1			
17C: PFOS	3/		20 510-	119/ 9/18 1-4/	119/ 9/18 2240:		1			
17C0 PFNA	112		20 510-	119/ 9/18 1-4/	119/ 9/18 2240:		1			

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -238

Date Ccllected/ : ~~WWWW~~ W:44

Date Redeihe/ : ~~WWMM~~ WW40

Lab Sample ID: 320-4481P-22

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SFO		00G1G) 00:21	00G1G) 23:C2	C
j ergvoro&exaSesvmpSic aciL g 9Hxhf	dD		2(0	0() 1	SFO		00G1G) 00:21	00G1G) 23:C2	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00G1G) 00:21	00G1G) 23:C2	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00G1G) 00:21	00G1G) 23:C2	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00G1G) 00:21	00G1G) 23:C2	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00G1G) 00:21	00G1G) 23:C2	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	33		20 510-	119I/ 9I8 1- 4I/	119I/ 9I8 274I2	1
17C: PFHpA	1- 8		20 510-	119I/ 9I8 1- 4I/	119I/ 9I8 274I2	1
17C: PFOA	11/		20 510-	119I/ 9I8 1- 4I/	119I/ 9I8 274I2	1
17C: PFOS	33		20 510-	119I/ 9I8 1- 4I/	119I/ 9I8 274I2	1
17C0 PFNA	112		20 510-	119I/ 9I8 1- 4I/	119I/ 9I8 274I2	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -240

Date Collected: ~~WWWW~~ WW23

Date Received: ~~WWMM~~ WW40

Lab Sample ID: 320-4481P-23

Ratio: 5 atex

Target: 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Finalize	Result	Qualifier	RL	r DL	Qnit	D	7xepax/	Finalize/	Dil kad
ergvorbvtaSesvopSic acil g 95hf	dD		2(0	0(62	SFO		00616) 00:21	00616) 23:3C	C
7ex(lucxAcioanesul(cnid adi/	3.B		2(0	0() 1	SFO		00616) 00:21	00616) 23:3C	C
Sk) oS.									
ergvoro&e. taSoic acil g 9H. Af	dD		2(0	0() 0	SFO		00616) 00:21	00616) 23:3C	C
ergvoroocataSoic acil g 9p Af	dD		2(0	0(1B	SFO		00616) 00:21	00616) 23:3C	C
ergvoroocataSesvopSic acil g 9p hf	dD		2(0	Q3	SFO		00616) 00:21	00616) 23:3C	C
ergvoroSoSaSoic acil g 9d Af	dD		2(0	0(7B	SFO		00616) 00:21	00616) 23:3C	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	36		20 510-	1191/ 918 1- 42/	1191/ 918 27471	1
17C: PFHpA	111		20 510-	1191/ 918 1- 42/	1191/ 918 27471	1
17C: PFOA	11-		20 510-	1191/ 918 1- 42/	1191/ 918 27471	1
17C: PFOS	1--		20 510-	1191/ 918 1- 42/	1191/ 918 27471	1
17C0 PFNA	11:		20 510-	1191/ 918 1- 42/	1191/ 918 27471	1

TestAmerica hacrameSto

Client Sample Results

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -34W

Date Ccllected/ : ~~WWWW~~ ~~WW~~4W

Date Redeihe/ : ~~WWMM~~ ~~WW~~40

Lab Sample ID: 320-4481P-24

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		00G1G) 00:21	00G1G) 23:46	C
7ex(lucxcAeoanesul(cnid adi/	MB		2(0	0() 1	SFO		00G1G) 00:21	00G1G) 23:46	C
σ k) oS.									
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00G1G) 00:21	00G1G) 23:46	C
7ex(lucxc cdtancid adi/ σ kHF.	0.89 B		2(0	0(1B	SFO		00G1G) 00:21	00G1G) 23:46	C
7ex(lucxc cdtanesul(cnid adi/	2.B		2(0	Q(3	SFO		00G1G) 00:21	00G1G) 23:46	C
σ kHS.									
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00G1G) 00:21	00G1G) 23:46	C
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	38		20 510-	119I/ 9I 8 1- 4/	119I/ 9I 8 274 3	1			
17C: PFHpA	111		20 510-	119I/ 9I 8 1- 4/	119I/ 9I 8 274 3	1			
17C: PFOA	11:		20 510-	119I/ 9I 8 1- 4/	119I/ 9I 8 274 3	1			
17C: PFOS	1- -		20 510-	119I/ 9I 8 1- 4/	119I/ 9I 8 274 3	1			
17C0 PFNA	117		20 510-	119I/ 9I 8 1- 4/	119I/ 9I 8 274 3	1			

TestAmerica hacrameSto

Client Sample Results

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -24W

Date Ccllede/ : ~~WWWW~~ ~~WWWW~~

Date Redeihe/ : ~~WWMM~~ ~~WW40~~

Lab Sample ID: 320-4481P-2M

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		00:01:00 00:21	00:01:00 00:01	C
7ex(lucxAcsoanesul(cnid adi/ σ k) oS.	1JW		2(0	0() 1	SFO		00:01:00 00:21	00:01:00 00:01	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00:01:00 00:21	00:01:00 00:01	C
7ex(lucxAcctancid adi/ σ kHF.	0.98 B		2(0	0(1B	SFO		00:01:00 00:21	00:01:00 00:01	C
7ex(lucxAcctanesul(cnid adi/ σ kHS.	2JP		2(0	Q(3	SFO		00:01:00 00:21	00:01:00 00:01	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00:01:00 00:21	00:01:00 00:01	C
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	1- 2		20 510-	1191/ 918 1- 4/	11918918 -- 4/	1			
17C: PFHpA	117		20 510-	1191/ 918 1- 4/	11918918 -- 4/	1			
17C: PFOA	122		20 510-	1191/ 918 1- 4/	11918918 -- 4/	1			
17C: PFOS	1- 6		20 510-	1191/ 918 1- 4/	11918918 -- 4/	1			
17C0 PFNA	110		20 510-	1191/ 918 1- 4/	11918918 -- 4/	1			

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -22W

Date Collected: ~~WWWW~~ M:39

Date Received: ~~WWMM~~ WW40

Lab Sample ID: 320-4481P-21

Ratio: 5 atex

retAc/ : 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95 hf	dD		2(0	0(62	SFO		00:21 00:27	00:27	C
j ergvoro&exaSesvmpSic aciL g 9Hxf	dD		2(0	0() 1	SFO		00:21 00:27	00:27	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00:21 00:27	00:27	C
j ergvoroctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00:21 00:27	00:27	C
j ergvoroctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00:21 00:27	00:27	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00:21 00:27	00:27	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1- 7		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 46	1
17C: PFHpA	1- 3		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 46	1
17C: PFOA	116		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 46	1
17C: PFOS	1- 2		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 46	1
17C0 PFNA	116		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 46	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -41W

Date Ccllede/ : ~~WW02W0~~ W4:NB

Date Redeihe/ : ~~WW0MW0~~ WW40

Lab Sample ID: 320-4481P-2P

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		00:21	00:44	C
7ex(lucxcAeoanesul(cnid adi/	WB	B	2(0	0() 1	SFO		00:21	00:44	C
OK) oS.									
7ex(lucxcAeptancid adi/ OK) pF.	WB	B	2(0	0() 0	SFO		00:21	00:44	C
7ex(lucxcctancid adi/ OKHF.	WB	B	2(0	0(1B	SFO		00:21	00:44	C
7ex(lucxcctanesul(cnid adi/	WB	B	2(0	Q3	SFO		00:21	00:44	C
OKHS.									
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00:21	00:44	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-7		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 4 :	1
17C: PFHpA	112		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 4 :	1
17C: PFOA	116		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 4 :	1
17C: PFOS	33		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 4 :	1
17C0 PFNA	11/		20 510-	119/ 9/ 8 1- 4/	119/ 89/ 8 -- 4 :	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Date Collected: 11/02/2018 11:02
 Date Received: 11/02/2018 11:40

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -43W

Lab Sample ID: 320-4481P-29

Date Collected: 11/02/2018 11:02

Rate: 5 atex

Date Received: 11/02/2018 11:40

Test Results: 5 S-LC-002MFtW- klucinate/ FlyzI Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	7xepax/	Finalize/	Dil kad
ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		00:21	00:21	C
7ex(lucxAcsoanesul(cnid adi/	MA		2(0	0(1	SFO		00:21	00:21	C
σ k) oS.									
ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0(0	SFO		00:21	00:21	C
ergvoroocataSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00:21	00:21	C
7ex(lucxAcctanesul(cnid adi/	1JW		2(0	Q(3	SFO		00:21	00:21	C
σ kHS.									
ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00:21	00:21	C
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	1-7		20 510-	11/19/18 1-42/	11/18/18 - 1421	1			
17C: PFHpA	11/		20 510-	11/19/18 1-42/	11/18/18 - 1421	1			
17C: PFOA	122		20 510-	11/19/18 1-42/	11/18/18 - 1421	1			
17C: PFOS	1- /		20 510-	11/19/18 1-42/	11/18/18 - 1421	1			
17C0 PFNA	120		20 510-	11/19/18 1-42/	11/18/18 - 1421	1			

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -410

Date Ccllected/ : WW02W0 V8:22

Date Redeihel/ : WW0MW0 WW40

Lab Sample ID: 320-4481P-28

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result f uali(iex)	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
7ex(lucxbutanesul(cnid adi/	WA B	2(0	0(62	SFO		00(1(00:21	00(00:36	C
σ k6 S.								
7ex(lucxAcsoanesul(cnid adi/	WP B	2(0	0() 1	SFO		00(1(00:21	00(00:36	C
σ k) oS.								
j ergvoro&e. taSoic aciL q 9H. Af	dD	2(0	0() 0	SFO		00(1(00:21	00(00:36	C
j ergvoroctaSoic aciL q 9p Af	dD	2(0	0(1B	SFO		00(1(00:21	00(00:36	C
j ergvoroctaSesvmpSic aciL q 9p hf	dD	2(0	Q3	SFO		00(1(00:21	00(00:36	C
j ergvoroSoSaSoic aciL q 9d Af	dD	2(0	0(7B	SFO		00(1(00:21	00(00:36	C
Isotope Dilution	%Recovery	Qualifier	Limits			Prepared	Analyzed	Dil Fac
18O2 PFHxS	1--		20 510-			1191/ 918 1- 42/	11918918 - 1473	1
17C: PFHpA	111		20 510-			1191/ 918 1- 42/	11918918 - 1473	1
17C: PFOA	11/		20 510-			1191/ 918 1- 42/	11918918 - 1473	1
17C: PFOS	1- 2		20 510-			1191/ 918 1- 42/	11918918 - 1473	1
17C0 PFNA	118		20 510-			1191/ 918 1- 42/	11918918 - 1473	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -249

Date Collected: 11/02/2018 13:20

Date Received: 11/02/2018 14:40

Lab Sample ID: 320-4481P-30

Matrix: 5 atex

Target: 5 S-LC-002MF tW- klucxinate/ FlyzI Substances

Finalize	Result	Qualifier	RL	DL	Qnit	D	7xepaxo/	Finalize/	Dil kad
ergvoro bvtaSesvno Sic aciL q 95 hf	dD		2(0	0(62	SFO		00:21	00:21	C
7ex(lucxAcsoanesul(cnid adi/	1.3		2(0	0(1	SFO		00:21	00:21	C
σ k) oS.									
ergvoro &e. taSoic aciL q 9H. Af	dD		2(0	0(0	SFO		00:21	00:21	C
7ex(lucxAcctancid adi/ σ kHF.	0.8P B		2(0	0(1B	SFO		00:21	00:21	C
7ex(lucxAcctanesul(cnid adi/	W0 B		2(0	Q(3	SFO		00:21	00:21	C
σ kHS.									
ergvoro SoSaSoic aciL q 9d Af	dD		2(0	0(7B	SFO		00:21	00:21	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	38		20 510-	11/9/918 1-42/	11/9/8918 - 140/	1
17C: PFHpA	111		20 510-	11/9/918 1-42/	11/9/8918 - 140/	1
17C: PFOA	11/		20 510-	11/9/918 1-42/	11/9/8918 - 140/	1
17C: PFOS	33		20 510-	11/9/918 1-42/	11/9/8918 - 140/	1
17C0 PFNA	117		20 510-	11/9/918 1-42/	11/9/8918 - 140/	1

TestAmerica hacrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -24P

Date Ccllected/ : ~~WW02W0~~ W:21

Date Redeihe/ : ~~WW0MW0~~ WW40

Lab Sample ID: 320-4481P-3V

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex	RL	r DL	Qnit	D	7xepaxe/	FnalzUe/	Dil kad
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SF0N		00G1G) 00:21	00G) G) 02:C7	C
7ex(lucxcAeoanesul(cnid adi/	2.P		2(0	0() 1	SF0N		00G1G) 00:21	00G) G) 02:C7	C
0 k) oS.									
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SF0N		00G1G) 00:21	00G) G) 02:C7	C
7ex(lucxcddtancid adi/ 0 kHF.	WW B		2(0	0(1B	SF0N		00G1G) 00:21	00G) G) 02:C7	C
j ergvoroocataSesvmpSic aciL g 9p hf	dD		2(0	Q3	SF0N		00G1G) 00:21	00G) G) 02:C7	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SF0N		00G1G) 00:21	00G) G) 02:C7	C

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	1-2		20 510-	1191/ 918 1- 42/	11918918 - 2416	1
17C: PFHpA	112		20 510-	1191/ 918 1- 42/	11918918 - 2416	1
17C: PFOA	116		20 510-	1191/ 918 1- 42/	11918918 - 2416	1
17C: PFOS	1--		20 510-	1191/ 918 1- 42/	11918918 - 2416	1
17C0 PFNA	12:		20 510-	1191/ 918 1- 42/	11918918 - 2416	1

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TestAmerica Job ID: 320-44671-C

Lab Sample ID: 320-4481P-32

ratio: 5 atex

retAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

TestAmerica h acrameSto

Client Sample Results

Location: h&aSSoS W, insoSPISc
 j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

Client Sample ID: 75 -348

Date Ccllected/ : ~~WW02W0~~ W4:49

Date Redeihe/ : ~~WW0MW0~~ WW40

Lab Sample ID: 320-4481P-33

r atxio: 5 atex

r etAc/ : 5 S-LC-002MFtW- klucxinate/ Flyzl Substandes

Fnalzte	Result	f uali(iex)	RL	r DL	Qnit	D	7 xepaxe/	F nalzUe/	Dil kad
j ergvorobvtaSesvnoSic aciL g 95hf	dD		2(0	0(62	SFO		00G1G) 00:21	00G) G) 02:B3	C
7ex(lucxcAeoanesul(cnid adi/ σ k) oS.	WM B		2(0	0() 1	SFO		00G1G) 00:21	00G) G) 02:B3	C
j ergvoro&e. taSoic aciL g 9H. Af	dD		2(0	0() 0	SFO		00G1G) 00:21	00G) G) 02:B3	C
j ergvoroocctaSoic aciL g 9p Af	dD		2(0	0(1B	SFO		00G1G) 00:21	00G) G) 02:B3	C
7ex(lucxcddtanesul(cnid adi/ σ kHS.	WA B		2(0	Q(3	SFO		00G1G) 00:21	00G) G) 02:B3	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7B	SFO		00G1G) 00:21	00G) G) 02:B3	C
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	1- 1		20 510-	1191/ 918 1- 42/	11918918 - 2407	1			
17C: PFHpA	11-		20 510-	1191/ 918 1- 42/	11918918 - 2407	1			
17C: PFOA	116		20 510-	1191/ 918 1- 42/	11918918 - 2407	1			
17C: PFOS	1- 1		20 510-	1191/ 918 1- 42/	11918918 - 2407	1			
17C0 PFNA	121		20 510-	1191/ 918 1- 42/	11918918 - 2407	1			

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Isotope Dilution Summary

IrieSt: h&aSSoS W, irisoSPISc
 j ro/ect@ite: u vstaQ/s Air8ort j 9Ah

TestAmerica Job ID: 320-44671-C

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)				
		PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)
320-44671-C	j , -530	002	006	002	005	000
320-44671-2	j , -430	00N	001	001	002	004
320-44671-3	j , -434	007	006	00N	005	007
320-44671-4	j , -432	007	00N	004	004	000
320-44671-5	j , -40C	005	001	005	003	004
320-44671-7	j , -435	00N	001	005	66	002
320-44671-1	j , -437	00N	022	00N	003	001
320-44671-N	j , -230	00N	02N	007	004	02C
320-44671-6	j , -23C	006	02C	022	005	023
320-44671-00	j , -232	005	024	023	003	00N
320-44671-0C	j , -233	007	025	00N	005	023
320-44671-02	j , -234	001	030	024	006	02N
320-44671-03	j , -255	007	022	020	005	020
320-44671-04	j , -337	000	004	001	00C	005
320-44671-05	j , -237	005	02C	024	004	006
320-44671-07	j , -440	67	003	003	61	002
320-44671-01	j , -203	00N	020	02C	007	006
320-44671-0N	j , -20N	002	001	006	000	020
320-44671-06	j , -235	61	001	00N	66	00C
320-44671-20	j , -231	002	007	001	66	00N
320-44671-2C	j , -23N	65	00C	000	61	002
320-44671-22	j , -236	66	00N	001	66	002
320-44671-23	j , -240	67	00C	000	000	004
320-44671-24	j , -34C	6N	00C	004	000	003
320-44671-25	j , -24C	002	003	022	007	005
320-44671-27	j , -22C	003	006	007	002	007
320-44671-21	j , -47C	003	002	007	66	001
320-44671-2N	j , -43C	003	001	022	001	025
320-44671-26	j , -470	000	00C	001	002	00N
320-44671-30	j , -24N	6N	00C	001	66	003
320-44671-3C	j , -241	002	002	007	000	024
320-44671-32	j , -246	61	001	00C	67	003
320-44671-33	j , -346	00C	000	007	00C	02C
pl h 320-2560450-A	pab l oStronham8re	006	002	006	00C	003
pl h 320-2560410-A	pab l oStronham8re	000	003	004	00C	003
pl hD 320-2560450-A	pab l oStronham8re Dv8	000	001	00C	00N	005
pl hD 320-2560410-A	pab l oStronham8re Dv8	000	00C	005	000	002
L M320-2560450-A	L et&oB MraSd	000	003	002	61	000
L M320-2560410-A	L et&oB MraSd	002	00N	004	005	003

Surrogate Legend

j 9k Fh HCNx 2 j 9k Fh
 j 9k 8A HC3I 4 j 9k 8A
 j 9x A HC3I 4 j 9x A
 j 9x h HC3I 4 j 9x h
 j 9=A HC3I 5 j 9=A

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QC Sample Results

Instrument: h&aSSoS W, insoSPISc
 Project Site: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

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

Lab Sample ID: MB 320-259145/1-A

Matrix: Water

Analysis Batch: 259862

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 259145

Analyte	Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SFO		00(1(6) 00:06	00(1(6) C4:02	C
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	dD		2(0	0() 1	SFO		00(1(6) 00:06	00(1(6) C4:02	C
j ergvoro&e. taSoic aciL g 9x . Af	dD		2(0	0() 0	SFO		00(1(6) 00:06	00(1(6) C4:02	C
j ergvoroocataSoic aciL g 9p Af	dD		2(0	0(1H	SFO		00(1(6) 00:06	00(1(6) C4:02	C
j ergvoroocataSesvmpSic aciL g 9p hf	dD		2(0	C(3	SFO		00(1(6) 00:06	00(1(6) C4:02	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7H	SFO		00(1(6) 00:06	00(1(6) C4:02	C

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	155		2- 01- 5	11/19/18 154#3	11/19/18 1: 42	1
1Qp: PFHAN	15C		2- 01- 5	11/19/18 154#3	11/19/18 1: 42	1
1Qp: PFON	152		2- 01- 5	11/19/18 154#3	11/19/18 1: 42	1
1Qp: PFOS	39		2- 01- 5	11/19/18 154#3	11/19/18 1: 42	1
1Qp- PF7N	155		2- 01- 5	11/19/18 154#3	11/19/18 1: 42	1

Lab Sample ID: LCS 320-259145/2-A

Matrix: Water

Analysis Batch: 259862

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 259145

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
j ergvorobvtaSesvmpSic aciL g 95hf	C1(1	C1(1		SFO		000	12 - CHC
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	C() (2	C1()		SFO		6)	13 - CH1
j ergvoro&e. taSoic aciL g 9x . Af	20(0	C6()		SFO		66	1C- C3)
j ergvoroocataSoic aciL g 9p Af	20(0	C() (6		SFO		64	10 - C40
j ergvoroocataSesvmpSic aciL g 9p hf	C() (7	C1()		SFO		67	76 - C44
j ergvoroSoSaSoic aciL g 9d Af	20(0	20(0		SFO		000	13 - C41

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	153		2- 01- 5
1Qp: PFHAN	112		2- 01- 5
1Qp: PFON	153		2- 01- 5
1Qp: PFOS	111		2- 01- 5
1Qp- PF7N	15C		2- 01- 5

Lab Sample ID: LCSD 320-259145/3-A

Matrix: Water

Analysis Batch: 259862

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 259145

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD Limit
j ergvorobvtaSesvmpSic aciL g 95hf	C1(1	C1(4		SFO		6)	12 - CHC	2	30
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	C() (2	C1(4		SFO		67	13 - CH1	2	30
j ergvoro&e. taSoic aciL g 9x . Af	20(0	20(4		SFO		002	1C- C3)	3	30
j ergvoroocataSoic aciL g 9p Af	20(0	C() (6		SFO		64	10 - C40	0	30
j ergvoroocataSesvmpSic aciL g 9p hf	C() (7	C1(1		SFO		6H	76 - C44	0	30
j ergvoroSoSaSoic aciL g 9d Af	20(0	C6(2		SFO		67	13 - C41	4	30

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QC Sample Results

Instrument: h&aSSoS W, insoSPISc
 Location: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

LCSD		LCSD	
Isotope Dilution	%Recovery	Qualifier	Limits
18O2 PFHxS	115		2- 01-5
1Qp: PFHAN	119		2- 01-5
1Qp: PFON	111		2- 01-5
1Qp: PFOS	158		2- 01-5
1Qp- PF7N	15-		2- 01-5

Lab Sample ID: MB 320-259147/1-A
 Matrix: Water
 Analysis Batch: 259862

Client Sample ID: Method Blank
 Prep Type: Total/NA
 Prep Batch: 259147

MB MB									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
j ergvorobvtaSesvmpSic aciL g 95hf	dD		2(0	0(62	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	dD		2(0	0() 1	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C
j ergvoro&e. taSoic aciL g 9x . Af	dD		2(0	0() 0	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C
j ergvoroocctaSoic aciL g 9p Af	dD		2(0	0(1H	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C
j ergvoroocctaSesvmpSic aciL g 9p hf	dD		2(0	Q3	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C
j ergvoroSoSaSoic aciL g 9d Af	dD		2(0	0(7H	SFO		00(1(6) 00:21	00(1(6) 2C:H6	C

MB MB									
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac			
18O2 PFHxS	152		2- 01-5	11/19/18 15:29	11/19/18 214.3	1			
1Qp: PFHAN	158		2- 01-5	11/19/18 15:29	11/19/18 214.3	1			
1Qp: PFON	11:		2- 01-5	11/19/18 15:29	11/19/18 214.3	1			
1Qp: PFOS	15-		2- 01-5	11/19/18 15:29	11/19/18 214.3	1			
1Qp- PF7N	11C		2- 01-5	11/19/18 15:29	11/19/18 214.3	1			

Lab Sample ID: LCS 320-259147/2-A
 Matrix: Water
 Analysis Batch: 259862

Client Sample ID: Lab Control Sample
 Prep Type: Total/NA
 Prep Batch: 259147

Spike		LCS	LCS						
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits		
j ergvorobvtaSesvmpSic aciL g 95hf	C1(1	C1(3		SFO		6)	12 - CHC		
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	C() (2	C1(6		SFO		6)	13 - CH1		
j ergvoro&e. taSoic aciL g 9x . Af	20(0	06(2		SFO		67	1C - C3)		
j ergvoroocctaSoic aciL g 9p Af	20(0	C() (2		SFO		6C	10 - C40		
j ergvoroocctaSesvmpSic aciL g 9p hf	C() (7	C1(4		SFO		64	76 - C44		
j ergvoroSoSaSoic aciL g 9d Af	20(0	C() (7		SFO		63	13 - C41		

LCS LCS									
Isotope Dilution	%Recovery	Qualifier	Limits						
18O2 PFHxS	155		2- 01-5						
1Qp: PFHAN	11C		2- 01-5						
1Qp: PFON	11:		2- 01-5						
1Qp: PFOS	151		2- 01-5						
1Qp- PF7N	11C		2- 01-5						

Lab Sample ID: LCSD 320-259147/3-A
 Matrix: Water
 Analysis Batch: 259862

Client Sample ID: Lab Control Sample Dup
 Prep Type: Total/NA
 Prep Batch: 259147

Spike		LCSD	LCSD							
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
j ergvorobvtaSesvmpSic aciL g 95hf	C1(1	C() (C		SFO		003	12 - CHC	H	30	
j ergvoro&eBaSesvmpSic aciL g 9x Bhf	C() (2	C() (2		SFO		000	13 - CH1	2	30	

TestAmerica hacrameSto

QC Sample Results

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s Air. ort j 9Ah

TestAmerica Job ID: 320-44671-C

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

Lab Sample ID: LCSD 320-259147/3-A

Matrix: Water

Analysis Batch: 259862

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 259147

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
j ergvoro&e. taSoic aciL g 9x . Af	20(0	20(6		SFO		00H	1C- C3)	)	30
j ergvoroOctaSoic aciL g 9p Af	20(0	06(7		SFO		6)	10 - C40	1	30
j ergvoroOctaSevmpSic aciL g 9p hf	C)(7	C1(6		SFO		67	76 - C44	3	30
j ergvoroSoSaSoic aciL g 9d Af	20(0	20(4		SFO		002	13 - C41	6	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	155		2- 01- 5
1Q: PFHAN	111		2- 01- 5
1Q: PFON	11-		2- 01- 5
1Q: PFOS	155		2- 01- 5
1Q- PF7N	112		2- 01- 5

TestAmerica hacrameSto

QC Association Summary

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

TestAmerica Job ID: 320-44967-1

LCMS

Prep Batch: 259145

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44967-1	PW-530	Total/NA	Water	PFAS Prep	
320-44967-2	PW-430	Total/NA	Water	PFAS Prep	
320-44967-3	PW-434	Total/NA	Water	PFAS Prep	
320-44967-4	PW-432	Total/NA	Water	PFAS Prep	
320-44967-5	PW-401	Total/NA	Water	PFAS Prep	
320-44967-6	PW-435	Total/NA	Water	PFAS Prep	
320-44967-7	PW-436	Total/NA	Water	PFAS Prep	
320-44967-8	PW-230	Total/NA	Water	PFAS Prep	
320-44967-9	PW-231	Total/NA	Water	PFAS Prep	
320-44967-10	PW-232	Total/NA	Water	PFAS Prep	
320-44967-11	PW-233	Total/NA	Water	PFAS Prep	
320-44967-12	PW-234	Total/NA	Water	PFAS Prep	
320-44967-13	PW-255	Total/NA	Water	PFAS Prep	
320-44967-14	PW-336	Total/NA	Water	PFAS Prep	
320-44967-15	PW-236	Total/NA	Water	PFAS Prep	
320-44967-16	PW-440	Total/NA	Water	PFAS Prep	
320-44967-17	PW-213	Total/NA	Water	PFAS Prep	
320-44967-18	PW-218	Total/NA	Water	PFAS Prep	
320-44967-19	PW-235	Total/NA	Water	PFAS Prep	
320-44967-20	PW-237	Total/NA	Water	PFAS Prep	
MB 320-259145/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-259145/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-259145/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 259147

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44967-21	PW-238	Total/NA	Water	PFAS Prep	
320-44967-22	PW-239	Total/NA	Water	PFAS Prep	
320-44967-23	PW-240	Total/NA	Water	PFAS Prep	
320-44967-24	PW-341	Total/NA	Water	PFAS Prep	
320-44967-25	PW-241	Total/NA	Water	PFAS Prep	
320-44967-26	PW-221	Total/NA	Water	PFAS Prep	
320-44967-27	PW-461	Total/NA	Water	PFAS Prep	
320-44967-28	PW-431	Total/NA	Water	PFAS Prep	
320-44967-29	PW-460	Total/NA	Water	PFAS Prep	
320-44967-30	PW-248	Total/NA	Water	PFAS Prep	
320-44967-31	PW-247	Total/NA	Water	PFAS Prep	
320-44967-32	PW-249	Total/NA	Water	PFAS Prep	
320-44967-33	PW-349	Total/NA	Water	PFAS Prep	
MB 320-259147/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-259147/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-259147/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 259862

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44967-1	PW-530	Total/NA	Water	WS-LC-0025	259145
				At1	
320-44967-2	PW-430	Total/NA	Water	WS-LC-0025	259145
				At1	
320-44967-3	PW-434	Total/NA	Water	WS-LC-0025	259145
				At1	

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-44967-1

LCMS (Continued)

Analysis Batch: 259862 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44967-4	PW-432	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-5	PW-401	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-6	PW-435	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-7	PW-436	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-8	PW-230	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-9	PW-231	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-10	PW-232	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-11	PW-233	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-12	PW-234	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-13	PW-255	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-14	PW-336	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-15	PW-236	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-16	PW-440	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-17	PW-213	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-18	PW-218	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-19	PW-235	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-20	PW-237	Total/NA	Water	WS-LC-0025 At1	259145
320-44967-21	PW-238	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-22	PW-239	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-23	PW-240	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-24	PW-341	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-25	PW-241	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-26	PW-221	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-27	PW-461	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-28	PW-431	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-29	PW-460	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-30	PW-248	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-31	PW-247	Total/NA	Water	WS-LC-0025 At1	259147
320-44967-32	PW-249	Total/NA	Water	WS-LC-0025 At1	259147

TestAmerica Sacramento

QC Association Summary

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

TestAmerica Job ID: 320-44967-1

LCMS (Continued)

Analysis Batch: 259862 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-44967-33	PW-349	Total/NA	Water	WS-LC-0025 At1	259147
MB 320-259145/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	259145
MB 320-259147/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	259147
LCS 320-259145/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	259145
LCS 320-259147/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	259147
LCSD 320-259145/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	259145
LCSD 320-259147/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	259147

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W20

Date Collecte8: MD/2MM5 06:- 0

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 14:57	D1R	TAL SAC

Client Sample ID: NP W20

Date Collecte8: MD/2MM5 06:24

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 15:16	D1R	TAL SAC

Client Sample ID: NP W24

Date Collecte8: MD/2MM5 M :21

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 15:34	D1R	TAL SAC

Client Sample ID: NP W2-

Date Collecte8: MD/2MM5 MM40

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 15:52	D1R	TAL SAC

Client Sample ID: NP W0M

Date Collecte8: MD/2MM5 M2:26

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 16:11	D1R	TAL SAC

Client Sample ID: NP W23

Date Collecte8: MD/2MM5 M4:4-

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 16:29	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W27

Date Collecte8: MD/2MM5 MB:24

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 16:47	D1R	TAL SAC

Client Sample ID: NP W20

Date Collecte8: MD/2MM5 06:20

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 17:24	D1R	TAL SAC

Client Sample ID: NP W2M

Date Collecte8: MD/2MM5 MD:25

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 17:42	D1R	TAL SAC

Client Sample ID: NP W2-

Date Collecte8: MD/2MM5 MM- 6

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 18:01	D1R	TAL SAC

Client Sample ID: NP W22

Date Collecte8: MD/2MM5 M :01

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 18:19	D1R	TAL SAC

Client Sample ID: NP W24

Date Collecte8: MD/2MM5 M2:- 0

Date Receive8: MM03/M5 MM40

Lab Sample ID: 2- 0W4671W

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 18:37	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W33

Lab Sample ID: 2-0W4671W2

Date Collecte8: MD/2MM5 M4:20

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 18:56	D1R	TAL SAC

Client Sample ID: NP W27

Lab Sample ID: 2-0W4671W4

Date Collecte8: MD/2MM5 M3:06

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 19:14	D1R	TAL SAC

Client Sample ID: NP W27

Lab Sample ID: 2-0W4671W3

Date Collecte8: MD/2MM5 M3:M5

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 19:32	D1R	TAL SAC

Client Sample ID: NP W40

Lab Sample ID: 2-0W4671W7

Date Collecte8: MM0MM5 M4:26

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 19:51	D1R	TAL SAC

Client Sample ID: NP WM2

Lab Sample ID: 2-0W4671W1

Date Collecte8: MM0MM5 M3:2-

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 20:09	D1R	TAL SAC

Client Sample ID: NP WM5

Lab Sample ID: 2-0W4671W5

Date Collecte8: MM0MM5 M7:30

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 20:46	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W23

Date Collected: MM06MM5 06:- 3

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W6

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 21:04	D1R	TAL SAC

Client Sample ID: NP W21

Date Collected: MM06MM5 MM- 0

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W0

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259145	11/17/18 10:19	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 21:22	D1R	TAL SAC

Client Sample ID: NP W25

Date Collected: MM06MM5 M2:M5

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W1

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 22:54	D1R	TAL SAC

Client Sample ID: NP W26

Date Collected: MM06MM5 M4:44

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W-

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 23:12	D1R	TAL SAC

Client Sample ID: NP W40

Date Collected: MM06MM5 M8:- 2

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W2

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 23:31	D1R	TAL SAC

Client Sample ID: NP W4M

Date Collected: MM06MM5 M8:4M

Date Received: MM03/MM5 MM40

Lab Sample ID: 2- 0W4671W4

x atrid: P ater

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/17/18 23:49	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W4M

Lab Sample ID: 2-0W4671W3

Date Collecte8: MM0MM5 M8:3M

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 00:07	D1R	TAL SAC

Client Sample ID: NP W- M

Lab Sample ID: 2-0W4671W7

Date Collecte8: MM0MM5 M7:25

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 00:26	D1R	TAL SAC

Client Sample ID: NP W7M

Lab Sample ID: 2-0W4671W1

Date Collecte8: MM0- /M5 M4:36

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 00:44	D1R	TAL SAC

Client Sample ID: NP W2M

Lab Sample ID: 2-0W4671W5

Date Collecte8: MM0- /M5 M7:0-

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 01:21	D1R	TAL SAC

Client Sample ID: NP W70

Lab Sample ID: 2-0W4671W6

Date Collecte8: MM0- /M5 M2:- -

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 01:39	D1R	TAL SAC

Client Sample ID: NP W45

Lab Sample ID: 2-0W4671W0

Date Collecte8: MM0- /M5 M2:- M

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 01:57	D1R	TAL SAC

TestAmerica Sacramento

Lab Chronicle

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

TestAmerica Job ID: 320-44967-1

Client Sample ID: NP W41

Lab Sample ID: 2-0W4671W1

Date Collecte8: MM0-/M5 M4:- 7

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 02:16	D1R	TAL SAC

Client Sample ID: NP W46

Lab Sample ID: 2-0W4671W1

Date Collecte8: MM0-/M5 M4:35

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 02:34	D1R	TAL SAC

Client Sample ID: NP W46

Lab Sample ID: 2-0W4671W2

Date Collecte8: MM0-/M5 M4:45

x atrid: P ater

Date Receive8: MM03/M5 MM40

Nrep Type	Batch Type	Batch x etho8	Run	Dil Factor	Initial Amount	Final Amount	Batch 9 umber	Nprepare8 or Analyze8	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	259147	11/17/18 10:27	VPM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			259862	11/18/18 02:53	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
 j ro/ectSite: u vstaO/s Airdort j f AS

TestAmerica Job ID: 320-44671-P

Laboratory: TestAmerica Sacramento

All accreyitationsGerti.ications hely bNthis laboratorNare listeyp k ot all accreyitationsGerti.ications are addlicable to this redortp

Authority	Program	EPA Region	Identification Number	Expiration Date
Alas(a U STg	State j roBram	P0	P1-020	0P-20-2P
Ak AE	DoD L8Aj		8247z	0P-20-2P
Ari9ona	State j roBram	6	AZ010z	0z-PP-P6
Ar(ansas DL Q	State j roBram	7	zz-076P	07-P1-P6
Cali.ornia	State j roBram	6	2z61	0P-3P-P6
Colorayo	State j roBram	z	CA00044	0z-3P-P6
Connecticvt	State j roBram	P	j H-076P	07-30-P6
f loriya	k L8Aj	4	Lz1F10	07-30-P6
u eorBia	State j roBram	4	k A	0P-2z-P6
Ha5 aii	State j roBram	6	k A	0P-26-P6
Illinois	k L8Aj	F	200070	03-P1-P6
wansas	k L8Aj	1	L-P031F	PP-30-Pz
8ovisiana	k L8Aj	7	307P2	07-30-P6
K aine	State j roBram	P	CA0004	04-P4-20
K ichiBan	State j roBram	F	6641	0P-3P-20
k eQaya	State j roBram	6	CA00044	01-3P-P6
k e5 Hamdshire	k L8Aj	P	2661	04-Pz-P6
k e5 JerseN	k L8Aj	2	CA00F	07-30-P6
k e5 Mbr(	k L8Aj	2	PP777	03-3P-P6
YreBon	k L8Aj	P0	4040	0P-26-P6
j ennsNCania	k L8Aj	3	7z-0P212	03-3P-P6
Texas	k L8Aj	7	TP04104366	0F-3P-P6
) S f ish & Wilyli.e	f eyeral		8L P4z3zz-0	01-3P-P6
) SDA	f eyeral		j 330-Pz-00236	0P-P1-2P
) SLj A) CKR	f eyeral	P	CA00044	P2-3P-20
) tah	k L8Aj	z	CA00044	02-2z-P6
Vermont	State j roBram	P	VT-4040	04-30-P6
VirBinia	k L8Aj	3	47021z	03-P4-P6
WashinBton	State j roBram	P0	CFzP	0F-0F-P6
West VirBinia UDWg	State j roBram	3	6630C	P2-3P-Pz
WNbminB	State j roBram	z	zTK S-8	0P-2z-P6

Method Summary

LineSt: h&aSSoS W, iisoSPISc
j ro/ect@ite: u vstaO/s AirLort j 5Ah

TestAmerica Job ID: 320-44671-C

Method	Method Description	Protocol	Laboratory
, h-FI -002d AtC	5rvoriSatek Arypnh vbstaSces	TAF-hAI	TAF hAI
j 5Ah j reL	j reLaratioSPDirect IS/ect j 5Ah	TAF-hAI	TAF hAI

Protocol References:

TAF-hAI = TestAmerica FaboratoriesP, est hacrameStoP5acirtp h taSkark g LeratiS. j rocekvre8

Laboratory References:

TAF hAI = TestAmerica hacrameStoPRRO wiCersike j ary9 apP, est hacrameStoPI A 6d70dPTEF (6C7)313-d700

Sample Summary

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

TestAmerica Job ID: 320-44967-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-44967-1	PW-530	Water	10/31/18 09:20	11/05/18 11:40
320-44967-2	PW-430	Water	10/31/18 09:34	11/05/18 11:40
320-44967-3	PW-434	Water	10/31/18 12:37	11/05/18 11:40
320-44967-4	PW-432	Water	10/31/18 11:40	11/05/18 11:40
320-44967-5	PW-401	Water	10/31/18 13:39	11/05/18 11:40
320-44967-6	PW-435	Water	10/31/18 14:42	11/05/18 11:40
320-44967-7	PW-436	Water	10/31/18 15:34	11/05/18 11:40
320-44967-8	PW-230	Water	10/31/18 09:30	11/05/18 11:40
320-44967-9	PW-231	Water	10/31/18 10:38	11/05/18 11:40
320-44967-10	PW-232	Water	10/31/18 11:29	11/05/18 11:40
320-44967-11	PW-233	Water	10/31/18 12:07	11/05/18 11:40
320-44967-12	PW-234	Water	10/31/18 13:20	11/05/18 11:40
320-44967-13	PW-255	Water	10/31/18 14:30	11/05/18 11:40
320-44967-14	PW-336	Water	10/31/18 15:09	11/05/18 11:40
320-44967-15	PW-236	Water	10/31/18 15:19	11/05/18 11:40
320-44967-16	PW-440	Water	11/01/18 14:39	11/05/18 11:40
320-44967-17	PW-213	Water	11/01/18 15:32	11/05/18 11:40
320-44967-18	PW-218	Water	11/01/18 16:50	11/05/18 11:40
320-44967-19	PW-235	Water	11/01/18 09:25	11/05/18 11:40
320-44967-20	PW-237	Water	11/01/18 11:20	11/05/18 11:40
320-44967-21	PW-238	Water	11/01/18 13:18	11/05/18 11:40
320-44967-22	PW-239	Water	11/01/18 14:44	11/05/18 11:40
320-44967-23	PW-240	Water	11/01/18 15:23	11/05/18 11:40
320-44967-24	PW-341	Water	11/01/18 15:41	11/05/18 11:40
320-44967-25	PW-241	Water	11/01/18 15:51	11/05/18 11:40
320-44967-26	PW-221	Water	11/01/18 16:38	11/05/18 11:40
320-44967-27	PW-461	Water	11/02/18 14:59	11/05/18 11:40
320-44967-28	PW-431	Water	11/02/18 16:02	11/05/18 11:40
320-44967-29	PW-460	Water	11/02/18 13:22	11/05/18 11:40
320-44967-30	PW-248	Water	11/02/18 13:21	11/05/18 11:40
320-44967-31	PW-247	Water	11/02/18 14:26	11/05/18 11:40
320-44967-32	PW-249	Water	11/02/18 14:58	11/05/18 11:40
320-44967-33	PW-349	Water	11/02/18 14:48	11/05/18 11:40



No. 35727

CHAIN-OF-CUSTODY RECORD

Page 2 of 4
Laboratory Test America
Attn: David Alltucker

Analytical Methods (include preservative if used)

Turn Around Time:

☐ Normal ☐ Rush

Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

PEAS #6

Sample Identity	Lab No.	Time	Date Sampled							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-233		1207	10/31/18	X						2	Groundwater
PW-234		1320		X						2	
PW-255		1430		X						2	
PW-336		1509		X						2	
PW-236		1519		X						2	
PW-440		1439	11/1/18	X						2	
PW-213		1532		X						2	
PW-218		1650		X						2	
PW-235		925		X						2	
PW-237		11:20		X						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature:	Time:	Signature:	Time:	Signature:	Time:
Name:		COC Seals/Intact? Y/N/NA		Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Contact:		Received Good Cond./Cold		Company:		Company:		Company:	
Ongoing Project? Yes <input type="checkbox"/> No <input type="checkbox"/>		Temp:							
Sampler:		Delivery Method:							
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
<p>see page one</p>				Signature:	Time: 1140	Signature:	Time:	Signature:	Time:
				Printed Name:	Date: 5/20/18	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

CHAIN-OF-CUSTODY RECORD

Page 3 of 4
Laboratory Test American
Attn: David Dalticker

Analytical Methods (include preservative if used)

Turn Around Time:

☐ Normal ☐ Rush

Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	PFAS x6						Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
PW-238		1318	11/1/18	X						2	Groundwater
PW-239		1444	↓	X						2	
PW-240		1523	↓	X						2	
PW-341		1541	↓	X						2	
PW-241		1551	↓	X						2	
PW-221		1638	↓	X						2	
PW-261		14:59	11/2/18	X							
PW-461		14:59	11/2/18	X						2	
PW-431		16:02	↓	X						2	
PW-460		1322	↓	X						2	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature:	Time:	Signature:	Time:	Signature:	Time:
Name:		COC Seals Intact? Y/N/NA		Printed Name:	Date:	Printed Name:	Date:	Printed Name:	Date:
Contact:		Received Good Cond./Cold		Company:		Company:		Company:	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp:							
Sampler:		Delivery Method:							
Notes:				Received By: 1.		Received By: 2.		Received By: 3.	
<p>Page One</p> <p>11/19/2018</p> <p>Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - job file</p>				Signature:	Time: 11:40	Signature:	Time:	Signature:	Time:
				Printed Name:	Date: 5 Nov 18	Printed Name:	Date:	Printed Name:	Date:
				Company:		Company:		Company:	

5.8°C

No. 35731

CHAIN-OF-CUSTODY RECORD

Page 4 of 4
Laboratory Test America
Attn: David Alltucker

Analytical Methods (include preservative if used)

Turn Around Time:

☐ Normal ☐ Rush

Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

PFAS x6

Total Number of Containers

Sample Identity	Lab No.	Time	Date Sampled																Remarks/Matrix Composition/Grab? Sample Containers
PW-248		1321	11/2/18	X															Groundwater
PW-247		1426	↓	X															↓
PW-249		1458	↓	X															
PW-349		1448	↓	X															

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Number:		Total No. of Containers:		Signature: _____ Time: _____		Signature: _____ Time: _____		Signature: _____ Time: _____	
Name:		COC Seals/Intact? Y/N/NA		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____		Printed Name: _____ Date: _____	
Contact:		Received Good Cond./Cold		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		Temp: _____		Received By: 1.		Received By: 2.		Received By: 3.	
Sampler:		Delivery Method: _____		Signature: _____ Time: 1146		Signature: _____ Time: _____		Signature: _____ Time: _____	
Notes:				Printed Name: _____ Date: 5/10/18		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

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-44967-1

Login Number: 44967

List Source: TestAmerica Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
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.	False	Refer to Job Narrative for details.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed By:

Kristen Freiburger

Title:

Senior Chemist

Date:

November 20, 2018

CS Report Name:

Gustavus Airport

Report Date:

November 19, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-44967-1

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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 sample coolers were recorded at 3.5 and 5.8° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☐ Yes ☒ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample coolers upon receipt at the laboratory were 3.5 and 5.8° C. It further notes that several samples were yellow, orange and/or had floating particles.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batches 320-259145 and 320-259147.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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 each sample.

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 action level for drinking water and proposed ADEC groundwater cleanup levels for PFAS.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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:

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:

N/A; analytical accuracy and precision were 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 usability were 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 compounds are not volatile; 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 usability were not affected; see above.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☒ Yes ☐ No

Comments:

Yes, four field-duplicates pairs were submitted with this work order.

ii. Submitted blind to lab?

☒ Yes ☐ No

Comments:

Field duplicate pairs *PW-336 / PW-236*, *PW-341/PW-241*, *PW-349/PW-249*, and *PW-530 / PW-430* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

The RPDs, where calculable for detected values, were less than 30% for each analyte.

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.

- 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

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: 320-46041-1

Client Project/Site: Gustavus PFAS

For:

Shannon & Wilson, Inc

2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Attn: Kristen Freiburger



Authorized for release by:

12/19/2018 8:16:11 AM

David Alltucker, Project Manager I

(916)374-4383

david.alltucker@testamericainc.com

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

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

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

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Definitions/Glossary

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

TestAmerica Job ID: 320-46041-1

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

Case Narrative

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

TestAmerica Job ID: 320-46041-1

Job ID: 320-46041-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative 320-46041-1

Receipt

The samples were received on 12/11/2018 11:15 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.9° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-265284.

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 PFAS

TestAmerica Job ID: 320-46041-1

Client Sample ID: PW-442

Lab Sample ID: 320-46041-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	2.0	0.87	ng/L	1			WS-LC-0025 At1	Total/NA

Client Sample ID: PW-066

Lab Sample ID: 320-46041-2

No Detections.

Client Sample ID: PW-275

Lab Sample ID: 320-46041-3

No Detections.

Client Sample ID: PW-375

Lab Sample ID: 320-46041-4

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample Results

1 Client: nSal I ol h & iSol Wll c
 , roEctjnite: / CstauCs , vAn

TestAmerica Job ID: 320-46047-7

Client Sample ID: PW-442

Date Collected: 12/07/18 16:55

Date Received: 12/11/18 11:15

Lab Sample ID: 320-46041-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, erCobGal esCil ic aci. q vgnL	8 D		25	052	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
Perfluorohexanesulfonic acid (PFHxS)	1.1	J	25	05	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
, erCobSeBtal oic aci. q vx BAL	8 D		25	050	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
, erCobrooctal oic aci. q vHAL	8 D		25	05N	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
, erCobrooctal esCil ic aci. q vHnL	8 D		25	75	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
, erCobrol ol al oic aci. q v8AL	8 D		25	05N	I dj(		72j74j7F 77:73	72j7Nj7F 72:2F	7
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	106		25 - 150				12/14/18 11:13	12/15/18 12:28	1
13C4 PFHpA	108		25 - 150				12/14/18 11:13	12/15/18 12:28	1
13C4 PFOA	110		25 - 150				12/14/18 11:13	12/15/18 12:28	1
13C4 PFOS	108		25 - 150				12/14/18 11:13	12/15/18 12:28	1
13C5 PFNA	103		25 - 150				12/14/18 11:13	12/15/18 12:28	1

TestAmerica nacramel to

Client Sample Results

100% of the total oil & grease weight
 , reflect the / of the total weight, vAn

TestAmerica Job ID: 320-46047-7

Client Sample ID: PW-066

Date Collected: 12/08/18 12:30

Date Received: 12/11/18 11:15

Lab Sample ID: 320-46041-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, erobGal esol ic aci. 9 vgnL	8 D		25	052	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7
, erobSepal esol ic aci. 9 vxpnL	8 D		25	055	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7
, erobSeBtal oic aci. 9 vx BAL	8 D		25	050	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7
, erobrooctal oic aci. 9 vHAL	8 D		25	05N	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7
, erobrooctal esol ic aci. 9 vHnL	8 D		25	75	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7
, erobrol ol al oic aci. 9 v8AL	8 D		25	05N	l dj(		72j74j7F 77:73	72j7Nj7F 72:46	7

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	113		25 - 150	12/14/18 11:13	12/15/18 12:46	1
13C4 PFHpA	114		25 - 150	12/14/18 11:13	12/15/18 12:46	1
13C4 PFOA	109		25 - 150	12/14/18 11:13	12/15/18 12:46	1
13C4 PFOS	111		25 - 150	12/14/18 11:13	12/15/18 12:46	1
13C5 PFNA	111		25 - 150	12/14/18 11:13	12/15/18 12:46	1

TestAmerica nacramel to

Client Sample Results

100% of the total sample is analyzed
 , no detection / 0.05 ug/L, vAn

TestAmerica Job ID: 320-46047-7

Client Sample ID: PW-275

Date Collected: 12/09/18 10:19

Date Received: 12/11/18 11:15

Lab Sample ID: 320-46041-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, erobGal esol ic aci. 9 vgnL	8 D		25	0.2	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
, erobSepal esol ic aci. 9 vxpnL	8 D		25	0.5	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
, erobSeBtal oic aci. 9 vx BAL	8 D		25	0.50	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
, erobrooctal oic aci. 9 vHAL	8 D		25	0.5 N	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
, erobrooctal esol ic aci. 9 vHnL	8 D		25	7.5	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
, erobrol ol al oic aci. 9 v8AL	8 D		25	0.5N	l dj(		72j74j7F 77:73	72j7Nj7F 73:23	7
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		25 - 150				12/14/18 11:13	12/15/18 13:23	1
13C4 PFHpA	115		25 - 150				12/14/18 11:13	12/15/18 13:23	1
13C4 PFOA	122		25 - 150				12/14/18 11:13	12/15/18 13:23	1
13C4 PFOS	116		25 - 150				12/14/18 11:13	12/15/18 13:23	1
13C5 PFNA	114		25 - 150				12/14/18 11:13	12/15/18 13:23	1

TestAmerica nacranel to

Client Sample Results

100% of the total sample is analyzed
 , no detection / 0.05 ug/L, vAn

TestAmerica Job ID: 320-46047-7

Client Sample ID: PW-375

Date Collected: 12/09/18 10:09

Date Received: 12/11/18 11:15

Lab Sample ID: 320-46041-4

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, erobGal esol ic aci. 9 vgnL	8 D		25	0.2	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7
, erobSepal esol ic aci. 9 vxpnL	8 D		25	0.5	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7
, erobSeBtal oic aci. 9 vx BAL	8 D		25	0.50	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7
, erobrooctal oic aci. 9 vHAL	8 D		25	0.5 N	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7
, erobrooctal esol ic aci. 9 vHnL	8 D		25	7.5	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7
, erobrol ol al oic aci. 9 v8AL	8 D		25	0.5 N	ug/L		72j74j7F 77:73	72j7Nj7F 73:47	7

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	117		25 - 150	12/14/18 11:13	12/15/18 13:41	1
13C4 PFHpA	115		25 - 150	12/14/18 11:13	12/15/18 13:41	1
13C4 PFOA	121		25 - 150	12/14/18 11:13	12/15/18 13:41	1
13C4 PFOS	118		25 - 150	12/14/18 11:13	12/15/18 13:41	1
13C5 PFNA	109		25 - 150	12/14/18 11:13	12/15/18 13:41	1

TestAmerica nacranel to

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13

QC Sample Results

1 Cell: nSal l ol h & iSol Wl c
 , rolectjnite: / GstauGs , vAn

TestAmerica Job ID: 320-46047-7

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

Lab Sample ID: MB 320-265284/1-A

Matrix: Water

Analysis Batch: 265413

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 265284

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
, erobGtal esGtal ic aci. q vgnL	8D		25	052	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7
, erobSeBal esGtal ic aci. q vx BnL	8D		25	05F	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7
, erobSeHal oic aci. q vx HAL	8D		25	050	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7
, erobrooctal oic aci. q vp AL	8D		25	05N	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7
, erobrooctal esGtal ic aci. q vp nL	8D		25	753	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7
, erobrol ol al oic aci. q v8 AL	8D		25	05N	I dj(		72j74j7F 77:73	72j7Nj7F 70:07	7

Isotope Dilution	%Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	110		25 - 150	129i: 9i8 11/13	129i59i8 10/01	1
13C: PFH4p	113		25 - 150	129i: 9i8 11/13	129i59i8 10/01	1
13C: PFOp	111		25 - 150	129i: 9i8 11/13	129i59i8 10/01	1
13C: PFOS	110		25 - 150	129i: 9i8 11/13	129i59i8 10/01	1
13C5 PFNp	10A		25 - 150	129i: 9i8 11/13	129i59i8 10/01	1

Lab Sample ID: LCS 320-265284/2-A

Matrix: Water

Analysis Batch: 265413

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 265284

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
, erobGtal esGtal ic aci. q vgnL	7) 5	7f 5		I dj(		70f	) 2 - 7N7
, erobSeBal esGtal ic aci. q vx BnL	7F52	7F5		I dj(		704	) 3 - 7N)
, erobSeHal oic aci. q vx HAL	205	205		I dj(		70N	) 7 - 73F
, erobrooctal oic aci. q vp AL	205	205		I dj(		704	) 0 - 740
, erobrooctal esGtal ic aci. q vp nL	7F5	7F5N		I dj(		700	6f - 744
, erobrol ol al oic aci. q v8 AL	205	225		I dj(		777	) 3 - 74)

Isotope Dilution	%Recovery	LCS Qualifier	Limits
18O2 PFHxS	10:		25 - 150
13C: PFH4p	105		25 - 150
13C: PFOp	103		25 - 150
13C: PFOS	10A		25 - 150
13C5 PFNp	A7		25 - 150

Lab Sample ID: LCSD 320-265284/3-A

Matrix: Water

Analysis Batch: 265413

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 265284

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
, erobGtal esGtal ic aci. q vgnL	7) 5	7f 5		I dj(		70f	) 2 - 7N7	0	30
, erobSeBal esGtal ic aci. q vx BnL	7F52	7F5		I dj(		704	) 3 - 7N)	0	30
, erobSeHal oic aci. q vx HAL	205	225N		I dj(		773	) 7 - 73F	)	30
, erobrooctal oic aci. q vp AL	205	275		I dj(		70)	) 0 - 740	2	30
, erobrooctal esGtal ic aci. q vp nL	7F5	7f 5		I dj(		703	6f - 744	3	30
, erobrol ol al oic aci. q v8 AL	205	225		I dj(		772	) 3 - 74)	0	30

TestAmerica nacramel to

QC Sample Results

100% of the total sample is recovered
 , no significant loss of sample

TestAmerica Job ID: 320-46047-7

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
¹⁸ O ₂ PFHxS	11:		25 - 150
¹³ C: PFH4p	110		25 - 150
¹³ C: PFOp	110		25 - 150
¹³ C: PFOS	10A		25 - 150
¹³ C ₅ PFNp	106		25 - 150

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- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15

QC Association Summary

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

TestAmerica Job ID: 320-46041-1

LCMS

Prep Batch: 265284

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-46041-1	PW-442	Total/NA	Water	PFAS Prep	
320-46041-2	PW-066	Total/NA	Water	PFAS Prep	
320-46041-3	PW-275	Total/NA	Water	PFAS Prep	
320-46041-4	PW-375	Total/NA	Water	PFAS Prep	
MB 320-265284/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-265284/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-265284/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 265413

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-46041-1	PW-442	Total/NA	Water	WS-LC-0025 At1	265284
320-46041-2	PW-066	Total/NA	Water	WS-LC-0025 At1	265284
320-46041-3	PW-275	Total/NA	Water	WS-LC-0025 At1	265284
320-46041-4	PW-375	Total/NA	Water	WS-LC-0025 At1	265284
MB 320-265284/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	265284
LCS 320-265284/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	265284
LCSD 320-265284/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	265284

Lab Chronicle

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

TestAmerica Job ID: 320-46041-1

Client Sample ID: NP W32

Date Collected: 6/24/2018

Date Received: 6/26/2018

Lab Sample ID: 02-W4-36W

7 atr1: P ater

Nrep vTpe	yatch vTpe	yatch 7 ethoM	5 sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	NrepareM or BnalTueM	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265284	12/14/18 11:13	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 12:28	D1R	TAL SAC

Client Sample ID: NP W44

Date Collected: 6/28/2018

Date Received: 6/26/2018

Lab Sample ID: 02-W4-36W

7 atr1: P ater

Nrep vTpe	yatch vTpe	yatch 7 ethoM	5 sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	NrepareM or BnalTueM	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265284	12/14/18 11:13	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 12:46	D1R	TAL SAC

Client Sample ID: NP Wd/

Date Collected: 6/29/2018

Date Received: 6/26/2018

Lab Sample ID: 02-W4-36W

7 atr1: P ater

Nrep vTpe	yatch vTpe	yatch 7 ethoM	5 sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	NrepareM or BnalTueM	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265284	12/14/18 11:13	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 13:23	D1R	TAL SAC

Client Sample ID: NP Wd/

Date Collected: 6/29/2018

Date Received: 6/26/2018

Lab Sample ID: 02-W4-36W

7 atr1: P ater

Nrep vTpe	yatch vTpe	yatch 7 ethoM	5 sn	Dil zactor	Initial Bmosnt	zinal Bmosnt	yatch Fsmber	NrepareM or BnalTueM	BnalTA	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	265284	12/14/18 11:13	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			265413	12/15/18 13:41	D1R	TAL SAC

Laboratory Reference:

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 PFAS

TestAmerica Job ID: 320-46041-1

Laboratory: TestAmerica Sacramento

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

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Gustapus PFAS

TestAmerica Job ID: 320-48041-1

Method	Method Description	Protocol	Laboratory
WS-LC-0025 At1	Fluorinated Alkyl Substances	TAL-SAC	TAL SAC
PFAS Pre=	Pre=aration, Direct Inject PFAS	TAL-SAC	TAL SAC

Protocol References:

TAL-SAC OTestAmerica Laboratories, West Sacramento, Facility Standard g =eratin. ProcedureR

Laboratory References:

TAL SAC OTestAmerica Sacramento, vv0 wiperside Park9 ay, West Sacramento, CA 65805, TEL (618)373-5800

Sample Summary

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

TestAmerica Job ID: 320-46041-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-46041-1	PW-442	Water	12/07/18 16:55	12/11/18 11:15
320-46041-2	PW-066	Water	12/08/18 12:30	12/11/18 11:15
320-46041-3	PW-275	Water	12/09/18 10:19	12/11/18 11:15
320-46041-4	PW-375	Water	12/09/18 10:09	12/11/18 11:15

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Test America
Attn: David Allfucker

Analytical Methods (include preservative if used)

Turn Around Time:

☐ Normal ☐ Rush

Please Specify

Quote No:

J-Flags: ☐ Yes ☐ No

Sample Identity	Lab No.	Time	Date Sampled	PK							Total	Composition/Grab? Sample Containers
PW-442		1655	12/7/18	X							2	Groundwater
PW-066		1230	12/8/18	X							2	
PW-275		1019	12/11/18	X							2	
PW-375		1009	12/9/18	X							2	

Project Information Number: <u>101543-001</u> Name: <u>Gustavus PFAS</u> Contact: <u>KRF</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>CAB/APW</u>	Sample Receipt Total No. of Containers: <u> </u> COC Seals/Intact? Y/N/NA <u> </u> Received Good Cond./Cold <u> </u> Temp: <u> </u> Delivery Method: <u> </u>	Relinquished By: 1. Signature: <u>Adam Wyborny</u> Time: <u>10:00</u> Printed Name: <u>Adam Wyborny</u> Date: <u>12/10/18</u> Company: <u>Shannon & Wilson, Inc.</u>	Relinquished By: 2. Signature: <u> </u> Time: <u> </u> Printed Name: <u> </u> Date: <u> </u> Company: <u> </u>	Relinquished By: 3. Signature: <u> </u> Time: <u> </u> Printed Name: <u> </u> Date: <u> </u> Company: <u> </u>
Notes: <u>Please bill to 101543-001</u>		Received By: 1. Signature: <u>[Signature]</u> Time: <u>11:15</u> Printed Name: <u>City of Fairbanks</u> Date: <u>12/11/18</u> Company: <u>City of Fairbanks</u>	Received By: 2. Signature: <u> </u> Time: <u> </u> Printed Name: <u> </u> Date: <u> </u> Company: <u> </u>	Received By: 3. Signature: <u> </u> Time: <u> </u> Printed Name: <u> </u> Date: <u> </u> Company: <u> </u>

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

No. 35733

Client: Shannon & Wilson, Inc

Job Number: 320-46041-1

Login Number: 46041

List Number: 1

Creator: Nelson, Kym D

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	SEALS
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.	False	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	

Laboratory Data Review Checklist

Completed By:

Amber Masters

Title:

Environmental Scientist

Date:

December 19, 2018

CS Report Name:

Gustavus Airport

Report Date:

December 19, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-46041-1

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:

ADEC has not approved an analytical laboratory for analysis of PFASs. However, the laboratory is certified for perfluorinated alkyl acids in drinking water analysis by the National Environmental Laboratory Accreditation Program (NELAP) in Oregon.

- 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:

N/A; all 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 sample cooler was recorded at 5.9° 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 a preservative other than temperature control.

- c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☒ Yes ☐ No

Comments:

The sample receipt form notes 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:

There were no discrepancies noted in the sample receipt documentation.

- e. Data quality or usability affected?

Comments:

Data quality and/or usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

- b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

The case narrative notes the samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 5.9° C.

The case narrative notes there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) associated with preparation batch 320-265284.

- c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions 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 specify 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 applicable EPA lifetime drinking water health advisory levels and ADEC groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were 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 method blank sample.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☒ No

Comments:

Qualification of the results was not required; see above.

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:

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 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 compounds are not volatile; 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 usability were 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 samples *PW-275* and *PW-375* were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☒ Yes ☐ No

Comments:

PFAS compounds were not detected in the field duplicate samples. Relative precision cannot be assessed when there are no measurable detections.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability are 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.

- ii. If above LOQ, what samples are affected?

Comments:

N/A; an equipment blank was not submitted.

- iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

- a. Defined and appropriate?

☐ Yes ☒ No Comments:

There were no other data flags/qualifiers required.

Laboratory Report of Analysis

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

Report Number: **1186919**

Client Project: **101543-001 Gustavus PFAS**

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
Project Manager
Jennifer.Dawkins@sgs.com

Date



Case Narrative

SGS Client: Shannon & Wilson-Fairbanks

SGS Project: 1186919

Project Name/Site: 101543-001 Gustavus PFAS

Refer to sample receipt form for information on sample condition.

PW-406

1186919001 PS

EPA 537- PFCs 5.1 DOD were analyzed by SGS of Orlando, FL.

Speciated Arsenic (Arsenate, Arsenite) was analyzed by Brooks Applied of Bothell, WA.

WTI/5078]

1491254 MB

2510B - Conductivity - Conductivity of the MB is detected above the LOQ. The conductivity of the samples are 10 times greater than the MB.

1186919005DUP

1491314 DUP

2540D - Total Suspended Solids - Sample duplicate RPD was outside of acceptance limits. The difference between sample and duplicate results is less than the LOQ.

1186919005MS

1491434 MS

4500NH3-G - Ammonia - MS recovery is outside of QC criteria. Refer to LCS for accuracy requirements.

1186919002MSD

1491650 MSD

4500NO3-F - Nitrate/Nitrite - MSD recovery for Total Nitrate/Nitrite is outside of QC criteria. Refer to LCS for accuracy requirements.

* 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, indemnification 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 (Provisionally Certified as of 12/06/2018 for Uranium by EPA200.8, TDS by SM 2540C and Nitrate by SM 4500-NO3-F) & 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.

Sample Summary

<u>Client Sample ID</u>	<u>Lab Sample ID</u>	<u>Collected</u>	<u>Received</u>	<u>Matrix</u>
PW-406	1186919001	12/07/2018	12/10/2018	Water (Surface, Eff., Ground)
PW-405	1186919002	12/08/2018	12/10/2018	Water (Surface, Eff., Ground)
PW-505	1186919003	12/08/2018	12/10/2018	Water (Surface, Eff., Ground)
PW-202	1186919004	12/08/2018	12/10/2018	Water (Surface, Eff., Ground)
PW-408	1186919005	12/08/2018	12/10/2018	Water (Surface, Eff., Ground)
PW-200	1186919006	12/09/2018	12/10/2018	Water (Surface, Eff., Ground)

<u>Method</u>	<u>Method Description</u>
SM21 2320B	Alkalinity as CaCO ₃ QC
SM21 4500-NH ₃ G	Ammonia-N (W) SM21 4500-NH ₃ G
SM21 2510B	Conductivity SM2510B
SM21 2340B	Hardness as CaCO ₃ by ICP-MS
EPA 300.0	Ion Chromatographic Analysis (W)
EP200.8	Metals in Water by 200.8 ICP-MS
SM21 4500NO ₃ -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

Print Date: 12/27/2018 1:32:22PM

Detectable Results Summary

Client Sample ID: **PW-406**

Lab Sample ID: 1186919001

Metals by ICP/MS

Parameter	Result	Units
Calcium	64100	ug/L
Hardness as CaCO ₃	198000	ug/L
Iron	7740	ug/L
Magnesium	9210	ug/L
Manganese	218	ug/L
Potassium	8540	ug/L
Sodium	100000	ug/L
Alkalinity	224000	ug/L
Ammonia-N	0.292	mg/L
Chloride	127000	ug/L
Conductivity	882	umhos/cm
Fluoride	151J	ug/L
Oil & Grease HEM	2150J	ug/L
pH	7.6	pH units
Sulfate	15400	ug/L
Total Nitrate/Nitrite-N	36.8J	ug/L
Total Organic Carbon	3030	ug/L
Total Suspended Solids	14000	ug/L
Total Dissolved Solids	481000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Client Sample ID: **PW-405**

Lab Sample ID: 1186919002

Metals by ICP/MS

Parameter	Result	Units
Calcium	69400	ug/L
Hardness as CaCO ₃	215000	ug/L
Iron	1980	ug/L
Magnesium	10100	ug/L
Manganese	218	ug/L
Potassium	6370	ug/L
Sodium	57000	ug/L
Alkalinity	239000	ug/L
Ammonia-N	0.0958J	mg/L
Chloride	74900	ug/L
Conductivity	727	umhos/cm
Fluoride	123J	ug/L
Oil & Grease HEM	2000J	ug/L
pH	7.6	pH units
Sulfate	12100	ug/L
Total Organic Carbon	2080	ug/L
Total Suspended Solids	4540	ug/L
Total Dissolved Solids	384000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Print Date: 12/27/2018 1:32:23PM

SGS North America Inc.

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

Member of SGS Group

Detectable Results Summary

Client Sample ID: **PW-505**
Lab Sample ID: 1186919003

Metals by ICP/MS

Parameter	Result	Units
Calcium	71500	ug/L
Hardness as CaCO ₃	220000	ug/L
Iron	2120	ug/L
Magnesium	10100	ug/L
Manganese	230	ug/L
Potassium	6670	ug/L
Sodium	57300	ug/L
Alkalinity	233000	ug/L
Ammonia-N	0.0452J	mg/L
Chloride	74500	ug/L
Conductivity	726	umhos/cm
Fluoride	122J	ug/L
Oil & Grease HEM	2500J	ug/L
pH	7.6	pH units
Sulfate	12100	ug/L
Total Nitrate/Nitrite-N	68.8J	ug/L
Total Organic Carbon	2270	ug/L
Total Suspended Solids	5760	ug/L
Total Dissolved Solids	393000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Client Sample ID: **PW-202**
Lab Sample ID: 1186919004

Metals by ICP/MS

Parameter	Result	Units
Calcium	96000	ug/L
Hardness as CaCO ₃	264000	ug/L
Iron	6020	ug/L
Magnesium	5870	ug/L
Manganese	146	ug/L
Potassium	1660	ug/L
Sodium	8890	ug/L
Alkalinity	257000	ug/L
Ammonia-N	0.135	mg/L
Chloride	15800	ug/L
Conductivity	592	umhos/cm
Fluoride	84.0J	ug/L
Oil & Grease HEM	2710J	ug/L
pH	7.6	pH units
Sulfate	19000	ug/L
Total Nitrate/Nitrite-N	65.0J	ug/L
Total Organic Carbon	2750	ug/L
Total Suspended Solids	13200	ug/L
Total Dissolved Solids	317000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Detectable Results Summary

Client Sample ID: **PW-408**
Lab Sample ID: 1186919005

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	65800	ug/L
Hardness as CaCO ₃	220000	ug/L
Iron	4190	ug/L
Magnesium	13500	ug/L
Manganese	225	ug/L
Potassium	7050	ug/L
Sodium	78100	ug/L
Alkalinity	217000	ug/L
Ammonia-N	0.274	mg/L
Chloride	127000	ug/L
Conductivity	845	umhos/cm
Fluoride	125J	ug/L
Oil & Grease HEM	2580J	ug/L
pH	7.6	pH units
Sulfate	13400	ug/L
Total Organic Carbon	2530	ug/L
Total Suspended Solids	13800	ug/L
Total Dissolved Solids	455000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Client Sample ID: **PW-200**
Lab Sample ID: 1186919006

Metals by ICP/MS

<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Calcium	64900	ug/L
Hardness as CaCO ₃	202000	ug/L
Iron	2440	ug/L
Magnesium	9700	ug/L
Manganese	339	ug/L
Potassium	6110	ug/L
Sodium	51300	ug/L
Alkalinity	232000	ug/L
Ammonia-N	0.120	mg/L
Chloride	68200	ug/L
Conductivity	689	umhos/cm
Fluoride	126J	ug/L
Oil & Grease HEM	2980J	ug/L
pH	7.6	pH units
Sulfate	9050	ug/L
Total Nitrate/Nitrite-N	31.6J	ug/L
Total Organic Carbon	2200	ug/L
Total Suspended Solids	5630	ug/L
Total Dissolved Solids	379000	ug/L

Waters Department

Waters Department (Provisional Cert for TDS)

Results of PW-406

Client Sample ID: **PW-406**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919001
 Lab Project ID: 1186919

Collection Date: 12/07/18 14:07
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	64100	500	150	ug/L	1		12/13/18 14:36
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:36
Iron	7740	250	78.0	ug/L	1		12/13/18 14:36
Magnesium	9210	50.0	15.0	ug/L	1		12/13/18 14:36
Manganese	218	1.00	0.310	ug/L	1		12/13/18 14:36
Potassium	8540	500	150	ug/L	1		12/13/18 14:36
Sodium	100000	500	150	ug/L	1		12/13/18 14:36

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:36
 Container ID: 1186919001-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	198000	5000	5000	ug/L	1		12/13/18 14:36

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:36
 Container ID: 1186919001-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-406

Client Sample ID: **PW-406**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919001
 Lab Project ID: 1186919

Collection Date: 12/07/18 14:07
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2150 J	4300	1080	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919001-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	127000	2000	500	ug/L	10		12/18/18 14:33
Fluoride	151 J	200	50.0	ug/L	1		12/14/18 19:24
Sulfate	15400	200	50.0	ug/L	1		12/14/18 19:24

Batch Information

Analytical Batch: WIC5858
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/18/18 14:33
 Container ID: 1186919001-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 19:24
 Container ID: 1186919001-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	3030	1000	400	ug/L	1		12/14/18 02:18

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 02:18
 Container ID: 1186919001-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-406

Client Sample ID: **PW-406**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919001
 Lab Project ID: 1186919

Collection Date: 12/07/18 14:07
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	224000	10000	2500	ug/L	1		12/12/18 11:54

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 11:54
 Container ID: 1186919001-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Conductivity	882	1.00	0.477	umhos/cm	1		12/12/18 11:54

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 11:54
 Container ID: 1186919001-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	14000	2220	689	ug/L	1		12/12/18 17:11

Batch Information

Analytical Batch: STS6108
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/12/18 17:11
 Container ID: 1186919001-D

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 11:54

Results of PW-406

Client Sample ID: **PW-406**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919001
 Lab Project ID: 1186919

Collection Date: 12/07/18 14:07
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 11:54
 Container ID: 1186919001-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.292		0.100	0.0310	mg/L	1		12/12/18 16:00

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 16:00
 Container ID: 1186919001-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 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	36.8	J	100	25.0	ug/L	2		12/14/18 13:14

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:14
 Container ID: 1186919001-H

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0	U	100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919001-G

Results of PW-406

Client Sample ID: **PW-406**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919001
 Lab Project ID: 1186919

Collection Date: 12/07/18 14:07
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	481000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919001-A

Results of PW-405

Client Sample ID: **PW-405**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919002
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:43
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	69400	500	150	ug/L	1		12/13/18 14:39
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:39
Iron	1980	250	78.0	ug/L	1		12/13/18 14:39
Magnesium	10100	50.0	15.0	ug/L	1		12/13/18 14:39
Manganese	218	1.00	0.310	ug/L	1		12/13/18 14:39
Potassium	6370	500	150	ug/L	1		12/13/18 14:39
Sodium	57000	500	150	ug/L	1		12/13/18 14:39

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:39
 Container ID: 1186919002-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	215000	5000	5000	ug/L	1		12/13/18 14:39

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:39
 Container ID: 1186919002-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-405

Client Sample ID: **PW-405**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919002
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:43
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2000 J	4210	1050	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919002-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	74900	1000	250	ug/L	5		12/14/18 23:11
Fluoride	123 J	200	50.0	ug/L	1		12/14/18 19:43
Sulfate	12100	200	50.0	ug/L	1		12/14/18 19:43

Batch Information

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 19:43
 Container ID: 1186919002-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 23:11
 Container ID: 1186919002-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	2080	1000	400	ug/L	1		12/14/18 02:37

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 02:37
 Container ID: 1186919002-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-405

Client Sample ID: **PW-405**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919002
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:43
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	239000	10000	2500	ug/L	1		12/12/18 12:16

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:16
 Container ID: 1186919002-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Conductivity	727	1.00	0.477	umhos/cm	1		12/12/18 12:16

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:16
 Container ID: 1186919002-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	4540	987	306	ug/L	1		12/13/18 15:02

Batch Information

Analytical Batch: STS6110
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:02
 Container ID: 1186919002-D

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 12:16

Results of PW-405

Client Sample ID: **PW-405**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919002
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:43
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:16
 Container ID: 1186919002-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Ammonia-N	0.0958 J	0.100	0.0310	mg/L	1		12/12/18 16:02

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 16:02
 Container ID: 1186919002-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 Prep Initial Wt./Vol.: 6 mL
 Prep Extract Vol: 6 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Nitrate/Nitrite-N	50.0 U	100	25.0	ug/L	2		12/14/18 13:16

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:16
 Container ID: 1186919002-H

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfide	50.0 U	100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919002-G

Results of PW-405

Client Sample ID: **PW-405**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919002
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:43
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	384000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919002-A

Results of PW-505

Client Sample ID: **PW-505**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919003
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:33
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	71500	500	150	ug/L	1		12/13/18 14:42
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:42
Iron	2120	250	78.0	ug/L	1		12/13/18 14:42
Magnesium	10100	50.0	15.0	ug/L	1		12/13/18 14:42
Manganese	230	1.00	0.310	ug/L	1		12/13/18 14:42
Potassium	6670	500	150	ug/L	1		12/13/18 14:42
Sodium	57300	500	150	ug/L	1		12/13/18 14:42

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:42
 Container ID: 1186919003-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	220000	5000	5000	ug/L	1		12/13/18 14:42

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:42
 Container ID: 1186919003-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-505

Client Sample ID: **PW-505**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919003
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:33
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2500 J	4170	1040	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919003-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	74500	1000	250	ug/L	5		12/14/18 23:30
Fluoride	122 J	200	50.0	ug/L	1		12/14/18 20:02
Sulfate	12100	200	50.0	ug/L	1		12/14/18 20:02

Batch Information

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 20:02
 Container ID: 1186919003-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 23:30
 Container ID: 1186919003-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	2270	1000	400	ug/L	1		12/14/18 02:59

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 02:59
 Container ID: 1186919003-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-505

Client Sample ID: **PW-505**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919003
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:33
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	233000	10000	2500	ug/L	1		12/12/18 12:26

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:26
 Container ID: 1186919003-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Conductivity	726	1.00	0.477	umhos/cm	1		12/12/18 12:26

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:26
 Container ID: 1186919003-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	5760	1090	337	ug/L	1		12/13/18 15:02

Batch Information

Analytical Batch: STS6110
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:02
 Container ID: 1186919003-D

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 12:26

Results of PW-505

Client Sample ID: **PW-505**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919003
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:33
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:26
 Container ID: 1186919003-A

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.0452 J	0.100	0.0310	mg/L	1		12/12/18 16:04

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 16:04
 Container ID: 1186919003-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 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	68.8 J	100	25.0	ug/L	2		12/14/18 13:21

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:21
 Container ID: 1186919003-H

Parameter	Result Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0 U	100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919003-G

Results of PW-505

Client Sample ID: **PW-505**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919003
 Lab Project ID: 1186919

Collection Date: 12/08/18 10:33
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	393000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919003-A

Results of PW-202

Client Sample ID: **PW-202**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919004
 Lab Project ID: 1186919

Collection Date: 12/08/18 15:10
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	96000	500	150	ug/L	1		12/13/18 14:45
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:45
Iron	6020	250	78.0	ug/L	1		12/13/18 14:45
Magnesium	5870	50.0	15.0	ug/L	1		12/13/18 14:45
Manganese	146	1.00	0.310	ug/L	1		12/13/18 14:45
Potassium	1660	500	150	ug/L	1		12/13/18 14:45
Sodium	8890	500	150	ug/L	1		12/13/18 14:45

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:45
 Container ID: 1186919004-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	264000	5000	5000	ug/L	1		12/13/18 14:45

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:45
 Container ID: 1186919004-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-202

Client Sample ID: **PW-202**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919004
 Lab Project ID: 1186919

Collection Date: 12/08/18 15:10
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2710 J	4170	1040	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919004-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	15800	200	50.0	ug/L	1		12/14/18 20:21
Fluoride	84.0 J	200	50.0	ug/L	1		12/14/18 20:21
Sulfate	19000	200	50.0	ug/L	1		12/14/18 20:21

Batch Information

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 20:21
 Container ID: 1186919004-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	2750	1000	400	ug/L	1		12/14/18 03:19

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 03:19
 Container ID: 1186919004-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	257000	10000	2500	ug/L	1		12/12/18 12:36

Results of PW-202

Client Sample ID: **PW-202**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919004
 Lab Project ID: 1186919

Collection Date: 12/08/18 15:10
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:36
 Container ID: 1186919004-A

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Conductivity	592	1.00	0.477	umhos/cm	1		12/12/18 12:36

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:36
 Container ID: 1186919004-A

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	13200	1010	312	ug/L	1		12/13/18 15:02

Batch Information

Analytical Batch: STS6110
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:02
 Container ID: 1186919004-D

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 12:36

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:36
 Container ID: 1186919004-A

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-202

Client Sample ID: **PW-202**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919004
 Lab Project ID: 1186919

Collection Date: 12/08/18 15:10
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Ammonia-N	0.135	0.100	0.0310	mg/L	1		12/12/18 16:06

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 16:06
 Container ID: 1186919004-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 Prep Initial Wt./Vol.: 6 mL
 Prep Extract Vol: 6 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Nitrate/Nitrite-N	65.0 J	100	25.0	ug/L	2		12/14/18 13:23

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:23
 Container ID: 1186919004-H

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Sulfide	50.0 U	100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919004-G

Results of PW-202

Client Sample ID: **PW-202**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919004
 Lab Project ID: 1186919

Collection Date: 12/08/18 15:10
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	317000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919004-A

Results of PW-408

Client Sample ID: **PW-408**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919005
 Lab Project ID: 1186919

Collection Date: 12/08/18 17:06
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	65800	500	150	ug/L	1		12/13/18 14:48
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:48
Iron	4190	250	78.0	ug/L	1		12/13/18 14:48
Magnesium	13500	50.0	15.0	ug/L	1		12/13/18 14:48
Manganese	225	1.00	0.310	ug/L	1		12/13/18 14:48
Potassium	7050	500	150	ug/L	1		12/13/18 14:48
Sodium	78100	500	150	ug/L	1		12/13/18 14:48

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:48
 Container ID: 1186919005-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	220000	5000	5000	ug/L	1		12/13/18 14:48

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:48
 Container ID: 1186919005-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-408

Client Sample ID: **PW-408**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919005
 Lab Project ID: 1186919

Collection Date: 12/08/18 17:06
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2580 J	4120	1030	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919005-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	127000	2000	500	ug/L	10		12/18/18 14:52
Fluoride	125 J	200	50.0	ug/L	1		12/14/18 20:40
Sulfate	13400	200	50.0	ug/L	1		12/14/18 20:40

Batch Information

Analytical Batch: WIC5858
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/18/18 14:52
 Container ID: 1186919005-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 20:40
 Container ID: 1186919005-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	2530	1000	400	ug/L	1		12/14/18 04:16

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 04:16
 Container ID: 1186919005-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-408

Client Sample ID: **PW-408**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919005
 Lab Project ID: 1186919

Collection Date: 12/08/18 17:06
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	217000	10000	2500	ug/L	1		12/12/18 12:57

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:57
 Container ID: 1186919005-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Conductivity	845	1.00	0.477	umhos/cm	1		12/12/18 12:57

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:57
 Container ID: 1186919005-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	13800	2220	689	ug/L	1		12/13/18 15:02

Batch Information

Analytical Batch: STS6110
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:02
 Container ID: 1186919005-D

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 12:57

Results of PW-408

Client Sample ID: **PW-408**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919005
 Lab Project ID: 1186919

Collection Date: 12/08/18 17:06
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 12:57
 Container ID: 1186919005-A

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Ammonia-N	0.274	0.100	0.0310	mg/L	1		12/12/18 15:42

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 15:42
 Container ID: 1186919005-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 Prep Initial Wt./Vol.: 6 mL
 Prep Extract Vol: 6 mL

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Total Nitrate/Nitrite-N	50.0 U	100	25.0	ug/L	2		12/14/18 13:25

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:25
 Container ID: 1186919005-H

<u>Parameter</u>	<u>Result</u> <u>Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> <u>Limits</u>	<u>Date Analyzed</u>
Sulfide	50.0 U	100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919005-G

Results of PW-408

Client Sample ID: **PW-408**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919005
 Lab Project ID: 1186919

Collection Date: 12/08/18 17:06
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	455000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919005-A

Results of PW-200

Client Sample ID: **PW-200**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919006
 Lab Project ID: 1186919

Collection Date: 12/09/18 11:01
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Metals by ICP/MS

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Calcium	64900	500	150	ug/L	1		12/13/18 14:51
Chromium	1.00 U	2.00	0.780	ug/L	1		12/13/18 14:51
Iron	2440	250	78.0	ug/L	1		12/13/18 14:51
Magnesium	9700	50.0	15.0	ug/L	1		12/13/18 14:51
Manganese	339	1.00	0.310	ug/L	1		12/13/18 14:51
Potassium	6110	500	150	ug/L	1		12/13/18 14:51
Sodium	51300	500	150	ug/L	1		12/13/18 14:51

Batch Information

Analytical Batch: MMS10392
 Analytical Method: EP200.8
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:51
 Container ID: 1186919006-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Hardness as CaCO3	202000	5000	5000	ug/L	1		12/13/18 14:51

Batch Information

Analytical Batch: MMS10392
 Analytical Method: SM21 2340B
 Analyst: DSH
 Analytical Date/Time: 12/13/18 14:51
 Container ID: 1186919006-I

Prep Batch: MXX32143
 Prep Method: E200.2
 Prep Date/Time: 12/12/18 11:20
 Prep Initial Wt./Vol.: 20 mL
 Prep Extract Vol: 50 mL

Results of PW-200

Client Sample ID: **PW-200**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919006
 Lab Project ID: 1186919

Collection Date: 12/09/18 11:01
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Oil & Grease HEM	2980 J	4260	1060	ug/L	1		12/13/18 09:18

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Analyst: EWW
 Analytical Date/Time: 12/13/18 09:18
 Container ID: 1186919006-E

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Chloride	68200	1000	250	ug/L	5		12/15/18 00:27
Fluoride	126 J	200	50.0	ug/L	1		12/14/18 21:37
Sulfate	9050	200	50.0	ug/L	1		12/14/18 21:37

Batch Information

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/15/18 00:27
 Container ID: 1186919006-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

Analytical Batch: WIC5857
 Analytical Method: EPA 300.0
 Analyst: DMM
 Analytical Date/Time: 12/14/18 21:37
 Container ID: 1186919006-A

Prep Batch: WXX12657
 Prep Method: METHOD
 Prep Date/Time: 12/14/18 16:30
 Prep Initial Wt./Vol.: 10 mL
 Prep Extract Vol: 10 mL

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Organic Carbon	2200	1000	400	ug/L	1		12/14/18 04:37

Batch Information

Analytical Batch: WTC2879
 Analytical Method: SM 5310B
 Analyst: VDL
 Analytical Date/Time: 12/14/18 04:37
 Container ID: 1186919006-C

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
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Print Date: 12/27/2018 1:32:24PM

J flagging is activated

Results of PW-200

Client Sample ID: **PW-200**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919006
 Lab Project ID: 1186919

Collection Date: 12/09/18 11:01
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Alkalinity	232000	10000	2500	ug/L	1		12/12/18 13:08

Batch Information

Analytical Batch: WTI5077
 Analytical Method: SM21 2320B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 13:08
 Container ID: 1186919006-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Conductivity	689	1.00	0.477	umhos/cm	1		12/12/18 13:08

Batch Information

Analytical Batch: WTI5078
 Analytical Method: SM21 2510B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 13:08
 Container ID: 1186919006-A

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Suspended Solids	5630	971	301	ug/L	1		12/13/18 15:02

Batch Information

Analytical Batch: STS6110
 Analytical Method: SM21 2540D
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:02
 Container ID: 1186919006-D

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
pH	7.6	0.100	0.100	pH units	1		12/12/18 13:08

Results of PW-200

Client Sample ID: **PW-200**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919006
 Lab Project ID: 1186919

Collection Date: 12/09/18 11:01
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department

Batch Information

Analytical Batch: WTI5076
 Analytical Method: SM21 4500-H B
 Analyst: DMM
 Analytical Date/Time: 12/12/18 13:08
 Container ID: 1186919006-A

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Ammonia-N	0.120		0.100	0.0310	mg/L	1		12/12/18 16:07

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Analyst: DMM
 Analytical Date/Time: 12/12/18 16:07
 Container ID: 1186919006-H

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/18 14:50
 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	31.6 J		100	25.0	ug/L	2		12/14/18 13:26

Batch Information

Analytical Batch: WFI2779
 Analytical Method: SM21 4500NO3-F
 Analyst: EWW
 Analytical Date/Time: 12/14/18 13:26
 Container ID: 1186919006-H

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Sulfide	50.0 U		100	31.0	ug/L	1		12/13/18 15:59

Batch Information

Analytical Batch: WAT11299
 Analytical Method: SM23 4500S D
 Analyst: EWW
 Analytical Date/Time: 12/13/18 15:59
 Container ID: 1186919006-G

Results of PW-200

Client Sample ID: **PW-200**
 Client Project ID: **101543-001 Gustavus PFAS**
 Lab Sample ID: 1186919006
 Lab Project ID: 1186919

Collection Date: 12/09/18 11:01
 Received Date: 12/10/18 16:50
 Matrix: Water (Surface, Eff., Ground)
 Solids (%):
 Location:

Results by Waters Department (Provisional Cert for TDS)

<u>Parameter</u>	<u>Result Qual</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable Limits</u>	<u>Date Analyzed</u>
Total Dissolved Solids	379000	10000	3100	ug/L	1		12/13/18 15:20

Batch Information

Analytical Batch: STS6111
 Analytical Method: SM21 2540C
 Analyst: DMM
 Analytical Date/Time: 12/13/18 15:20
 Container ID: 1186919006-A

Method Blank

Blank ID: MB for HBN 1789682 [MXX/32143]
Blank Lab ID: 1491043

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EP200.8

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Calcium	250U	500	150	ug/L
Chromium	1.00U	2.00	0.780	ug/L
Iron	125U	250	78.0	ug/L
Magnesium	25.0U	50.0	15.0	ug/L
Manganese	0.500U	1.00	0.310	ug/L
Potassium	250U	500	150	ug/L
Sodium	250U	500	150	ug/L

Batch Information

Analytical Batch: MMS10392
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 12/13/2018 12:54:32PM

Prep Batch: MXX32143
Prep Method: E200.2
Prep Date/Time: 12/12/2018 11:20:30AM
Prep Initial Wt./Vol.: 20 mL
Prep Extract Vol: 50 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [MXX32143]

Blank Spike Lab ID: 1491044

Date Analyzed: 12/13/2018 13:00

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EP200.8

Blank Spike (ug/L)				
Parameter	Spike	Result	Rec (%)	CL
Calcium	10000	9750	98	(85-115)
Chromium	400	403	101	(85-115)
Iron	5000	4820	96	(85-115)
Magnesium	10000	10000	100	(85-115)
Manganese	500	503	101	(85-115)
Potassium	10000	9810	98	(85-115)
Sodium	10000	10200	102	(85-115)

Batch Information

Analytical Batch: MMS10392

Analytical Method: EP200.8

Instrument: Perkin Elmer Nexlon P5

Analyst: DSH

Prep Batch: MXX32143

Prep Method: E200.2

Prep Date/Time: 12/12/2018 11:20

Spike Init Wt./Vol.: 10000 ug/L Extract Vol: 50 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1491047
MS Sample ID: 1491048 MS
MSD Sample ID:

Analysis Date: 12/13/2018 13:51
Analysis Date: 12/13/2018 13:54
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EP200.8

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Calcium	219J	10000	9650	94				70-130		
Chromium	1.00U	400	408	102				70-130		
Iron	93.1J	5000	5010	98				70-130		
Magnesium	77.0	10000	10200	101				70-130		
Manganese	2.25	500	503	100				70-130		
Potassium	179J	10000	10100	100				70-130		
Sodium	120000	10000	130000	99				70-130		

Batch Information

Analytical Batch: MMS10392
Analytical Method: EP200.8
Instrument: Perkin Elmer Nexlon P5
Analyst: DSH
Analytical Date/Time: 12/13/2018 1:54:24PM

Prep Batch: MX32143
Prep Method: DW Digest for Metals on ICP-MS
Prep Date/Time: 12/12/2018 11:20:30AM
Prep Initial Wt./Vol.: 20.00mL
Prep Extract Vol: 50.00mL

Print Date: 12/27/2018 1:32:30PM

Method Blank

Blank ID: MB for HBN 1789703 [STS/6108]

Blank Lab ID: 1491110

QC for Samples:

1186919001

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Suspended Solids	500U	1000	310	ug/L

Batch Information

Analytical Batch: STS6108

Analytical Method: SM21 2540D

Instrument:

Analyst: DMM

Analytical Date/Time: 12/12/2018 5:11:12PM

Duplicate Sample Summary

Original Sample ID: 1186919001

Duplicate Sample ID: 1491113

QC for Samples:

1186919001

Analysis Date: 12/12/2018 17:11

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	14000	13778	ug/L	1.60	(< 5)

Batch Information

Analytical Batch: STS6108

Analytical Method: SM21 2540D

Instrument:

Analyst: DMM

Print Date: 12/27/2018 1:32:33PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [STS6108]
 Blank Spike Lab ID: 1491111
 Date Analyzed: 12/12/2018 17:11

Spike Duplicate ID: LCSD for HBN 1186919 [STS6108]
 Spike Duplicate Lab ID: 1491112
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001

Results by SM21 2540D

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Suspended Solids	25000	24100	96	25000	24900	100	(75-125)	3.30	(< 5)

Batch Information

Analytical Batch: STS6108
 Analytical Method: SM21 2540D
 Instrument:
 Analyst: DMM

Print Date: 12/27/2018 1:32:34PM

Method Blank

Blank ID: MB for HBN 1789703 [STS/611] L
Blank ba4 ID: 1091311

QC for Samples:
1186919]] t i 1186919]] 3i 1186919]] 0i 1186919]] xi 1186919]] 6

MaWu: c aW,SErfa. ei Gffd) roEnRy

UesEW40SM21 2540D

<u>5aramewr</u>	<u>UesEW</u>	<u>bg Q/Cb</u>	<u>Db</u>	<u>PnW</u>
ToW SEspenPeR Sol(Rs	x]] P	1]]]	31]	EA/b

Batch Information

hnaQW/al BaW2: STS611]
hnaQW/al MeWoR: Smt 1 t x0] D
InsWEmenW
hnaQW DMM
hnaQW/al DaW/T(me: 1t/13/t] 18 3:] t:375M

5r(nVDAW: 1t/t 7/t] 18 1:3t:3x5M

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t]] c esV6oW Dr(ve hn. 2oraAei hK 9xx18
t 9] 7d6t d 303 f 9] 7d61d3] 1 www.EsdAsd om

Mem4er of S) S) roEp

Duplicate Sample Summary

Original Sample ID: 1186919005

Duplicate Sample ID: 1491314

QC for Samples:

1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Analysis Date: 12/13/2018 15:02

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	13800	12889	ug/L	6.70*	(< 5)

Batch Information

Analytical Batch: STS6110

Analytical Method: SM21 2540D

Instrument:

Analyst: DMM

Print Date: 12/27/2018 1:32:36PM

Duplicate Sample Summary

Original Sample ID: 1186953007

Duplicate Sample ID: 1491315

QC for Samples:

1186919006

Analysis Date: 12/13/2018 15:02

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2540D

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Total Suspended Solids	34000	40000	ug/L	16.20*	(< 5)

Batch Information

Analytical Batch: STS6110

Analytical Method: SM21 2540D

Instrument:

Analyst: DMM

Print Date: 12/27/2018 1:32:36PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [STS6110]
 Blank Spike Lab ID: 1491t 1A
 Daye z nald2e/ : 1A71t 7A018 1u:0A

Spike DcpliRye ID: LCSD for HBN 1186919
 [STS6110]

Spike DcpliRye Lab ID: 1491t 1t
 x ayriW (aye ,ScrfaRe ffE) rocn/ P

5 C for Sa%pleM 118691900AE118691900t E1186919004E118691900uE1186919006

s eMtyMbd **SM21 2540D**

	Blank Spike ,cQLP			Spike DcpliRye ,cQLP					
<u>marayey</u>	<u>Spike</u>	<u>s eMty</u>	<u>s eR.g P</u>	<u>Spike</u>	<u>s eMty</u>	<u>s eR.g P</u>	<u>CL</u>	<u>s mD .g P</u>	<u>s mD CL</u>
Total ScMpen/ e/ Soli/ M	Au000	A4800	99	Au000	Au600	10A	, - u<1Au P	t 00	,3 u P

Batch Information

z naldyPal BayRh: **STS6110**
 z naldyPal x eyho/ : **SM21 2540D**
 InMrc%eny
 z naldM: **DMM**

minyDaye: 1A7A- 7A018 1:1At -mx

Method Blank

Blank ID: MB for HBN 1789703 [STS/6111]
Blank Lab ID: 1491Q49

MaWu: c aW,SErfa. sxGffdk) roEnRy

Cm for Sap elst:

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Ust EWbOSM21 2540C

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ToW D(t t olAsR Sol(Rt

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Batch Information

2nalQW/al BaW: STS6111

2nalQW/al MsWoR SM31 304i m

Int WEp snW

2nalQ W DMM

2nalQW/al DaW/T(p s: 13/1Q3i 18 Q3i :045M

5r(nWDaW: 13/37/3i 18 1:Q3:Q85M

S) S NorW 2p sr(. a In. d

3i i c st V6oW Dr(As 2n. vorahsx2K 90018

t 9i 70630Q4Qf 9i 70610Q 1 wwwEt d ht d op

Msp bsr of S) S) roEe

Duplicate Sample Summary

Original Sample ID: 118690ucc1

Dt pli4a3e Sample ID: 1A91u0y

QC for Sample/ :

1186919cc1, 1186919ccy, 1186919ccu, 1186919ccA, 1186919cc0, 1186919cc6

s nal2/ i/ Da3e: 1y7u7yc18 10:yc

Ma3ix: Wa3er (St rfa4e, Eff., Grot nd)

Re/ t l3 b2 **SM21 2540C**

<u>NsME</u>	<u>Original</u>	<u>Dt pli4a3e</u>	<u>Uni3</u>	<u>RPD (%)</u>	<u>RPD CL</u>
<o3al Di/ / ol5ed Solid/	1uyccc	1uTccc	t g7L	u.Tc	(B 0)

Batch Information

s nal234al ha3iv: S<S6111

s nal234al Me3rod: SMY1 y0AcC

In/ 3t men3

s nal2/ 3 DMM

Prin3Da3e: 1y7u7yc18 1:uy:u9PM

SGS Nor3v s meri4a In4.

ycc We/ 3Po3er Dri5e s n4vorage, s K 90018

t 9cT.06y.yuAu f 9cT.061.0uc1 www.t / . / g/ .4om

Member of SGS Grot p

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [STS61110
Blank Spike La] ID: 1b914t A
Daye z nald2e/ : 17u14u7A18 1t:7A

Spike DcpliRye ID: LCSD for HBN 1186919
[STS61110
Spike DcpliRye La] ID: 1b914t 1
x ayriW (aye ,ScrfaRe ffE) rocn/ P

5 C for Sa%pleM 1186919AA1E1186919AA7E1186919AA4E1186919AAbE1186919AAt E1186919AA6

s eMtyM] d **SM21 2540C**

	Blank Spike ,cQLP			Spike DcpliRye ,cQLP					
<u>mara%eyer</u>	<u>Spike</u>	<u>s eMty</u>	<u>s eR.g P</u>	<u>Spike</u>	<u>s eMty</u>	<u>s eR.g P</u>	<u>CL</u>	<u>s mD .g P</u>	<u>s mD CL</u>
Total DiMbl-e/ Soli/ M	44AAAA	7<AAAA	87	44AAAA	76bAAA	8A	, <t 317t P	7GA	,h t P

Batch Information

z naldyPal BayRv: **STS6111**
z naldyPal x eyvo/ : **SM21 2540C**
InMrc%eny
z naldM: **DMM**

minyDaye: 17u14u7A18 1:47:bAnx

S) S Nory z %eriPa InRG

7AA (eMmoyer Dri-e z nRvoraQeEz K 9t t 18
t 9A<G67G4b4 f 9A<G61G4A1 www.GMCMQb%

x e%] er of S) S) rocp

Method Blank

Blank ID: MB for HBN 1789717 [THOG/1253]
Blank Lab ID: 1491183

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 1664B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Oil & Grease HEM	1900J	4000	1000	ug/L

Batch Information

Analytical Batch: THOG1253
Analytical Method: EPA 1664B
Instrument:
Analyst: EWW
Analytical Date/Time: 12/13/2018 9:18:43AM

Print Date: 12/27/2018 1:32:40PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [THOG1253]
 Blank Spike Lab ID: 1491184
 Date Analyzed: 12/13/2018 09:18

Spike Duplicate ID: LCSD for HBN 1186919 [THOG1253]
 Spike Duplicate Lab ID: 1491185
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 1664B

Parameter	Blank Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Oil & Grease HEM	40000	34100	85	40000	36400	91	(78-114)	6.50	(< 18)

Batch Information

Analytical Batch: THOG1253
 Analytical Method: EPA 1664B
 Instrument:
 Analyst: EWW

Matrix Spike Summary

Original Sample ID: 1491191
MS Sample ID: 1491192 MS
MSD Sample ID:

Analysis Date: 12/13/2018 9:18
Analysis Date: 12/13/2018 9:18
Analysis Date:
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 1664B

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Oil & Grease HEM	2150J	42100	40000	90				78-114		

Batch Information

Analytical Batch: THOG1253
Analytical Method: EPA 1664B
Instrument:
Analyst: EWW
Analytical Date/Time: 12/13/2018 9:18:43AM

Print Date: 12/27/2018 1:32:42PM

Method Blank

Blank ID: MB for HBN 1789756 [WAT/11299]
Blank Lab ID: 1491371

Matrix: Drinking Water

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM23 4500S D

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Sulfide	50.0U	100	31.0	ug/L

Batch Information

Analytical Batch: WAT11299
Analytical Method: SM23 4500S D
Instrument:
Analyst: EWW
Analytical Date/Time: 12/13/2018 3:59:00PM

Print Date: 12/27/2018 1:32:43PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WAT11299]

Blank Spike Lab ID: 1491372

Date Analyzed: 12/13/2018 15:59

Matrix: Drinking Water

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM23 4500S D

Blank Spike (ug/L)				
Parameter	Spike	Result	Rec (%)	CL
Sulfide	499	550	110	(75-125)

Batch Information

Analytical Batch: WAT11299

Analytical Method: SM23 4500S D

Instrument:

Analyst: EWW

Print Date: 12/27/2018 1:32:44PM

Matrix Spike Summary

Original Sample ID: 1186919003
MS Sample ID: 1491373 MS
MSD Sample ID: 1491374 MSD

Analysis Date: 12/13/2018 15:59
Analysis Date: 12/13/2018 15:59
Analysis Date: 12/13/2018 15:59
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM23 4500S D

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Sulfide	50.0U	499	530	106	499	530	106	75-125	0.00	(< 25)

Batch Information

Analytical Batch: WAT11299
Analytical Method: SM23 4500S D
Instrument:
Analyst: EWW
Analytical Date/Time: 12/13/2018 3:59:00PM

Print Date: 12/27/2018 1:32:45PM

Method Blank

Blank ID: MB for HBN 1789818 (WFI/2779)
Blank Lab ID: 1491667

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Nitrate-N	50.0U	100	25.0	ug/L
Nitrite-N	75.4J	100	25.0	ug/L
Total Nitrate/Nitrite-N	33.8J	100	25.0	ug/L

Batch Information

Analytical Batch: WFI2779

Analytical Method: SM21 4500NO3-F

Instrument: Astoria segmented flow

Analyst: EWW

Analytical Date/Time: 12/14/2018 12:17:25PM

Method Blank

Blank ID: MB for HBN 1789818 (WFI/2779)
Blank Lab ID: 1491669

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Nitrate-N	50.0U	100	25.0	ug/L
Nitrite-N	50.0U	100	25.0	ug/L
Total Nitrate/Nitrite-N	50.0U	100	25.0	ug/L

Batch Information

Analytical Batch: WFI2779
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 12/14/2018 2:40:25PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WFI2779]

Blank Spike Lab ID: 1491653

Date Analyzed: 12/14/2018 12:15

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Nitrate-N	2500	4880	195 *	(70-130)
Nitrite-N	2500	0	0 *	(90-110)
Total Nitrate/Nitrite-N	5000	4880	98	(90-110)

Batch Information

Analytical Batch: WFI2779

Analytical Method: SM21 4500NO3-F

Instrument: Astoria segmented flow

Analyst: EWW

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WFI2779]

Blank Spike Lab ID: 1491668

Date Analyzed: 12/14/2018 14:38

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Nitrate-N	2500	4530	181 *	(70-130)
Nitrite-N	2500	0	0 *	(90-110)
Total Nitrate/Nitrite-N	5000	4530	91	(90-110)

Batch Information

Analytical Batch: WFI2779

Analytical Method: SM21 4500NO3-F

Instrument: Astoria segmented flow

Analyst: EWW

Matrix Spike Summary

Original Sample ID: 1186919002
MS Sample ID: 1491649 MS
MSD Sample ID: 1491650 MSD

Analysis Date: 12/14/2018 13:16
Analysis Date: 12/14/2018 13:18
Analysis Date: 12/14/2018 13:19
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Nitrate/Nitrite-N	50.0U	5000	5470	109	5000	5550	111 *	90-110	1.40	(< 25)

Batch Information

Analytical Batch: WFI2779
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 12/14/2018 1:18:10PM

Print Date: 12/27/2018 1:32:47PM

Matrix Spike Summary

Original Sample ID: 1186953009
MS Sample ID: 1491651 MS
MSD Sample ID: 1491652 MSD

Analysis Date: 12/14/2018 14:43
Analysis Date: 12/14/2018 14:45
Analysis Date: 12/14/2018 14:47
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500NO3-F

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Nitrate/Nitrite-N	87.6J	5000	5070	100	5000	4880	96	90-110	3.90	(< 25)

Batch Information

Analytical Batch: WFI2779
Analytical Method: SM21 4500NO3-F
Instrument: Astoria segmented flow
Analyst: EWW
Analytical Date/Time: 12/14/2018 2:45:40PM

Print Date: 12/27/2018 1:32:47PM

Method Blank

Blank ID: MB for HBN 1789782 [WTC/2879]
Blank Lab ID: 1491514

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM 5310B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Total Organic Carbon	500U	1000	400	ug/L

Batch Information

Analytical Batch: WTC2879
Analytical Method: SM 5310B
Instrument: TOC Analyzer
Analyst: VDL
Analytical Date/Time: 12/13/2018 11:53:46PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTC2879]

Blank Spike Lab ID: 1491512

Date Analyzed: 12/13/2018 23:38

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM 5310B

Parameter	Blank Spike (ug/L)			CL
	Spike	Result	Rec (%)	
Total Organic Carbon	75000	66800	89	(80-120)

Batch Information

Analytical Batch: WTC2879

Analytical Method: SM 5310B

Instrument: TOC Analyzer

Analyst: VDL

Print Date: 12/27/2018 1:32:49PM

Matrix Spike Summary

Original Sample ID: 1186953019
MS Sample ID: 1491507 MS
MSD Sample ID: 1491508 MSD

Analysis Date: 12/14/2018 0:13
Analysis Date: 12/14/2018 0:32
Analysis Date: 12/14/2018 0:57
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM 5310B

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Total Organic Carbon	1020	10000	10300	93	10000	10300	93	75-125	0.29	(< 25)

Batch Information

Analytical Batch: WTC2879
Analytical Method: SM 5310B
Instrument: TOC Analyzer
Analyst: VDL
Analytical Date/Time: 12/14/2018 12:32:36AM

Print Date: 12/27/2018 1:32:50PM

Duplicate Sample Summary

Original Sample ID: 1186919001

Duplicate Sample ID: 1491213

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Analysis Date: 12/12/2018 12:06

Matrix: Water (Surface, Eff., Ground)

Results by SM21 4500-H B

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
pH	7.6	7.60	pH units	0.00	(< 5)

Batch Information

Analytical Batch: WTI5076

Analytical Method: SM21 4500-H B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:51PM

Duplicate Sample Summary

Original Sample ID: 1186919004

Duplicate Sample ID: 1491214

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Analysis Date: 12/12/2018 12:47

Matrix: Water (Surface, Eff., Ground)

Results by SM21 4500-H B

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
pH	7.6	7.60	pH units	0.00	(< 5)

Batch Information

Analytical Batch: WTI5076

Analytical Method: SM21 4500-H B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:51PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTI5076]

Blank Spike Lab ID: 1491210

Date Analyzed: 12/12/2018 10:16

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500-H B

Blank Spike (pH units)

<u>Parameter</u>	<u>Spike</u>	<u>Result</u>	<u>Rec (%)</u>	<u>CL</u>
pH	7	7.04	101	(99-101)

Batch Information

Analytical Batch: WTI5076

Analytical Method: SM21 4500-H B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:53PM

Method Blank

Blank ID: MB for HBN 1789726 [WTI/5077]
Blank Lab ID: 1491242

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 2320B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Alkalinity	2840J	10000	2500	ug/L

Batch Information

Analytical Batch: WTI5077
Analytical Method: SM21 2320B
Instrument: Titration
Analyst: DMM
Analytical Date/Time: 12/12/2018 11:29:00AM

Print Date: 12/27/2018 1:32:54PM

Method Blank

Blank ID: MB for HBN 1789726 [WTI/5077]
Blank Lab ID: 1491247

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 2320B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Alkalinity	5000U	10000	2500	ug/L

Batch Information

Analytical Batch: WTI5077
Analytical Method: SM21 2320B
Instrument: Titration
Analyst: DMM
Analytical Date/Time: 12/12/2018 2:57:18PM

Duplicate Sample Summary

Original Sample ID: 1186919001

Duplicate Sample ID: 1491245

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004

Analysis Date: 12/12/2018 12:06

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2320B

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Alkalinity	224000	219430	ug/L	1.90	(< 25)

Batch Information

Analytical Batch: WTI5077

Analytical Method: SM21 2320B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:55PM

Duplicate Sample Summary

Original Sample ID: 1186919004

Duplicate Sample ID: 1491246

QC for Samples:

1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Analysis Date: 12/12/2018 12:47

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2320B

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Alkalinity	257000	269400	ug/L	4.70	(< 25)

Batch Information

Analytical Batch: WTI5077

Analytical Method: SM21 2320B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:55PM

Duplicate Sample Summary

Original Sample ID: 1186953001

Duplicate Sample ID: 1491249

QC for Samples:

1186919005, 1186919006

Analysis Date: 12/12/2018 15:24

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2320B

<u>NAME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Alkalinity	81400	80360	ug/L	1.20	(< 25)

Batch Information

Analytical Batch: WT15077

Analytical Method: SM21 2320B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:32:55PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTI5077]

Blank Spike Lab ID: 149124t

Date ynalzde/ : 12/2/2018 11:21

x aAi(: WaAer cSMfa, eE. ffE) roMh/ P

- C for Sa%pleu: 1186919001E1186919002E118691900t E1186919004E1186919005E1186919006

s euMA bz **SM21 2320B**

Blank Spike dVRP

<u>maraeAer</u>	<u>Spike</u>	<u>s euMA</u>	<u>s.e. cQP</u>	<u>CL</u>
y lkaliniA	250000	217000	87	c85h115 P

Batch Information

y nalzA, al BaAv: **WTI5077**

y nalzA, al x eAo/ : **SM21 2320B**

InuAM%enA **Titration**

y nalzuA **DMM**

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTI5077]

Blank Spike Lab ID: 1491248

Date ynalzde/ : 12/2/2018 15:06

x aAi(: WaAer cSMfa, eE. ffE) roMh/ P

- C for Sa%pleu: 1186919001E1186919002E118691900t E1186919004E1186919005E1186919006

s euMA bz **SM21 2320B**

Blank Spike dVRP

<u>maraeAer</u>	<u>Spike</u>	<u>s euMA</u>	<u>s.e. cQP</u>	<u>CL</u>
y lkaliniA	250000	216000	86	c85h115 P

Batch Information

y nalzA, al BaAv: **WTI5077**

y nalzA, al x eAo/ : **SM21 2320B**

InuAM%enA **Titration**

y nalzuA **DMM**

Method Blank

Blank ID: MB for HBN 1789728 [WTI/5078]
Blank Lab ID: 1491254

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 2510B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Conductivity	2.30*	1.00	0.477	umhos/cm

Batch Information

Analytical Batch: WTI5078
Analytical Method: SM21 2510B
Instrument: Titration
Analyst: DMM
Analytical Date/Time: 12/12/2018 11:29:00AM

Print Date: 12/27/2018 1:32:57PM

Method Blank

Blank ID: MB for HBN 1789728 [WTI/5078]

Blank Lab ID: 1491259

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Matrix: Water (Surface, Eff., Ground)

Results by SM21 2510B

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Conductivity	0.800J	1.00	0.477	umhos/cm

Batch Information

Analytical Batch: WTI5078

Analytical Method: SM21 2510B

Instrument: Titration

Analyst: DMM

Analytical Date/Time: 12/12/2018 2:57:18PM

Print Date: 12/27/2018 1:32:57PM

Duplicate Sample Summary

Original Sample ID: 1186919001

Duplicate Sample ID: 14913Ay

QC for Sample/ :

1186919001, 1186919003, 118691900T, 1186919004

Sample ID: 137137018 13:06

Matrix: Water (Surface, Eff., Ground)

Re/ ult/ b2 **SM21 2510B**

<u>NsME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Unit/</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Conductivity	883	883	um5o/ 7cm	0.0T	(B 30)

Batch Information

Sample ID: WvIA0y8

Sample ID: SM31 3A10h

Instrument: vitration

Sample ID: DMM

Print Date: 137137018 1:13:4yPM

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190y.A63.3T4T 190y.A61.AT01 www.sgs.com

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Duplicate Sample Summary

Original Sample ID: 1186919004

Duplicate Sample ID: 14913A8

QC for Sample/ :

1186919003, 118691900T, 1186919004, 118691900A, 1186919006

Sample ID: 137137018 13:4y

Matrix: Water (Surface, Eff., Ground)

Re/ ult/ b2 **SM21 2510B**

<u>NsME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Unit/</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Conductivity	A93	A91	um5o/ 7cm	0.14	(B 30)

Batch Information

Sample ID: WvIA0y8

Sample ID: SM31 3A10h

Instrument: vitration

Sample ID: DMM

Print Date: 137137018 1:13:4yPM

Duplicate Sample Summary

Original Sample ID: 11869AT001
 Duplicate Sample ID: 1491363
 QC for Sample/ :
 118691900A, 1186919006

Sample ID: 137137018 1A:34
 Matrix: Water (Surface, Eff., Ground)

Re/ ult/ b2 **SM21 2510B**

<u>NsME</u>	<u>Original</u>	<u>Duplicate</u>	<u>Unit/</u>	<u>RPD (%)</u>	<u>RPD CL</u>
Conductivity	3T4	3TT	um5o/ 7cm	0.09	(B 30)

Batch Information

Sample ID: WvIA0y8
 Sample ID: SM31 3A10h
 Instrument: vitration
 Sample ID: DMM

Print Date: 137137018 1:13:45PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTI5078]

Blank Spike Lab ID: 1491255

Date Analyzed: 12/12/2018 10:48

Matrix: Water (Surface, Eff., Ground)

3 C for Samples: 1186919001, 1186919002, 118691900- , 1186919004, 1186919005, 1186919006

Results by SM21 2510B

Parameter	Blank Spike (umQs/cm)			CL
	Spike	Result	Rec (%)	
Conductihity	9.8-	9.50	97	(90v110)

Batch Information

Analytical BatcQ WTI5078

Analytical MetQod: SM21 2510B

Instrument: Titration

Analyst: DMM

Print Date: 12/27/2018 1:- 2:59PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WTI5078]

Blank Spike Lab ID: 1491260

Date Analyzed: 12/12/2018 14:- -

Matrix: Water (Surface, Eff., Ground)

3 C for Samples: 1186919001, 1186919002, 118691900- , 1186919004, 1186919005, 1186919006

Results by SM21 2510B

Parameter	Blank Spike (umQs/cm)			CL
	Spike	Result	Rec (%)	
Conductihity	9.8-	9.60	98	(90v110)

Batch Information

Analytical BatcQ WTI5078

Analytical MetQod: SM21 2510B

Instrument: Titration

Analyst: DMM

Method Blank

Blank ID: MB for HBN 1789772 [WXX/12655]
Blank Lab ID: 1491431

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500-NH3 G

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
Ammonia-N	0.0500U	0.100	0.0310	mg/L

Batch Information

Analytical Batch: WDA4471
Analytical Method: SM21 4500-NH3 G
Instrument: Discrete Analyzer 2
Analyst: DMM
Analytical Date/Time: 12/12/2018 3:37:32PM

Prep Batch: WXX12655
Prep Method: METHOD
Prep Date/Time: 12/12/2018 2:50:00PM
Prep Initial Wt./Vol.: 6 mL
Prep Extract Vol: 6 mL

Print Date: 12/27/2018 1:33:00PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WXX12655]
 Blank Spike Lab ID: 1491432
 Date Analyzed: 12/12/2018 15:39

Spike Duplicate ID: LCSD for HBN 1186919 [WXX12655]
 Spike Duplicate Lab ID: 1491433
 Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500-NH3 G

Parameter	Blank Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
	Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Ammonia-N	1	1.01	101	1	0.905	91	(75-125)	10.80	(< 25)

Batch Information

Analytical Batch: WDA4471
 Analytical Method: SM21 4500-NH3 G
 Instrument: Discrete Analyzer 2
 Analyst: DMM

Prep Batch: WXX12655
 Prep Method: METHOD
 Prep Date/Time: 12/12/2018 14:50
 Spike Init Wt./Vol.: 1 mg/L Extract Vol: 6 mL
 Dupe Init Wt./Vol.: 1 mg/L Extract Vol: 6 mL

Matrix Spike Summary

Original Sample ID: 1186919005
MS Sample ID: 1491434 MS
MSD Sample ID: 1491435 MSD

Analysis Date: 12/12/2018 15:42
Analysis Date: 12/12/2018 15:44
Analysis Date: 12/12/2018 15:45
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by SM21 4500-NH3 G

Parameter	Sample	Matrix Spike (mg/L)			Spike Duplicate (mg/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Ammonia-N	0.274	1.00	.993	72 *	1.00	1.18	91	75-125	17.50	(< 25)

Batch Information

Analytical Batch: WDA4471
Analytical Method: SM21 4500-NH3 G
Instrument: Discrete Analyzer 2
Analyst: DMM
Analytical Date/Time: 12/12/2018 3:44:15PM

Prep Batch: WXX12655
Prep Method: Ammonia by SM21 4500F prep (W)
Prep Date/Time: 12/12/2018 2:50:00PM
Prep Initial Wt./Vol.: 6.00mL
Prep Extract Vol: 6.00mL

Print Date: 12/27/2018 1:33:02PM

Method Blank

Blank ID: MB for HBN 1789819 [WXX/12657]
Blank Lab ID: 1491670

Matrix: Water (Surface, Eff., Ground)

QC for Samples:

1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 300.0

<u>Parameter</u>	<u>Results</u>	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>
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: WIC5857
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: DMM
Analytical Date/Time: 12/14/2018 5:50:05PM

Prep Batch: WXX12657
Prep Method: METHOD
Prep Date/Time: 12/14/2018 4:30:00PM
Prep Initial Wt./Vol.: 10 mL
Prep Extract Vol: 10 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1186919 [WXX12657]

Blank Spike Lab ID: 1491671

Date Analyzed: 12/14/2018 18:09

Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 300.0

Blank Spike (ug/L)				
Parameter	Spike	Result	Rec (%)	CL
Chloride	5000	4890	98	(90-110)
Fluoride	5000	5000	100	(90-110)
Sulfate	5000	4980	100	(90-110)

Batch Information

Analytical Batch: WIC5857

Analytical Method: EPA 300.0

Instrument: 930 Metrohm compact IC flex

Analyst: DMM

Prep Batch: WXX12657

Prep Method: METHOD

Prep Date/Time: 12/14/2018 16:30

Spike Init Wt./Vol.: 5000 ug/L Extract Vol: 10 mL

Dupe Init Wt./Vol.: Extract Vol:

Matrix Spike Summary

Original Sample ID: 1186950001
MS Sample ID: 1491672 MS
MSD Sample ID: 1491673 MSD

Analysis Date: 12/14/2018 18:27
Analysis Date: 12/14/2018 18:46
Analysis Date: 12/14/2018 19:05
Matrix: Drinking Water

QC for Samples: 1186919001, 1186919002, 1186919003, 1186919004, 1186919005, 1186919006

Results by EPA 300.0

Parameter	Sample	Matrix Spike (ug/L)			Spike Duplicate (ug/L)			CL	RPD (%)	RPD CL
		Spike	Result	Rec (%)	Spike	Result	Rec (%)			
Chloride	2480	5000	7160	94	5000	7260	96	90-110	1.30	(< 15)
Fluoride	205	5000	4980	96	5000	5040	97	90-110	1.20	(< 15)
Sulfate	4930	5000	9430	90 *	5000	9530	92	90-110	1.10	(< 15)

Batch Information

Analytical Batch: WIC5857
Analytical Method: EPA 300.0
Instrument: 930 Metrohm compact IC flex
Analyst: DMM
Analytical Date/Time: 12/14/2018 6:46:54PM

Prep Batch: WXX12657
Prep Method: EPA 300.0 Extraction Waters/Liquids
Prep Date/Time: 12/14/2018 4:30:00PM
Prep Initial Wt./Vol.: 10.00mL
Prep Extract Vol: 10.00mL

Print Date: 12/27/2018 1:33:06PM

1186919

age 1 of 1

SHANNON & WILSON, INC.

Geotechnical and Environmental Consultants

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CHAIN-OF-CUSTODY RECORD

Laboratory 252

Attn: _____

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total Alkalinity	Cl, F, PH	TDS, Sulfate	Conductivity	TOL CHL	Dissolved CHL	Sulfide (NaOH + Zn)	Ammonia Nitrate, Nitrite	Methyl Hg	Speciated Arsenic	PFAS	Total Number of Containers	Remarks/Matrix
PW-406	① A-L	1407	12/7/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	Groundwater
PW-405	② A-L	1043	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-505	③ A-L	1033	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-202	④ A-L	1510	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-408	⑤ A-L	1706	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-200	⑥ A-L	1101	12/9/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	12	

Project Information Project Number: <u>10543-001</u> Project Name: <u>Gustavus PFAS</u> Contact: <u>KRF</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>CAB/APW</u>		Sample Receipt Total Number of Containers: <u>2F</u> COC Seals/Intact? Y/N/NA <u>2F</u> Received Good Cond./Cold <input type="checkbox"/> Delivery Method: _____ (attach shipping bill, if any)		Relinquished By: 1. Signature: _____ Time: <u>12:00</u> Printed Name: <u>Adam Wylborny</u> Date: <u>12/10/18</u> Company: <u>Shannon & Wilson, Inc.</u>		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: <u>Rush</u> Special Instructions: <u>See attached for PFAS and Full list of analytes.</u>				Received By: 1. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: _____ Time: <u>16:50</u> Printed Name: <u>Jillian Vlahovich</u> Date: <u>12/10</u> Company: <u>SGS</u>	

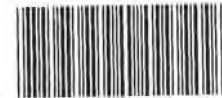
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
 Yellow - w/shipment - for consignee files
 Pink - Shannon & Wilson - Job File

CS: 2F

1: 3.3°C DI

No. 34523

1186919



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CHAIN-OF-CUSTODY RECORD

Laboratory SGS Page 1 of 1
Attn: _____

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total Alkalinity Cl, F, PH	TDS Sulfate Conductivity	TOL (HCL)	TSS	Dissolved Solids (HCL)	Self-Heal N, NH4 + Zn	Metals As, Cd, Cr, Cu, Fe, Hg, Mn, Ni, Pb, Se, V, Zn	Speciated As, Cu, Fe, Hg, Ni, Pb, Se, V, Zn	Total Number of Containers	Remarks/Matrix
PW-406		1407	12/7/2018	X	X	X	X	X	X	X	X	X	X	12	Groundwater
PW-405		1043	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-505		1033	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-202		1510	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-408		1706	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-200		1101	12/9/2018	X	X	X	X	X	X	X	X	X	X	12	

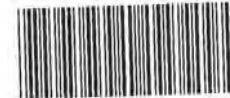
Project Information Project Number: <u>101543-001</u> Project Name: <u>Gustavus PFAS</u> Contact: <u>KRF</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>CAB/APW</u>		Sample Receipt Total Number of Containers: _____ COC Seals/Intact? Y/N/NA: _____ Received Good Cond./Cold: _____ Delivery Method: _____ (attach shipping bill, if any)		Relinquished By: 1. Signature: _____ Time: <u>10:00</u> Printed Name: <u>Adam Wyborny</u> Date: <u>12/10/18</u> Company: <u>Shannon & Wilson</u>		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: <u>Rush</u> Special Instructions: <u>See attached for PFAS and Full list of analytes.</u>				Received By: 1. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: <u>[Signature]</u> Time: <u>10:50</u> Printed Name: <u>JKV</u> Date: _____ Company: _____	

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

CS: 2F 4:1.4 °C D2S

No. 34524

1186919



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CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: _____

Page 1 of 1

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	Total Alkalinity	Cl, F, PH	TDS, Sulfate	Conductivity	TOC, E100	TSS	Dissolved E100	Sulfide E100	Nitrate Nitrite, Ammonia	Molybdate Ascorbic Acid	Specialized Analyte E100	PFAS	Total Number of Containers	Remarks/Matrix
PW-406		1407	12/7/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	Groundwater
PW-405		1043	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-505		1033	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-202		1510	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-408		1706	12/8/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	
PW-200		1101	12/9/2018	X	X	X	X	X	X	X	X	X	X	X	X	X	X	12	

Project Information Project Number: <u>10543-001</u> Project Name: <u>Gustavus PFAS</u> Contact: <u>KRF</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>CAB/APW</u>		Sample Receipt Total Number of Containers: _____ COC Seals/Intact? Y/N/NA: _____ Received Good Cond./Cold: _____ Delivery Method: _____ (attach shipping bill, if any)		Relinquished By: 1. Signature: _____ Time: <u>10:00</u> Printed Name: <u>Adam Wylbarny</u> Date: <u>12/10/18</u> Company: <u>Shannon & Wilson, Inc.</u>		Relinquished By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Relinquished By: 3. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____	
Instructions Requested Turnaround Time: <u>Rush</u> Special Instructions: <u>See attached for PFAS and full list of analytes.</u>		Received By: 1. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 2. Signature: _____ Time: _____ Printed Name: _____ Date: _____ Company: _____		Received By: 3. Signature: <u>[Signature]</u> Time: <u>16:50</u> Printed Name: <u>Jillian Mahovich</u> Date: <u>12/10/18</u> Company: <u>SGS</u>			

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

Page 91 of 148

CS:2F 3.4.6°C D11

No. 34523

1186919



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CHAIN-OF-CUSTODY RECORD

Laboratory JGS Page 1 of 1
Attn: _____

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp. Grab	Total Alkalinity Cl, F, P, H ₂ O	TDS Solids Conductivity	TOL (KCl)	TSS	Gravimetric Losses (KCl)	Swifite (NaOH + Zn)	Wetox + Nitric Ammonia	Metals / Hachman / Hachman	Special Analysis LEDA / PFAS	Total Number of Containers	Remarks/Matrix
PW-406		1407	12/7/2018	X	X	X	X	X	X	X	X	X	X	12	Groundwater
PW-405		1043	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-505		1033	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-202		1510	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-408		1706	12/8/2018	X	X	X	X	X	X	X	X	X	X	12	
PW-200		1101	12/9/2018	X	X	X	X	X	X	X	X	X	X	12	

Project Information		Sample Receipt		Relinquished By: 1.		Relinquished By: 2.		Relinquished By: 3.	
Project Number: <u>101543-001</u>	Total Number of Containers: _____	Signature: _____	Time: <u>10:00</u>	Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____
Project Name: <u>Gustavus PFAS</u>	COC Seals/Intact? Y/N/NA	Printed Name: <u>Adam Wyborny</u>	Date: <u>12/10/18</u>	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____
Contact: <u>KRF</u>	Received Good Cond./Cold	Company: <u>Shannon & Wilson</u>		Company: _____		Company: _____		Company: _____	
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Delivery Method: _____								
Sampler: <u>CAB/APW</u>	(attach shipping bill, if any)								
Instructions		Received By: 1.		Received By: 2.		Received By: 3.			
Requested Turnaround Time: <u>Rush</u>		Signature: _____	Time: _____	Signature: _____	Time: _____	Signature: _____	Time: _____		
Special Instructions: <u>See attached for PFAS and Full list of analytes.</u>		Printed Name: _____	Date: _____	Printed Name: _____	Date: _____	Printed Name: _____	Date: _____		
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - w/shipment - for consignee files Pink - Shannon & Wilson - Job File		Company: _____		Company: _____		Company: _____			

Page 92 of 148

Parameter	Units
Per- and Polyfluoroalkyl Substances	
4:2 Fluorotelomer sulfonate (4:2 FTS)	ng/l
6:2 Fluorotelomer sulfonate (6:2 FTS)	ng/l
8:2 Fluorotelomer sulfonate (8:2 FTS)	ng/l
n-Ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ng/l
n-Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)	ng/l
Perfluorobutane sulfonate (PFBS)	ng/l
Perfluorobutanoic acid (PFBA)	ng/l
Perfluorodecane sulfonate (PFDS)	ng/l
Perfluorodecanoic acid (PFDA)	ng/l
Perfluorododecanoic acid (PFDoA / PFDoDA)	ng/l
Perfluoroheptane sulfonate (PFHpS)	ng/l
Perfluoroheptanoic acid (PFHpA)	ng/l
Perfluorohexane sulfonate (PFHxS)	ng/l
Perfluorohexanoic acid (PFHxA)	ng/l
Perfluorononanesulfonate (PFNS)	ng/l
Perfluorononanoic acid (PFNA)	ng/l
Perfluorooctanesulfonamide (PFOSA / FOSA)	ng/l
Perfluorooctanesulfonate (PFOS)	ng/l
Perfluorooctanoic acid (PFOA)	ng/l
Perfluoropentanoic acid (PFPeA)	ng/l
Perfluoropentansulfonate (PFPeS)	ng/l
Perfluorotetradecanoic acid (PFTA / PFTeDA / PFTeA)	ng/l
Perfluorotridecanoic acid (PFTrDA / PFTrA)	ng/l
Perfluoroundecanoic acid (PFUnA / PFUnDA)	ng/l
General Parameters	
Alkalinity, total, as CaCO ₃	mg/l
Carbon, total organic	mg/l
Chloride	mg/l
Fluoride	mg/l
Hardness, as CaCO ₃	ug/l
Nitrogen, nitrate + nitrite, as N	mg/l
Nitrogen, ammonia, as N	mg/l
pH	units
Solids, total dissolved	mg/l
Solids, total suspended	mg/l
Specific conductance @ 25 °C	umhos/cm
Oil and Grease	mg/l
Sulfide	mg/L
Sulfate, as SO ₄	mg/l
Total Metals	
Arsenate	ug/l
Arsenite	ug/l
Calcium	ug/l
Chromium	ug/l
Iron	ug/l
Magnesium	ug/l
Manganese	ug/l
Potassium	ug/l
Sodium	ug/l

Shipper's Name and Address Shannon and Wilson Inc 2355 Hill Rd Fairbanks, AK 99712 USA Tel: 907-479-0600		Shipper's Account Number 27400200733 Customer's ID Number 10926		Not Negotiable Air Waybill Issued By Alaska. AIR CARGO P.O. BOX 68900 SEATTLE, WA 98168 800-225-2752 ALASKACARGO.COM	
Consignee's Name and Address SGS CT and ENVIRONM 200 W Potter Drive Anchorage, AK 99518 USA Tel: 907-562-2343		Consignee's Account Number 27400215947		Also notify Tel:	
Issuing Carrier's Agent and City Agent's IATA Code Account No. Airport of Departure (Addr. of First Carrier) and Requested Routing Juneau		Accounting Information Shannon and Wilson Inc 2355 Hill Rd Fairbanks, AK 99712 USA SRN/101543 GoldStreak 10926			
To By First Carrier ANC Alaska Airlines		To / By	To / By	Currency USD PX X	WT/VOL X
Airport of Destination Anchorage		Flight/Date AS 065/10	Flight/Date	Amount of Insurance XXX	Declared Value For Customs NCV
Handling Information		Declared Value For Customs NVD			
No of Pieces 4		Gross Weight 168.0	kg L	Commodity Item No.	Chargeable Weight 168.0
Rate / Charge		Total AS AGREED		Nature and Quantity of Goods (Incl. Dimensions or Volume) WATER SAMPLES Dims: 24 x 13 x 14 x 3 11 x 11 x 9 x 1 GSX Volume: 8.214	
4		168.0	L		AS AGREED
Prepaid AS AGREED		Weight Charge		Collect Other Charges XBC 0.00	
Valuation Charge		Tax		Total Other Charges Due Agent	
Total Other Charges Due Carrier		Total Prepaid AS AGREED		Total Collect	
Shipper certifies that the particulars on the face hereof are correct and that insofar as any part of the consignment contains dangerous goods, such part is properly described by name and is in proper condition for carriage by air according to the applicable Dangerous Goods Regulations. I consent to the inspection of this cargo.		For: Shannon and Wilson Inc		Signature of Shipper or his Agent APW	
THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS		THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS		THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS	
10 Dec 2018 09:28		Juneau		Alaska Airlines	
Executed On (Date)		at (Place)		Signature of Issuing Carrier or its Agent	
027-3575 4294					

Alaska Department of Fish and Game

Wildlife Management Division

Date

Time

To

From

Project

Project

Job

Job

Project

Project

Project



e-Sample Receipt Form

SGS Workorder #:

1186919



1 1 8 6 9 1 9

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	2-F Coolers 1-2, 4, 1-F cooler 3	
COC accompanied samples?		Yes		
N/A		**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	@ 3.3 °C Therm. ID: D11
	Yes	Cooler ID:	2	@ 3.6 °C Therm. ID: D25
	Yes	Cooler ID:	3	@ 4.6 °C Therm. ID: D11
	Yes	Cooler ID:	4	@ 1.4 °C Therm. ID: D25
		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		
If samples received <u>without</u> a temperature blank, the "cooler temperature" will be documented in lieu of the temperature blank & "COOLER TEMP" will be noted to the right. In cases where neither a temp blank nor cooler temp can be obtained, note "ambient" or "chilled".				
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.				
Were analyses requested unambiguous? (i.e., method is specified for analyses with >1 option for analysis)		Yes		
N/A		***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):				

Sample Containers and Preservatives

<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>	<u>Container Id</u>	<u>Preservative</u>	<u>Container Condition</u>
1186919001-A	No Preservative Required	OK	1186919005-C	HCL to pH < 2	OK
1186919001-B	No Preservative Required	OK	1186919005-D	No Preservative Required	OK
1186919001-C	HCL to pH < 2	OK	1186919005-E	HCL to pH < 2	OK
1186919001-D	No Preservative Required	OK	1186919005-F	HCL to pH < 2	OK
1186919001-E	HCL to pH < 2	OK	1186919005-G	Zn Acetate,NaOH to pH > 9	OK
1186919001-F	HCL to pH < 2	OK	1186919005-H	H2SO4 to pH < 2	OK
1186919001-G	Zn Acetate,NaOH to pH > 9	OK	1186919005-I	HNO3 to pH < 2	OK
1186919001-H	H2SO4 to pH < 2	OK	1186919005-J	EDA	OK
1186919001-I	HNO3 to pH < 2	OK	1186919005-K	No Preservative Required	OK
1186919001-J	EDA	OK	1186919005-L	No Preservative Required	OK
1186919001-K	No Preservative Required	OK	1186919006-A	No Preservative Required	OK
1186919001-L	No Preservative Required	OK	1186919006-B	No Preservative Required	OK
1186919002-A	No Preservative Required	OK	1186919006-C	HCL to pH < 2	OK
1186919002-B	No Preservative Required	OK	1186919006-D	No Preservative Required	OK
1186919002-C	HCL to pH < 2	OK	1186919006-E	HCL to pH < 2	OK
1186919002-D	No Preservative Required	OK	1186919006-F	HCL to pH < 2	OK
1186919002-E	HCL to pH < 2	OK	1186919006-G	Zn Acetate,NaOH to pH > 9	OK
1186919002-F	HCL to pH < 2	OK	1186919006-H	H2SO4 to pH < 2	OK
1186919002-G	Zn Acetate,NaOH to pH > 9	OK	1186919006-I	HNO3 to pH < 2	OK
1186919002-H	H2SO4 to pH < 2	OK	1186919006-J	EDA	OK
1186919002-I	HNO3 to pH < 2	OK	1186919006-K	No Preservative Required	OK
1186919002-J	EDA	OK	1186919006-L	No Preservative Required	OK
1186919002-K	No Preservative Required	OK			
1186919002-L	No Preservative Required	OK			
1186919003-A	No Preservative Required	OK			
1186919003-B	No Preservative Required	OK			
1186919003-C	HCL to pH < 2	OK			
1186919003-D	No Preservative Required	OK			
1186919003-E	HCL to pH < 2	OK			
1186919003-F	HCL to pH < 2	OK			
1186919003-G	Zn Acetate,NaOH to pH > 9	OK			
1186919003-H	H2SO4 to pH < 2	OK			
1186919003-I	HNO3 to pH < 2	OK			
1186919003-J	EDA	OK			
1186919003-K	No Preservative Required	OK			
1186919003-L	No Preservative Required	OK			
1186919004-A	No Preservative Required	OK			
1186919004-B	No Preservative Required	OK			
1186919004-C	HCL to pH < 2	OK			
1186919004-D	No Preservative Required	OK			
1186919004-E	HCL to pH < 2	OK			
1186919004-F	HCL to pH < 2	OK			
1186919004-G	Zn Acetate,NaOH to pH > 9	OK			
1186919004-H	H2SO4 to pH < 2	OK			
1186919004-I	HNO3 to pH < 2	OK			
1186919004-J	EDA	OK			
1186919004-K	No Preservative Required	OK			
1186919004-L	No Preservative Required	OK			
1186919005-A	No Preservative Required	OK			
1186919005-B	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 that 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.



December 20, 2018

SGS Environmental
ATTN: Julie Shumway
200 West Potter Drive
Anchorage AK 99518
julie.shumway@sgs.com

RE: Project SGS-AN1803

Client Project ID: 1186919

Dear Julie Shumway,

On December 13, 2018, Brooks Applied Labs (BAL) received six (6) 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 performed 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.

It should be noted that all Brooks Applied Labs, LLC methods, standard operating procedures, inventions, ideas, processes, improvements, designs and techniques included or referred to therein, must be considered and treated as Proprietary Information, protected by the Washington State Trade Secret Act, RCW 19.108 et seq., and other laws. All Proprietary Information, written or implied, will not be distributed, copied, or altered in any fashion without prior written consent from Brooks Applied Labs, LLC. All Proprietary Information (including originals, copies, summaries or other reproductions thereof) shall remain the property of Brooks Applied Labs, LLC at all times and must be returned upon demand. Furthermore, products presented in this document may be protected by Federal Patent laws and infringement will be subject to prosecution in accordance with Title 35 US Code 271.

Sincerely,

Amanda Royal
Senior Project Manager
amanda@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.



Sample Information

Sample	Lab ID	Report Matrix	Type	Sampled	Received
PW-406	1850041-01	Water	Sample	12/07/2018	12/13/2018
PW-405	1850041-02	Water	Sample	12/08/2018	12/13/2018
PW-505	1850041-03	Water	Sample	12/08/2018	12/13/2018
PW-202	1850041-04	Water	Sample	12/08/2018	12/13/2018
PW-408	1850041-05	Water	Sample	12/08/2018	12/13/2018
PW-200	1850041-06	Water	Sample	12/09/2018	12/13/2018

Batch Summary

Analyte	Lab Matrix	Method	Prepared	Analyzed	Batch	Sequence
As(III)	Water	SOP BAL-4100	12/14/2018	12/15/2018	B183424	1801706
As(V)	Water	SOP BAL-4100	12/14/2018	12/15/2018	B183424	1801706
DMAs	Water	SOP BAL-4100	12/14/2018	12/15/2018	B183424	1801706
MMAs	Water	SOP BAL-4100	12/14/2018	12/15/2018	B183424	1801706



Sample Results

Sample	Analyte	Report Matrix	Basis	Result	Qualifier	MDL	MRL	Unit	Batch	Sequence
PW-406										
1850041-01	As(III)	Water	D	19.6		0.043	0.216	µg/L	B183424	1801706
1850041-01	As(V)	Water	D	2.29		0.043	0.216	µg/L	B183424	1801706
1850041-01	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-01	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706
PW-405										
1850041-02	As(III)	Water	D	10.8		0.043	0.216	µg/L	B183424	1801706
1850041-02	As(V)	Water	D	0.945		0.043	0.216	µg/L	B183424	1801706
1850041-02	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-02	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706
PW-505										
1850041-03	As(III)	Water	D	10.9		0.043	0.216	µg/L	B183424	1801706
1850041-03	As(V)	Water	D	0.949		0.043	0.216	µg/L	B183424	1801706
1850041-03	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-03	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706
PW-202										
1850041-04	As(III)	Water	D	3.85		0.043	0.216	µg/L	B183424	1801706
1850041-04	As(V)	Water	D	0.642		0.043	0.216	µg/L	B183424	1801706
1850041-04	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-04	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706
PW-408										
1850041-05	As(III)	Water	D	18.5		0.043	0.216	µg/L	B183424	1801706
1850041-05	As(V)	Water	D	1.65		0.043	0.216	µg/L	B183424	1801706
1850041-05	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-05	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706
PW-200										
1850041-06	As(III)	Water	D	9.70		0.043	0.216	µg/L	B183424	1801706
1850041-06	As(V)	Water	D	1.31		0.043	0.216	µg/L	B183424	1801706
1850041-06	DMAs	Water	D	≤ 0.054	U	0.054	0.227	µg/L	B183424	1801706
1850041-06	MMAs	Water	D	≤ 0.097	U	0.097	0.248	µg/L	B183424	1801706



Accuracy & Precision Summary

Batch: B183424
Lab Matrix: Water
Method: SOP BAL-4100

Sample	Analyte	Native	Spike	Result	Units	REC & Limits	RPD & Limits
B183424-BS1	Blank Spike, (1833019)						
	As(III)		5.010	5.047	µg/L	101% 75-125	
	As(V)		5.000	5.142	µg/L	103% 75-125	
	DMAs		3.198	3.215	µg/L	101% 75-125	
B183424-BS2	Blank Spike, (1833021)						
	MMAs		4.700	4.933	µg/L	105% 75-125	
B183424-DUP1	Duplicate, (1850041-06)						
	As(III)	9.701		9.522	µg/L		2% 25
	As(V)	1.312		1.305	µg/L		0.5% 25
	DMAs	ND		ND	µg/L		N/C 25
	MMAs	ND		ND	µg/L		N/C 25
B183424-MS1	Matrix Spike, (1850041-06)						
	As(III)	9.701	11.12	20.65	µg/L	98% 75-125	
	As(V)	1.312	11.23	12.46	µg/L	99% 75-125	
	DMAs	ND	11.02	11.13	µg/L	101% 75-125	
	MMAs	ND	10.80	10.80	µg/L	100% 75-125	
B183424-MSD1	Matrix Spike Duplicate, (1850041-06)						
	As(III)	9.701	11.12	20.60	µg/L	98% 75-125	0.2% 25
	As(V)	1.312	11.23	12.55	µg/L	100% 75-125	0.7% 25
	DMAs	ND	11.02	11.19	µg/L	102% 75-125	0.6% 25
	MMAs	ND	10.80	10.62	µg/L	98% 75-125	2% 25



Method Blanks & Reporting Limits

Batch: B183424
Matrix: Water
Method: SOP BAL-4100
Analyte: As(III)

Sample	Result	Units	
B183424-BLK1	0.00	µg/L	
B183424-BLK2	0.00	µg/L	
B183424-BLK3	0.00	µg/L	
B183424-BLK4	0.00	µg/L	
Average: 0.000			MDL: 0.004
Limit: 0.020			MRL: 0.020

Analyte: As(V)

Sample	Result	Units	
B183424-BLK1	0.004	µg/L	
B183424-BLK2	0.002	µg/L	
B183424-BLK3	0.003	µg/L	
B183424-BLK4	0.004	µg/L	
Average: 0.003			MDL: 0.004
Limit: 0.020			MRL: 0.020

Analyte: DMA_s

Sample	Result	Units	
B183424-BLK1	0.00	µg/L	
B183424-BLK2	0.00	µg/L	
B183424-BLK3	0.00	µg/L	
B183424-BLK4	0.00	µg/L	
Average: 0.000			MDL: 0.005
Limit: 0.021			MRL: 0.021



Method Blanks & Reporting Limits

Analyte: MMAs

Sample	Result	Units
B183424-BLK1	0.00	µg/L
B183424-BLK2	0.00	µg/L
B183424-BLK3	0.00	µg/L
B183424-BLK4	0.00	µg/L

Average: 0.000
Limit: 0.023

MDL: 0.009
MRL: 0.023



Sample Containers

Lab ID: 1850041-01 Sample: PW-406			Report Matrix: Water Sample Type: Sample			Collected: 12/07/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041
Lab ID: 1850041-02 Sample: PW-405			Report Matrix: Water Sample Type: Sample			Collected: 12/08/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041
Lab ID: 1850041-03 Sample: PW-505			Report Matrix: Water Sample Type: Sample			Collected: 12/08/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041
Lab ID: 1850041-04 Sample: PW-202			Report Matrix: Water Sample Type: Sample			Collected: 12/08/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041
Lab ID: 1850041-05 Sample: PW-408			Report Matrix: Water Sample Type: Sample			Collected: 12/08/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041
Lab ID: 1850041-06 Sample: PW-200			Report Matrix: Water Sample Type: Sample			Collected: 12/09/2018 Received: 12/13/2018	
Des	Container	Size	Lot	Preservation	P-Lot	pH	Ship. Cont.
A	Bottle HDPE As-SP	125 mL	18-0119	10 mL EDTA (PP)	1849005	5	Styro Cooler - 1850041

Project ID: SGS-AN1803
PM: Amanda Royal



BAL Report 1850041
Client PM: Julie Shumway
Client Project: 1186919

Shipping Containers

Styro Cooler - 1850041

Received: December 13, 2018 12:30

Tracking No: 1ZA8619W0166007635 via UPS

Coolant Type: Blue Ice

Temperature: 1.1 °C

Description: Styro Cooler

Damaged in transit? No

Returned to client? No

Comments: IR#18

Custody seals present? Yes

Custody seals intact? Yes

COC present? Yes



SGS North America Inc.
CHAIN OF CUSTODY RECORD



BAL Report 1850041
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 Rand												Page 1 of 1																	
CONTACT: Julie Shumway PHONE NO: (907) 562-2343				Additional Comments: All soils report out in dry weight unless otherwise requested.																													
PROJECT NAME: 1186919				PWSID#: NPDL#:				<table border="1"><tr><td rowspan="3">#</td><td rowspan="3">Preservative Used:</td><td rowspan="3">EDTA</td><td rowspan="3">TYPE</td><td rowspan="3">C = COMP G = GRAS Multi Incremental Soils</td><td rowspan="3">Speciated Arsenic (Arsenate, Arsenite)</td><td rowspan="3">MS</td><td rowspan="3">MSD</td><td rowspan="3">SGS lab #</td><td rowspan="3">Location ID</td></tr><tr></tr><tr></tr></table>														#	Preservative Used:	EDTA	TYPE	C = COMP G = GRAS Multi Incremental Soils	Speciated Arsenic (Arsenate, Arsenite)	MS	MSD	SGS lab #	Location ID		
#	Preservative Used:	EDTA	TYPE	C = COMP G = GRAS Multi Incremental Soils	Speciated Arsenic (Arsenate, Arsenite)	MS	MSD																									SGS lab #	Location ID
REPORTS TO: E-MAIL: Julie.Shumway@sgs.com				INVOICE TO: QUOTE #: 1186919																													
SGS - Alaska P.O. #: 1186919																																	
RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HHMM	MATRIX/MATRIX	1	G	X																										
	PW-406	12/7/2018	14:07	Water	1	G	X																										
	PW-405	12/8/2018	10:43	Water	1	G	X																										
	PW-505	12/8/2018	10:33	Water	1	G	X																										
	PW-202	12/8/2018	15:10	Water	1	G	X																										
	PW-408	12/8/2018	17:06	Water	1	G	X																										
	PW-200	12/9/2018	11:01	Water	1	G	X																										
Relinquished By: (1) <i>Julie Shumway</i>				Date	Time	Received By:				DOD Project? NO				Data Deliverable Requirements:																			
				12/12/18	0832					Report to DL (J Flags)? YES				Level 2 w/SGS EDD																			
Relinquished By: (2)				Date	Time	Received By:				Report as DL/LOD/LOQ? YES				Cooler ID:																			
										Requested Turnaround Time and/or Special Instructions:																							
Relinquished By: (3)				Date	Time	Received By:				RUSH Due 12/19/2018, Report in ug/L.																							
Relinquished By: (4)				Date	Time	Received For Laboratory By:				Temp Blank °C: _____				Chain of Custody Seal: (Circle)																			
						12/13/18 12:30				or Ambient []				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 *NSW*

Page 108 of 148
1186919_SpecAs_12.11.2018.xls

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

1186919

SGS Job Number: FA60120

Sampling Dates: 12/07/18 - 12/09/18

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
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

This report shall not be reproduced, except in its entirety, without the written approval of SGS.
Test results relate only to samples analyzed.

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Sample Summary

SGS North America, Inc
1186919

Job No: FA60120

Sample Number	Collected Date	Time By	Received	Matrix Code	Type	Client Sample ID
FA60120-1	12/07/18	14:07 JS	12/13/18	AQ	Water	PW-406
FA60120-2	12/08/18	10:43 JS	12/13/18	AQ	Water	PW-405
FA60120-3	12/08/18	10:33 JS	12/13/18	AQ	Water	PW-505
FA60120-4	12/08/18	15:10 JS	12/13/18	AQ	Water	PW-202
FA60120-5	12/08/18	17:06 JS	12/13/18	AQ	Water	PW-408
FA60120-6	12/09/18	11:01 JS	12/13/18	AQ	Water	PW-200

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: SGS North America, Inc

Job No FA60120

Site: 1186919

Report Date 12/27/2018 2:06:26

2

6 Samples were collected between 12/07/2018 and 12/09/2018 and were received at SGS North America Inc - Orlando on 12/13/2018 properly preserved, at 4 Deg. C and intact. These samples received an SGS Orlando job number of FA60120. 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: OP73097

All samples were extracted within the recommended method holding time.

All samples were analyzed within the recommended method holding time.

Sample(s) FA60120-4MS, FA60120-6DUP were used as the QC samples indicated.

All method blanks for this batch meet method specific criteria.

Sample(s) FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6 have compound(s) reported with a "B" qualifier, indicating analyte is found in the associated method blank.

RPD(s) for Duplicate for Perfluorobutanoic acid, Perfluoroheptanoic acid, Perfluorohexanoic acid, Perfluorooctanoic acid, Perfluoropentanoic acid are outside control limits for sample OP73097-DUP. Probable cause is due to sample non-homogeneity.

Matrix: AQ

Batch ID: OP73163

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.

OP73163-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:

Ariel Hartney, Client Services (*Signature on File*)

Summary of Hits

Job Number: FA60120
Account: SGS North America, Inc
Project: 1186919
Collected: 12/07/18 thru 12/09/18



Lab Sample ID	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
FA60120-1 PW-406						
Perfluorobutanoic acid		0.00520 J	0.015	0.0077	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0143	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.0121 B	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00544 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0134 B	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00198 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00299 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0238	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00230 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.113	0.0077	0.0038	ug/l	EPA 537M BY ID
FA60120-2 PW-405						
Perfluorobutanoic acid		0.00470 J	0.015	0.0077	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0115	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00930 B	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00424 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0168 B	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00201 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00305 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0266	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00266 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.106	0.0077	0.0038	ug/l	EPA 537M BY ID
FA60120-3 PW-505						
Perfluorobutanoic acid		0.00492 J	0.016	0.0080	ug/l	EPA 537M BY ID
Perfluoropentanoic acid		0.0116	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00995 B	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00457 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.0107 B	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid		0.00219 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid		0.00351 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid		0.0288	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid		0.00323 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid		0.114	0.0080	0.0040	ug/l	EPA 537M BY ID
FA60120-4 PW-202						
Perfluoropentanoic acid		0.00515 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorohexanoic acid		0.00542 JB	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid		0.00233 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorooctanoic acid		0.00822 B	0.0080	0.0040	ug/l	EPA 537M BY ID

Summary of Hits

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Job Number: FA60120
Account: SGS North America, Inc
Project: 1186919
Collected: 12/07/18 thru 12/09/18



Lab Sample ID	Client Sample ID	Result/ Qual	LOQ	LOD	Units	Method
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Perfluorobutanesulfonic acid	0.00251 J	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.00877	0.0080	0.0040	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0200	0.0080	0.0040	ug/l	EPA 537M BY ID

FA60120-5 PW-408

Perfluoropentanoic acid	0.0131	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.00867	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.00320 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.00264 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid	0.00234 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0211	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.115	0.0077	0.0038	ug/l	EPA 537M BY ID

FA60120-6 PW-200

Perfluoropentanoic acid	0.00847	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanoic acid	0.00626 JB	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanoic acid	0.00280 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanoic acid	0.00285 JB	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorobutanesulfonic acid	0.00218 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoropentanesulfonic acid	0.00333 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorohexanesulfonic acid	0.0230	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluoroheptanesulfonic acid	0.00213 J	0.0077	0.0038	ug/l	EPA 537M BY ID
Perfluorooctanesulfonic acid	0.0977	0.0077	0.0038	ug/l	EPA 537M BY ID

Sample Results

Report of Analysis

Report of Analysis

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Client Sample ID:	PW-406	Date Sampled:	12/07/18
Lab Sample ID:	FA60120-1	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25362.D	1	12/21/18 06:49	NAF	12/19/18 09:00	OP73097	S2Q393
Run #2							

	Initial Volume	Final Volume
Run #1	130 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00520	0.015	0.0077	0.0038	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0143	0.0077	0.0038	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.0121	0.0077	0.0038	0.0019	ug/l	B
375-85-9	Perfluoroheptanoic acid	0.00544	0.0077	0.0038	0.0019	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0134	0.0077	0.0038	0.0019	ug/l	B
375-95-1	Perfluorononanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00198	0.0077	0.0038	0.0019	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00299	0.0077	0.0038	0.0019	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0238	0.0077	0.0038	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00230	0.0077	0.0038	0.0019	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.113	0.0077	0.0038	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	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

Page 2 of 2

Client Sample ID:	PW-406	Date Sampled:	12/07/18
Lab Sample ID:	FA60120-1	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	94%		30-140%
	13C5-PFPeA	99%		40-140%
	13C5-PFHxA	102%		50-150%
	13C4-PFHpA	103%		50-150%
	13C8-PFOA	114%		50-150%
	13C9-PFNA	112%		50-150%
	13C6-PFDA	113%		50-150%
	13C7-PFUnDA	97%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	83%		40-150%
	13C3-PFBS	94%		50-150%
	13C3-PFHxS	97%		50-150%
	13C8-PFOS	95%		50-150%
	13C8-FOSA	109%		30-140%
	d3-MeFOSAA	89%		50-150%
	13C2-4:2FTS	97%		50-150%
	13C2-6:2FTS	105%		50-150%
	13C2-8:2FTS	109%		50-150%

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

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Client Sample ID:	PW-405	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-2	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25363.D	1	12/21/18 07:05	NAF	12/19/18 09:00	OP73097	S2Q393
Run #2							

	Initial Volume	Final Volume
Run #1	130 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00470	0.015	0.0077	0.0038	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0115	0.0077	0.0038	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.00930	0.0077	0.0038	0.0019	ug/l	B
375-85-9	Perfluoroheptanoic acid	0.00424	0.0077	0.0038	0.0019	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0168	0.0077	0.0038	0.0019	ug/l	B
375-95-1	Perfluorononanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00201	0.0077	0.0038	0.0019	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00305	0.0077	0.0038	0.0019	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0266	0.0077	0.0038	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00266	0.0077	0.0038	0.0019	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.106	0.0077	0.0038	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	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

Page 2 of 2

Client Sample ID: PW-405	Date Sampled: 12/08/18
Lab Sample ID: FA60120-2	Date Received: 12/13/18
Matrix: AQ - Water	Percent Solids: n/a
Method: EPA 537M BY ID EPA 537 MOD	
Project: 1186919	

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	103%		30-140%
	13C5-PFPeA	106%		40-140%
	13C5-PFHxA	108%		50-150%
	13C4-PFHpA	110%		50-150%
	13C8-PFOA	120%		50-150%
	13C9-PFNA	101%		50-150%
	13C6-PFDA	92%		50-150%
	13C7-PFUnDA	101%		50-150%
	13C2-PFDoDA	64%		50-150%
	13C2-PFTeDA	72%		40-150%
	13C3-PFBS	103%		50-150%
	13C3-PFHxS	96%		50-150%
	13C8-PFOS	78%		50-150%
	13C8-FOSA	99%		30-140%
	d3-MeFOSAA	75%		50-150%
	13C2-4:2FTS	104%		50-150%
	13C2-6:2FTS	115%		50-150%
	13C2-8:2FTS	85%		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

Page 1 of 2

Client Sample ID:	PW-505	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-3	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25364.D	1	12/21/18 07:21	NAF	12/19/18 09:00	OP73097	S2Q393
Run #2							

	Initial Volume	Final Volume
Run #1	125 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.00492	0.016	0.0080	0.0040	ug/l	J
2706-90-3	Perfluoropentanoic acid	0.0116	0.0080	0.0040	0.0030	ug/l	
307-24-4	Perfluorohexanoic acid	0.00995	0.0080	0.0040	0.0020	ug/l	B
375-85-9	Perfluoroheptanoic acid	0.00457	0.0080	0.0040	0.0020	ug/l	J
335-67-1	Perfluorooctanoic acid	0.0107	0.0080	0.0040	0.0020	ug/l	B
375-95-1	Perfluorononanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	0.0040 U	0.0080	0.0040	0.0030	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00219	0.0080	0.0040	0.0020	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00351	0.0080	0.0040	0.0020	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0288	0.0080	0.0040	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00323	0.0080	0.0040	0.0020	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.114	0.0080	0.0040	0.0030	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0040 U	0.0080	0.0040	0.0020	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.016 U	0.040	0.016	0.0080	ug/l	
2991-50-6	EtFOSAA	0.016 U	0.040	0.016	0.0080	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0080 U	0.016	0.0080	0.0040	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0080 U	0.016	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

Page 2 of 2

Client Sample ID:	PW-505	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-3	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U	0.016	0.0080	0.0040	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	97%		30-140%
	13C5-PFPeA	100%		40-140%
	13C5-PFHxA	104%		50-150%
	13C4-PFHpA	101%		50-150%
	13C8-PFOA	114%		50-150%
	13C9-PFNA	96%		50-150%
	13C6-PFDA	92%		50-150%
	13C7-PFUnDA	97%		50-150%
	13C2-PFDoDA	69%		50-150%
	13C2-PFTeDA	73%		40-150%
	13C3-PFBS	97%		50-150%
	13C3-PFHxS	88%		50-150%
	13C8-PFOS	73%		50-150%
	13C8-FOSA	87%		30-140%
	d3-MeFOSAA	74%		50-150%
	13C2-4:2FTS	98%		50-150%
	13C2-6:2FTS	109%		50-150%
	13C2-8:2FTS	82%		50-150%

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

Page 1 of 2

Client Sample ID:	PW-202	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-4	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25365.D	1	12/21/18 07:36	NAF	12/19/18 09:00	OP73097	S2Q393
Run #2							

	Initial Volume	Final Volume
Run #1	125 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0080 U	0.016	0.0080	0.0040	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00515	0.0080	0.0040	0.0030	ug/l	J
307-24-4	Perfluorohexanoic acid	0.00542	0.0080	0.0040	0.0020	ug/l	JB
375-85-9	Perfluoroheptanoic acid	0.00233	0.0080	0.0040	0.0020	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00822	0.0080	0.0040	0.0020	ug/l	B
375-95-1	Perfluorononanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-76-2	Perfluorodecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
307-55-1	Perfluorododecanoic acid	0.0040 U	0.0080	0.0040	0.0030	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00251	0.0080	0.0040	0.0020	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
355-46-4	Perfluorohexanesulfonic acid	0.00877	0.0080	0.0040	0.0020	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.0200	0.0080	0.0040	0.0030	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0040 U	0.0080	0.0040	0.0020	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0040 U	0.0080	0.0040	0.0020	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.016 U	0.040	0.016	0.0080	ug/l	
2991-50-6	EtFOSAA	0.016 U	0.040	0.016	0.0080	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0080 U	0.016	0.0080	0.0040	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0080 U	0.016	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

Page 2 of 2

Client Sample ID:	PW-202	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-4	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0080 U	0.016	0.0080	0.0040	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	101%		30-140%
	13C5-PFPeA	104%		40-140%
	13C5-PFHxA	107%		50-150%
	13C4-PFHpA	107%		50-150%
	13C8-PFOA	113%		50-150%
	13C9-PFNA	96%		50-150%
	13C6-PFDA	97%		50-150%
	13C7-PFUnDA	99%		50-150%
	13C2-PFDoDA	69%		50-150%
	13C2-PFTeDA	78%		40-150%
	13C3-PFBS	101%		50-150%
	13C3-PFHxS	90%		50-150%
	13C8-PFOS	77%		50-150%
	13C8-FOSA	97%		30-140%
	d3-MeFOSAA	77%		50-150%
	13C2-4:2FTS	101%		50-150%
	13C2-6:2FTS	108%		50-150%
	13C2-8:2FTS	86%		50-150%

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

Page 1 of 2

Client Sample ID:	PW-408	Date Sampled:	12/08/18
Lab Sample ID:	FA60120-5	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25531.D	1	12/24/18 23:08	NAF	12/22/18 08:30	OP73163	S2Q395
Run #2							

	Initial Volume	Final Volume
Run #1	130 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0077 U	0.015	0.0077	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	0.0131	0.0077	0.0038	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.00867	0.0077	0.0038	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	0.00320	0.0077	0.0038	0.0019	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00264	0.0077	0.0038	0.0019	ug/l	J
375-95-1	Perfluorononanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	0.00234	0.0077	0.0038	0.0019	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0211	0.0077	0.0038	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	0.115	0.0077	0.0038	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	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

Page 2 of 2

Client Sample ID: PW-408	Date Sampled: 12/08/18
Lab Sample ID: FA60120-5	Date Received: 12/13/18
Matrix: AQ - Water	Percent Solids: n/a
Method: EPA 537M BY ID EPA 537 MOD	
Project: 1186919	

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	105%		30-140%
	13C5-PFPeA	112%		40-140%
	13C5-PFHxA	115%		50-150%
	13C4-PFHpA	113%		50-150%
	13C8-PFOA	129%		50-150%
	13C9-PFNA	111%		50-150%
	13C6-PFDA	93%		50-150%
	13C7-PFUnDA	86%		50-150%
	13C2-PFDoDA	71%		50-150%
	13C2-PFTeDA	79%		40-150%
	13C3-PFBS	106%		50-150%
	13C3-PFHxS	105%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	101%		30-140%
	d3-MeFOSAA	80%		50-150%
	13C2-4:2FTS	107%		50-150%
	13C2-6:2FTS	117%		50-150%
	13C2-8:2FTS	85%		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

Page 1 of 2

Client Sample ID:	PW-200	Date Sampled:	12/09/18
Lab Sample ID:	FA60120-6	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	2Q25368.D	1	12/21/18 08:23	NAF	12/19/18 09:00	OP73097	S2Q393
Run #2							

	Initial Volume	Final Volume
Run #1	130 ml	1.0 ml
Run #2		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
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PERFLUOROALKYLCARBOXYLIC ACIDS

375-22-4	Perfluorobutanoic acid	0.0077 U	0.015	0.0077	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	0.00847	0.0077	0.0038	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.00626	0.0077	0.0038	0.0019	ug/l	JB
375-85-9	Perfluoroheptanoic acid	0.00280	0.0077	0.0038	0.0019	ug/l	J
335-67-1	Perfluorooctanoic acid	0.00285	0.0077	0.0038	0.0019	ug/l	JB
375-95-1	Perfluorononanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	0.0038 U	0.0077	0.0038	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROALKYLSULFONATES

375-73-5	Perfluorobutanesulfonic acid	0.00218	0.0077	0.0038	0.0019	ug/l	J
2706-91-4	Perfluoropentanesulfonic acid	0.00333	0.0077	0.0038	0.0019	ug/l	J
355-46-4	Perfluorohexanesulfonic acid	0.0230	0.0077	0.0038	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	0.00213	0.0077	0.0038	0.0019	ug/l	J
1763-23-1	Perfluorooctanesulfonic acid	0.0977	0.0077	0.0038	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	0.0038 U	0.0077	0.0038	0.0019	ug/l	

PERFLUOROOCTANESULFONAMIDES

754-91-6	PFOSA	0.0038 U	0.0077	0.0038	0.0019	ug/l	
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PERFLUOROOCTANESULFONAMIDOACETIC ACIDS

2355-31-9	MeFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	
2991-50-6	EtFOSAA	0.015 U	0.038	0.015	0.0077	ug/l	

FLUOROTELOMER SULFONATES

757124-72-4	4:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	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

Page 2 of 2

Client Sample ID:	PW-200	Date Sampled:	12/09/18
Lab Sample ID:	FA60120-6	Date Received:	12/13/18
Matrix:	AQ - Water	Percent Solids:	n/a
Method:	EPA 537M BY ID EPA 537 MOD		
Project:	1186919		

PFAS List

CAS No.	Compound	Result	LOQ	LOD	DL	Units	Q
39108-34-4	8:2 Fluorotelomer sulfonate	0.0077 U	0.015	0.0077	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Run# 1	Run# 2	Limits
	13C4-PFBA	100%		30-140%
	13C5-PFPeA	104%		40-140%
	13C5-PFHxA	105%		50-150%
	13C4-PFHpA	105%		50-150%
	13C8-PFOA	124%		50-150%
	13C9-PFNA	104%		50-150%
	13C6-PFDA	100%		50-150%
	13C7-PFUnDA	109%		50-150%
	13C2-PFDoDA	79%		50-150%
	13C2-PFTeDA	83%		40-150%
	13C3-PFBS	100%		50-150%
	13C3-PFHxS	99%		50-150%
	13C8-PFOS	84%		50-150%
	13C8-FOSA	98%		30-140%
	d3-MeFOSAA	83%		50-150%
	13C2-4:2FTS	101%		50-150%
	13C2-6:2FTS	117%		50-150%
	13C2-8:2FTS	91%		50-150%

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

Misc. Forms

5

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody

CLIENT:		SGS North America Inc. - Alaska Division				SGS Reference:		SGS Orlando, FL				Page 1 of 1	
CONTACT:		Julie Shumway		PHONE NO:		(907) 562-2343		Additional Comments: All soils report out in dry weight unless otherwise requested.					
PROJECT NAME:		1186919		PWSID#:				COIN					
REPORTS TO:		E-MAIL:		Julie.Shumway@sgs.com				TYPE					
INVOICE TO:		QUOTE #:						G =					
SGS - Alaska		P.Q. #:		1186919				COMP					
RESERVED for lab use		SAMPLE IDENTIFICATION		DATE mm/dd/yy		TIME HHMM		MATRIX					
1		PW-406		12/7/2018		14:07		Water		2		G X	
2		PW-405		12/8/2018		10:43		Water		2		G X	
3		PW-505		12/8/2018		10:33		Water		2		G X	
4		PW-202		12/8/2018		15:10		Water		2		G X	
5		PW-408		12/8/2018		17:06		Water		2		G X	
6		PW-200		12/9/2018		11:01		Water		2		G X	
Relinquished By: (1)		Date		Time		Received By:		DOD Project?		NO		Data Deliverable Requirements:	
Julie Shumway		12/12/18		0830		UPS		Report to DL (J Flags)?		YES		Level 2 w/SGS EDD	
Relinquished By: (2)		Date		Time		Received By:		Cooler ID:					
UPS								Requested Turnaround Time and/or Special Instructions:					
Relinquished By: (3)		Date		Time		Received By:		RUSH Due 12/19/2018, see attached compound list				Chain of Custody Seal: (Circle)	
Relinquished By: (4)		Date		Time		Received For Laboratory By:		Temp Blank *C:		4.0		INTACT BROKEN ABSENT	
						SLA 12/13/18		or Ambient []					

[X] 200 W. Potter Drive Anchorage, AK 99518 Tel: (907) 562-2343 Fax: (907) 581-5301
[] 5500 Business Drive Wilmington, NC 28405 Tel: (910) 350-1903 Fax: (910) 350-1557

http://www.sgs.com/terms_and_conditions.htm

REVIEWED NJW

1186919_PfAS_12.11.2018.xls

Parameter	Units
Per- and Polyfluoroalkyl Substances	
4:2 Fluorotelomer sulfonate (4:2 FTS)	ng/l
6:2 Fluorotelomer sulfonate (6:2 FTS)	ng/l
8:2 Fluorotelomer sulfonate (8:2 FTS)	ng/l
n-Ethyl perfluorooctanesulfonamidoacetic acid (N-EtFOSAA)	ng/l
n-Methyl perfluorooctanesulfonamidoacetic acid (MeFOSAA)	ng/l
Perfluorobutane sulfonate (PFBS)	ng/l
Perfluorobutanoic acid (PFBA)	ng/l
Perfluorodecane sulfonate (PFDS)	ng/l
Perfluorodecanoic acid (PFDA)	ng/l
Perfluorododecanoic acid (PFDoA / PFDoDA)	ng/l
Perfluoroheptane sulfonate (PFHpS)	ng/l
Perfluoroheptanoic acid (PFHpA)	ng/l
Perfluorohexane sulfonate (PFHxS)	ng/l
Perfluorohexanoic acid (PFHxA)	ng/l
Perfluorononanesulfonate (PFNS)	ng/l
Perfluorononanoic acid (PFNA)	ng/l
Perfluorooctanesulfonamide (PFOSA / FOSA)	ng/l
Perfluorooctanesulfonate (PFOS)	ng/l
Perfluorooctanoic acid (PFOA)	ng/l
Perfluoropentanoic acid (PFPeA)	ng/l
Perfluoropentanesulfonate (PFPeS)	ng/l
Perfluorotetradecanoic acid (PFTA / PFTeDA / PFTeA)	ng/l
Perfluorotridecanoic acid (PFTrDA / PFTTrA)	ng/l
Perfluoroundecanoic acid (PFUnA / PFUnDA)	ng/l
General Parameters	
Alkalinity, total, as CaCO ₃	mg/l
Carbon, total organic	mg/l
Chloride	mg/l
Fluoride	mg/l
Hardness, as CaCO ₃	ug/l
Nitrogen, nitrate + nitrite, as N	mg/l
Nitrogen, ammonia, as N	mg/l
pH	units
Solids, total dissolved	mg/l
Solids, total suspended	mg/l
Specific conductance @ 25 °C	umhos/cm
Oil and Grease	mg/l
Sulfide	mg/l
Sulfate, as SO ₄	mg/l
Total Metals	
Arsenate	ug/l
Arsenite	ug/l
Calcium	ug/l
Chromium	ug/l
Iron	ug/l
Magnesium	ug/l
Manganese	ug/l
Potassium	ug/l
Sodium	ug/l

FA60120: Chain of Custody
Page 2 of 3

SGS Sample Receipt Summary

Job Number: FA60120 **Client:** SGS **Project:** 1186919
Date / Time Received: 12/13/2018 10:00:00 AM **Delivery Method:** UPS **Airbill #s:** 1za8619w0167055242

Therm ID: IR 1;	Therm CF: -0.2;	# of Coolers: 1
Cooler Temps (Raw Measured) °C: Cooler 1: (4.2);		
Cooler Temps (Corrected) °C: Cooler 1: (4.0);		

Cooler Information	Y	or	N	Sample Information	Y	or	N	N/A
1. Custody Seals Present	<input checked="" type="checkbox"/>		<input type="checkbox"/>	1. Sample labels present on bottles	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Custody Seals Intact	<input checked="" type="checkbox"/>		<input type="checkbox"/>	2. Samples preserved properly	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
3. Temp criteria achieved	<input checked="" type="checkbox"/>		<input type="checkbox"/>	3. Sufficient volume/containers recvd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Cooler temp verification	IR Gun			4. Condition of sample	Intact			
5. Cooler media	Ice (Bag)			5. Sample recvd within HT	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
				6. Dates/Times/IDs on COC match Sample Label	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
				7. VOCs have headspace	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
				8. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				9. Compositing instructions clear	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
				10. Voa Soil Kits/Jars received past 48hrs?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
				11. % Solids Jar received?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
				12. Residual Chlorine Present?	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

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 _____
Residual Chlorine Test Strip Lot #: _____			

Comments

SM001 Technician: SHAYLAP Date: 12/13/2018 10:00:00 Reviewer: BK Date: 12/13/2018
 Rev. Date 05/24/17

FA60120: Chain of Custody
Page 3 of 3

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

Page 1 of 2

Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-MB	2Q25361.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	0.00231	0.0077	0.0019	ug/l	J
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	0.00391	0.0077	0.0019	ug/l	J
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0077	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	92% 30-140%
	13C5-PFPeA	92% 40-140%
	13C5-PFHxA	95% 50-150%
	13C4-PFHpA	94% 50-150%
	13C8-PFOA	101% 50-150%
	13C9-PFNA	100% 50-150%
	13C6-PFDA	96% 50-150%
	13C7-PFUnDA	104% 50-150%

Method Blank Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-MB	2Q25361.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	76% 50-150%
	13C2-PFTeDA	79% 40-150%
	13C3-PFBS	90% 50-150%
	13C3-PFHxS	90% 50-150%
	13C8-PFOS	91% 50-150%
	13C8-FOSA	97% 30-140%
	d3-MeFOSAA	85% 50-150%
	13C2-4:2FTS	91% 50-150%
	13C2-6:2FTS	95% 50-150%
	13C2-8:2FTS	88% 50-150%

Method Blank Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73163-MB	2Q25529.D	1	12/24/18	NAF	12/22/18	OP73163	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.0077	0.0029	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	101% 30-140%
	13C5-PFPeA	106% 40-140%
	13C5-PFHxA	110% 50-150%
	13C4-PFHpA	109% 50-150%
	13C8-PFOA	115% 50-150%
	13C9-PFNA	112% 50-150%
	13C6-PFDA	107% 50-150%
	13C7-PFUnDA	102% 50-150%

Method Blank Summary

Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73163-MB	2Q25529.D	1	12/24/18	NAF	12/22/18	OP73163	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-5

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	87% 50-150%
	13C2-PFTeDA	89% 40-150%
	13C3-PFBS	104% 50-150%
	13C3-PFHxS	105% 50-150%
	13C8-PFOS	106% 50-150%
	13C8-FOSA	110% 30-140%
	d3-MeFOSAA	97% 50-150%
	13C2-4:2FTS	102% 50-150%
	13C2-6:2FTS	106% 50-150%
	13C2-8:2FTS	98% 50-150%

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q393-IBLK	2Q25298.D	1	12/20/18	NAF	n/a	n/a	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.017	0.0042	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0083	0.0031	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0083	0.0021	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0083	0.0021	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0083	0.0021	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0083	0.0021	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0083	0.0021	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0083	0.0021	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0083	0.0031	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0083	0.0021	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0083	0.0021	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0083	0.0021	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0083	0.0021	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0083	0.0021	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0083	0.0021	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.017	0.0042	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0083	0.0021	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0083	0.0021	ug/l	
754-91-6	PFOSA	ND	0.0083	0.0021	ug/l	
2355-31-9	MeFOSAA	ND	0.042	0.0083	ug/l	
2991-50-6	EtFOSAA	ND	0.042	0.0083	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.017	0.0042	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	97% 50-150%
	13C5-PFPeA	97% 50-150%
	13C5-PFHxA	101% 50-150%
	13C4-PFHpA	100% 50-150%
	13C8-PFOA	101% 50-150%
	13C9-PFNA	104% 50-150%
	13C6-PFDA	106% 50-150%
	13C7-PFUnDA	102% 50-150%

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Job Number: FA60120

Account: SGSAKA SGS North America, Inc

Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q393-IBLK	2Q25298.D	1	12/20/18	NAF	n/a	n/a	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	103% 50-150%
	13C2-PFTeDA	99% 50-150%
	13C3-PFBS	98% 50-150%
	13C3-PFHxS	99% 50-150%
	13C8-PFOS	99% 50-150%
	13C8-FOSA	105% 50-150%
	d3-MeFOSAA	101% 50-150%
	13C2-4:2FTS	92% 50-150%
	13C2-6:2FTS	97% 50-150%
	13C2-8:2FTS	96% 50-150%

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q395-IBLK	2Q25509.D	1	12/24/18	NAF	n/a	n/a	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60120-5

CAS No.	Compound	Result	RL	MDL	Units	Q
375-22-4	Perfluorobutanoic acid	ND	0.015	0.0038	ug/l	
2706-90-3	Perfluoropentanoic acid	ND	0.0077	0.0029	ug/l	
307-24-4	Perfluorohexanoic acid	ND	0.0077	0.0019	ug/l	
375-85-9	Perfluoroheptanoic acid	ND	0.0077	0.0019	ug/l	
335-67-1	Perfluorooctanoic acid	ND	0.0077	0.0019	ug/l	
375-95-1	Perfluorononanoic acid	ND	0.0077	0.0019	ug/l	
335-76-2	Perfluorodecanoic acid	ND	0.0077	0.0019	ug/l	
2058-94-8	Perfluoroundecanoic acid	ND	0.0077	0.0019	ug/l	
307-55-1	Perfluorododecanoic acid	ND	0.0077	0.0029	ug/l	
72629-94-8	Perfluorotridecanoic acid	ND	0.0077	0.0019	ug/l	
376-06-7	Perfluorotetradecanoic acid	ND	0.0077	0.0019	ug/l	
375-73-5	Perfluorobutanesulfonic acid	ND	0.0077	0.0019	ug/l	
2706-91-4	Perfluoropentanesulfonic acid	ND	0.0077	0.0019	ug/l	
355-46-4	Perfluorohexanesulfonic acid	ND	0.0077	0.0019	ug/l	
375-92-8	Perfluoroheptanesulfonic acid	ND	0.0077	0.0019	ug/l	
1763-23-1	Perfluorooctanesulfonic acid	ND	0.015	0.0038	ug/l	
68259-12-1	Perfluorononanesulfonic acid	ND	0.0077	0.0019	ug/l	
335-77-3	Perfluorodecanesulfonic acid	ND	0.0077	0.0019	ug/l	
754-91-6	PFOSA	ND	0.0077	0.0019	ug/l	
2355-31-9	MeFOSAA	ND	0.038	0.0077	ug/l	
2991-50-6	EtFOSAA	ND	0.038	0.0077	ug/l	
757124-72-44:2	Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
27619-97-2	6:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	
39108-34-4	8:2 Fluorotelomer sulfonate	ND	0.015	0.0038	ug/l	

CAS No.	ID Standard Recoveries	Limits
	13C4-PFBA	98% 50-150%
	13C5-PFPeA	99% 50-150%
	13C5-PFHxA	102% 50-150%
	13C4-PFHpA	102% 50-150%
	13C8-PFOA	102% 50-150%
	13C9-PFNA	100% 50-150%
	13C6-PFDA	109% 50-150%
	13C7-PFUnDA	105% 50-150%

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Job Number: FA60120

Account: SGSAKA SGS North America, Inc

Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
S2Q395-IBLK	2Q25509.D	1	12/24/18	NAF	n/a	n/a	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M QSM5.1 B-15

FA60120-5

CAS No.	ID Standard Recoveries	Limits
	13C2-PFDoDA	102% 50-150%
	13C2-PFTeDA	100% 50-150%
	13C3-PFBS	99% 50-150%
	13C3-PFHxS	100% 50-150%
	13C8-PFOS	99% 50-150%
	13C8-FOSA	108% 50-150%
	d3-MeFOSAA	99% 50-150%
	13C2-4:2FTS	93% 50-150%
	13C2-6:2FTS	95% 50-150%
	13C2-8:2FTS	97% 50-150%

Blank Spike Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-BS	2Q25360.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.154	0.146	95	70-130
2706-90-3	Perfluoropentanoic acid	0.154	0.145	94	70-130
307-24-4	Perfluorohexanoic acid	0.154	0.130	84	70-130
375-85-9	Perfluoroheptanoic acid	0.154	0.144	94	71-130
335-67-1	Perfluorooctanoic acid	0.154	0.149	97	74-130
375-95-1	Perfluorononanoic acid	0.154	0.123	80	76-130
335-76-2	Perfluorodecanoic acid	0.154	0.121	79	70-130
2058-94-8	Perfluoroundecanoic acid	0.154	0.146	95	70-130
307-55-1	Perfluorododecanoic acid	0.154	0.149	97	70-130
72629-94-8	Perfluorotridecanoic acid	0.154	0.165	107	70-139
376-06-7	Perfluorotetradecanoic acid	0.154	0.132	86	70-130
375-73-5	Perfluorobutanesulfonic acid	0.136	0.123	90	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.145	0.132	91	70-130
355-46-4	Perfluorohexanesulfonic acid	0.14	0.122	87	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.146	0.144	99	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.142	0.141	99	70-130
68259-12-1	Perfluorononanesulfonic acid	0.148	0.129	87	70-130
335-77-3	Perfluorodecanesulfonic acid	0.148	0.121	82	70-130
754-91-6	PFOSA	0.154	0.145	94	70-131
2355-31-9	MeFOSAA	0.154	0.146	95	70-130
2991-50-6	EtFOSAA	0.154	0.158	103	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.144	0.138	96	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.146	0.143	98	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.148	0.140	95	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	103%	30-140%
	13C5-PFPeA	102%	40-140%
	13C5-PFHxA	104%	50-150%
	13C4-PFHpA	103%	50-150%
	13C8-PFOA	106%	50-150%
	13C9-PFNA	107%	50-150%
	13C6-PFDA	107%	50-150%
	13C7-PFUnDA	113%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-BS	2Q25360.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	91%	50-150%
	13C2-PFTeDA	90%	40-150%
	13C3-PFBS	101%	50-150%
	13C3-PFHxS	100%	50-150%
	13C8-PFOS	97%	50-150%
	13C8-FOSA	104%	30-140%
	d3-MeFOSAA	93%	50-150%
	13C2-4:2FTS	105%	50-150%
	13C2-6:2FTS	108%	50-150%
	13C2-8:2FTS	101%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73163-BS ^a	2Q25530.D	1	12/24/18	NAF	12/22/18	OP73163	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
375-22-4	Perfluorobutanoic acid	0.154	0.143	93	70-130
2706-90-3	Perfluoropentanoic acid	0.154	0.140	91	70-130
307-24-4	Perfluorohexanoic acid	0.154	0.127	83	70-130
375-85-9	Perfluoroheptanoic acid	0.154	0.144	94	71-130
335-67-1	Perfluorooctanoic acid	0.154	0.148	96	74-130
375-95-1	Perfluorononanoic acid	0.154	0.120	78	76-130
335-76-2	Perfluorodecanoic acid	0.154	0.130	84	70-130
2058-94-8	Perfluoroundecanoic acid	0.154	0.150	97	70-130
307-55-1	Perfluorododecanoic acid	0.154	0.152	99	70-130
72629-94-8	Perfluorotridecanoic acid	0.154	0.157	102	70-139
376-06-7	Perfluorotetradecanoic acid	0.154	0.134	87	70-130
375-73-5	Perfluorobutanesulfonic acid	0.136	0.123	90	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.145	0.133	92	70-130
355-46-4	Perfluorohexanesulfonic acid	0.14	0.120	86	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.146	0.140	96	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.142	0.139	98	70-130
68259-12-1	Perfluorononanesulfonic acid	0.148	0.125	85	70-130
335-77-3	Perfluorodecanesulfonic acid	0.148	0.109	73	70-130
754-91-6	PFOSA	0.154	0.145	94	70-131
2355-31-9	MeFOSAA	0.154	0.144	94	70-130
2991-50-6	EtFOSAA	0.154	0.139	90	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.144	0.136	95	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.146	0.137	94	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.148	0.133	90	70-130

CAS No.	ID Standard Recoveries	BSP	Limits
	13C4-PFBA	105%	30-140%
	13C5-PFPeA	109%	40-140%
	13C5-PFHxA	110%	50-150%
	13C4-PFHpA	110%	50-150%
	13C8-PFOA	108%	50-150%
	13C9-PFNA	114%	50-150%
	13C6-PFDA	107%	50-150%
	13C7-PFUnDA	113%	50-150%

* = Outside of Control Limits.

Blank Spike Summary

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Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73163-BS ^a	2Q25530.D	1	12/24/18	NAF	12/22/18	OP73163	S2Q395

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-5

CAS No.	ID Standard Recoveries	BSP	Limits
	13C2-PFDoDA	92%	50-150%
	13C2-PFTeDA	96%	40-150%
	13C3-PFBS	106%	50-150%
	13C3-PFHxS	107%	50-150%
	13C8-PFOS	107%	50-150%
	13C8-FOSA	109%	30-140%
	d3-MeFOSAA	99%	50-150%
	13C2-4:2FTS	109%	50-150%
	13C2-6:2FTS	108%	50-150%
	13C2-8:2FTS	104%	50-150%

(a) Insufficient sample for MS/MSD.

* = Outside of Control Limits.

Matrix Spike Summary

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Job Number: FA60120
Account: SGS/SAK North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-MS	2Q25366.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393
FA60120-4	2Q25365.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	Compound	FA60120-4 ug/l	Spike Q	MS ug/l	MS %	Limits
375-22-4	Perfluorobutanoic acid	0.016 U		0.154	88	70-130
2706-90-3	Perfluoropentanoic acid	0.00515 J		0.154	85	70-130
307-24-4	Perfluorohexanoic acid	0.00542 JB		0.154	75	70-130
375-85-9	Perfluoroheptanoic acid	0.00233 J		0.154	84	71-130
335-67-1	Perfluorooctanoic acid	0.00822 B		0.154	82	74-130
375-95-1	Perfluorononanoic acid	0.0080 U		0.154	79	76-130
335-76-2	Perfluorodecanoic acid	0.0080 U		0.154	84	70-130
2058-94-8	Perfluoroundecanoic acid	0.0080 U		0.154	96	70-130
307-55-1	Perfluorododecanoic acid	0.0080 U		0.154	105	70-130
72629-94-8	Perfluorotridecanoic acid	0.0080 U		0.154	104	70-139
376-06-7	Perfluorotetradecanoic acid	0.0080 U		0.154	92	70-130
375-73-5	Perfluorobutanesulfonic acid	0.00251 J		0.136	83	73-130
2706-91-4	Perfluoropentanesulfonic acid	0.0080 U		0.145	86	70-130
355-46-4	Perfluorohexanesulfonic acid	0.00877		0.14	81	74-130
375-92-8	Perfluoroheptanesulfonic acid	0.0080 U		0.146	90	74-130
1763-23-1	Perfluorooctanesulfonic acid	0.0200		0.142	100	70-130
68259-12-1	Perfluorononanesulfonic acid	0.0080 U		0.148	82	70-130
335-77-3	Perfluorodecanesulfonic acid	0.0080 U		0.148	72	70-130
754-91-6	PFOSA	0.0080 U		0.154	91	70-131
2355-31-9	MeFOSAA	0.040 U		0.154	97	70-130
2991-50-6	EtFOSAA	0.040 U		0.154	104	70-130
757124-72-44:2	Fluorotelomer sulfonate	0.016 U		0.144	88	70-130
27619-97-2	6:2 Fluorotelomer sulfonate	0.016 U		0.146	90	70-133
39108-34-4	8:2 Fluorotelomer sulfonate	0.016 U		0.148	91	70-130

CAS No.	ID Standard Recoveries	MS	FA60120-4	Limits
	13C4-PFBA	103%	101%	30-140%
	13C5-PFPeA	107%	104%	40-140%
	13C5-PFHxA	109%	107%	50-150%
	13C4-PFHpA	107%	107%	50-150%
	13C8-PFOA	116%	113%	50-150%
	13C9-PFNA	103%	96%	50-150%
	13C6-PFDA	97%	97%	50-150%
	13C7-PFUnDA	92%	99%	50-150%

* = Outside of Control Limits.

Matrix Spike Summary

Page 2 of 2

Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-MS	2Q25366.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393
FA60120-4	2Q25365.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	ID Standard Recoveries	MS	FA60120-4	Limits
	13C2-PFDoDA	67%	69%	50-150%
	13C2-PFTeDA	75%	78%	40-150%
	13C3-PFBS	103%	101%	50-150%
	13C3-PFHxS	102%	90%	50-150%
	13C8-PFOS	85%	77%	50-150%
	13C8-FOSA	99%	97%	30-140%
	d3-MeFOSAA	78%	77%	50-150%
	13C2-4:2FTS	109%	101%	50-150%
	13C2-6:2FTS	116%	108%	50-150%
	13C2-8:2FTS	97%	86%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Page 1 of 2

Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-DUP	2Q25369.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393
FA60120-6	2Q25368.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	Compound	FA60120-6 ug/l	DUP Q	ug/l	Q	RPD	Limits
375-22-4	Perfluorobutanoic acid	0.015 U		0.00521 J		200*	30
2706-90-3	Perfluoropentanoic acid	0.00847		0.0119		34*	30
307-24-4	Perfluorohexanoic acid	0.00626 JB		0.00998		46*	30
375-85-9	Perfluoroheptanoic acid	0.00280 J		0.00471 J		51*	30
335-67-1	Perfluorooctanoic acid	0.00285 JB		0.0135		130*	30
375-95-1	Perfluorononanoic acid	0.0077 U		ND		nc	30
335-76-2	Perfluorodecanoic acid	0.0077 U		ND		nc	30
2058-94-8	Perfluoroundecanoic acid	0.0077 U		ND		nc	30
307-55-1	Perfluorododecanoic acid	0.0077 U		ND		nc	30
72629-94-8	Perfluorotridecanoic acid	0.0077 U		ND		nc	30
376-06-7	Perfluorotetradecanoic acid	0.0077 U		ND		nc	30
375-73-5	Perfluorobutanesulfonic acid	0.00218 J		0.00195 J		11	30
2706-91-4	Perfluoropentanesulfonic acid	0.00333 J		0.00331 J		1	30
355-46-4	Perfluorohexanesulfonic acid	0.0230		0.0237		3	30
375-92-8	Perfluoroheptanesulfonic acid	0.00213 J		0.00223 J		5	30
1763-23-1	Perfluorooctanesulfonic acid	0.0977		0.108		10	30
68259-12-1	Perfluorononanesulfonic acid	0.0077 U		ND		nc	30
335-77-3	Perfluorodecanesulfonic acid	0.0077 U		ND		nc	30
754-91-6	PFOSA	0.0077 U		ND		nc	30
2355-31-9	MeFOSAA	0.038 U		ND		nc	30
2991-50-6	EtFOSAA	0.038 U		ND		nc	30
757124-72-44:2	Fluorotelomer sulfonate	0.015 U		ND		nc	30
27619-97-2	6:2 Fluorotelomer sulfonate	0.015 U		ND		nc	30
39108-34-4	8:2 Fluorotelomer sulfonate	0.015 U		ND		nc	30

CAS No.	ID Standard Recoveries	DUP	FA60120-6	Limits
	13C4-PFBA	102%	100%	30-140%
	13C5-PFPeA	105%	104%	40-140%
	13C5-PFHxA	106%	105%	50-150%
	13C4-PFHpA	108%	105%	50-150%
	13C8-PFOA	121%	124%	50-150%
	13C9-PFNA	102%	104%	50-150%
	13C6-PFDA	96%	100%	50-150%
	13C7-PFUnDA	105%	109%	50-150%

* = Outside of Control Limits.

Duplicate Summary

Page 2 of 2

Job Number: FA60120
Account: SGSAKA SGS North America, Inc
Project: 1186919

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
OP73097-DUP	2Q25369.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393
FA60120-6	2Q25368.D	1	12/21/18	NAF	12/19/18	OP73097	S2Q393

The QC reported here applies to the following samples:

Method: EPA 537M BY ID

FA60120-1, FA60120-2, FA60120-3, FA60120-4, FA60120-6

CAS No.	ID Standard Recoveries	DUP	FA60120-6	Limits
	13C2-PFDoDA	70%	79%	50-150%
	13C2-PFTeDA	78%	83%	40-150%
	13C3-PFBS	101%	100%	50-150%
	13C3-PFHxS	95%	99%	50-150%
	13C8-PFOS	78%	84%	50-150%
	13C8-FOSA	104%	98%	30-140%
	d3-MeFOSAA	77%	83%	50-150%
	13C2-4:2FTS	102%	101%	50-150%
	13C2-6:2FTS	116%	117%	50-150%
	13C2-8:2FTS	87%	91%	50-150%

* = Outside of Control Limits.

Laboratory Data Review Checklist

Completed By:

Craig Beebe

Title:

Geologist

Date:

January 2, 2019

CS Report Name:

101543-001 Gustavus PFAS

Report Date:

December 27, 2018

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

SGS North America Inc.

Laboratory Report Number:

1186919

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:

The analyses of perfluoroalkyl substances (PFASs) were performed by an SGS network laboratory in Orlando, FL.

The analysis of speciated arsenic was sub-contracted to Brooks Applied Labs in Bothell, WA.

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:

- 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 the samples were received in good condition and properly persevered by each of the three laboratories.

- 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 discrepancies noted in the sample receipt documentation for the three laboratories.

- e. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

4. Case Narrative

- a. Present and understandable?

☒ Yes ☐ No

Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

☒ Yes ☐ No

Comments:

*****SGS Anchorage Case Narrative*****

The case narrative notes the conductivity of the 2510B method blank, associated with preparation batch WTI/5078, was greater than the limit of quantitation (LOQ). The laboratory notes that the conductivity of the associated project samples were ten times greater than that of the method blank.

The case narrative notes that the relative precision demonstrated by the total suspended solids (TSS) result of the laboratory duplicate sample 1491314 DUP was outside of control limits. The laboratory notes that the difference between the primary and duplicate results is less than the LOQ.

The case narrative notes that the recovery of ammonia was outside of laboratory control limits in the matrix spike (MS) sample 1491314 MS associated with preparation batch WXX12655.

The case narrative notes that the recovery of nitrate/nitrite was outside of laboratory control limits in the MS duplicate (MSD) sample 1491650 MSD associated with analytical batch WFI2779.

*****SGS Orlando Case Narrative*****

The case narrative notes that the samples *PW-406*, *PW-405*, *PW-505*, *PW-202*, and *PW-200* have compound(s) reported with a 'B' qualifier. This qualifier indicates that the qualified compound was detected in the associated method blank.

The case narrative notes that the relative precision demonstrated by the laboratory duplicate sample OP73097-DUP was outside of control limits for the PFAS compounds perfluorobutanoic acid, perfluoroheptanoic acid, perfluorohexanoic acid, perfluorooctanoic acid, and perfluoropentanoic acid. The laboratory attributes these precision failures to sample non-homogeneity.

The case narrative notes that there was insufficient sample volume available to perform MS/MSD samples associated with batch OP73163.

*****Brooks Applied Labs Case Narrative*****

The cover letter notes that all data was reported without qualification (aside from concentration qualifiers) and that all associated quality control sample results met the method acceptance criteria.

c. Were all corrective actions documented?

☐ Yes ☒ No

Comments:

There were no corrective actions documented in the case narratives.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative did not specify an effect on the data quality and usability.

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 for 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:

- e. Data quality or usability affected?

☐ Yes ☒ No

Comments:

The data quality and usability were not affected.

6. QC Samples

- a. Method Blank

- i. One method blank reported per matrix, analysis and 20 samples?

☐ Yes ☒ No

Comments:

Method blanks were not reported for hardness nor pH analyses.

ii. All method blank results less than limit of quantitation (LOQ)?

☐ Yes ☒ No

Comments:

Oil & grease HEM was detected at an estimated concentration in the EPA 1664B method blank sample associated with preparation batch THOG/1253.

Nitrite-N and total nitrate/nitrite-N were detected at estimated concentrations in the SM21 4500NO₃-F method blank sample associated with preparation batch WFI/2779.

Alkalinity was detected at an estimated concentration in the SM21 2320B method blank sample associated with preparation batch WTI/5077.

Conductivity was measurable above the LOQ in the SM21 2510B method blank sample 1491254 associated with preparation batch WTI/5078. The method blank sample 1491259, associated with the same preparation batch, had conductivity measurable below the LOQ.

As(V) was detected in the BAL-4100 method blank samples associated with batch B183424.

Perfluorohexanoic and Perfluorooctanoic acids were detected at estimated concentrations in the EPA 537 (MOD) method blank sample associated with preparation batch OP73097.

iii. If above LOQ, what samples are affected?

Comments:

The samples *PW-200*, *PW-202*, *PW-405*, *PW-406*, *PW-408* and *PW-505* were affected by the oil & grease detection in the method blank associated with preparation batch THOG/1253.

The samples *PW-200*, *PW-202*, *PW-406*, and *PW-505* were affected by the total nitrate/nitrite-N detection in the method blank associated with preparation batch WFI/2779.

The samples were not affected by the detection of alkalinity in the method blank sample because the sample concentrations exceeded ten times that of the method blank concentration.

The samples were not affected by the elevated conductivity measurements of the method blank samples. The conductivities measured in the associated project samples exceeded ten times that of the method blank conductivities.

The samples were not affected by the detections of As(V) in the method blank samples because the sample concentrations exceeded ten times that of the method blank concentrations.

The samples *PW-200*, *PW-202*, *PW-405*, *PW-406*, and *PW-505* contained perfluorohexanoic acid and perfluorooctanoic acid at concentrations within five times that of the concentrations detected in the method blank, with one exception. Perfluorohexanoic acid was detected at a concentration within ten times that of the method blank concentration in the sample *PW-406*.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No

Comments:

The estimated oil & grease results of the samples *PW-200*, *PW-202*, *PW-405*, *PW-406*, *PW-408* and *PW-505* are considered false positives attributed to laboratory contamination. These results are flagged 'UB' at their respective LOQs.

The estimated total nitrate/nitrite-N results of the samples *PW-200*, *PW-202*, *PW-406*, and *PW-505* are considered false positives attributed to laboratory contamination. These results are flagged 'UB' at their respective LOQs.

The Perfluorooctanoic acid results of the samples *PW-200*, *PW-202*, *PW-405*, *PW-406*, and *PW-505* are considered false positives attributed to laboratory contamination and are flagged 'UB' at the sample concentration or LOQ (whichever is greater).

The perfluorohexanoic acid results of the samples *PW-200*, *PW-202*, *PW-405*, and *PW-505* are considered false positives attributed to laboratory contamination and are flagged 'UB' at the sample concentration or LOQ (whichever is greater). The perfluorohexanoic acid result of the sample *PW-406* is considered estimated with a high analytical bias. This result is flagged 'JH' for reporting purposes.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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 and MS samples were reported for oil & grease HEM analysis

LCS and MS/MSD samples were reported for total organic carbon (TOC) analysis.

LCS/LCSD and MS/MSD samples were reported for ammonia-N analysis.

LCS, MS, and laboratory duplicate samples were reported for PFAS 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 reported for metals analysis by EPA 200.8. No measure of analytical precision was provided for this method.

LCS/LCSD and laboratory duplicate samples were reported for TSS and total dissolved solids (TDS) analyses.

LCS and MS/MSD samples were reported for sulfide, nitrate/nitrite-N, chloride, fluoride, and sulfate analyses.

LCS and laboratory duplicate samples were reported for pH, alkalinity, and conductivity analyses.

LCS, MS/MSD, and laboratory duplicate samples were reported for speciated arsenic 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 recoveries of nitrate-N and nitrite-N were outside of laboratory control limits for the LCSs 1491653 and 1491668 and the MSD 1491650 associated with preparation batch WFI/2779.

The recovery of ammonia-N was below the lower control limit in the MS sample 1491434 associated with preparation batch WXX12655.

The recovery of sulfate was recorded at the lower control limit for the MS sample 1491672 associated with preparation batch WXX12657. The laboratory flagged this value, indicating that the result was below the lower control limit but rounded up.

- 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:

The relative precision demonstrated by the laboratory duplicate sample 1491314, did not meet acceptance criteria for TSS.

The relative precision demonstrated by the laboratory duplicate sample 1491315, did not meet acceptance criteria for TSS.

The relative precision demonstrated by the laboratory duplicate sample OP73097-DUP, did not meet acceptance criteria for the PFAS analytes perfluorobutanoic acid, perfluoropentanoic acid, perfluorohexanoic acid, perfluorooctanoic acid and perfluoroheptanoic acid.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

The laboratory duplicate sample 1491314 was performed using *PW-408* as the parent sample. The parent sample TSS result is considered affected by the analytical precision failure demonstrated by the laboratory duplicate sample.

The laboratory duplicate sample 1491315 was performed using a sample that was not included with this work order. The sample TSS results are considered unaffected by this precision failure.

The total nitrate/nitrite-N results of the project samples associated with this work order are considered to be affected by the recovery failures demonstrated by the LCS and MSD samples associated with preparation batch WFI/2779.

The MS sample 1491434 was performed using *PW-408* as the parent sample. The parent sample ammonia-N result is considered affected by the recovery failure demonstrated by the MS sample.

The MS sample 1491672 was performed using a sample that was not included with this work order. The sample sulfate results are considered unaffected by this recovery failure.

The laboratory duplicate sample OP73097-DUP was performed using *PW-200* as the parent sample. The parent sample perfluorobutanoic acid, perfluoropentanoic acid, perfluorohexanoic acid, perfluorooctanoic acid and perfluoroheptanoic acid results are considered affected by the analytical precision failures demonstrated by the laboratory duplicate sample.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☒ Yes ☐ No

Comments:

The TSS result of the sample *PW-408* is considered estimated due to the analytical precision failure in the laboratory duplicate sample. This result is flagged 'J' for reporting purposes.

The total nitrate/nitrite-N results of the project samples are considered estimated due to the conflicting biases in the recoveries of the individual nitrate-N and nitrite-N analytes in the LCS samples. However, the total nitrate/nitrite-N results of the samples *PW-200*, *PW-202*, *PW-406*, and *PW-505* were previously qualified for a method blank detection. Additional qualification of these samples is not required. The non-detect total nitrate/nitrite-N results of the samples *PW-405* and *PW-408* are considered estimated and flagged 'UJ' for reporting purposes.

The ammonia-N result of the sample *PW-408* is considered estimated with a low analytical bias due to the MS recovery failure. This result is flagged 'JL' for reporting purposes.

The perfluorobutanoic acid, perfluoropentanoic acid, perfluorohexanoic acid, perfluorooctanoic acid and perfluoroheptanoic acid results of the sample *PW-200* are considered estimated due to the analytical precision failures in the laboratory duplicate sample. These results are flagged 'J' for reporting purposes, unless qualified elsewhere.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and usability are affected; see above.

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 surrogate 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:

N/A; volatile analyses were not requested in this work order.

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:

A trip blank was not submitted with this work order.

iii. All results less than LOQ?

☒ Yes ☐ No

Comments:

Trip blanks are not required for this project.

iv. If above LOQ, what samples are affected?

Comments:

None; volatile analyses were not requested.

v. Data quality or usability affected?

Comments:

The data quality and usability were 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 pair *PW-405* / *PW-505* was submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

☐ Yes ☒ No

Comments:

The relative precision demonstrated between the results of the field duplicate samples was within the recommended DQO of 30% for all analytes, where calculable, except ammonia-N.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The ammonia-N results of the field duplicate samples *PW-405* and *PW-505* are considered estimated and flagged 'J' for reporting purposes; unless already qualified.

- f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

☐ Yes ☐ No ☒ Not Applicable

Project samples are not collected with reusable equipment, so the prospect of foreign contaminants being introduced through equipment contamination is not plausible.

- i. All results less than LOQ?

☒ Yes ☐ No Comments:

An equipment blank was not submitted with this work order.

- ii. If above LOQ, what samples are affected?

Comments:

None; an equipment blank was not required for this project.

- 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 other flags or qualifiers required.

IMPORTANT INFORMATION

Important Information

About Your Geotechnical/Environmental Report

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

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

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