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SUMMARY REPORT

February 2019 to February 2020 Water Supply Well Sampling

DILLINGHAM, ALASKA

SHANNON & WILSON

December 2020

Shannon & Wilson No: 102581-003/004

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Submitted To: Alaska Department of Transportation & Public Facilities, Central Region
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Attn: Michael Cook, C.M. and Sam Loud Cummings

Subject: SUMMARY REPORT, FEBRUARY 2019 TO FEBRUARY 2020 WATER SUPPLY WELL SAMPLING, DILLINGHAM, 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. Shannon & Wilson's services were authorized by several amendments to Professional Services Agreement Number 25-19-1-013 issued by the DOT&PF.

This report presents a summary of Shannon & Wilson's services from February 2019 through February 2020 and was prepared by the undersigned. This report has been revised in response to DOT&PF comments received in July and November 2020.

Shannon & Wilson appreciates the opportunity to be of service to you on this project. If you have questions concerning this report, or Shannon & Wilson may be of further service, please contact us.

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ACRONYMS

AAC	Alaska Administrative Code
AFFF	aqueous film-forming foam
ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
COC	chain of custody
DEC	Alaska Department of Environmental Conservation
DHSS	Alaska Department of Health and Social Services
DLG	Dillingham Airport
DNR	Alaska Department of Natural Resources
DOT&PF	Alaska Department of Transportation and Public Facilities
DRM	Alaska Department of Administration's Division of Risk Management
EPA	U.S. Environmental Protection Agency
LDRC	Laboratory Data Review Checklist
LHA	Lifetime Health Advisory
ng/L	nanograms per liter
PFAS	per- and polyfluoroalkyl substance
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perflurohexanesulfonic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonic acid
PFNA	perfluorononanoic acid
ppt	parts per trillion
QA	quality assurance
QC	quality control
TestAmerica	Eurofins TestAmerica Laboratories, Sacramento
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 well-search and water supply well-sampling efforts near the Dillingham Airport (DLG) in Dillingham, Alaska. This report covers February 2019 to February 2020 for this ongoing project. The DLG is an active, Alaska Department of Environmental Conservation (DEC) listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFAS) in groundwater and surface water (File Number 2540.38.023, Hazard ID 26971).

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

Shannon & Wilson's services were authorized by Professional Services Agreement Number 25-19-1-013 issued by DOT&PF on December 19, 2018, and the following contract amendments:

- Amendment 1, Notice to Proceed (NTP) 2-1 for initial response planning on January 17, 2019;
- Amendment 3, NTP 2-2 for public relations support on February 13, 2019;
- Amendment 3, NTP 2-3, 2-3a, and 2-3b for well search and sampling on February 13, 2019, May 31, 2019, and February 19, 2020;
- Amendment 10, NTP 2-4 and Amendment 13, NTP 2-4b for interim alternate water on April 4 and June 20, 2019; and
- Amendment 19, NTP 2-5 for quarterly residential monitoring on October 26, 2019.

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the potential for human exposure to PFAS in water supply water-supply wells near the DLG. Shannon & Wilson's objectives were to identify water supply wells in neighborhoods near the DLG, sample any active well identified, and resample water supply wells meeting the quarterly sampling criteria described in Section 2.3, Water Supply Well Monitoring. The well search areas are shown in Figure 1, Well Search Areas.

1.2 Background

The DLG is owned by the DOT&PF, which also owns multiple adjacent parcels. DOT&PF leases numerous lots for use as terminals, hangars, and other businesses (Area 1). The geographic coordinates of the DLG are latitude 59.043470, longitude -158.510496.

1.2.1 History of AFFF Use

The DOT&PF Crash and Fire Rescue program used aqueous film-forming foam (AFFF) for training and annual fire apparatus testing and possible emergency response at the DLG for many years. Areas of reported use are shown in Figure 2, AFFF Release Locations. DOT&PF personnel report limited use for training, and regular systems testing during Federal Aviation Administration inspections particularly towards the middle and south end of the runway. DOT&PF personnel released an estimated 5 gallons of AFFF in response to an aircraft incident towards the north portion of the runway on July 5, 2019 (Figure 2). DOT&PF does not have records of previous AFFF emergency response at the DLG. The City of Dillingham also has AFFF response capabilities, and AFFF may have been used for emergency response at fires off airport property. The precise timeline and locations of AFFF use at the DLG is unknown.

1.2.2 Sampling and Regulatory History

AFFF contains PFAS, a category of persistent organic compounds considered emerging contaminants. Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where AFFFs were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of concern to environmental and health agencies. In May 2016, the U.S. Environmental Protection Agency (EPA) published a Lifetime Health Advisory (LHA) level of 70 nanograms per liter (ng/L) (equivalent to parts per trillion (ppt)) for the sum of PFOS and PFOA in drinking water. In November 2016, the DEC Contaminated Sites Program published groundwater-cleanup levels of 400 ng/L for either PFOS or PFOA.

On August 20, 2018, the DEC published a Technical Memorandum outlining a new action level of 70 ng/L for the sum of five PFAS (PFOA, PFOS, perfluorohexane sulfonate [PFHxS], perfluoroheptanoate [PFHpA], and perfluorononanoate [PFNA]) in drinking water. The action level was submitted as a proposed regulation. PFAS projects for the State of Alaska adopted the proposed regulatory action level from August 2018 to March 2019.

In December 2018, DEC sampled nine wells near the DLG. Analytical results received on January 17, 2019 indicated that one well exceeded applicable action levels. These results triggered the water supply well search and sampling effort summarized in this report. The

initial response referenced the sum of five PFAS action level for the purposes of assessing drinking-water contamination.

On April 9, 2019 DEC issued an update to the August 20, 2018 Technical Memorandum rescinding the previous action level. The memo states “in order to align state actions to the recently announced EPA plans, DEC will use the EPA LHA (PFOS+PFOA above 0.07 µg/L) as the action level. Any new testing for PFAS will be for PFOS and PFOA only.” Water supply well sampling that occurred in Dillingham after April 9, 2019 referenced the EPA's LHA level for the purposes of assessing drinking-water contamination.

On October 2, 2019 DEC issued a second update to the August 20, 2018 Technical Memorandum stating, "any new testing for PFAS will report the full suite of PFAS compounds analyzed by the appropriate EPA Method." Responding to this update, DOT&PF requested revised laboratory reports for samples initially submitted for PFOS and PFOA only. These reports included four additional PFAS analytes. Water supply well sampling that occurred after October 2, 2019 reported 18 PFAS compounds as outlined in Section 1.4.

1.3 Geology and Hydrology

Dillingham is located at the confluence of the Nushagak and Wood Rivers, at the northernmost point of Nushagak Bay within Bristol Bay. Dillingham lies on a glacial moraine and outwash-mantled lowland with wide expanses of wetlands and lakes. Irregularly shaped rolling hills, including those in the well search area, are typically 50 to 100 feet high.

The Dillingham Airport is in the relatively flat floodplain of Nushagak River. The terrain is characterized as low rolling hills and muskeg underlain with peat bogs. The Dillingham airport lease area is within a muskeg swamp. Surface water is often present across the native ground surface, which is approximately 10 to 12 feet below the runway and embankment.

The area is underlain by a complex sequence of primarily fine-grained glacial, fluvial, and marine sediments that are several hundred feet thick. The subsurface consists of unconsolidated deposits of silt, sand, gravel, and boulders. These deposits are overlain with an intermingled, variable thickness of silt and organic silt at the surface. Although not encountered in water supply well logs, Dillingham lies within the sporadic permafrost zone (Hopkins, 1955). Depth to bedrock is unknown and estimated at over 200 feet (Mertie, 1938).

As part of an unrelated project to support the design of DLG runway improvements, Shannon & Wilson advanced over 25 soil borings at the DLG and along Wood River Road in March and April 2019. Wood River Road is adjacent to the northern half of the runway,

north of well search and sampling areas. Borings depths ranged from 16.5 to 41.5 feet below ground surface (bgs).

A 2019 investigation conducted by Shannon & Wilson at the DLG encountered 12 to 15.5 feet of fill in most runway area borings. In five test holes on the western edge of the runway it was between 2 and 5 feet thick. The fill was underlain by native fine-grained materials, organic rich material, and occasional granular soils. The fine-grained materials were dominated by silt; however, field staff also encountered silt with sand, clayey silt, and clay. During drilling, groundwater was observed at a wide range of depths, between 15 and 30 feet bgs. Groundwater was generally perched atop fine-grained soils over peat. Water levels can fluctuate by several feet seasonally or during periods of high precipitation or rapid snow melt. In lower-lying neighborhoods groundwater may be as shallow as 7 feet bgs.

The Wood River Road borings found approximately 2 feet of organic silt at the surface, overlying silt or clay for the remainder of the boring. Two of the four borings found native granular material consisting of silty sand with gravel at 19 and 35 feet bgs, respectively.

Shannon & Wilson reviewed water supply well logs obtained from property owners and the Alaska Department of Natural Resources (DNR) Well Log Tracking System (WELTS). The logs described interbedded sands, silts, and clays consistent with the soil borings summarized above. Several logs identify perched groundwater on top of silt or clay layers. Clay layers were encountered between 3 and 55 feet in thickness. Silt and clay, where present, likely impede the movement of PFAS-containing groundwater near the DLG.

Property owners and local drillers report wells with high-mineral content and sulfur odor, and wells with clear water from a range of depths near the DLG. This suggests there may be multiple, localized aquifers suppling water supply wells.

The DEC drinking water protection areas database indicates regional groundwater flow near the DLG is generally to the south. Approximately one mile west, the database indicates a southeastern flow direction (Figures 4 and 5). As part of another, unrelated project, Shannon & Wilson installed 11 groundwater monitoring wells in the Airport lease area in 2006 to investigate petroleum in groundwater. Due to tightly-packed silts, multiple different, localized groundwater flow directions were indicated but flow was primarily to the south or southwest. Based on the review of information from previous Shannon & Wilson reports, DNR WELTS, and other Dillingham-area sources, it is Shannon & Wilson's opinion that groundwater flow direction may vary within the study area.

1.4 Contaminants of Concern and Action Levels

The primary contaminants of concern are PFOS and PFOA. The current DEC action level for drinking water is the EPA LHA level of 70 ng/L for the sum of PFOS and PFOA. This action level was published in an April 9, 2019 update to *Technical Memorandum: Action Levels for PFAS in Water and Guidance on Sampling Groundwater and Drinking Water*.

The groundwater-cleanup level for PFOS or PFOA is 400 ng/L. These levels were promulgated in 18 AAC 75.345 on November 6, 2016.

On October 2, 2019, DEC published an updated Technical Memorandum requesting sample results be reported for the following 18 PFAS analytes:

- PFOS
- PFOA
- PFHpA
- PFNA
- PFHxS
- perfluorobutanesulfonic acid (PFBS)
- perluorodecanoic acid (PFDA)
- perluorododecanoic acid (PFDoA)
- perfluorohexanoic acid (PFHxA)
- perfluorotetradecanoic acid (PFTeA)
- perfluorotridecanoic acid (PFTrDA or PFTriA)
- perfluoroundecanoic acid (PFUnA)
- hexafluoropropylene oxide dimer acid (HFPO-DA)
- N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)
- N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)
- 11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)
- 9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CL-PF3ONS)
- 4,8-dioxa-3H-perfluorononanoic acid (DONA or ADONA)

Additional PFAS analytical methods for different matrices are being developed by the EPA. DEC's Technical Memorandum requests the use of new analytical methods as they are published and available.

The current drinking-water action level and current DEC groundwater-cleanup levels for PFOS and PFOA are summarized below in Exhibit 1-1. Previous action levels are described in Section 1.2.2.

Exhibit 1-1: Applicable Regulatory Action Levels

Media	Compound	Level
Drinking water	PFOS + PFOA	70 ng/L [a]
Groundwater	PFOS	400 ng/L [b]
Groundwater	PFOA	400 ng/L [b]

Notes:

ng/L is equivalent to ppt

a Drinking-water action level reported in DEC's April 9, 2019 Technical Memorandum. EPA's LHA was originally published in 2016.

b DEC groundwater-cleanup level is reported in micrograms per liter (µg/L) in 18 AAC 75.345, Table C.

1.5 Scope of Services

The scope of services summarized in this report includes water supply well search and sampling efforts in three geographic search areas (Figure 1, Well Search Areas), public-outreach support, site reconnaissance, quarterly resampling of select water supply wells, and coordinating interim bottled water deliveries. Please note this project is ongoing; planned future work is summarized in Section 4.3.

This report summarizes well search and sampling efforts performed between February 2019 and February 2020. The well search sought to identify water supply wells, well use, and well details. The initial well search in February 2019 included Areas 1 and 2, or properties within approximately one-half mile of the south end of the DLG runway (Figure 1). Shannon & Wilson interviewed DOT&PF staff and conducted a site reconnaissance of the DLG to document historic AFFF use locations. Field staff also collected a limited number of samples outside Areas 1 and 2. In response to PFAS concentrations above the action level, in June 2019 the well search expanded to include Area 3.

In November 2019 and February 2020, Shannon & Wilson conducted quarterly sampling at select locations.

DOT&PF began supplying bottled water through Shannon & Wilson as an interim alternate water source in February 2019. Water deliveries to impacted properties are ongoing. Shannon & Wilson is conducting a long-term alternative water feasibility study; this effort is not discussed in this report.

This report was prepared for the exclusive use of the DOT&PF and its representatives. This work presents Shannon & Wilson's professional judgment as to the conditions of the site. Information presented here is based on the sampling and analyses field staff performed.

This report should not be used for other purposes without Shannon & Wilson's approval or if any of the following occurs:

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

If any of these occur, Shannon & Wilson should be retained to review the applicability of 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 field activities performed between February 26, 2019 and February 12, 2020.

2.1 Well Search

Field staff began the well search by obtaining ArcGIS files from the City of Dillingham Planning Department. These files included tax parcels, owner names, and physical addresses. This information, available satellite imagery DNR's WELTS database, and subsurface water rights files listed on the DNR Water Estate Map were used to identify possible structures.

Shannon & Wilson scheduled sampling appointments with residents including those previously sampled by DEC and those who contacted DOT&PF in response to the January 18, 2019 DOT&PF press release (Appendix B, Public Information). Water supply well sample collection began on February 26, 2019.

Door-to-door well search activities began in Search Areas 1 and 2 (Figure 1) on February 27, 2019 following a public meeting hosted by various employees of the State of Alaska (see Section 2.8).

Field staff visited each parcel in the well search areas (Figure 1) to determine the current property use. Where a parcel was occupied, field staff asked property owners, employees, and/or occupants about their water source. Shannon & Wilson made a reasonable attempt to contact every property owner in the search areas. If occupants were unavailable, field staff left a door tag with contact information for a Shannon & Wilson representative. Field staff also used public telephone and business records, made multiple visits to the property, and/or asked neighbors for information.

Shannon & Wilson field staff completed a Private Well Inventory Survey Form for each identified water supply well (Appendix A). Please note, a water supply well as referenced herein does not match the DEC Drinking Water Program classification of a private water system, "a potable water system serving one single-family residence or duplex" (18 AAC 80, 2014). Well categories are described below. Wells that have been decommissioned are not categorized.

- Category 1: water supply wells used for drinking or cooking, as reported by owners or occupants.
- Category 2: water supply wells used for dish washing, bathing, and other domestic purposes. Homes or businesses where the occupants report they do not drink the water, but where the water supply wells lead to kitchen or bathroom faucets, are considered possible future drinking water wells.
- Category 3: water supply wells used for vegetable gardening and are not plumbed to indoor faucets or spigots. The well water is not 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: water supply wells used for outdoor purposes only, such as irrigation or vehicle washing. These wells are considered non-drinking water wells.
- Category 5: water supply wells currently not in use. Wells that have been abandoned in place, are inoperable, disconnected, or intended for future use, are considered non-drinking water wells.

Field staff requested to sample each category 1, 2, 3 and 4 well identified during the well search. During sampling field staff provided residents with a fact sheet with a list of project contacts, a two-page PFAS fact sheet published by the Agency for Toxic Substances and Disease Registry (ATSDR), and other information as requested (Appendix B, Public Information).

In response to site reconnaissance, field staff coordinated with DOT&PF to collect limited water supply well samples outside the well search area. Field staff identified geographically

distributed wells from Emperor Way west of Area 1, Wood River Road northeast of the DLG runway, and Kanakanak Road east of Area 2.

In coordination with the DOT&PF, DRM, and DEC, Shannon and Wilson expanded the well search and sampling area to include Area 3 in June 2019. Area 3 is located southeast of the airport runway (Figure 1).

Field staff collected one pre- and one post-treatment water samples from the [redacted] in February 2019 (samples 162620 and 162620-POST).

The results of the well search are summarized below in Exhibit 2-1; this does not include wells outside the search area. Please note, numerous wells in Dillingham serve multiple properties and some properties contain more than one well. Although 91 parcels within the search areas contained wells, 97 total wells were sampled during this reporting period. This includes parcels containing multiple wells and wells outside the well search area. Parcels classified as "unknown" have not had well status confirmed by owners or residents of the property. Some of these parcels appeared unoccupied; these parcels are included in future well search efforts.

Exhibit 2-1: Search Area Well Summary by Parcel

Well present – sampled	91
Well present – not sampled	3
Unknown – possible well	2
Unknown – improbable well	5
No well	98
Total	199

2.2 Water Supply Well Sampling

Shannon & Wilson conducted multiple water supply well-sampling events within the time period discussed in this report. 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
- Cherissa Dukelow, Environmental Scientist
- Alena Voight, Geologist

- Rachel Willis, Environmental Scientist
- Sheila Hinckley, Environmental Scientist
- Michael Jaramillo, Chemist

Shannon & Wilson field staff sampled 97 water supply wells during the reporting period; some wells were sampled multiples times. Field staff collected water supply well samples upstream of water-treatment systems or water softeners, where possible. Samples collected downstream of water treatment systems are listed in Section 2.9, Deviations. For the purposes of this project Shannon & Wilson does not consider small (i.e., less than 18 inches in height) particulate filters to be treatment systems.

Field staff purged the systems prior to sampling by allowing the water to run until parameters stabilized. Field staff measured these parameters using a multiprobe water quality meter (YSI). Field staff recorded pH, temperature, and conductivity every three to five minutes. The following values were used to indicate stability for a minimum of three consecutive readings: ±0.1 pH, ±0.5 degrees Celsius temperature, and ±3 percent conductivity.

Purge water was discharged to an indoor sink or to the ground surface. In most cases, indoor plumbing leads to a private septic system. Structures in the DLG lease area are connected to the City of Dillingham sewer system (Figure 1). Following parameter stabilization, field staff collected PFAS water samples using laboratory-supplied bottles. Copies of the Residential Well Sampling Logs are included in Appendix A.

Exhibit 2-2: Water Supply Well Purge and Sample Locations in Dillingham, Alaska.

Field staff are aware of the potential for cross-contamination from numerous everyday household items. Precautions to prevent cross-contamination include discontinuing the use

of personal protective equipment and field supplies known to contain PFAS, 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 Quarterly Monitoring

In November 2019 and February 2020, Shannon & Wilson collected samples from six quarterly monitoring locations. These are shown in Figure 3, Quarterly Sampling Locations.

Per DEC guidance, the following wells are included because the maximum combined PFOS and PFOA concentration is between 35 and 69 ng/L:

- [redacted] sample *191320*,
- [redacted] sample *191300*,
- [redacted] sample *191050*, and
- [redacted] sample *191700*.

The following wells are included because they are adjacent to wells where the combined PFOS and PFOA concentration is 35 ng/L or greater:

- Hangar in DLG lease area, [redacted] sample *191170*, and
- Terminal in Area 1 Sample *191290*,

Due to a scheduling conflict, *191170* was not sampled in November 2019. Field staff sampled six locations in February 2020.

2.4 Surface Water Sampling

In coordination with Dillingham DOT&PF in November 2019, Shannon & Wilson located the site of a recent AFFF emergency response discharge on the runway. Field staff collected a surface-water sample (*SW-001*) from the low-lying swamp adjacent to the discharge location, near a small culvert under a DLG access road (Figure 2, AFFF Release Locations). At the time of sample collection, the swamp was beginning to freeze; water was less than six inches deep.

2.5 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 analytical samples and chain-of-custody (COC) forms were packaged in a hard-plastic

cooler with an adequate quantity of frozen-ice substitute and packing materials to prevent bottle breakage. Staff applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory.

Shannon & Wilson shipped sample coolers to Eurofins TestAmerica Laboratories, Sacramento (TestAmerica) in West Sacramento, California for analysis of PFAS using Alaska Air Cargo priority overnight service, also known as Goldstreak. The samples were shipped from Goldstreak in Fairbanks and Anchorage. Water supply well samples were submitted promptly to the analytical laboratory after each well search and sampling effort. This allowed sufficient time for the laboratory to analyze the samples within holding-time requirements of the analytical method. Laboratory reports are included in Appendix C.

Shannon & Wilson also submitted samples to SGS North America Inc. in Anchorage, Alaska on November 19, 2019 for point-of-entry treatment system design. These results are discussed separately.

2.6 Notification of Results

Following Shannon & Wilson's review, environmental staff prepared analytical data tables and called property owners and occupants to notify them of the results.

Results letters specific to each property were mailed or emailed to owners and occupants, these included the following information:

- sample name;
- analytical results;
- comparison of analytical results to DEC's former action level (February 2019 only) or EPA's LHA level (remaining sampling events);
- description of the project; and
- pages of the TestAmerica laboratory report that apply to the water-well sample.

Analytical samples for the June 2019 sampling event were initially submitted for PFOS and PFOA only as directed by DEC's April 9, 2019 memorandum. After publication of revised guidance on October 2, 2019, DOT&PF requested the laboratory provide revised laboratory reports that included an additional four PFAS analytes. Following the receipt of the remaining analytical data, updated results letters were mailed in January 2020.

2.7 Alternative Water Sources

The City of Dillingham installed an outdoor spigot at the Dillingham Senior Center to provide water to residents who used the [redacted] (sample *191050*) as their drinking water source. Residents of impacted properties have been offered bottled water deliveries from N&N Market in Dillingham. They receive cases of 17-ounce bottles, 1-gallon jugs, and/or 2.5-gallon jugs. Initially, some residents collected bottled water from Bigfoot LGM, Inc., or Shannon & Wilson supplied locally purchased water directly. Properties receiving water deliveries are listed in Table 6, Water Delivery Recipients as of February 28, 2020.

Shannon & Wilson, Barr Engineering Co., and HDR Engineering, Inc. are performing a feasibility study to explore the various options to provide a long-term alternative water source to affected properties. The results of the Dillingham Long-Term Alternate Water Feasibility Study are not discussed in this report.

2.8 Public Information

The DOT&PF hosts a webpage describing the PFAS water-testing project. The webpage includes a project summary, list of contacts, simplified results map, and links to additional resources. The map is updated after the receipt of analytical data from a sampling event; Appendix B includes versions from March 2019 and March 2020.

On February 26, 2019 the DOT&PF hosted a public meeting at the Dillingham Elementary School. Representatives from the DOT&PF, DEC, and Alaska Department of Health and Social Services (DHSS) gave presentations. Flyers advertising the public meeting were displayed at public locations in Dillingham. A copy of the public-meeting flyer and presentation are included in Appendix B.

Exhibit 2-3: February 26, 2019 Public Meeting

2.9 Deviations

In general, Shannon & Wilson conducted services in accordance with the approved proposals and procedures. The following are deviations from the proposed scope of services listed in Section 1.0.

Exhibit 2-4: "Martin Spring"

- The following samples were collected from a location downstream of the property's water softener or other in-home treatment system during one or more sampling events: *172430*, *172030*, and *191110*.
- Sampling protocol includes stabilization of parameters; however, sample *191490* was collected from a continuously flowing spring (Martin Spring) and parameters were not stabilized prior to sample collection.
- Field staff collected two water samples from [redacted] in February 2019 (samples *162620* and *162620-POST)*. Field staff collected a single surface-water sample adjacent to the DLG runway. These samples were collected per DOT&PF request.
- Upon discussion with DOT&PF, the following water supply well samples outside Areas 1 through 3 were collected: *133340, 171435, 171240, 171260, 171270, 171352, 171351, 171180, 133370, 171400*, *180040*, and *171410*.
- The quarterly resampling criteria described in the October 26, 2019 proposal and Amendment 19 includes sampling wells within 500 feet of those whose maximum combined PFOS and PFOA concentration exceeds 35 ng/L. Field staff attempted to sample the locations indicated in the proposal; however, due to an ArcGIS projection error the proposal did not capture all wells within 500 feet. The projection error has been corrected and future sampling will include additional samples to meet the 500 feet buffer criteria.

3 ANALYTICAL RESULTS

Shannon & Wilson submitted water samples to TestAmerica for analysis of PFAS concentrations using EPA Methods 537M, 537.1, or 537.1M. Field staff collected 97 water supply well samples, two public water system samples, and one surface-water sample.

The February through June 2019 drinking-water samples were submitted for six PFAS listed in the EPA's Unregulated Contaminant Monitoring Rule (UCMR): PFOS, PFOA, PFHpA, PFNA, PFBS, and PFHxS. Please note only PFOS and PFOA concentrations were originally

reported for the June 2019 samples; the results for the four additional analytes were reported in revised laboratory reports issued in December 2019.

Most November 2019 samples were submitted for determination of 18 PFAS using Method 537.1. This method analyzes for PFOS, PFOA, PFHpA, PFNA, PFHxS, PFBS, PFDA, PFDoA, PFHxA, PFTeA, PFTrDA, PFUnA, HFPO-DA, N-EtFOSAA, N-MeFOSAA, 11CL-PF3OUdS, 9CL-PF3ONS and DONA. A single surface-water sample was submitted for determination of 18 PFAS by Method 537.1M. Four water supply well samples were submitted for determination of 24 PFAS and 23 non-PFAS analytes for water-treatment planning purposes. The additional analytes are reported separately.

In February 2020 seven drinking-water samples were submitted for determination of 18 PFAS using Method 537.1.

The TestAmerica laboratory reports and associated DEC Laboratory Data Review Checklists (LDRCs) for each work order (WO) are included in chronological order in Appendix C. Please note that Shannon & Wilson was asked to review data for samples collected by DEC in December 2018. The results for these samples (WO 82900) are not discussed in this section; however, the laboratory report and associated LDRC are included in Appendix C.

3.1 Initial Water Supply Well Samples

Table 1 summarizes the concentrations of six PFAS in first-time samples collected from water supply wells in February 2019. For the purposes of providing alternative drinking water, these results were compared to the action level of 70 ng/L for the sum of five PFAS compounds applicable at the time samples were collected. Table 1 includes sum of five and sum of PFOS and PFOA results. Field staff's sampling efforts identified results above action levels at [redacted]. The results for the sum of PFOS and PFOA range from not detected to 89 ng/L. The results for the sum of five PFAS range from not detected to 253 ng/L. The analyte with the highest concentrations was PFHxS, with results up to 170 ng/L.

The two [redacted] samples are also included in Table 1. Most PFAS were not detected above the laboratory reporting limit. PFHxS was detected at an estimated concentration of 1.1 ng/L in the pre-treatment water sample *162620*.

Table 2 summarizes the concentrations of six PFAS in first-time samples and a resample collected in June 2019. For the purposes of this report, concentrations are compared to the action level of 70 ng/L for the sum of PFOS and PFOA, the applicable action level at the time the samples were collected. The results for the sum of PFOS and PFOA range from not detected to 14 ng/L. Results for the resample collected from [redacted] are

comparable to the initial sampling event, but now exceed the EPA's LHA level. The sum of PFOS and PFOA results equals 78 ng/L and PFHxS concentration equals 61 ng/L in this sample.

3.2 Quarterly Samples

Table 3 summarizes the concentrations of 18 PFAS in first-time and quarterly samples collected in November 2019. The results for the sum of PFOS and PFOA range from not detected to 64 ng/L.

In addition to water supply well samples, Table 3 includes the results for a surface water sample (*SW-001*) collected from the low-lying area adjacent to a recent AFFF release on the airport runway. PFOS was detected at an estimated 1.6 ng/L, PFOA was not detected. PFNA and PFHxA were also detected at estimated concentrations below the method detection limit. HFPO-DA was detected at 4.0 ng/L.

Table 4 summarizes the concentrations of 18 PFAS in quarterly samples collected in February 2020. The results for the sum of PFOS and PFOA range from not detected to 34 ng/L.

Table 5 compares the concentrations of six PFAS in eight wells sampled two or more times between February 2019 and February 2020. The largest percent change in combined PFOS, PFOA, or LHA combined concentration was in sample *191320*, [redacted]. The LHA combined concentration for this well decreased from 56 ng/L to 1.7 ng/L between samples collected in February 2019 and November 2019. Other changes were minor, three sum of PFOS and PFOA concentrations increased between the first and second sampling event and all sum of PFOS and PFOA concentrations decreased between the second and third sampling event.

4 DISCUSSION AND RECOMMENDATIONS

Shannon & Wilson presents this discussion relevant to PFAS in groundwater at and near the DLG.

4.1 Comparison to Action Levels

Of the 97 water supply well samples collected between February 2019 and 2020, there were seven category 1 and 2 wells with combined concentrations exceeding applicable drinking-water action levels. Of these, four are category 1 wells and three are category 2 wells. These wells service a total of 11 buildings.

Six water supply well exceedances were discovered in Area 1; one was discovered in Area 3 (Figure 1). Within Area 1, the exceedances are located on airport property, and near the airport property line to the south of the lease area. These wells are shown in red in Figures 4 and 5 and summarized in Tables 1 and 2. There are no properties with water supply well exceedances in Area 2. There were no samples that exceeded the DEC groundwater-cleanup levels for PFOS or PFOA.

Figure 4 compares water supply well concentrations to the EPA's LHA level. Figure 5 compares water supply well concentrations to the former DEC action level (70 ng/L for the sum of PFOS, PFOA, PFHxS, PFNA, and PFHpA) applicable for samples collected prior to April 2019. PFOS and PFOA do not tend to be the most dominant PFAS compounds in water supply well samples collected from Dillingham. For this reason, wells may be denoted in red on Figure 5, but not on Figure 4. Several water supply wells near the single Area 3 exceedance contain PFHxS, PFBS, and PFHpA above detection limits, resulting in sum of five PFAS concentrations greater than 25 percent of the former DEC action level (former monitoring criteria).

PFHxS was most frequently the highest detected PFAS in water supply wells tested to date. However, samples collected in November 2019 and February 2020 were analyzed for additional PFAS not included in the earlier reports; these results show that PFHxA was the highest detected PFAS in several samples.

4.1.1 Concentrations with Depth

Reported well depths ranged from 20 feet to 310 feet bgs. Where Shannon & Wilson has obtained depth information, less than 20 percent came from well logs or direct measurements. The depth of approximately one-third of the water supply wells sampled is unknown.

Samples collected from water supply wells in close proximity often showed highly variable PFAS results, both in concentration and types of PFAS present. There was no apparent correlation between well depth and maximum sum of five PFAS concentration in wells. Depths were reported by the owners and occupants of the seven impacted wells, and some are considered estimated. The seven wells exceeding applicable action levels range from 32 to 87 feet deep.

4.2 Surface Water

A surface-water sample was collected approximately four months after an AFFF release on the DLG runway. PFAS-containing water from the release may have flowed offsite or settled into swamp sediments. It is unclear whether water in the swamp remains onsite or is

directed away from the DLG. Results for the surface-water sample near the AFFF release site were low, although further site characterization is needed to evaluate the extent of PFAS impacts from the July 2019 release.

4.3 Quarterly Water Supply Well Monitoring

The purpose of the well monitoring network is to evaluate the potential for human PFAS exposure through drinking water in different seasons. Analytical data from the first two quarterly sampling events, conducted in November 2019 and February 2020, demonstrated minimal seasonal variation in PFAS concentrations with one notable exception. Results for sample *191320* were 56 ng/L combined PFOS and PFOA in February 2019, 1.7 ng/L in November 2019, and 1.4 ng/L in February 2020 (Table 5). The second-highest change between consecutive sample results was in sample *191700*. The combined PFOS and PFOA concentration for this well decreased from an estimated 48 ng/L to 27 ng/L between November 2019 and February 2020.

During sampling efforts in February 2019, it was observed that samples were collected during spring snow melt. Anecdotal reports from residents indicate that water quality changes seasonally, indicating higher levels of iron and other unpalatable qualities during thaw. The spring thaw had not yet begun during the sampling efforts in February 2020, despite sampling taking place at the same time of year.

Future sampling is planned for water supply wells that meet the quarterly sampling criteria, pending resolution of COVID-19 travel restrictions. Shannon & Wilson will further evaluate seasonal trends when there is sufficient data to conduct statistical analyses (4 sampling events during the same seasonal time period).

4.4 Planned Future Work

DOT&PF intends to continue quarterly sampling throughout 2020, contingent upon local, state, and federal COVID-19 regulations and guidance. The May 2020 sampling event has been canceled due to local travel restrictions and quarantine requirements.

During the next sampling event, field staff will continue to visit properties for which well status is unknown in addition to known sample locations. The outcomes of the ongoing water supply well resampling and well search efforts will be reported separately.

4.5 Recommendations

Based on the water supply well search and sampling efforts completed between February 2019 to February 2020, Shannon & Wilson recommends the DOT&PF continue to:

- attempt to identify wells at properties where well status is unknown, per Exhibit 2-1;
- sample select water supply wells quarterly, where practical due to COVID-19 regulations and guidance;
- 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.

Shannon & Wilson recommends quarterly resampling of active wells within 500 lateral feet of wells with a combined PFOS and PFOA concentration greater than or equal to 35 ng/L. This distance buffer captures several water supply wells near the single Area 3 exceedance (sample *200150*), including a water supply well serving multiple apartment buildings, a church, and four homes east of the exceedance (well *200340*). Based on occupant-reported information, these wells are similar in depth. Shannon & Wilson also recommends annual resampling of all category 1 through 4 wells with a sum of PFOS and PFOA greater than 17.5 ng/L, per DEC guidance.

Shannon & Wilson further recommends that DOT&PF assess the lateral and vertical extent of the PFAS groundwater plume at and near the DLG. Shannon & Wilson's *DOT&PF Statewide PFAS General Work Plan Revision 1* (GWP) was submitted July 2020 and has been approved. Shannon & Wilson recommends preparing a Dillingham addendum that would include a preliminary conceptual site model describing potential and known contaminant-exposure pathways; and PFAS groundwater, surface water, and soil samples. It is recommended that the first phase of site characterization occur in spring or summer 2021.

Recommendations are based on:

- Offsite groundwater conditions inferred through water supply well analytical water samples collected during the reporting period.
- The results of testing performed on water samples collected from the water supply wells on, near, and downgradient from the DLG.
- Publicly available literature and data reviewed for this project.
- The understanding of the project and information provided by the DOT&PF, DRM, and other members of the project team.
- Conditions observed as they existed during sampling efforts in February 2019, June 2019, November 2019, and February 2020.
- The limitations of Shannon & Wilson's approved Professional Services Agreement Number 25-19-1-013.

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. "Important Information about your Geotechnical/Environmental Report" has been prepared and is included, to assist you and others in understanding the use and limitations of this report.

5 REFERENCES

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Table 1 - February 2019 Private Well Analytical Results

Analyte				Perfluoro-octanoic acid (PFOA)	Perfluoro-octanesulfonic acid (PFOS)	Perfluoro-butanesulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	LHA Combined (PFOS + PFOA)	Sum of 5 PFAS§
Action Level				70†		-	-	-	-	70†	70§
Sample Name	Address	Sample Date	Well Category	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
133340	[redacted]	2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
133370		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
162620		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	1.1 J	N/A	1.1 J‡
162620-POST		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171180		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171240		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171260		2/28/2019	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171270		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171345		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171351		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171352		2/28/2019	1	<2.0	3.9	<2.0	<2.0	<2.0	<2.0	3.9 ‡	3.9 ‡
171400		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
171410		3/1/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172030		2/28/2019	1	3.0	<2.0	<2.0	<2.0	<2.0	1.2 J	3.0 ‡	4.2 J‡
172040		2/26/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172241		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	2.6	N/A	2.6 ‡
172250		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172300		2/28/2019	1	6.6	<2.0	<2.0	<2.0	<2.0	<2.0	6.6 ‡	6.6 ‡
172320		2/27/2019	1	9.7	1.5 J	1.3 J	2.7	<2.0	6.8	11 J	21 J‡
172320.2		3/1/2019	1	1.9 J	<2.0	<2.0	0.85 J	<2.0	11	1.9 J‡	14 J‡
272320.2		3/1/2019	1	2.1	1.6 J	<2.0	0.86 J	<2.0	11	3.7 J	16 J‡
172340		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172392		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172399		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	1.4 J	N/A	1.4 J‡
172410		2/27/2019	1	<2.0	<2.0	1.9 J	<2.0	<2.0	2.6	N/A	2.6 ‡
172420		2/27/2019	1	<2.0	1.5 J	<2.0	1.7 J	<2.0	2.9	1.5 J‡	6.1 J‡
172430		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
172440		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
180040		2/26/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191040		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191050		2/26/2019	1	4.2	42	57	3.4	<2.0	170	46	220 ‡
291050 (DUP)		2/26/2019	1	3.8	42	54	3.2	<2.0	160	46	209 ‡
191090		2/27/2019	1	<2.0	<2.0	1.1 J	<2.0	<2.0	1.5 J	N/A	1.5 J‡
191101		2/28/2019	1	1.4 J	2.3	2.2 I	<2.0	<2.0	4.6	3.7 J	8.3 J‡

Table 1 - February 2019 Private Well Analytical Results

Analyte				Perfluoro-octanoic acid (PFOA)	Perfluoro-octanesulfonic acid (PFOS)	Perfluoro-butanesulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	LHA Combined (PFOS + PFOA)	Sum of 5 PFAS§
Action Level				70†		-	-	-	-	70†	70§
Sample Name	Address	Sample Date	Well Category	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
191110	[redacted]	3/1/2019	1	1.5 J	<2.0	9.9	1.8 J	<2.0	18	1.5 J‡	21 J‡
191132		2/27/2019	2	<2.0	<2.0	4.9	<2.0	<2.0	51	N/A	51 ‡
191170		2/27/2019	2	1.6 J*	<2.0	<2.0	0.93 J	<2.0	<2.0	1.6 J*‡	2.5 J*‡
291170 (DUP)		2/27/2019	2	0.76 J*	<2.0	<2.0	<2.0	<2.0	<2.0	0.76 J*‡	0.76 J*‡
191210		2/26/2019	2	<2.0	5.0	<2.0	<2.0	<2.0	<2.0	5.0 ‡	5.0 ‡
191210.1		2/26/2019	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191240		2/26/2019	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191280		2/28/2019	2	2.6	<2.0	<2.0	2.2	<2.0	1.8 J	2.6 ‡	6.6 J‡
191290		2/27/2019	2	3.7	<2.0	<2.0	3.9	<2.0	2.4	3.7 ‡	10 ‡
191300		2/27/2019	2	36	2.7	1.9 J	39	<2.0	7.6	39	85 ‡
191320		2/26/2019	1	13	43	10 J*	13	2.8	15	56	87
291320 (DUP)		2/26/2019	1	12	38	14 J*	13	2.9	15	50	81
191381		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191420		2/26/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191440		2/27/2019	2	<2.0	<2.0	<2.0	<2.0	<2.0	1.9 J	N/A	1.9 J‡
191450		2/27/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
191480		2/27/2019	1	2.7	4.3	5.7	5.1	<2.0	14	7.0	26 ‡
191490		2/27/2019	1	2.4	5	3.2	4.1	<2.0	11	7.4	23 ‡
191700		2/28/2019	2	15	37	34	16	<2.0	88	52	156 ‡
191710		2/27/2019	1	25	64	48	24	<2.0	140	89	253 ‡
191720		2/28/2019	2	22	58	47	22	<2.0	140	80	242 ‡
191741		2/26/2019	1	1.5 J	8.8	20	1.3 J	<2.0	46	10 J	58 J‡
291741 (DUP)		2/26/2019	1	1.4 J	9.5	20	1.2 J	<2.0	47	11 J	59 J‡
191750		2/26/2019	1	<2.0	2.5	13	<2.0	<2.0	28	2.5 ‡	31 ‡
191760		2/26/2019	1	<2.0	<2.0	3.5	<2.0	<2.0	5.7 I	N/A	5.7 I‡
191770		3/1/2019	1	<2.0	<2.0	1.7 J	<2.0	<2.0	2.6	N/A	2.6 ‡
291770 (DUP)		3/1/2019	1	<2.0	<2.0	1.8 J	<2.0	<2.0	2.5	N/A	2.5 ‡
191810		2/27/2019	1	1.4 J	<2.0	<2.0	<2.0	<2.0	1.4 J	1.4 J‡	2.8 J‡
191841		2/26/2019	1	1.5 J	<2.0	1.8 J	0.85 J	<2.0	2.0	1.5 J‡	4.4 J‡
200020		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200020.2		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200030		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200040		3/2/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200060		2/28/2019	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A

Table 1 - February 2019 Private Well Analytical Results

				Analyte	Perfluoro-octanoic acid (PFOA)	Perfluoro-octanesulfonic acid (PFOS)	Perfluoro-butanesulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	LHA Combined (PFOS + PFOA)	Sum of 5 PFAS§
				Action Level	70†		-	-	-	-	70†	70§
Sample Name	Address	Sample Date	Well Category		ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
300060 (DUP)	[redacted]	2/28/2019	1		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200070		3/1/2019	1		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A
200090		2/27/2019	1		1.2 J	<2.0	5.0	1.4 J	<2.0	2.5	1.2 J‡	5.1 J‡
200150		2/28/2019	1		5.1	60	7.9	2.4	<2.0	53	65	121 ‡
200340		2/27/2019	1		1.6 J	7.2	3.6	1.2 J	<2.0	12	8.8 J	22 J‡
200380		2/28/2019	1		<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A	N/A

ppt parts per trillion, equivalent to nanograms per liter
LHA Lifetime Health Advisory
† LHA level is 70 ppt for PFOS and PFOA combined.
§ Sum of 5 PFAS is equal to the sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA. Former DEC action level is 70 ppt for samples taken prior to April 2019.
Bold Concentration exceeds action level.
DUP Field-duplicate sample
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
I Value is estimated maximum possible concentration. Flag applied by the laboratory.
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.
‡ 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 LHA Combined or Sum of 5 PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

Table 2 - June 2019 **Water Supply Well** Analytical Results

Analyte				Perfluoro-octanoic acid (PFOA)	Perfluoro-octanesulfonic acid (PFOS)	Perluoro-butane sulfonic acid (PFBS)	Perfluoro-heptanoic acid (PFHpA)	Perfluoro-nonanoic acid (PFNA)	Perfluoro-hexane sulfonic acid (PFHxS)	LHA Combined (PFOS + PFOA)
Action Level				70†		-	-	-	-	70†
Sample Name	Address	Sample Date	Well Category	ppt	ppt	ppt	ppt	ppt	ppt	ppt
172020	[redacted]	6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	2.0	N/A
172050		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172060		6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172090		6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
272090 (DUP)		6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172100		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172150		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172155		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172170		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172180		6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172190		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
272190 (DUP)		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172200		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172220		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172230		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172243		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
272243 (DUP)		6/12/19	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172245		6/11/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172280		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
172390		6/10/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
191430		6/12/19	1	1.2 J	<2.0	<2.0	2.9	<2.0	2.9	1.2 J‡
191520		6/13/19	1	<2.0	<2.0	0.95 J	<2.0	<2.0	<2.0	N/A
191861		6/12/19	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
200100		6/12/19	1	<2.0	<2.0	2.7	<2.0	<2.0	1.6 J	N/A
200132		6/10/19	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
200140		6/11/19	1	0.96 J	13	<2.0	<2.0	<2.0	11	14 J
200150		6/11/19	1	5.3	73	7.6	2.6	<2.0	59	78
300150 (DUP)		6/11/19	1	5.5	72	7.5	2.9	<2.0	61	78
200310		6/10/19	1	1.7 J	7.0	3.2	<2.0	<2.0	17	8.7 J
200320		6/10/19	1	2.8	16	3.9	<2.0	<2.0	22	19
200390		6/12/19	1	1.3 J	<2.0	2.5 I	<2.0	<2.0	8.7	1.3 J‡
200400		6/11/19	1	2.8	4.6	2.7	<2.0	<2.0	10	7.4
200410		6/11/19	1	1.1 J	2.6	1.6 J	<2.0	<2.0	6.3	3.7 J
200420.1		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
200420.2		6/12/19	1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A

ppt parts per trillion, equivalent to nanograms per liter
LHA Lifetime Health Advisory
† LHA level is 70 ppt for PFOS and PFOA combined.
Bold Concentration exceeds action level.
DUP Field-duplicate sample
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
I Value is estimated maximum possible concentration. Flag applied by the laboratory.
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
‡ Minimum concentration, the LHA Combined or Sum of 5 PFAS concentration includes one or more result that is not detected greater than the MDL.
N/A Not applicable. The LHA Combined or Sum of 5 PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

Table 3 - November 2019 Quarterly and First-Time **Water Supply** Well Analytical Results

		Sample Name	*172210*	*172370*	*191050*	*191290*	*191300*	*191320*	*191700*		*191710*	*200150*	*SW-001*
		Address	[redacted]										
		Well Category	2	1	1	2	2	1	2		1	1	N/A
Analyte	EPA LHA	Units	11/15/19	11/15/19	11/15/19	11/16/19	11/16/19	11/14/19	11/15/19		11/15/2019	11/15/2019	11/14/19
Perfluorooctanoic acid (PFOA)	70†	ppt	<1.9	1.8 J	4.3	4.9	34	1.7 J	15	16	22	5.5	<2.0
Perfluorooctane sulfonate (PFOS)		ppt	<1.9	<1.9	40	<1.9	6.5	<1.9	33 J*	31 J*	58	58	1.6 J
Perfluorobutanesulfonic acidd (PFBS)	-	ppt	0.24 J	0.77 J	50	0.64 J	1.3 J	12	24	24	34	6.9	<2.0
Perfluoroheptanoic acid (PFHpA)	-	ppt	<1.9	<1.9 B*	2.8	4.4	33	9.3	17	18	23	2.4	<2.0 B*
Perfluorononanoic acid (PFNA)	-	ppt	<1.9	<1.9	<1.9	0.34 J	1.9 J	<1.9	<1.9	<2.0	<1.8	<1.8	0.63 J*
Perfluorohexanesulfonic acid (PFHxS)	-	ppt	<1.9 B*	<1.9 B*	140	2.4 JH*	8.5	6.5	79	81	110	56	<2.0 B*
4,8- Dioxa-3H-perfluorononanoic acid (ADONA)	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	-	ppt	<19	<19	<19	<19	<20	<19	<19	<20	<18	<18	<20
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
Perfluorotridecanoic acid (PFTrDA)	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
Perfluorotetradecanoic acid (PFTeA)	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
Hexafluoropropylene oxide dimer acid (HFPO-DA)	-	ppt	<3.8	<3.8	<3.8	<3.9	<3.9	<3.8	<3.9	<4.0	<3.7	<3.7	4.0
Perfluorodecanoic acid (PFDA)	-	ppt	<1.9	<1.9	<1.9	<1.9	1.1 J	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
N-ehtylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	-	ppt	<19	<19	<19	<19	<20	<19	<19	<20	<18	<18	<20
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
Perfluorohexanoic acid (PFHxA)	-	ppt	1.1 J	2.0	37	11	67	59	81	78	110	16	1.6 J
Perfluoroundecanoic acid (PFUnA)	-	ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
Perfluorododecanoic acid (PFDoA)		ppt	<1.9	<1.9	<1.9	<1.9	<2.0	<1.9	<1.9	<2.0	<1.8	<1.8	<2.0
LHA Combined (PFOS + PFOA)	70†	ppt	N/A	1.8 J‡	44	4.9 ‡	41	1.7 J‡	48 J*	47 J*	80	64	1.6 J‡

ppt	parts per trillion, equivalent to nanograms per liter
EPA	Environmental Protection Agency
LHA	Lifetime Health Advisory
†	EPA LHA level is 70 ppt for PFOS and PFOA combined.
<	Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
Bold	Concentration exceeds LHA level.
DUP	Field-duplicate sample
J	Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J*	Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.
JH*	Estimated concentration, biased high due to quality control failures. Flag applied by Shannon & Wilson, Inc.
B*	Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc.
‡	Minimum concentration, the LHA Combined oconcentration includes one or more result that is not detected greater than the MDL.
N/A	Not applicable

Table 4 - February 2020 Quarterly **Water Supply** Well Analytical Results

Sample Name			*191050*	*191170*	*191290*	*191300*	*191320*	*191700*	
Address			[redacted]						
Well Category			1	2	2	2	1	2	
Analyte	EPA LHA	Units	2/11/2020	2/11/2020	2/10/2020	2/10/2020	2/10/2020	2/11/2020	
Perfluorooctanoic acid (PFOA)	70†	ppt	3.0	<1.7	3.9	32	1.4 J	9.4	8.7
Perfluorooctane sulfonate (PFOS)		ppt	31	<1.7	<1.8	1.5 J	<1.9	18	19
Perfluorobutanesulfonic acidd (PFBS)	-	ppt	41	0.53 J	<1.8	1.2 J	11	17	17
Perfluoroheptanoic acid (PFHpA)	-	ppt	2.4	0.45 J	3.4	36	9.0	10	11
Perfluorononanoic acid (PFNA)	-	ppt	<2.0	<1.7	<1.8	0.48 J	<1.9	<1.9	<1.9
Perfluorohexanesulfonic acid (PFHxS)	-	ppt	140	0.71 J	1.9	7.5	5.7	59	60
4,8- Dioxa-3H-perfluorononanoic acid (ADONA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
N-methylperfluorooctanesulfonamidoacetic acid	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorotridecanoic acid (PFTrDA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorotetradecanoic acid (PFTeA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9 J*	<1.9	<1.9
Perfluorodecanoic acid (PFDA)	-	ppt	<2.0	<1.7 J*	<1.8 J*	<1.8 J*	<1.9	<1.9 J*	<1.9
N-ehtylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorohexanoic acid (PFHxA)	-	ppt	28	2.3	8.2	62	46	47	50
Perfluoroundecanoic acid (PFUnA)	-	ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
Perfluorododecanoic acid (PFDoA)		ppt	<2.0	<1.7	<1.8	<1.8	<1.9	<1.9	<1.9
LHA Combined (PFOS + PFOA)	70†	ppt	34	N/A	3.9 ‡	34 J	1.4 J‡	27	28

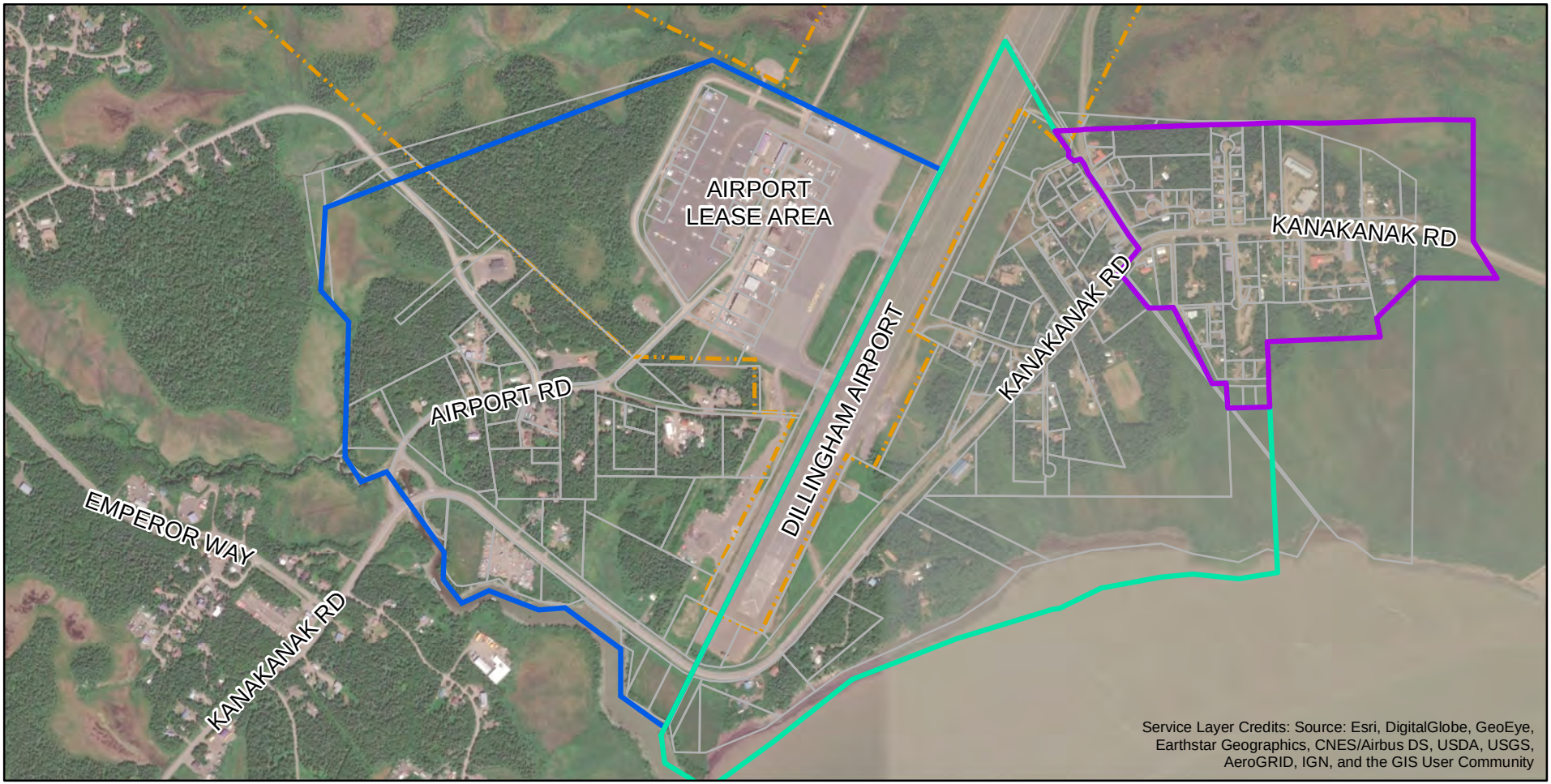
ppt parts per trillion, equivalent to nanograms per liter
EPA Environmental Protection Agency
LHA Lifetime Health Advisory
† EPA LHA level is 70 ppt for PFOS and PFOA combined.
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.
Bold Concentration exceeds LHA level.
DUP Field-duplicate sample
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.
J* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.
‡ Minimum concentration, the LHA Combined oconcentration includes one or more result that is not detected greater than the MDL.
N/A Not applicable

Table 5 - Dillingham Quarterly Comparison of **Water Supply** Well Results

Analyte			Perfluorooctanoic acid (PFOA)	Perfluoro-octanesulfonic acid (PFOS)	Perfluorobutane sulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorohexane sulfonic acid (PFHxS)	LHA Combined (PFOS + PFOA)	Exceed LHA Level?†
EPA LHA Level			70†		—	—	—	—	70†	—
Sample Name	Address	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt	—
191050	[redacted]	2/26/2019	4.2	42	57	3.4	<2.0	170	46	NO
191050		11/15/2019	4.3	40	50	2.8	<1.9	140	44	
191050		2/11/2020	3.0	31	41	2.4	<2.0	140	34	
191170		2/27/2019	1.6 J*	<2.0	<2.0	0.93 J	<2.0	<2.0	1.6 J*‡	NO
191170		2/11/2020	<1.7	<1.7	0.53 J	0.45 J	<1.7	0.71 J	N/A	
191290		2/27/2019	3.7	<2.0	<2.0	3.9	<2.0	2.4	3.7 ‡	NO
191290		11/16/2019	4.9	<1.9	0.64 J	4.4	0.34 J	2.4 JH*	4.9 ‡	
191290		2/10/2020	3.9	<1.8	<1.8	3.4	<1.8	1.9	3.9 ‡	
191300		2/27/2019	36	2.7	1.9 J	39	<2.0	7.6	39	NO
191300		11/16/2019	34	6.5	1.3 J	33	1.9 J	8.5	41	
191300		2/10/2020	32	1.5 J	1.2 J	36	0.48 J	7.5	34 J	
191320		2/26/2019	13	43	10 J*	13	2.8	15	56	NO
191320		11/14/2019	1.7 J	<1.9	12	9.3	<1.9	6.5	1.7 J‡	
191320		2/10/2020	1.4 J	<1.9	11	9.0	<1.9	5.7	1.4 J‡	
191700		2/28/2019	15	37	34	16	<2.0	88	52	NO
191700		11/15/2019	15	33 J*	24	17	<1.9	79	48 J*	
191700		2/11/2020	9.4	18	17	10	<1.9	59	27	
191710		2/27/2019	25	64	48	24	<2.0	140	**89**	YES
191710		11/15/2019	22	58	34	23	<1.8	110	**80**	
200150		2/28/2019	5.1	60	7.9	2.4	<2.0	53	65	YES to NO
200150		6/11/2019	5.3	73	7.6	2.6	<2.0	59	78	
200150		11/15/2019	5.5	58	6.9	2.4	<1.8	56	64	

ppt parts per trillion, equivalent to nanograms per liter
EPA Environmental Protection Agency
LHA Lifetime Health Advisory
RE Resample result
† EPA LHA level is 70 ppt for PFOS and PFOA combined.
— EPA LHA level not established
Bold Concentration exceeds EPA LHA level.
‡ Minimum concentration, the LHA Combined includes one result that is not detected greater than the MDL.
< 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* Result considered estimated due to a QC failure. Flag applied by Shannon & Wilson, Inc.
JH* Estimated concentration, biased high due to quality control failures. Flag applied by Shannon & Wilson, Inc.
N/A Not applicable. The LHA Combined concentration could not be calculated because one or more PFAS was not detected in the project sample.

Table 6 contains personal information. Content has been removed for confidentiality.



LEGEND

- Area 1
- Area 2
- Area 3
- Parcel Boundaries
- Airport Boundary

0 0.5

Miles

N

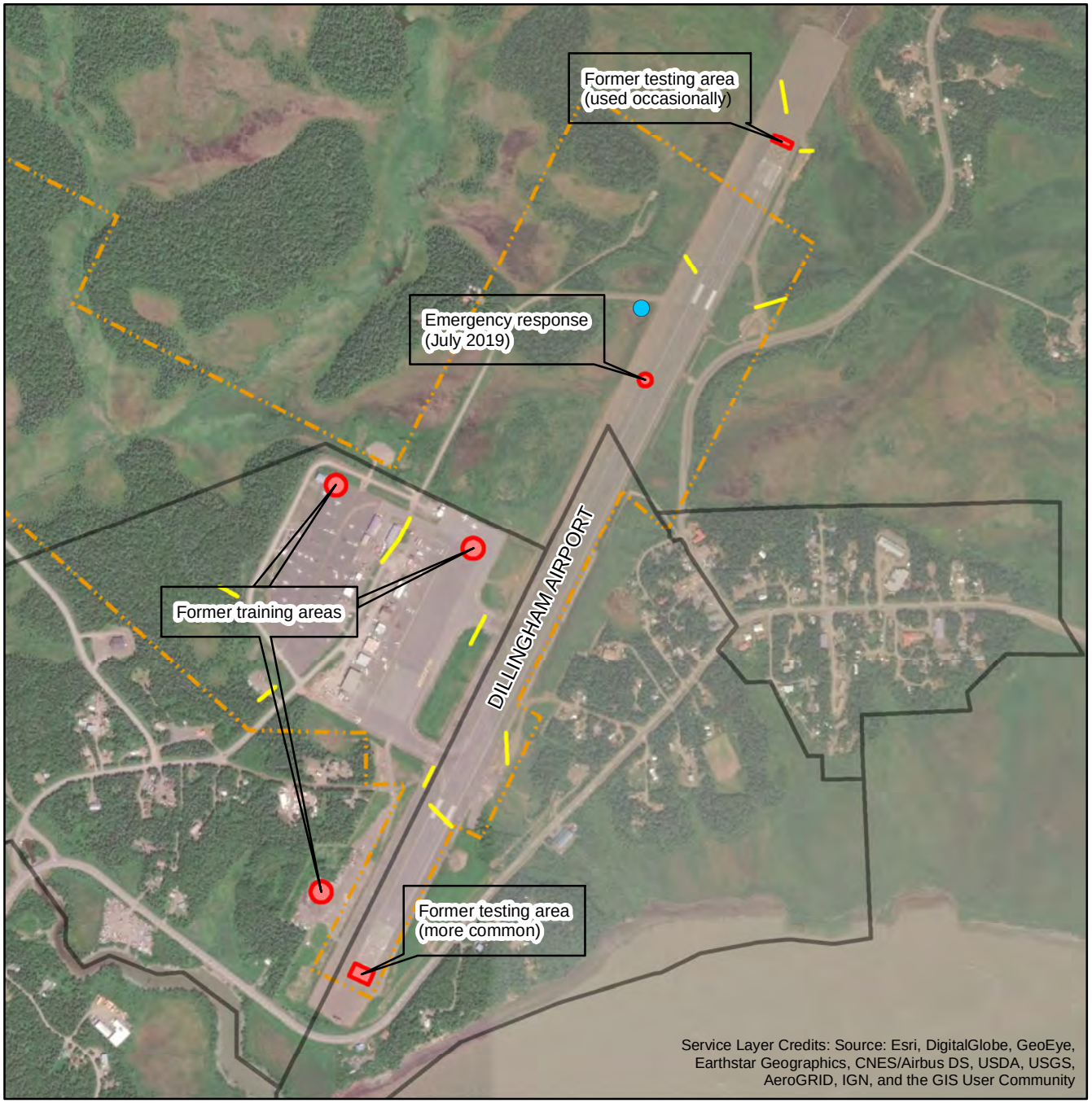
Dillingham Airport
Dillingham, Alaska

WELL SEARCH AREAS

December 2020 102581

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



LEGEND

- Aircraft Rescue and Firefighting (ARFF) Site
- Drainage Outfall
- Surface-water sample
- Airport Boundary

0 0.4

Miles

N

Dillingham Airport
Dillingham, Alaska

AFFF RELEASE LOCATIONS

December 2020 102581

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 2

LEGEND

- Quarterly sampling locations in November 2019 and February 2020
- Sum of PFOS and PFOA exceeds LHA (≥70 ppt)
- Previously sampled, not included in quarterly
- Airport Boundary

0 500 1,000 1,500

Feet

N

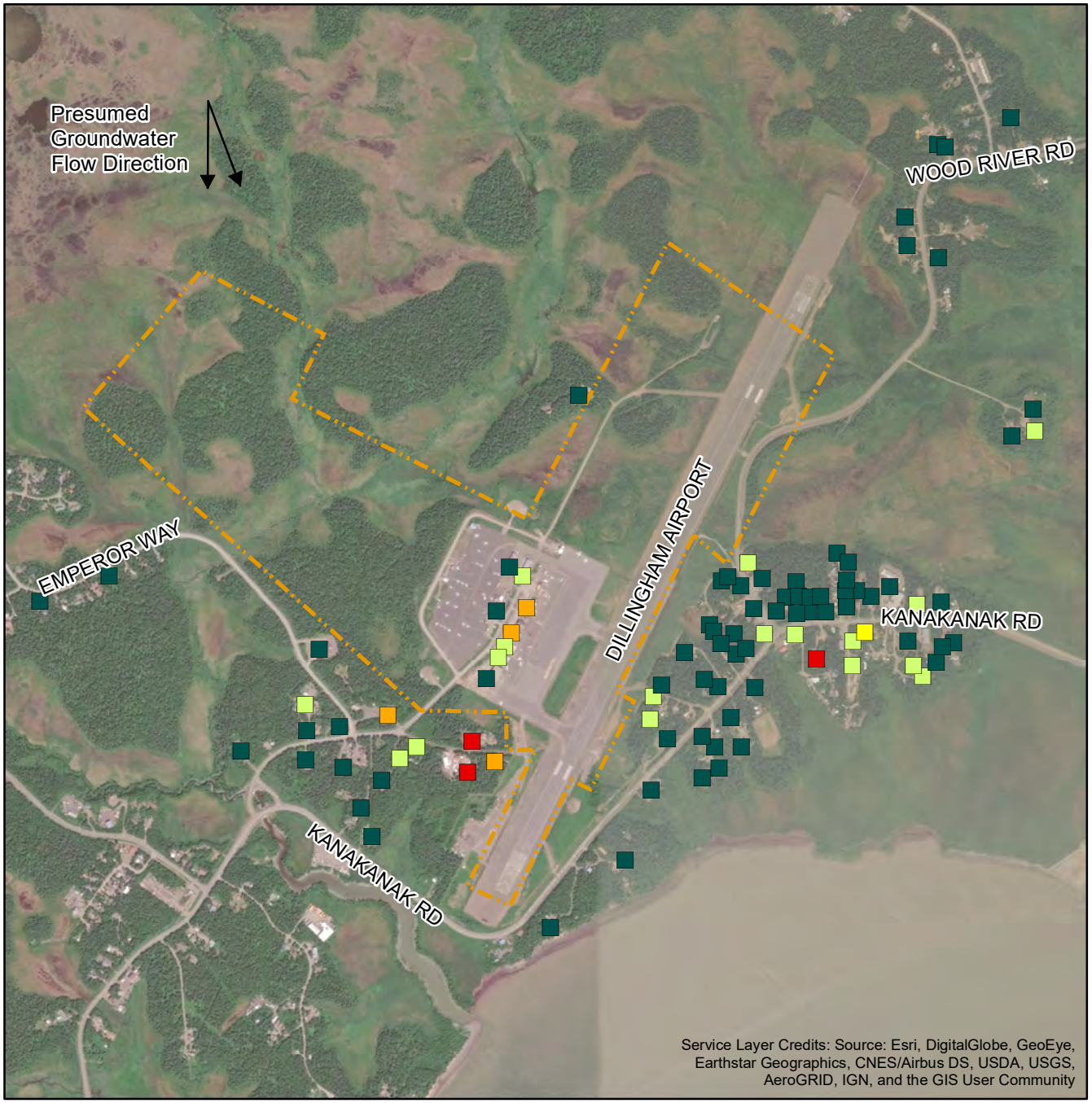
Dillingham Airport
Dillingham, Alaska

QUARTERLY SAMPLING LOCATIONS

December 2020 102581

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 3



LEGEND

Highest result of PFOS and PFOA

- ≤ 2.0 parts per trillion (ppt)
- 2.1 - 16 ppt
- 17 - 34 ppt
- 35 - 69 ppt
- ≥ 70 ppt (over current EPA LHA)
- Airport Boundary

0 0.25 0.5

Miles

N

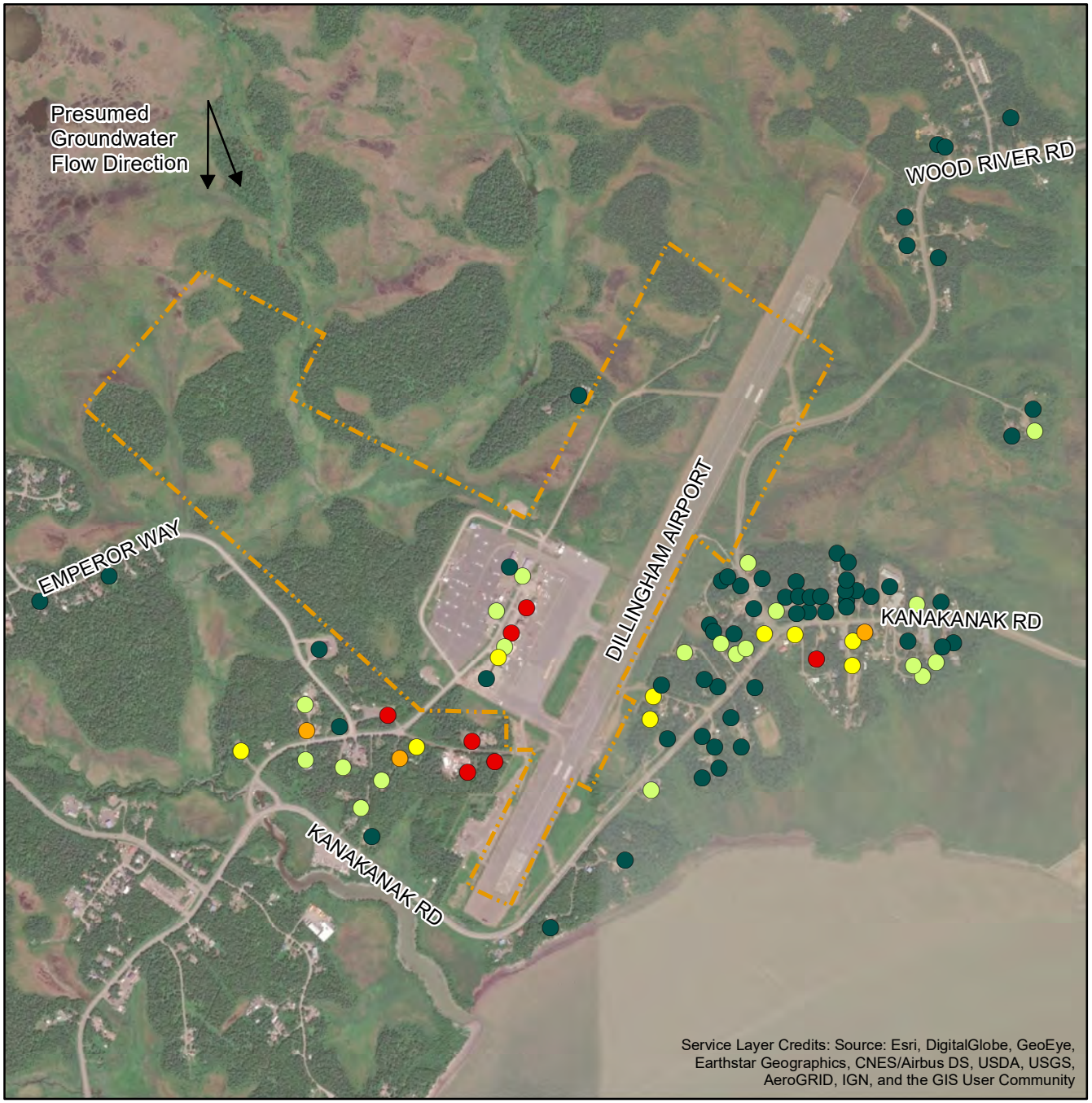
Dillingham Airport
Dillingham, Alaska

PFOS AND PFOA ANALYTICAL RESULTS

December 2020 102581

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 4



LEGEND

Highest result of PFOS, PFOA, PFHxS, PFHpA and PFNA

- ≤2.0 parts per trillion (ppt)
- 2.1 - 16 ppt
- 17 - 34 ppt
- 35 - 69
- ≥ 70 ppt (over former ADEC action level)
- Airport Boundary

0 0.25 0.5

Miles

N

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

Dillingham Airport
Dillingham, Alaska

SUM OF FIVE PFAS ANALYTICAL RESULTS

December 2020 102581

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 5

APPENDIX A: FIELD LOGS

Appendix A

FIELD LOGS

CONTENTS

This appendix contains personal information. Content has been removed for confidentiality.

APPENDIX B: PUBLIC INFORMATION

Appendix B

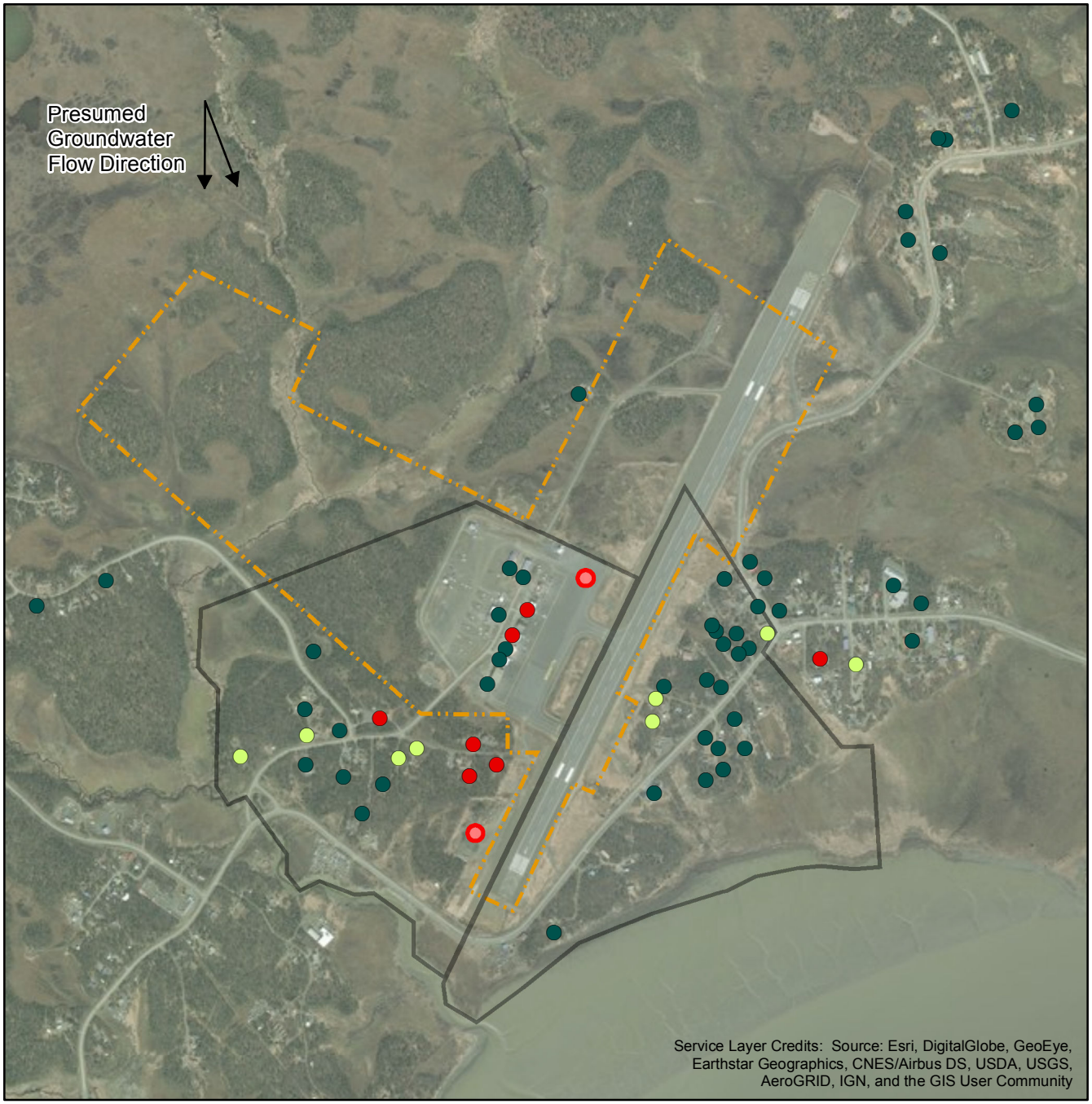
PUBLIC INFORMATION

CONTENTS

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

Shannon & Wilson, Inc. Maps and Letter Templates



LEGEND

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

- ≤ 17 parts per trillion (ppt)
- 18 to 64 ppt
- ≥ 65 ppt (over ADEC action level)
- Well Search Areas
- Airport Boundary
- Aircraft Rescue and Firefighting (ARFF) Site

0 0.5 1

Miles

N

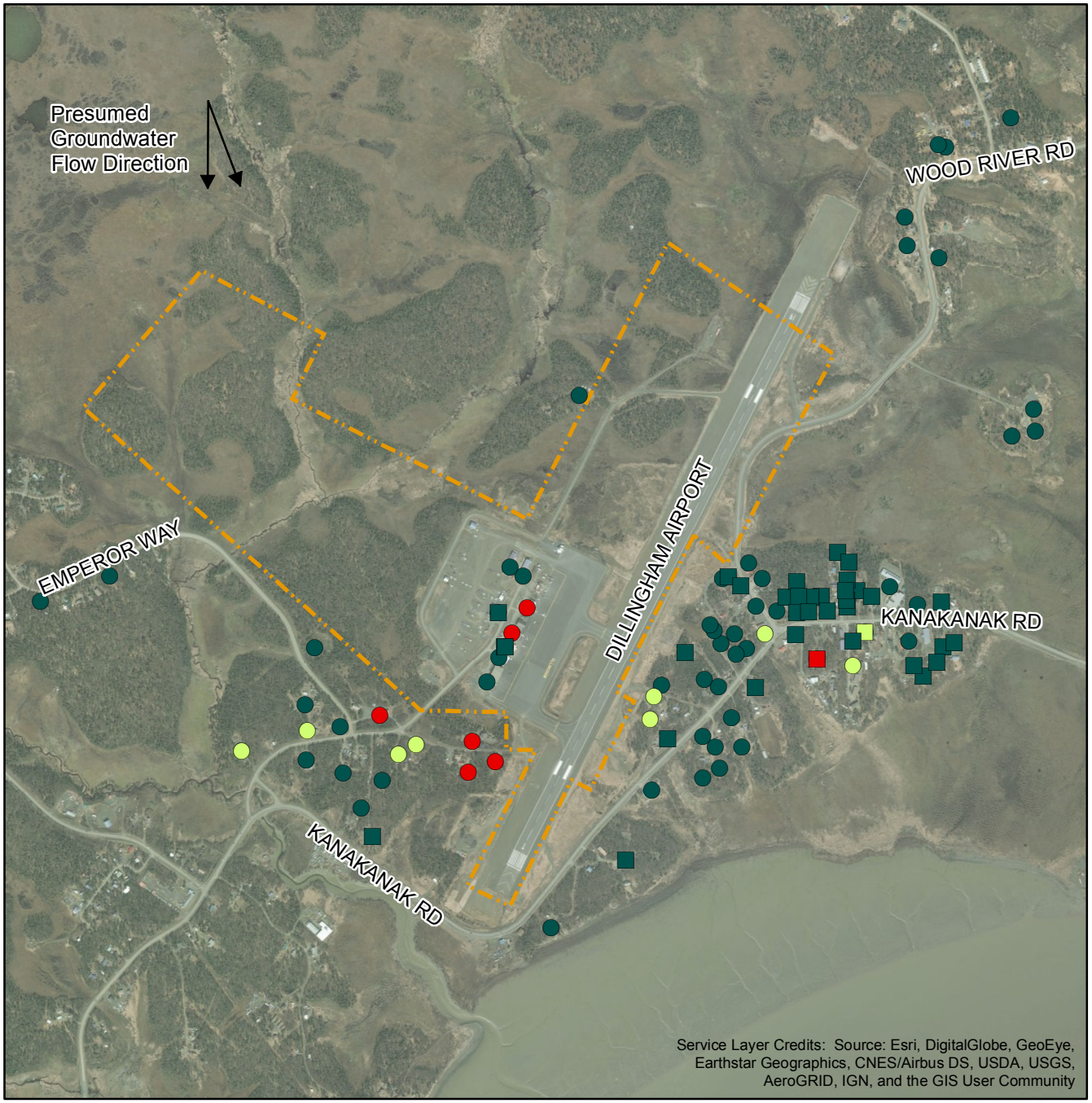
Dillingham Airport
Dillingham, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

March 2019 102581-003

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1



LEGEND

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

- ≤ 17 parts per trillion (ppt)
- 18 to 69 ppt
- ≥ 70 ppt (over EPA advisory)

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

- ≤ 17 ppt
- 18 to 69 ppt
- ≥ 70 ppt (over former ADEC action level)
- Airport Boundary

0 0.25 0.5

Miles

N

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

Dillingham Airport
Dillingham, Alaska

PFAS WELL SEARCH AND SAMPLE LOCATIONS

March 2020 102581

SHANNON & WILSON, INC. GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Figure 1

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Private Well Inventory Survey Form

Date: _____ Parcel ID#: _____

Physical Address: _____

Name (Owner): _____

Name (Occupant): _____

Mailing Address (Owner): _____

Mailing Address (Occupant): _____

Owner Email: _____ Occupant Email: _____

Owner Phone: _____ Occupant Phone: _____

Preferred method of contact (circle): Email Phone

Number of people 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
   - ☐ Cooking food preparation
   - ☐ Other _____
   - ☐ Vegetable/grain Gardening
     -Size of Garden_____ sq.feet/acres
     -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 the Shannon & Wilson, Inc. have permission to sample your private well? ☐ Yes ☐ No

_____ _____
Signature Date

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

P.O. Box 196900, 99519-6900
4111 Aviation Avenue, 99502
Anchorage, AK
Main: 907.269.0730
Fax: 907.269.0489
dot.state.ak.us

February 26, 2019

Dear Property Owner or Occupant:

The Department of Transportation and Public Facilities (DOT&PF) was recently alerted to concentrations of per- and polyfluoroalkyl substances (PFAS) in groundwater near the Dillingham Airport. Firefighters at the Dillingham Airport used aqueous film forming foam (AFFF), a standard firefighting agent that contains PFAS, to extinguish hydrocarbon fires during training exercises and emergency events.

The levels of PFAS in the Holy Rosary Church well exceeded the Department of Environmental Conservation (DEC) action level for drinking water. The Holy Rosary Church has discontinued public access to their water well. Community members who used the Church well as a drinking-water source may visit the Dillingham Senior Center instead. Nine wells were sampled on or near airport property, the others had concentrations well below the action level of 70 parts per trillion for the sum of five PFAS compounds.

The DOT&PF has contracted with environmental consulting firm Shannon & Wilson, Inc. to continue the preliminary investigation. Shannon & Wilson, Inc. will identify and sample private water wells near the airport to determine if these substances are present and above recommended levels. PFAS are emerging contaminants, research into the health effects of exposure to PFAS is ongoing.

Results of the water samples will be shared with property residents. If your well is found to have PFAS above the DEC action level, DOT&PF will assist with access to clean drinking water.

If you have any questions, please contact me, or see the list on the reverse side of this letter to identify the most appropriate person or agency for your inquiry. We appreciate your patience as we work through this process.

Sincerely,

Sammy Loud
PFAS Project Manager, DOT&PF Statewide Aviation

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

March X, 2019

NAME
MAILING ADDRESS
Dillingham, AK 99576

RE: RESULTS OF FEBRUARY 2019 PFAS PRIVATE WELL SAMPLING, DILLINGHAM AIRPORT

Dear Mr. and Mrs. 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 Dillingham Airport. Shannon & Wilson, Inc. collected a water sample on February X, 2019, from the well at your residence/business. Enclosed are the analytical results for the sample from your residential/commercial 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 compounds. 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.

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 excluding PFBS /or/ the five PFAS compounds were not detected] in the water sample collected from your well. The sum of the 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.

We sampled over 60 private water-supply wells in Dillingham on behalf of the Alaska Department of Transportation and Public Facilities (DOT&PF). DOT&PF will provide an alternative drinking water source to the occupants of homes and businesses whose well water exceeds the ADEC action level, and who use their water for drinking or cooking. //OR// is

2355 HILL ROAD
FAIRBANKS, ALASKA 99709-5326
907-479-0600 • FAX 907-479-5691

offering your residence/business an alternate source of drinking water. Please contact N&N Market at (907) 842-5283 if you have any questions or concerns regarding bottled water delivery.

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

Sincerely,

SHANNON & WILSON, INC.

Name
Title

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

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FAIRBANKS, ALASKA 99709-5326
907-479-0600 • FAX 907-479-5691

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

July 15, 2019

Full Name/s
PO Box
Dillingham, AK 99576

RE: RESULTS OF JUNE 2019 PFAS PRIVATE WELL SAMPLING, DILLINGHAM AIRPORT

Dear Mr. and Ms. Name,

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 Dillingham Airport. Shannon & Wilson, Inc. collected a water sample on June X, 2019, from the well at your residence/business. Enclosed are the analytical results for the sample from your residential/commercial water-supply well at PHYSICAL ADDRESS. We have prepared an identical letter for your tenant/s NAME.

The well-water sample was analyzed for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA). We compare these concentrations to the U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water. The lifetime health advisory level is 70 parts per trillion (ppt) for the sum of PFOS and PFOA. Please note that these units are equivalent to nanograms per liter (ng/L). [For resamples only: With the recent release of the EPA's PFAS action plan in February 2019, the state's multi-agency response effort now aligns with the EPA's LHA level. Previous analytical results for your well were compared to the former Alaska Department of Environmental Conservation action level.]

Results of the analysis conducted by TestAmerica Laboratories, Inc. indicate that PFOS was not/was detected at X ppt, and PFOA was not/was detected at X ppt in the water sample from your well. The sum of these PFOS and PFOA concentrations is less than the lifetime health advisory 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.

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907-479-0600 • FAX 907-479-5691

The Alaska Department of Transportation and Public Facilities (DOT&PF) is providing an alternate source of drinking water to the occupants of homes and businesses whose well water exceeds the health advisory level, and who use their water for drinking or cooking. //OR// is offering your residence/business an alternate source of drinking water. N & N Market is coordinating bottled water deliveries; they can be reached at (907) 842-5283

We have sampled over 90 private water-supply wells near the Dillingham Airport on behalf of DOT&PF. Please see the enclosed PFAS fact sheet for a link to the DOT&PF project website, as requests are received we will update the website map. 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. ###
PFAS Fact Sheet – Dillingham Airport
Dillingham Results Map

2355 HILL ROAD
FAIRBANKS, ALASKA 99709-5326581
907-479-0600 • FAX 907-479-5691

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Month X, 2019

Full Name/s
Mailing Address
City, AK xxxxx

RE: RESULTS OF NOVEMBER 2019 PFAS PRIVATE WELL SAMPLING, DILLINGHAM AIRPORT

Dear Mr. and Ms. Name,

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 Dillingham Airport. Shannon & Wilson, Inc. collected a water sample on November X, 2019, from the well at your residence/business. Enclosed are the analytical results for the sample from your residential/commercial water-supply well at PHYSICAL ADDRESS. We have prepared an identical letter for your tenant/s NAME.

The well-water sample was analyzed for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and other PFAS compounds. We compare these concentrations to the U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water. The lifetime health advisory level is 70 parts per trillion (ppt) for the sum of PFOS and PFOA. Please note that these units are equivalent to nanograms per liter (ng/L). [For resamples only: With the recent release of the EPA's PFAS action plan in February 2019, the state's multi-agency response effort now aligns with the EPA's LHA level. Previous analytical results for your well were compared to the former Alaska Department of Environmental Conservation action level.]

Results of the analysis conducted by TestAmerica Laboratories, Inc. indicate that PFOS was not/was detected at X ppt, and PFOA was not/was detected at X ppt in the water sample from your well. The sum of these PFOS and PFOA concentrations is less than/greater than the lifetime health advisory 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.

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907-479-0600 • FAX 907-479-5691

The Alaska Department of Transportation and Public Facilities (DOT&PF) is providing an alternate source of drinking water to the occupants of homes and businesses whose well water exceeds the health advisory level, and who use their water for drinking or cooking. //OR// is offering your residence/business an alternate source of drinking water. N&N Market is coordinating bottled water deliveries; they can be reached at (907) 842-5283.

We sampled over 90 private water-supply wells near the Dillingham Airport on behalf of DOT&PF. Please see the enclosed PFAS fact sheet for a link to the DOT&PF project website, as requests are received we will update the website map. Feel free to contact us if you have questions regarding your results.

Sincerely,

SHANNON & WILSON, INC.

Name
Title

Enc: Select Pages of Test America Laboratory Report No. 320-xxxxx
PFAS Fact Sheet – Dillingham Airport

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FAIRBANKS, ALASKA 99709-5326
907-479-0600 • FAX 907-479-5691

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Month X, 2019

Full Name/s
Mailing Address
City, AK xxxxx

RE: RESULTS OF NOVEMBER 2019 PRIVATE WELL SAMPLING, DILLINGHAM AIRPORT

Dear Mr. and Ms. Name,

Thank you for participating in our private-well sampling program to evaluate the potential for Point-of-Entry Treatment (POET) systems to reduce per- and polyfluoroalkyl substances (PFAS) in your well water. Shannon & Wilson, Inc. collected a water sample on November X, 2019, from the well at your residence/business. Enclosed are the analytical results for the sample from your residential/commercial water-supply well at PHYSICAL ADDRESS. We have prepared an identical letter for your tenant/s NAME.

The well-water sample was analyzed for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), other PFAS compounds, metals, petroleum, and additional parameters. Please note these samples were collected to evaluate the effectiveness of POET remediation technology for your area. We compare the PFOS and PFOA concentrations to the U.S. Environmental Protection Agency's (EPA) health advisory level for drinking water. The lifetime health advisory level is 70 parts per trillion (ppt) for the sum of PFOS and PFOA. Please note that these units are equivalent to nanograms per liter (ng/L). [For resamples only: With the recent release of the EPA's PFAS action plan in February 2019, the state's multi-agency response effort now aligns with the EPA's LHA level. Previous analytical results for your well were compared to the former Alaska Department of Environmental Conservation action level.] The other results are provided for your information only; we have not compared these concentrations to state and/or federal drinking-water standards.

Results of the analyses conducted by TestAmerica Laboratories, Inc. and SGS Laboratories, Inc. are summarized in the enclosed table (sample number *XXXXXX* and field-duplicate sample

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XXXXXX). PFOS was not/was detected at X ppt, and PFOA was not/was detected at X ppt in the water sample from your well. The sum of these PFOS and PFOA concentrations is less than/greater than the lifetime health advisory level.

The Alaska Department of Transportation and Public Facilities (DOT&PF) is providing an alternate source of drinking water to the occupants of homes and businesses whose well water exceeds the health advisory level, and who use their water for drinking or cooking. //OR// is offering your residence/business an alternate source of drinking water. N&N Market is coordinating bottled water deliveries; they can be reached at (907) 842-5283.

We sampled over 90 private water-supply wells near the Dillingham Airport on behalf of DOT&PF. Please see the enclosed PFAS fact sheet for a link to the DOT&PF project website, as requests are received we will update the website map. Feel free to contact us if you have questions regarding your results.

Sincerely,

SHANNON & WILSON, INC.

Name
Title

Enc: Analytical Results Table
PFAS Fact Sheet – Dillingham Airport

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907-479-0600 • FAX 907-479-5691

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

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4111 Aviation Avenue, 99502
Anchorage, AK
Main: 907.269.0730
Fax: 907.269.0489
dot.state.ak.us

January 16, 2020

Re: Updated Sampling Method and Results for PFAS Private Well Sampling

Dear Well User,

Thank you for participating in our private-well sampling program to evaluate the potential presence of per- and polyfluoroalkyl substances (PFAS) in groundwater near a Department of Transportation and Public Facilities (DOT&PF) airport. Shannon & Wilson, Inc. has previously collected a sample from the well at your home or business.

Samples collected between April 9, 2019 and Oct. 2, 2019 were analyzed in compliance with the Department of Environmental Conservation's (DEC) technical memorandum in which the action level for drinking water of 70 parts per trillion (ppt) for the sum of two compounds, PFOS and PFOA.

Although the action level remains the same for the sum of PFOS and PFOA, as of Oct. 2, 2019 DEC updated their technical memorandum to include, *"Any new testing for PFAS will report the full suite of PFAS compounds analyzed by the appropriate EPA Method."* The appropriate EPA Method 537.1 for PFAS sampling includes a suite of 18 compounds: PFOS, PFOA, PFHpA, PFHxS, PFBS, PFNA, HFPO-DA, NEtFOSAA, NMeFOSAA, PFDA, PFDoA, PFHxA, PFTA, PFTrDA, PFUnA, 11C1-PF3OUdS, 9C1-PF3ONS, ADONA.

Shortly after the update, DEC requested DOT&PF work with environmental contractor, Shannon & Wilson, Inc., and the project laboratories to re-report samples that were collected under the previous policy where only PFOS and PFOA were reported. We asked the laboratory to provide information for any and all PFAS that were quantified at the time the samples were analyzed. After engaging the laboratories, it was determined that in some cases it was possible to retrieve additional data.

Enclosed are updated analytical results from the sampling event/s you participated in. Please be advised that the lab was not able to report on all 18 compounds stated above and has provided all of the data that was available to us retroactively.

To sign up for email alerts, view project updates, contact information, fact sheets and/or maps visit: www.dot.state.ak.us/airportwater/

Sincerely,

Sammy Cummings, C.M.
Development Specialist, PFAS Coordinator
Alaska Department of Transportation & Public Facilities

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

DOT&PF Fliers, Notices, Press Releases, and Letters

John MacKinnon
Commissioner

Department of Transportation
and Public Facilities

www.DOT.Alaska.Gov

Juneau, Alaska

STATE OF ALASKA

PRESS RELEASE

For Immediate Release: Jan. 18, 2019

PFAS Discovered in Groundwater Near Dillingham Airport Firefighting Foam Discharge Areas

DOT&PF immediately offering alternate water source; expanding testing.

(Dillingham, Alaska) – The Alaska Department of Transportation and Public Facilities (DOT&PF) was recently alerted to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in one well located at the Holy Rosary Church near the Dillingham Airport. Nine wells were sampled on or near airport property. The Holy Rosary Church well tested at 186 parts per trillion (ppt) for the sum of five PFAS compounds, which exceeds the Alaska Department of Environmental Conservation (DEC) action level of 70 ppt. The eight other wells that were tested ranged from not detected to 22 ppt.

The Alaska Department of Environmental Conservation (DEC) began initial sampling of private water wells near airport property in December. DOT&PF has contracted with third-party independent contractor, Shannon & Wilson, Inc. to finish the preliminary investigation, which includes an in-depth well search and sampling.

"The safety of Dillingham residents is of utmost importance. As soon as PFAS were discovered, DOT&PF in collaboration with DEC and Shannon & Wilson, Inc. initiated the process of notifying the impacted residents to provide an alternate source of drinking water," said John Binder, DOT&PF Deputy 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 apparel, some consumer products, and firefighting aqueous film forming foams (AFFF). The use of AFFF during firefighting equipment testing at the Dillingham 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.

Community members who utilized the Holy Rosary Church as a drinking water source may visit the Dillingham Senior Center, water is available on the north side of the building, between the hours of 7 a.m. – 7 p.m. to refill their jugs until an alternative permanent water solution has been established at the church.

For more information, visit http://www.dot.state.ak.us/airportwater/ or contact Sammy Loud, 907-888-5671, airportwater@alaska.gov

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/

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."

Media Contact: Sammy Loud, 907-888-5671, sam.loud@alaska.gov

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Health and Social Services

DIVISION OF PUBLIC HEALTH
Section of Epidemiology

3601 C Street, Suite 540
Anchorage, Alaska 99503-5932
Main: 907.269.8000
Fax: 907.562.7802

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?

Plants may absorb small amounts of PFAS through their roots, which can be distributed to other parts of the plant. The amount taken up will vary based on the PFAS concentration, the types of PFAS in the water, and the type of produce grown. Ultimately, exposure to PFAS through vegetables is not likely to be substantial compared to other exposure routes (e.g. drinking contaminated water), so the health benefits of eating fresh vegetables may outweigh the risks associated with PFAS exposure. Prior to eating, it is best to wash vegetables with clean water, and consider peeling root vegetables. To reduce PFAS uptake in garden vegetables, consider growing produce in raised beds with clean soil using rainwater or an alternative water source.

Note: DEC regulations (AS 46.03.710 & AS 46.03.745) prohibit the continued use of contaminated wells for all purposes, including watering gardens, because they may create new sources of PFAS exposure.

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/*

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

P.O. Box 196900, 99519-6900
4111 Aviation Avenue, 99502
Anchorage, AK
Main: 907.269.0730
Fax: 907.269.0489
dot.state.ak.us

PFAS Fact Sheet – Dillingham Airport

June 2019

Per- and polyfluoroalkyl substances (PFAS) are a group of manmade chemicals used for a wide variety of residential, commercial, and industrial uses. PFAS are considered emerging environmental contaminants and the health effects are not well known.

The presumed source of PFAS in groundwater in your community is the use of a fire-fighting foam called aqueous film forming foam (AFFF). Airport firefighters used the foam to extinguish petroleum fires during training exercises and emergency events.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has tested 65 private water-supply wells starting in late February 2019. Most impacted wells are on airport property or south/southeast of the airport.

DOT&PF has hired Shannon & Wilson to test private wells for perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The U.S. Environmental Protection Agency (EPA) lifetime health advisory (LHA) level for drinking water is **70 parts per trillion** for the sum of PFOS and PFOA.

We advise residents with test results above this level not to use their water for drinking or cooking. If your well is considered affected, you can continue to shower, clean, and do laundry.

Test results are typically available within four to five weeks of sample collection. If your well is found to have PFAS above the EPA LHA, DOT&PF will assist with access to an alternate source of drinking water.

For results and sampling area map:
www.dot.alaska.gov/airportwater/dillingham/

For questions about well testing:
Shannon & Wilson, Inc.
Marcy Nadel, Project Manager
Dillingham Phone: 907-371-9022
Office Phone: 907-458-3150
Email: mdn@shanwil.com

For regulatory questions:
Dept. of Environmental Conservation
Gretchen Caudill, Contaminated Sites Program
Phone: 907-451-2370
Email: gretchen.caudill@alaska.gov

For questions about PFAS and health:
Dept. of Health & Social Services
Kristin Bridges, Public Health Scientist
Phone: 907-269-8028
Email: kristin.bridges@alaska.gov

To file an insurance claim:
Dept. of Admin., Risk Management
Risk Assessor
Phone: 907-465-2183

For questions about fire training and other inquiries:
Sammy Loud, DOT&PF Statewide Aviation
Phone: 907-888-5671
Email: airportwater@alaska.gov

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

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4111 Aviation Avenue, 99502
Anchorage, AK
Main: 907.269.0730
Fax: 907.269.0489
dot.state.ak.us

PFAS Fact Sheet – Dillingham Airport

November 2019

Per- and polyfluoroalkyl substances (PFAS) are a group of manmade chemicals used for a wide variety of residential, commercial, and industrial uses. PFAS are considered emerging environmental contaminants and the health effects are not well known.

The presumed source of PFAS in groundwater in your community is the use of a fire-fighting foam called aqueous film forming foam (AFFF). Airport firefighters used the foam to extinguish petroleum fires during training exercises and emergency events.

The Alaska Department of Transportation & Public Facilities (DOT&PF) has sampled over 95 private water-supply wells starting in late February 2019. Most impacted wells are on airport property or south/southeast of the airport.

DOT&PF has hired Shannon & Wilson to test private wells for perfluorooctane sulfonate (PFOS), perfluorooctanoic acid (PFOA), and other PFAS compounds.

The U.S. Environmental Protection Agency (EPA) lifetime health advisory (LHA) level for drinking water is **70 parts per trillion** for the sum of PFOS and PFOA.

We advise residents with test results above this level not to use their water for drinking or cooking. If your well is considered affected, you can continue to shower, clean, and do laundry.

Test results are typically available within four to five weeks of sample collection. If your well is found to have PFAS above the EPA LHA, DOT&PF will assist with access to an alternate source of drinking water.

For results and sampling area map:
www.dot.alaska.gov/airportwater/dillingham/

For questions about well testing:
Shannon & Wilson, Inc.
Marcy Nadel, Project Manager
Office Phone: 907-458-3150
Dillingham Phone: 907-371-9022
Email: mdn@shanwil.com

For regulatory questions:
Dept. of Environmental Conservation
Bill O'Connell, Contaminated Sites Program
Phone: 907-269-3057
Email: bill.oconnell@alaska.gov

For questions about PFAS and health:
Dept. of Health & Social Services
Sarah Yoder, Public Health Specialist
Phone: 907-269-8054
Email: sarah.yoder@alaska.gov

To file an insurance claim:
Dept. of Admin., Risk Management
Sheri Gray, Risk Manager
Phone: 907-465-5724
Email: sheri.gray@alaska.gov

For questions about fire training and other inquiries:
Sammy Loud Cummings, DOT&PF Statewide Aviation
Phone: 907-888-5671
Email: airportwater@alaska.gov

January 18, 2019

Holy Rosary Church Water Testing Notice

PFAS Discovered in Groundwater Near Dillingham Airport Firefighting Foam Discharge Areas

The Alaska Department of Transportation and Public Facilities (DOT&PF) was recently alerted to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) exceeding the state action level for drinking water in the Holy Rosary Church well near the Dillingham Airport. The Church well tested at 186 parts per trillion (ppt) for the sum of five PFAS compounds, which exceeds the Alaska Department of Environmental Conservation (DEC) action level of 70 ppt. Nine wells were sampled on or near airport property, the eight other wells that were tested ranged from not detected to 22 ppt.

The Alaska Department of Environmental Conservation (DEC) began initial sampling of private water wells near airport property in December. DOT&PF has contracted with third-party independent contractor, Shannon & Wilson, Inc. to continue the preliminary investigation, which includes an in-depth well search and sampling event.

PFAS are commonly used in products for fire suppression, resistance to wear, and repelling oil, stains, grease, and water. PFAS can be found in apparel, some consumer products, and firefighting aqueous film forming foams (AFFF). The use of AFFF during firefighting equipment testing at the Dillingham 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.

The Holy Rosary Church has discontinued public access to their water well. Community members who utilized the Holy Rosary Church as a drinking water source may visit the Dillingham Senior Center, water is available on the north side of the building, between the hours of 7 a.m. – 7 p.m. to refill their jugs until an alternative permanent water solution has been established. For those who have water from the Church well at their homes, we advise that residents no longer use it for drinking and cooking. However, cleaning, showering, and laundry are acceptable based on current research.

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/Pages/PFAS.aspx
- Department of Environmental Conservation: http://dec.alaska.gov/spar/csp/pfas-contaminants/
- Department of Transportation & Public Facilities: http://dot.alaska.gov/airportwater/

For questions:

- Department of Transportation & Public Facilities
  Sammy Loud, 907-888-5671, airportwater@alaska.gov

- Department of Environmental Conservation
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THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Transportation and Public Facilities

STATEWIDE AVIATION

P.O. Box 196900, 99519-6900
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PFAS Fact Sheet

February 2019

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.

The presumed source of PFAS in groundwater in Dillingham is the use of a fire-fighting foam called aqueous film forming foam (AFFF). Dillingham Airport fire fighters used the foam to extinguish hydrocarbon fires during training exercises and emergency events.

The Dept. of Transportation and Public Facilities has hired Shannon & Wilson to test private wells for six PFAS. Two of the most common PFAS are perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The Dept. of Environmental Conservation action level for drinking water is **70 parts per trillion** for the sum of five similar compounds. Out of caution, alternate water will be provided to those with levels above 65 parts per trillion.

We advise that residents with test results above this level do not use their water for drinking or cooking. If your well is considered affected, you can continue to shower, clean, and do laundry.

Test results are typically available within three to four weeks of sample collection. If your well is found to have PFAS above the state action level, DOT&PF will assist with access to clean drinking water.

PFAS are used in a large number of products ranging from fabric waterproofing compounds, non-stick cookware, stain-resistant carpeting, some food packaging, and firefighting foams.

For the sampling area map:
www.dot.alaska.gov/airportwater/dillingham/

For questions about well testing:
Shannon & Wilson, Inc.
Marcy Nadel, Project Manager
Phone: 907-458-3150
Email: mdn@shanwil.com

For regulatory questions:
Dept. of Environmental Conservation
Bill O'Connell, Contaminated Sites Program
Phone: 907-269-3057
Email: bill.oconnell@alaska.gov

For questions about PFAS and health:
Dept. of Health & Social Services
Kristin Bridges, Public Health Scientist
Phone: 907-269-8028
Email: kristin.bridges@alaska.gov

To file an insurance claim:
Dept. of Admin., Risk Management
Britney Hunter, Risk Assessor
Phone: (907) 465-2183
Email: britney.hunter@alaska.gov

For questions about fire training and other inquiries:
Sammy Loud, DOT&PF Statewide Aviation
Phone: 907-888-5671
Email: airportwater@alaska.gov

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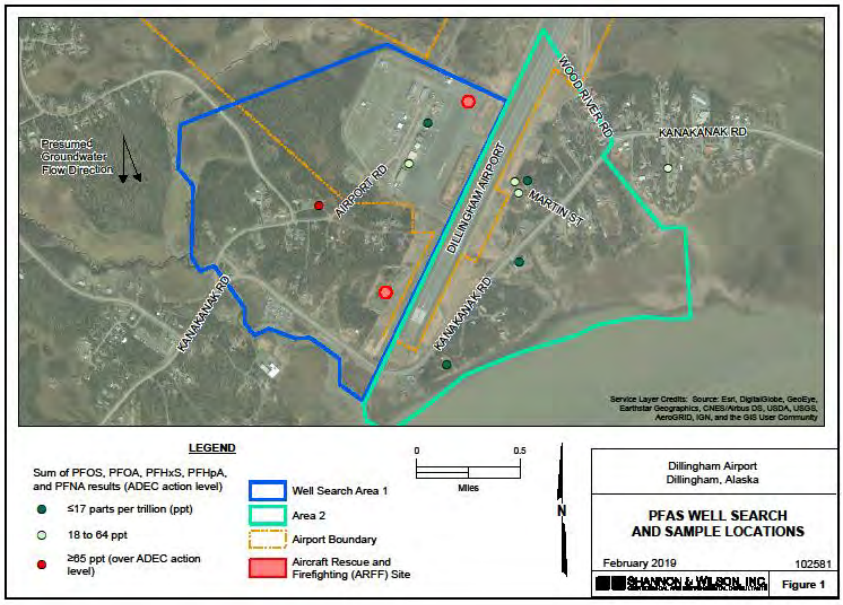
PUBLIC MEETING NOTICE
DRINKING WATER

DOT&PF was alerted in January 2019 to concentrations of Per- and Polyfluoroalkyl Substances (PFAS) in groundwater near the Dillingham Airport.

Firefighters at the Dillingham Airport used aqueous film forming foam (AFFF), a standard firefighting agent that contains PFAS, to extinguish hydrocarbon fires during training exercises and emergency events.



The levels of PFAS in the Holy Rosary Church well exceeded the DEC action level for drinking water. The Holy Rosary Church has discontinued public access to their water well. Community members who used the Church well as a drinking-water source may visit the Dillingham Senior Center instead. Nine wells were sampled on or near airport property, the others had concentrations well below the action level of 70 parts per trillion for the sum of five PFAS compounds.

Shannon & Wilson, Inc. will be conducting further testing in the designated sampling areas shown above from **Tuesday, February 26 to Friday, March 1**. If you have an active well at your home or business, please speak with Shannon & Wilson staff at the upcoming public meeting or call 907-371-9022 to schedule a sampling appointment.

Public Information Meeting

Tuesday, Feb. 26, 2019, 5:30 - 7 p.m., at the Dillingham Elementary School

- The Alaska Departments of Transportation, Environmental Conservation, and Health and Social Services will provide information.
- Shannon & Wilson, Inc. will attend to schedule sampling appointments properties in areas shown above.
- Please visit www.dot.state.ak.us/airportwater/dillingham or email airportwater@alaska.gov if you have questions ahead of the meeting.

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

ATSDR Flier

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.

Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
ATSDR

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 sulfonaminde
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

DHSS Fliers

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Health and Social Services

DIVISION OF PUBLIC HEALTH
Section of Epidemiology

3601 C Street, Suite 540
Anchorage, Alaska 99503-5932
Main: 907.269.8000
Fax: 907.562.7802

Fact Sheet on Perfluoroalkyl Substances (PFAS) in Drinking Water

What are PFAS and how can I be exposed?

- PFAS are human-made chemicals that are manufactured for their heat, water, and stain-resistant properties. They are used in a wide variety of common products, like rain gear, non-stick cookware, stain-resistant fabrics, and certain types of firefighting foams called aqueous film forming foams (AFFF), which are used to extinguish fuel and chemical fires.
- The use of AFFF is a common source of environmental PFAS contamination, particularly near airports, military bases, industrial sites, and fire training centers. AFFF discharged during firefighting activities can eventually migrate into the groundwater, contaminating nearby drinking water supplies.

How do I know if I have been previously exposed to PFAS and how can I remove it from my body?

- Because PFAS are used in so many different types of products, almost all people and animals have been exposed to more than one type of PFAS. There is no medical technique that can remove PFAS from the body, so the best approach is to stop the source of exposure and let the body's natural elimination processes slowly remove it.

How can PFAS affect my health?

- The likelihood of experiencing health effects from PFAS depends on many different factors, like how much, how often, and how long someone is exposed. Things like age, lifestyle, and underlying health status also play a role.
- Our current knowledge about the health effects of PFAS comes mostly from animal toxicology studies and a smaller number of human epidemiology studies; however, the number of human health studies showing effects are growing rapidly.
- Studies using human stem cells and animals show that certain types of PFAS can lead to negative effects on several different body systems. However, animals and humans have important differences in physiology that can cause them to respond to chemicals differently. Also, laboratory experiments usually use doses of PFAS that are much higher than the average person is likely to experience, so scientists are still learning about the potential health effects of low-dose exposure to PFAS.
- The Agency for Toxic Substances and Disease Registry (ATSDR) and the US Environmental Protection Agency (EPA) state that long-term exposure to high levels of PFAS can have the following effects on human health:
    - 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, skeletal abnormalities, altered puberty

What levels of PFAS are considered unsafe in drinking water?

- EPA issued the following lifetime health advisory (LHA) for two types of PFAS, called PFOS and PFOA: *"To provide Americans, including the most sensitive populations, with a margin of protection from a life- time of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion."* The LHA value of 70 ppt applies to PFOS and PFOA separately, and in combination with one another.
- The EPA has not yet developed guidance for additional types of PFAS compounds, some of which are thought to have human health effects similar to those of PFOS and PFOA. However, ATSDR issued the following draft guidance for four types of PFAS compounds in 2018:

ATSDR Drinking Water Screening Values		
COMPOUND	ADULT (ppt)	CHILD (ppt)
PFOA	78	21
PFOS	52	14
PFHxS	517	140
PFNA	78	21

** These values do not account for exposure from other sources, like dietary PFAS exposure and exposure from consumer products. They will also vary according to individual differences in body weight and water intake rates.*

- DEC previously required the provision of alternative drinking water when the sum concentration of PFOS + PFOA+ PFNA + PFHxS + PFHpA exceeded 70 ppt. However, a policy update that supersedes their previous guidelines was released on 4/10/19. DEC's new policy states that *"DEC will use the EPA LHA (PFOS+PFOA above 0.07 µg/L) as the Action Level. Any new testing for PFAS will be for PFOS and PFOA only."* More information on DEC's current and former PFAS policy can be found in their Technical Memorandum, dated 4/10/2019. Visit EPHP's FAQ's for a summary of the policies of other regulatory agencies.

What do I do if my drinking water is contaminated with PFAS above the DEC action level?

- If the concentration of PFAS in your drinking water exceeds the DEC action level, stop drinking the water and stop using it to prepare baby formula. Do not use contaminated water to wash or cook food (boiling contaminated water does not remove PFAS). Consider finding a clean water source for pets and other animals.

What if my water contains PFAS at concentrations that don't exceed DEC's current action level, but I still have concerns?

- People with concerns about these chemicals in their drinking water may want to consider taking measures to reduce their exposure from drinking water.

How can I reduce my exposure to PFAS?

- EPA provides information on filtration options that are effective at removing PFAS from drinking water on their website, and DEC provides information on water testing here.

Where can I get more information about PFAS?

- Visit the EPHP PFAS webpage for a list of answers to Frequently Asked Questions, or call 907-269-8000
- Visit the Alaska DEC Contaminated Sites webpage to learn more about PFAS sites in Alaska, or call 907-269-7545
- ATSDR also has a list of FAQs and information on talking to your doctor about PFAS exposure on their webpage.
- The Northwest Pediatric Environmental Health Specialty Unit (PEHSU) is also available for clinician consultation by phone (1-877-543-2436) or email (pehsu@u.washington.edu).

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Department of Health and Social Services

DIVISION OF PUBLIC HEALTH
Section of Epidemiology

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Fax: 907.562.7802

Frequently Asked Questions About Perfluoroalkyl Substances (PFAS)

What are PFAS and how can I be exposed?

- PFAS are human-made chemicals that are manufactured for their heat, water, and stain-resistant properties. They are used in a wide variety of common products, like rain gear, non-stick cookware, stain-resistant fabrics, and certain types of firefighting foams called aqueous film forming foams (AFFF), which are used to extinguish fuel and chemical fires.
- The use of AFFF is a common source of environmental PFAS contamination, particularly near airports, military bases, industrial sites, and fire training centers. AFFF discharged during firefighting activities can eventually migrate into the groundwater, contaminating nearby drinking water supplies.

How do I know if I have been previously exposed to PFAS and how can I remove it from my body?

- Because PFAS are used in so many different types of products, almost all people and animals have been exposed to more than one type of PFAS. There is no medical technique that can remove PFAS from the body, so the best approach is to stop the source of exposure and let the body's natural elimination processes slowly remove it.

How can PFAS affect my health?

- The likelihood of experiencing health effects from PFAS depends on many different factors, like how much, how often, and how long someone is exposed. Things like age, lifestyle, and underlying health status also play a role.
- Our current knowledge about the health effects of PFAS comes mostly from animal toxicology studies and a smaller number of human epidemiology studies; however, the number of studies showing negative effects of PFAS on humans is growing rapidly.
- Studies using human stem cells and animals show that certain types of PFAS can lead to negative effects on several different body systems. However, animals and humans have important differences in physiology that can cause them to respond to chemicals differently. Also, laboratory experiments usually use doses of PFAS that are much higher than the average person is likely to experience, so scientists are still learning about the potential health effects of low-dose exposure to PFAS.
- The Agency for Toxic Substances and Disease Registry (ATSDR) and the US Environmental Protection Agency (EPA) state that long-term exposure to high levels of PFAS can have the following effects on human health:
    - 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, skeletal abnormalities, altered puberty

What levels of PFAS are considered unsafe in drinking water?

- EPA issued the following lifetime health advisory (LHA) for two types of PFAS, called PFOS and PFOA: *"To provide Americans, including the most sensitive populations, with a margin of protection from a life- time of exposure to PFOA and PFOS from drinking water, EPA established the health advisory levels at 70 parts per trillion."* The LHA value of 70 ppt applies to PFOS and PFOA separately, and in combination with one another.
- The LHA was issued based on the available scientific evidence at the time about the potential health effects of PFAS, and most of the available research at that time focused on PFOS and PFOA. However, a rapidly growing number of scientific studies that suggest other PFAS compounds (e.g., PFNA, PFHxS,) have human health effects similar to those of PFOS and PFOA.
- The EPA has not yet developed guidance for additional types of PFAS compounds; however, ATSDR provides draft Minimum Risk Levels (MRLs) for four PFAS compounds (PFOS, PFOA, PFHxS, and PFNA). An MRL is the estimated daily dose of a chemical that a person can eat, drink, or breathe over a long period of time without experiencing a detectable increase in the risk of non-cancerous health effects.
- ATSDR used these MRLs and the average body weight and drinking water intake rates for children and adults in the US to calculate the maximum drinking water concentration of each type of PFAS that is not expected to increase your risk of developing health effects (see: https://www.atsdr.cdc.gov/pfas/mrl_pfas.html). However, it is important to note that these values can vary for each individual based on their body weight and water intake. Also, these values do not account for added exposure from other sources (like contaminated food), which may cause you to exceed the MRL if you drink PFAS-contaminated water that approaches these maximum concentrations. The drinking water values that ATSDR has developed are summarized in the following table:

ATSDR Drinking Water Screening Values		
COMPOUND	ADULT (ppt)	CHILD (ppt)
PFOA	78	21
PFOS	52	14
PFHxS	517	140
PFNA	78	21

- DEC previously required the provision of alternative drinking water when the sum concentration of PFOS + PFOA+ PFNA + PFHxS + PFHpA exceeded 70 ppt. However, a policy update that supersedes their previous guidelines was released on 4/10/19. DEC's new policy states that *"DEC will use the EPA LHA (PFOS+PFOA above 0.07 µg/L) as the Action Level. Any new testing for PFAS will be for PFOS and PFOA only."* More information on DEC's current and former PFAS policy can be found in their latest Technical Memorandum.

Where can I find an overview of PFAS standards and guidance values established by EPA, states, and other countries?

- An overview of PFAS standards and guidance values established by various regulatory agencies is available here.

What do I do if my drinking water is contaminated with PFAS above the DEC action level?

- If the concentration of PFAS in your drinking water exceeds the DEC action level, stop drinking the water and stop using it to prepare baby formula. Do not use contaminated water to wash or cook food (boiling contaminated water does not remove PFAS). Consider finding a clean water source for pets and other animals.

What if my water contains PFAS at concentrations that don't exceed DEC's current action level, but I still have concerns?

- People in this situation may wish to consider taking measures to reduce their exposure from drinking water.
- Technologies effective at removing many type of PFAS from drinking water include activated carbon adsorption, ion exchange resins, and high-pressure membranes. These systems can be installed in homes at the point-of-entry (where water enters the home), or even at the point-of-use (such as in a kitchen sink or a shower).

- While installing a filtration system in your home can reduce PFAS levels, these filters may not reduce the PFAS concentration enough to meet DEC guidelines in some circumstances.
- Factors affecting how much PFAS can be removed include:
    - The water concentration before filtration
    - The type of PFAS in the water
    - The type of filter and how well the filter is maintained (the manufacturer may be able to make recommendations to maximize the removal of PFAS)

Where can I find more information about testing my water for PFAS?

- DEC provides information on water testing here.

Are some populations more susceptible to PFAS?

- ATSDR considers babies and children to be more susceptible to PFAS exposure. This is because there are additional sources of PFAS exposure for children that lead to higher body concentrations relative to their body weight. Some of these additional sources include hand-to-mouth transfer from contaminated items, and transfer from mothers to babies during pregnancy and breastfeeding.

Is it okay to breastfeed my child if I have been exposed to PFAS through my drinking water?

- ATSDR recommends that nursing mothers should continue to breastfeed because the benefits of breastfeeding outweigh any known risk associated with transfer of PFAS through breast milk.

Is it okay to shower/bathe with PFAS-contaminated tap water until I have a long-term solution?

- It is very unlikely that showering or bathing with PFAS contaminated water will result in considerable exposure, unless large amounts of contaminated water are routinely being ingested while bathing. This is because PFAS is not easily absorbed by the skin, and very little PFAS is inhaled while showering.

Is it okay to clean and wash dishes and clothes with PFAS-contaminated water until I have a long-term solution?

- If tap water is contaminated with PFAS, it is considered safe to use the water to clean your house, wash dishes, and do laundry until a treated or alternative water source is available.

Is it okay to brush my teeth with PFAS-contaminated tap water until I have a long-term solution?

- It is better to reduce PFAS exposure by using a clean or treated water source for brushing teeth or any other activity that might result in accidental ingestion of water, especially for young children who may swallow water during these activities.

Is it okay to eat garden fruits and vegetables that were irrigated with contaminated water or grown in contaminated soil?

- Plants irrigated with contaminated water or grown in contaminated soil have been shown to take up some PFAS from the surrounding environment. Most of the water and soil contamination in Alaska is the result of AFFF use, but other sources of contamination may include landfills (which generally contain a wide variety of disposed-of consumer products that contain PFAS), certain industrial processes, or using contaminated biosolids as a fertilizer.
- The amount of PFAS taken up by fruits and vegetables will vary based on the severity of the PFAS contamination, the type(s) of PFAS in the water and/or soil, and the type of produce grown. Different parts of the same plant are also expected to accumulate variable amounts and types of PFAS (fruits usually have the lowest concentration of PFAS of concern).
- Ultimately, exposure to PFAS through produce is not likely to be substantial compared to other exposure routes, like drinking contaminated water. Furthermore, the health benefits of eating fresh produce generally outweigh the risks associated with PFAS exposure from plants.

How can I reduce my exposure to PFAS from garden produce that was irrigated with contaminated water or grown in contaminated soil?

- To reduce PFAS uptake in garden produce, consider growing produce in raised beds with clean soil, avoid the use of PFAS-containing fertilizers, and use rainwater or an alternative water source to irrigate crops if there is

groundwater contamination nearby. *Note: DEC regulations (AS 46.03.710 & AS 46.03.745) prohibit the continued use of contaminated wells for all purposes, including watering gardens, because they may create new sources of PFAS exposure.*

- To reduce dietary exposure to PFAS from fruits and vegetables irrigated with PFAS-contaminated water or grown in PFAS-contaminated soil, wash fruits and vegetables in clean water before eating them, and peel root vegetables.

Should I be concerned about exposure to PFAS from contaminated fish?

- Long chain PFAS (e.g., PFOS, PFOA, PFNA, and PFHxS) have been shown to bioaccumulate in fish, creating a potential route of human exposure through consumption of contaminated fish.
- Because the health effects of PFAS contamination are not yet well understood, federal health officials and most states (including Alaska) do not currently have fish consumption guidance for PFAS chemicals. However, the. EPA has developed a reference dose (RfD) for PFOS and PFOA and ATSDR has developed MRLs for the four compounds discussed above.
- Both the RfD and the MRL are intended to provide an estimate of the amount of a chemical a person can eat, drink, or breathe each day without a detectable increase in the risk of non-cancerous health effects in chronic exposure scenarios.
- Consumption of contaminated fish could result in exposure to PFAS at levels that exceed EPA's RfD and ATSDR's MRL, depending on the concentrations in the fish, and the amount and frequency of consumption.

Where can I find information about PFAS contamination in Alaska fish?

- All fish sampled for PFAS by the Office of the Alaska State Veterinarian Fish Monitoring Program have had very low, or undetectable amounts of PFAS. Fish included in the monitoring program are not collected from sites with known PFAS contamination, and are considered to be representative of background levels in fish from Alaska. Visit the Alaska Fish Monitoring Program page online, or call 907-375-8200 with additional questions.
- On 4/3/19, the Alaska Department of Fish and Game issued the following Emergency Order: "*Surface water in Kimberly and Polaris Lakes have tested to exceed EPA and DEC action levels for PFAS. As a precautionary measure, Kimberly Lake and Polaris Lake are closed to sport fishing effective immediately, and will not be stocked until additional information becomes available*." DEC has made testing results for these two lakes available online here: Kimberly Lake and Polaris Lake. Visit our fact sheet on PFAS in fish from Kimberly Lake for more information.

Should I be concerned about exposure to PFAS from game meat?

- Studies show that PFAS do not typically accumulate to levels of concern in the muscle of game animals, so game meat is not considered a significant route of PFAS exposure to humans. In Michigan, one deer living in a marsh with known PFAS contamination was found to have levels of PFAS in the muscle that exceeded the state's action levels. No other deer in the sample area that were tested had unsafe levels of PFAS, and it is unknown how PFAS could have accumulated to such high levels in the muscle of the contaminated deer. Out of an abundance of caution, a recommendation to avoid eating meat from deer living in/near the marsh was issued. Michigan has tested at least 147 other deer, including those living near water sources with known PFAS contamination, and none had levels of PFAS in the muscle the exceeded the state's action levels.
- However, animal livers have the potential to accumulate high levels of many contaminants, including PFAS. You may want to consider limiting consumption of animal liver to avoid exposure to environmental contaminants, including PFAS.

Is a blood test for PFAS routinely recommended for people who have been exposed?

- Blood testing for PFAS is not currently a routine test offered by most doctors or health departments. This is because scientists do not know how blood levels of PFAS correspond with effects on health. As such, blood test results are not helpful to clinicians developing treatment plans or assessing health risks for patients at this time.

What should I do if I would like to get tested for PFAS even though it is not routinely recommended?

- If you would like to get you or your family tested for PFAS, you should contact your health care provider. Measuring a person's exposure to PFAS and monitoring potential impacts on an individual patient's health is best served by the relationship between a patient and their health care provider.
- If you choose to get a blood test, please consider that:
    - The test results will not determine if your health problems are due to PFAS exposure
    - Your health insurance may not cover testing; if you pay out-of-pocket, testing can cost hundreds of dollars
    - You will need a health care provider or clinic to collect, process, and send your blood sample to a laboratory that can run the test

Is state funding available to pay for PFAS testing for Alaskans who would like to get tested?

- No, state funds are not currently available to pay for blood testing for PFAS.

Will the responsible party reimburse me for the cost of a blood test if I chose to pay out-of-pocket?

- If your drinking water has been contaminated with PFAS and you have paid out-of-pocket for a blood test, you may file a claim with the responsible party to request reimbursement. *Be aware that filing a claim with the responsible party does not guarantee reimbursement.*
- DHSS is not involved with any part of the claim/reimbursement process.
- If the Department of Transportation (DOT) is the party responsible for contamination of your well, you can find more information about the claims process by contacting the Alaska DOT (phone: 907-465-2183)

Where can I get more information about PFAS?

- Visit the Alaska DEC Contaminated Sites webpage to learn more about PFAS sites in Alaska, or call 907-269-7545
- ATSDR also has a list of FAQs and information on talking to your doctor about PFAS exposure on their webpage.
- The Northwest Pediatric Environmental Health Specialty Unit (PEHSU) is available for clinician consultation regarding PFAS exposures in Alaska. PEHSU can be reached by phone at: 1-877-543-2436 or via email at pehsu@u.washington.edu.

APPENDIX B: PUBLIC INFORMATION

PUBLIC INFORMATION

DHSS Presentation

WELCOME

DEC - DOT&PF – DHSS

Dillingham Public Meeting February 26, 2019

INTRODUCTIONS

Department of Environmental Conservation

- Bill O'Connell, CPG – Environmental Program Manager
- Gretchen Caudill – Environmental Program Specialist

Department of Health and Social Services

- Kristin Bridges, PHD – Toxicologist & Environmental Public Health Program Manager

Department of Transportation

- Sammy Loud, C.M. - Development Specialist, PFAS Project Coordinator

Shannon & Wilson, Inc.

- Marcy Nadel – Geologist, Project Manager

WHAT WE WILL COVER TODAY

- Project Team Introductions
- PFAS Overview
- Health Effects of PFAS
- PFAS at the Dillingham Airport
- What to Expect Next
- Questions & Answers

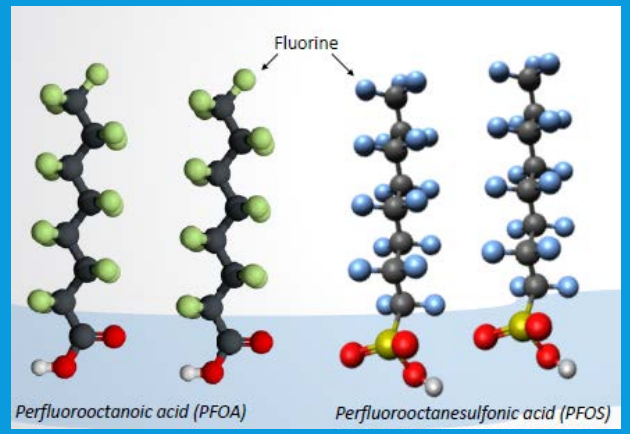
PER-& POLYFLUOROALKYL SUBSTANCES (PFAS)

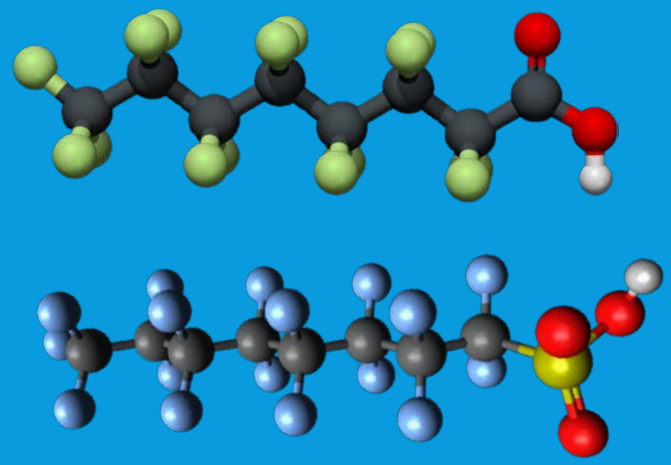
DEC

Dillingham Public Meeting February 26, 2019

PER- AND POLYFLUOROALKYL SUBSTANCES (PFAS)

- What are PFAS
  - Family of around 5,000 chemicals
  - Does not break down easily
  - Builds up in humans and animals
  - Toxic





Products, sources and history

- Aqueous Film Forming Foam (AFFF)
  Consumer Products- non-stick and stain-resistant products used in furniture, ski waxes, raingear, cooking utensils, paints, plastics, adhesives, personal care products (such as dental floss) convenience food packaging

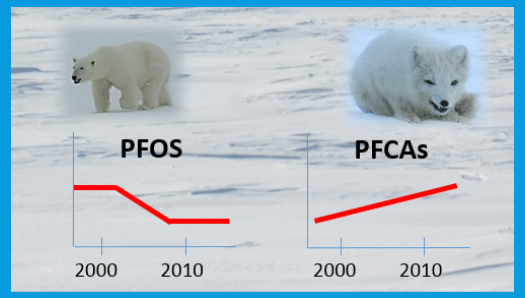
Major Sources of Releases

- Manufacturing
- Releases from fire suppression activities
- Wastewater Treatment Plants
- Landfills

State Action on PFAS - DEC DOT&PF DH&SS
Alaska Forum on the Environment 2019

PFAS IN THE ENVIRONMENT

- Occurrence of PFAS is widespread
- Can be transported atmospherically on airborne particulates
- Studies have detected PFAS near urban areas in both soil and groundwater at higher levels than in remote locations
- Almost every US citizen has detectable levels of PFAS (PFOS and PFOA) in their blood serum
- Have been found in blood of arctic animals including polar bears and arctic fox.

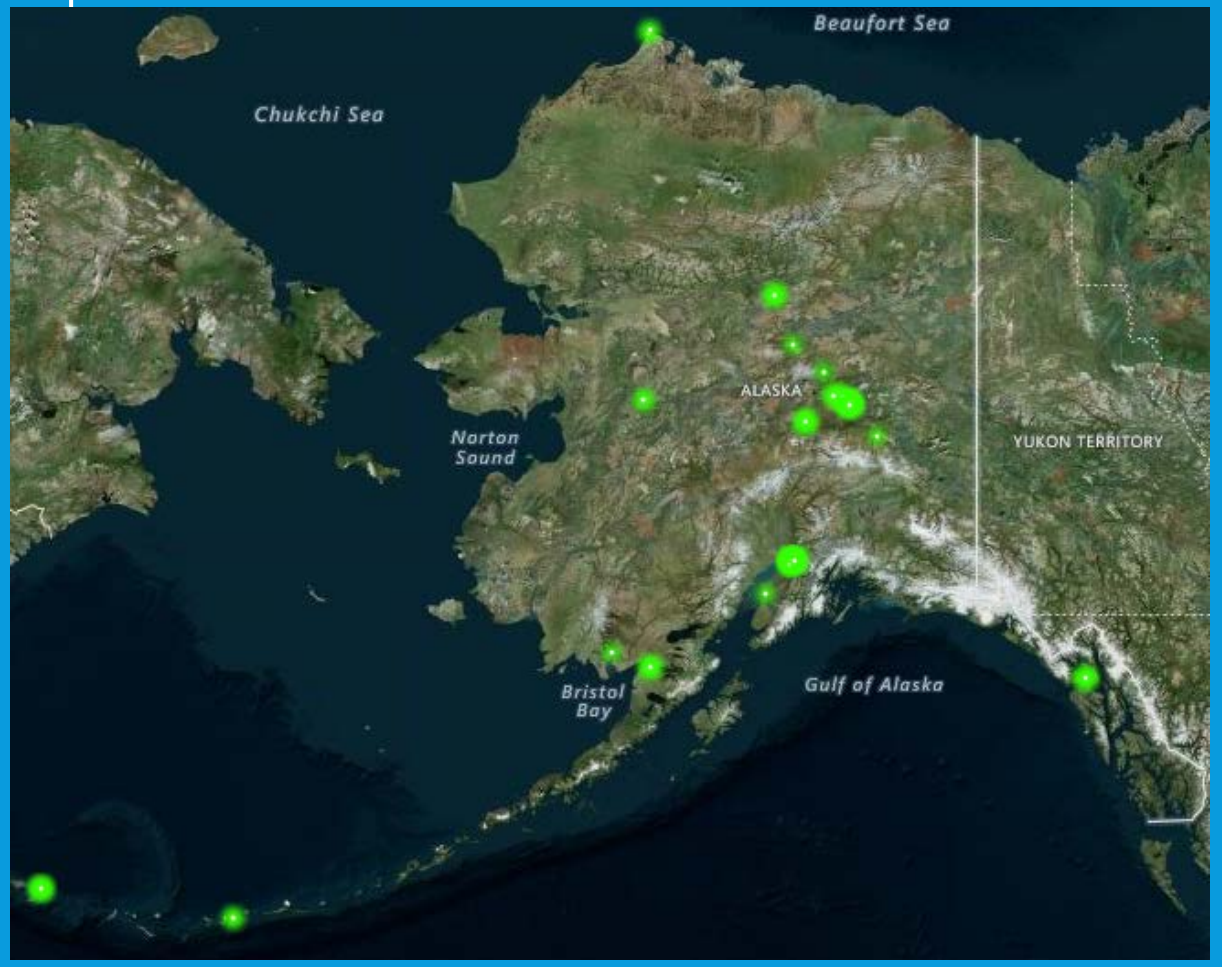


Emission Changes Dwarf the Influence of Feeding Habits on Temporal Trends of Per- and Polyfluoroalkyl Substances in Two Arctic Top Predators - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/figure/Graphical-abstract_fig3_319880721 [accessed 1 Feb, 2019]

PFAS CONTAMINATION IN ALASKA

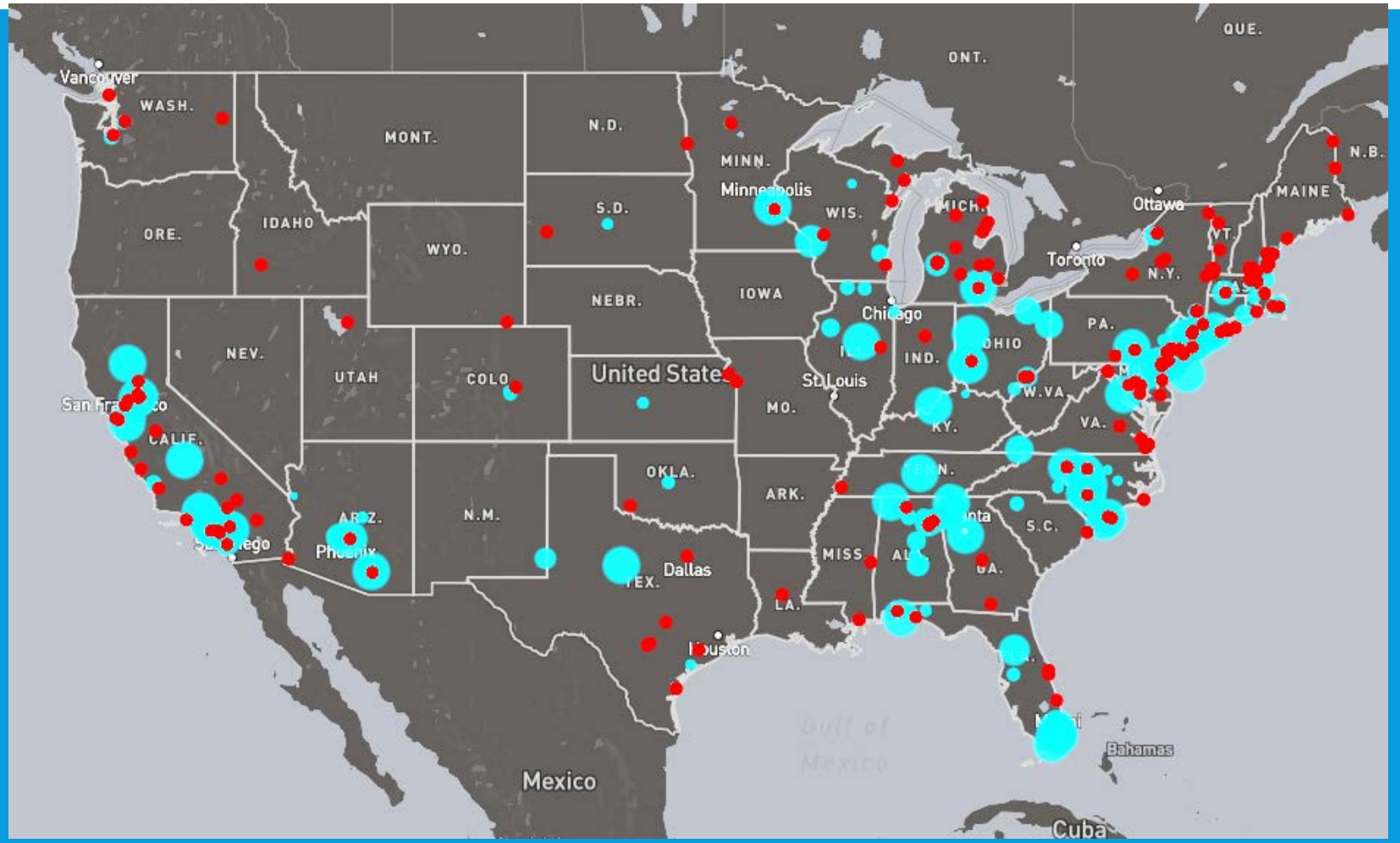
Communities with Drinking Water Impacts and Contaminated Sites

- Eielson/Moose Creek
- Fairbanks Municipal Fire Training Center
- Fairbanks International Airport
- North Pole
- Utqiagvik- Airport
- Gustavus Airport
- Dillingham - Airport
- King Salmon - Airport
- Eareckson Air Station, Shemya
- Galena



PFAS ACROSS THE COUNTRY

RED: CONTAMINATED SITES BLUE: EPA TAP WATER DETECTIONS



Credit: EWG and SSEHRI at Northeastern University (July 30, 2018)

State Action on PFAS - DEC DOT&PF DH&SS - Alaska Forum on the Environment 2019

WORKING TOGETHER

- Since PFAS was first discovered at DOT&PF managed airports, DEC, DHSS, DOA, and DOT&PF have coordinated to provide information to the public and provide temporary and permanent alternative drinking water to affected communities
- The agencies are currently involved in response actions in Fairbanks, Gustavus, Dillingham, King Salmon, Moose Creek, North Pole
- Other affected areas shown on previous slides also are being investigated by DEC

HEALTH EFFECTS OF PFAS

Dr. Kristin Bridges, PhD

Toxicologist

Environmental Public Health Program Manager

Division of Public Health

HOW CAN I BE EXPOSED TO PFAS?

CONTAMINATED FOOD

HOUSEHOLD PRODUCTS

CONTAMINATED WATER

PFAS OVER TIME

Production begins 1940-1950's

PFOS and PFOA are 2 most used, but > 5,000

Discovered:

Globally Distributed

Extremely Stable

Bioaccumulative

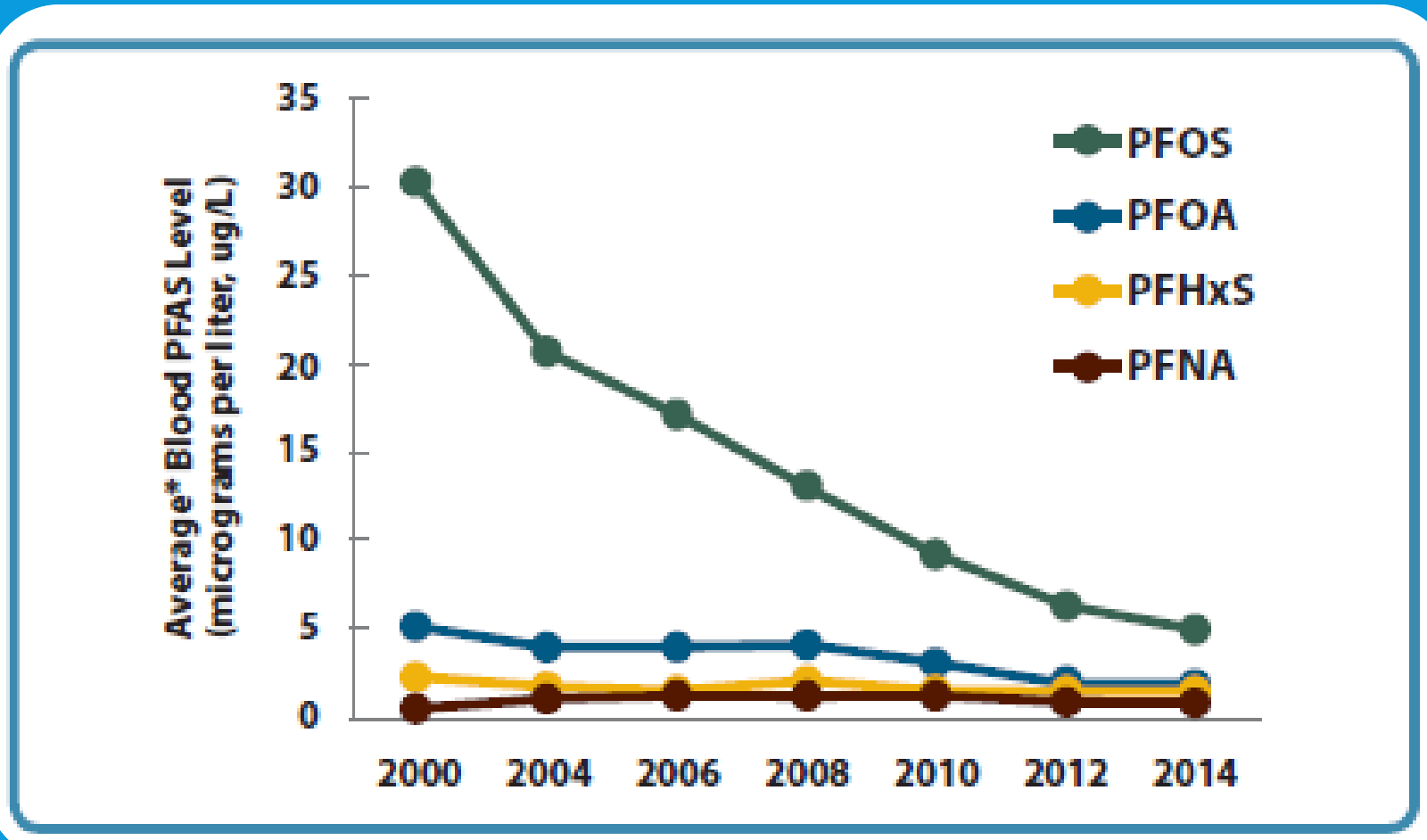
Toxic

Phase out of PFOA & PFOS in 2000s

PFAS IN THE POPULATION

Extremely stable in the environment and not well metabolized by humans

Widely distributed and found in nearly all people



WHAT ABOUT HEALTH EFFECTS?

PFAS ARE AN EMERGING CONTAMINANT AND THE SCIENCE IS STILL EVOLVING

CURRENT GUIDANCE IS BASED ON EVIDENCE FROM EPI STUDIES AND LABORATORY TOXICITY TESTS USING ANIMALS

<u>EPIDEMIOLOGY STUDIES</u>

- Results are from highly exposed communities/occupations
- Differences in environment, nutrition, demographic, and social factors influence health (can confound results)

<u>ANIMAL TOXICITY STUDIES</u>

- Use much higher exposure doses than is typical for humans
- Species differences in absorption, distribution, metabolism, excretion, development and physiology all influence sensitivity/toxicity

POTENTIAL HEALTH EFFECTS OF PFAS

Probable link between exposure to some PFAS and effects on several organs/body systems

- 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

It is still unclear how chronic, low-level PFAS exposure may impact human health

HOW DO I KNOW I'VE BEEN EXPOSED & HOW CAN I REMOVE PFAS FROM MY BODY?

- Because of the prevalence of PFAS in the environment and consumer products, almost all people and animals have more than one type of PFAS present in their blood.
- At this time, there are no medical interventions that will remove PFAS from the body. The best intervention is to stop the source of exposure.

SHOULD I GET A BLOOD TEST FOR PFAS?

- Federal and state health departments do not currently recommend blood testing for individuals, because:
  - Knowing how much PFAS is in your blood does not yet provide information about whether or not current health problems are related to PFAS exposure
  - Knowing how much PFAS is in your blood will not help your doctor predict or rule-out future health risks related to a PFAS exposure.

For those who still want a test:

- Contact your health care provider and insurance to find out if it is covered, and if your provider can collect a sample
- Tests will need to go to one of these laboratories:

Axys Analytical	1-888-373-0881	www.axysanalytical.com
NMS Laboratory	1-866-522-2206	www.nmslabs.com
Vista Analytical	1-916-573-1520	www.vista-analytical.com

IS IT SAFE TO SHOWER OR BATHE IN WATER >70 PPT?

Yes, because:

- Studies show that your skin is a good barrier against PFAS exposure
- You do not inhale enough PFAS during a shower to pose a health risk
- PFAS do not irritate the skin or eyes at the levels present in the well water

However:

- Incidental ingestion of water from all activities should be avoided, including while brushing teeth (especially young children)
- Regulations prohibit discharge of hazardous substances into the environment

SHOULD I CONTINUE TO BREASTFEED?

- ATSDR and DHSS both recommend that you continue to breastfeed
- The known benefits of breastfeeding outweigh the potential risks
- However, breastfeeding mothers should use a clean drinking water source

IS MY PRODUCE SAFE TO EAT?

- Studies show that plants absorb small amounts of PFAS from contaminated water and soil, but the amount absorbed depends on how much/what kind of PFAS are present, and the produce type
- Exposure to PFAS through vegetables not likely to be substantial compared to other exposure routes (e.g. drinking contaminated water)
- The health benefits of eating fresh fruits and vegetables cannot be ignored
- Just because food is purchased from a store doesn't mean it's free of PFAS

SUMMARY OF RECOMMENDATIONS

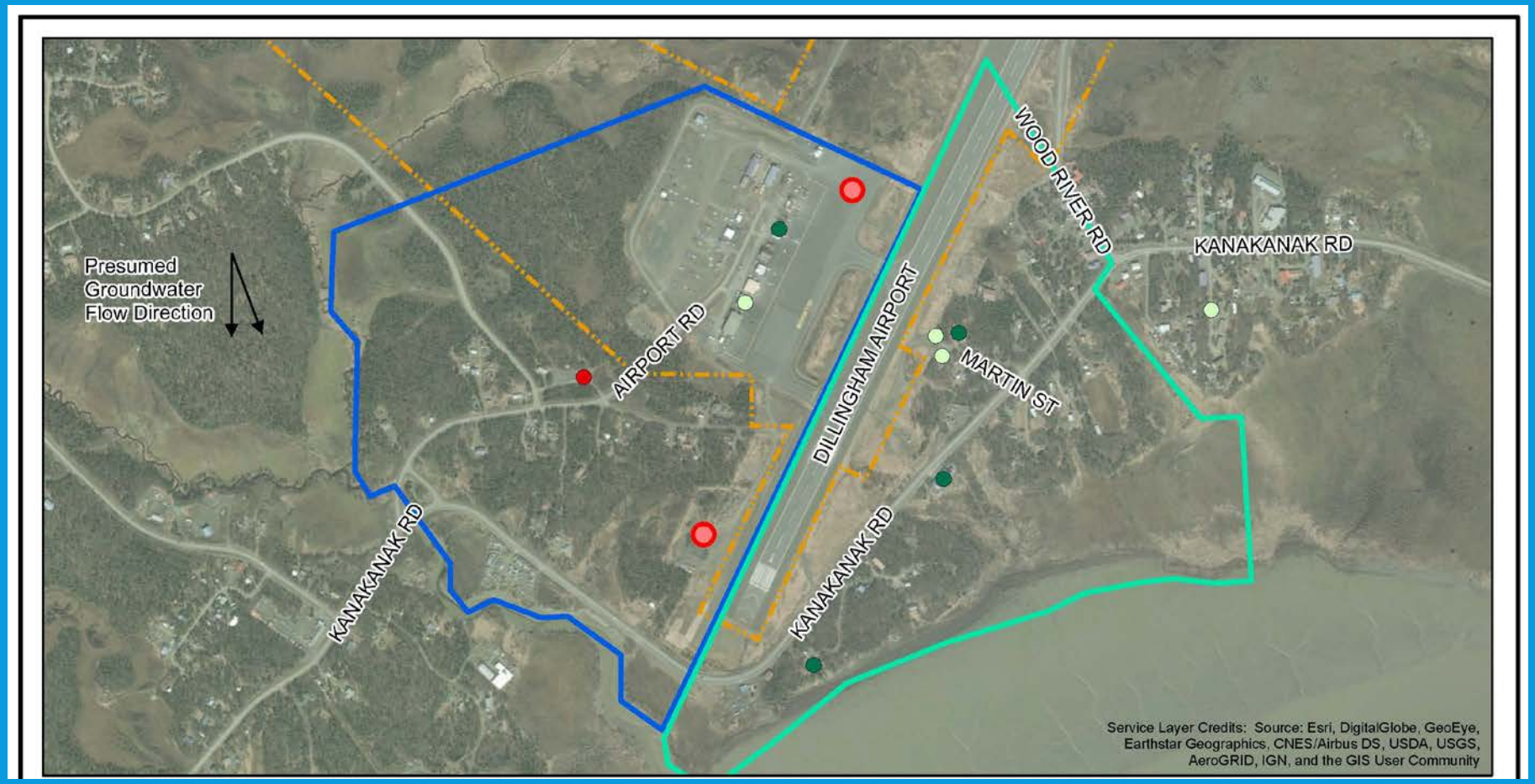
If water contains 70 ppt PFAS or more:

- **Do not** drink it
- **Do not** use it to prepare baby formula
- **Do not** give it to pets or animals
- **Do not** use it to brush your teeth
- It is still considered safe for showering and bathing
- It is still considered safe for cleaning

PFAS AT THE DILLINGHAM AIRPORT

Sammy Loud, PFAS Coordinator, DOT&PF Statewide Aviation

DILLINGHAM AIRPORT, AFFF USE AREAS, SAMPLING AREAS



WHY HAVE PFAS BEEN USED AT AIRPORTS?

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

The Federal Aviation Administration (FAA) mandates:

- "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 412:

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

Per the FAA, there is no exemption to annual testing.

FAA Reauthorization Act – Must provide an alternate AFFF option to airports by 2021.

AQUEOUS FILM FORMING FOAMS AT DOT&PF AIRPORTS

FAA National Part 139 CertAlert No. 19-01

- On January 17, 2019, the FAA released CertAlert No. 19-01, acknowledging that testing ARFF vehicles' AFFF systems is essential to safety, but also recognizing the environmental concerns of discharging fluorine containing AFFF during annual testing. Keeping both in mind, FAA recommends that airport operators consider using one of the following AFFF testing systems, which the FAA has accepted for immediate use, to satisfy the Part 139 testing requirement while minimizing the environmental impact:

1. Eco-Logic system from E-One
2. NoFoam System
3. OshKosh Eco EFP (Electronic Foam Proportioning) System

TIMELINE

- Dillingham Airport became a certified Part 139 airport – March 1973
- AFFF only used at Dillingham Airport for certification testing or in the event of an emergency (less than 10 seconds) - March 1973
- DEC sampled nine wells in Dillingham – December 2019
- DOT&PF/DEC received preliminary sampling results – January 2019
- Shannon & Wilson, Inc. To conduct well search and sampling – February 2019

MOVING FORWARD

PFAS sampling results will determine the scope of action moving forward

- For wells testing above 400ppt – begin groundwater cleanup
- For wells testing above 70ppt – provide alternative drinking water source and develop permanent source of drinking water
- For wells testing 35-70ppt – retest quarterly
- Future sampling may include source area delineation and more groundwater monitoring

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

Off-airport

- Determine extent of PFAS plume
- Site characterization

On-airport

- Site characterization (e.g., extent of contamination, identifying sources and dates)
- Remediation (removal or treatment of affected soil and water) if necessary
- Provide long-term source of alternative drinking water if necessary

COMMUNITY OUTREACH

Press Releases:

- Sign up for GovDelivery

https://public.govdelivery.com/accounts/AKDOT/subscriber/new

Website:

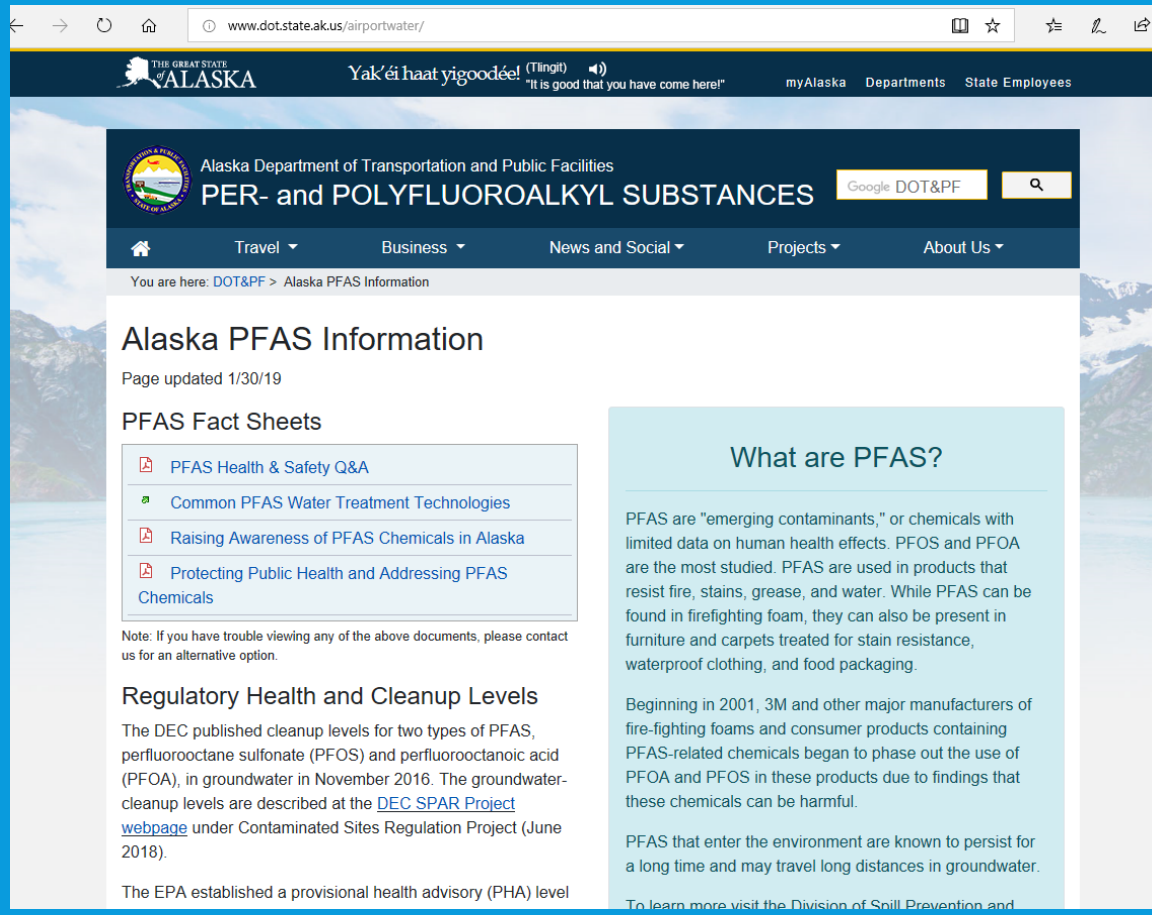
- http://www.dot.state.ak.us/airportwater/

Email:

- Airportwater@alaska.gov
- Subject – sign up

Contact:

Sammy Loud, C.M.
Development Specialist
PFAS Project Manager
Statewide Aviation – DOT&PF
C: 907-888-5671



For more information contact:

DEC Contaminated Sites Project Oversight
bill.oconnell@alaska.gov
Fairbanks Area Sites
robert.burgess@alaska.gov
Regulations/Policy
sally.schlichting@alaska.gov

DEC Drinking Water
cindy.christian@alaska.gov

DEC Water Quality
earl.crapps@alaska.gov
brock.tabor@alaska.gov

DOT&PF PFAS Coordinator
sam.loud@alaska.gov

DH&SS Human health questions
stacey.cooper@alaska.gov
kristin.bridges@alaska.gov

Or visit:

DOT&PF website: http://dot.alaska.gov/airportwater/
DHSS website: http://dhss.alaska.gov/dph/Epi/eph/Pages/PFAS.aspx
DEC website: http://dec.alaska.gov/spar/csp/pfas-contaminants

APPENDIX C: ANALYTICAL RESULTS

Appendix C

ANALYTICAL RESULTS

CONTENTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

TestAmerica Job ID: 580-82900-1
Client Project/Site: PFAS, AK Drinking Water December

For:
Alaska Department of Env. Conservation
Post Office Box 1542
Haines, Alaska 99827

Attn: Anne Marie Palmieri

M. Elaine Walker

Authorized for release by:
1/16/2019 2:49:13 PM

Elaine Walker, Project Manager II
(253)248-4972
elaine.walker@testamericainc.com

Table of Contents

Job ID: 580-82900-1

Laboratory: TestAmerica Seattle

Narrative

Job Narrative
580-82900-1

Receipt
Twenty-one samples were received on 12/26/2018 11:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.0º C.

The samples were forwarded to Eurofins Lancaster Lab for Method 537 DW PSAS analysis. Their report is included here.

Glossary

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

Accreditation/Certification Summary

Client: Alaska Department of Env. Conservation
Project/Site: PFAS, AK Drinking Water December

TestAmerica Job ID: 580-82900-1

Laboratory: TestAmerica Seattle

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	17-024	01-19-19
ANAB	DoD ELAP		L2236	01-19-22
ANAB	ISO/IEC 17025		L2236	01-19-19
California	State Program	9	2901	11-05-19
Montana (UST)	State Program	8	N/A	04-30-20
Nevada	State Program	9	WA000502019-1	07-31-19
Oregon	NELAP	10	WA100007	11-05-19
US Fish & Wildlife	Federal		LE058448-0	07-31-19
USDA	Federal		P330-14-00126	02-10-20
Washington	State Program	10	C553	02-17-19

Sample Summary

Client: Alaska Department of Env. Conservation
Project/Site: PFAS, AK Drinking Water December

TestAmerica Job ID: 580-82900-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-82900-1	DIL-01	Water	12/17/18 09:40	12/26/18 11:00
580-82900-2	DIL-02	Water	12/17/18 10:40	12/26/18 11:00
580-82900-3	DIL-03	Water	12/17/18 11:10	12/26/18 11:00
580-82900-4	DIL-04	Water	12/17/18 11:20	12/26/18 11:00
580-82900-5	DIL-05	Water	12/17/18 11:50	12/26/18 11:00
580-82900-6	DIL-06	Water	12/17/18 11:50	12/26/18 11:00
580-82900-7	DIL-07	Water	12/17/18 13:30	12/26/18 11:00
580-82900-8	DIL-08	Water	12/17/18 14:00	12/26/18 11:00
580-82900-9	DIL-09	Water	12/17/18 14:20	12/26/18 11:00
580-82900-10	DIL-10	Water	12/17/18 15:15	12/26/18 11:00
580-82900-11	KIN-01	Water	12/18/18 14:50	12/26/18 11:00
580-82900-12	KIN-02 (field blank)	Water	12/18/18 14:50	12/26/18 11:00
580-82900-13	KIN-03	Water	12/18/18 15:10	12/26/18 11:00
580-82900-14	KIN-04	Water	12/18/18 15:10	12/26/18 11:00
580-82900-15	KIN-05	Water	12/18/18 15:50	12/26/18 11:00
580-82900-16	KIN-06	Water	12/18/18 16:10	12/26/18 11:00
580-82900-17	KIN-07	Water	12/18/18 16:40	12/26/18 11:00
580-82900-18	KIN-08	Water	12/18/18 16:45	12/26/18 11:00
580-82900-19	KIN-09	Water	12/18/18 17:00	12/26/18 11:00
580-82900-20	KIN-10	Water	12/18/18 17:30	12/26/18 11:00
580-82900-21	KIN-11	Water	12/19/18 10:15	12/26/18 11:00

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2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

ANALYSIS REPORT

Prepared by:

Eurofins Lancaster Laboratories Environmental
2425 New Holland Pike
Lancaster, PA 17601

Prepared for:

TestAmerica
880 Riverside Parkway
West Sacramento CA 95605

Report Date: January 14, 2019 11:17

Project: Alaska DEC

Account #: 01042
Group Number: 2021414
SDG: TAK30
State of Sample Origin: AK

Electronic Copy To TestAmerica Attn: Elaine Walker

Respectfully Submitted,

Kay Hower

Kay Hower

(717) 556-7364

To view our laboratory's current scopes of accreditation please go to https://www.eurofinsus.com/environment-testing/laboratories/eurofins-lancaster-laboratories-environmental/certifications-and-accreditations-eurofins-lancaster-laboratories-environmental/ . Historical copies may be requested through your project manager.

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

SAMPLE INFORMATION

Client Sample Description	Sample Collection Date/Time	ELLE#
DIL-01 Grab Water	12/17/2018 09:40	9953226
DIL-02 Grab Water	12/17/2018 10:40	9953227
DIL-03 Grab Water	12/17/2018 11:10	9953228
DIL-04 Grab Water	12/17/2018 11:20	9953229
DIL-05 Grab Water	12/17/2018 11:50	9953230
DIL-06 Grab Water	12/17/2018 11:50	9953231
DIL-07 Grab Water	12/17/2018 13:30	9953232
DIL-08 Grab Water	12/17/2018 14:00	9953233
DIL-09 Grab Water	12/17/2018 14:20	9953234
DIL-10 Grab Water	12/17/2018 15:15	9953235
KIN-01 Grab Water	12/18/2018 14:50	9953236
KIN-02 (field blank) Grab Water	12/18/2018 14:50	9953237
KIN-03 Grab Water	12/18/2018 15:10	9953238
KIN-04 Grab Water	12/18/2018 15:10	9953239
KIN-05 Grab Water	12/18/2018 15:50	9953240
KIN-06 Grab Water	12/18/2018 16:10	9953241
KIN-07 Grab Water	12/18/2018 16:40	9953242
KIN-08 Grab Water	12/18/2018 16:45	9953243
KIN-09 Grab Water	12/18/2018 17:00	9953244
KIN-10 Grab Water	12/18/2018 17:30	9953245
KIN-11 Grab Water	12/19/2018 10:15	9953246

The specific methodologies used in obtaining the enclosed analytical results are indicated on the Laboratory Sample Analysis Record.

Sample Description: **DIL-01 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 09:40
SDG#: TAK30-01

TestAmerica
ELLE Sample #: **WW 9953226**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.48	1.9	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.48	1.9	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.51 J	0.48	1.9	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.48	1.9	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.48	1.9	1
14070	Perfluoroheptanoic acid	375-85-9	3.9	0.48	1.9	1
14070	Perfluorohexanesulfonate	355-46-4	2.2	0.48	1.9	1
14070	Perfluorohexanoic acid	307-24-4	8.2	0.48	1.9	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.48	1.9	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.48	1.9	1
14070	Perfluorooctanoic acid	335-67-1	3.8	0.48	1.9	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.48	1.9	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.48	1.9	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.48	1.9	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 19:22	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **DIL-02 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 10:40
SDG#: TAK30-02

TestAmerica
ELLE Sample #: **WW 9953227**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.44	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.44	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	4.4	0.44	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	3.6	0.44	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	12	0.44	1.7	1
14070	Perfluorohexanoic acid	307-24-4	17	0.44	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.44	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	3.4	0.44	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.5	0.44	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.44	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.44	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 19:34	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

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Analysis Report

Sample Description: **DIL-03 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 11:10
SDG#: TAK30-03

TestAmerica
ELLE Sample #: **WW 9953228**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.45	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.45	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	3.0	0.45	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	3.6	0.45	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	10	0.45	1.8	1
14070	Perfluorohexanoic acid	307-24-4	12	0.45	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.45	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	3.5	0.45	1.8	1
14070	Perfluorooctanoic acid	335-67-1	2.3	0.45	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.45	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.45	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/08/2019 16:39	Joshua P Trost	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: DIL-04 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 11:20
SDG#: TAK30-04

TestAmerica
ELLE Sample #: WW 9953229
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.70 J	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	N.D.	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	0.62 J	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	5.0	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	0.49 J	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 19:57	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

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Analysis Report

Sample Description: **DIL-05 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 11:50
SDG#: TAK30-05

TestAmerica
ELLE Sample #: **WW 9953230**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.44	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.44	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	51	0.44	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	3.3	0.44	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	140	4.4	18	10
14070	Perfluorohexanoic acid	307-24-4	39	0.44	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.44	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	37	0.44	1.8	1
14070	Perfluorooctanoic acid	335-67-1	5.2	0.44	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.44	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.44	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 20:09	Marissa C Drexinger	1
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/08/2019 16:51	Joshua P Trost	10
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

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Analysis Report

Sample Description: **DIL-06 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 11:50
SDG#: TAK30-06

TestAmerica
ELLE Sample #: **WW 9953231**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	54	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	3.3	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	130	4.3	17	10
14070	Perfluorohexanoic acid	307-24-4	39	0.43	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	36	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	4.8	0.43	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 20:20	Marissa C Drexinger	1
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/08/2019 17:02	Joshua P Trost	10
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

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Analysis Report

Sample Description: **DIL-07 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 13:30
SDG#: TAK30-07

TestAmerica
ELLE Sample #: **WW 9953232**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.47 J	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	N.D.	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	N.D.	0.43	1.7	1
14070	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 20:32	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: **DIL-08 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 14:00
SDG#: TAK30-08

TestAmerica
ELLE Sample #: **WW 9953233**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	4.2	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	1.3 J	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	2.4	0.43	1.7	1
14070	Perfluorohexanoic acid	307-24-4	9.4	0.43	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	1.2 J	0.43	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 20:55	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: **DIL-09 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 14:20
SDG#: TAK30-09

TestAmerica
ELLE Sample #: **WW 9953234**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	2.5	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	0.85 J	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	12	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	4.0	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	5.0	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.0	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 21:07	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: DIL-10 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/17/2018 15:15
SDG#: TAK30-10

TestAmerica
ELLE Sample #: WW 9953235
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.45	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.45	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	11	0.45	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	9.7	0.45	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	7.0	0.45	1.8	1
14070	Perfluorohexanoic acid	307-24-4	44	0.45	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.45	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.8	1
14070	Perfluorooctanoic acid	335-67-1	1.9	0.45	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.45	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.45	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 21:18	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-01 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 14:50
SDG#: TAK30-11

TestAmerica
ELLE Sample #: WW 9953236
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	3.4	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	0.87 J	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	1.2 J	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	7.5	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.4	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 21:30	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-02 (field blank) Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 14:50
SDG#: TAK30-12FB

TestAmerica
ELLE Sample #: WW 9953237
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	N.D.	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	N.D.	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	N.D.	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	N.D.	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	N.D.	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 21:41	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-03 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 15:10
SDG#: TAK30-13

TestAmerica
ELLE Sample #: WW 9953238
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	56	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	17	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	75	4.3	17	10
14070	Perfluorohexanoic acid	307-24-4	110	4.3	17	10
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	1.2 J	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	62	4.3	17	10
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 21:53	Marissa C Drexinger	1
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/08/2019 17:14	Joshua P Trost	10
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-04 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 15:10
SDG#: TAK30-14

TestAmerica
ELLE Sample #: WW 9953239
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.44	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.44	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	51	4.4	17	10
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	17	0.44	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	72	4.4	17	10
14070	Perfluorohexanoic acid	307-24-4	99	4.4	17	10
14070	Perfluorononanoic acid	375-95-1	N.D.	0.44	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	1.4 J	0.44	1.7	1
14070	Perfluorooctanoic acid	335-67-1	62	4.4	17	10
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.44	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.44	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 22:05	Marissa C Drexinger	1
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/08/2019 17:26	Joshua P Trost	10
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-05 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 15:50
SDG#: TAK30-15

TestAmerica
ELLE Sample #: WW 9953240
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.96 J	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	0.77 J	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	1.8	0.43	1.7	1
14070	Perfluorohexanoic acid	307-24-4	2.1	0.43	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.0	0.43	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 22:16	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-06 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 16:10
SDG#: TAK30-16

TestAmerica
ELLE Sample #: WW 9953241
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.43	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.43	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	N.D.	0.43	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	N.D.	0.43	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	N.D.	0.43	1.7	1
14070	Perfluorohexanoic acid	307-24-4	1.6 J	0.43	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.43	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.0	0.43	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.43	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.43	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 22:28	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-07 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 16:40
SDG#: TAK30-17

TestAmerica
ELLE Sample #: WW 9953242
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.55 J	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	3.3	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	2.1	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	3.1	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	2.9	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 22:39	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-08 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 16:45
SDG#: TAK30-18

TestAmerica
ELLE Sample #: WW 9953243
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.44	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.44	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	1.5 J	0.44	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	1.1 J	0.44	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	2.4	0.44	1.8	1
14070	Perfluorohexanoic acid	307-24-4	5.3	0.44	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.44	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.8	1
14070	Perfluorooctanoic acid	335-67-1	5.0	0.44	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.44	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.44	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 23:03	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: **KIN-09 Grab Water**
Alaska DEC

Project Name: **Alaska DEC**

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 17:00
SDG#: TAK30-19

TestAmerica
ELLE Sample #: **WW 9953244**
ELLE Group #: **2021414**
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.44	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.44	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.73 J	0.44	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	0.99 J	0.44	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	2.0	0.44	1.8	1
14070	Perfluorohexanoic acid	307-24-4	4.6	0.44	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.44	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.8	1
14070	Perfluorooctanoic acid	335-67-1	5.7	0.44	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.44	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.44	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 23:14	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-10 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/18/2018 17:30
SDG#: TAK30-20

TestAmerica
ELLE Sample #: WW 9953245
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.42	1.7	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.42	1.7	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	N.D.	0.42	1.7	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.7	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.7	1
14070	Perfluoroheptanoic acid	375-85-9	N.D.	0.42	1.7	1
14070	Perfluorohexanesulfonate	355-46-4	N.D.	0.42	1.7	1
14070	Perfluorohexanoic acid	307-24-4	0.50 J	0.42	1.7	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.42	1.7	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.7	1
14070	Perfluorooctanoic acid	335-67-1	0.55 J	0.42	1.7	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.42	1.7	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.42	1.7	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.7	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18362013	01/05/2019 23:26	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18362013	12/29/2018 06:00	Robert Brown	1

*=This limit was used in the evaluation of the final result

Sample Description: KIN-11 Grab Water
Alaska DEC

Project Name: Alaska DEC

Submittal Date/Time: 12/21/2018 11:20
Collection Date/Time: 12/19/2018 10:15
SDG#: TAK30-21

TestAmerica
ELLE Sample #: WW 9953246
ELLE Group #: 2021414
Matrix: Water

CAT No.	Analysis Name	CAS Number	Result	Method Detection Limit*	Limit of Quantitation	Dilution Factor
LC/MS/MS Miscellaneous	**EPA 537 Version 1.1**		**ng/l**	**ng/l**	**ng/l**	
14070	NEtFOSAA	2991-50-6	N.D.	0.46	1.8	1
	NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.					
14070	NMeFOSAA	2355-31-9	N.D.	0.46	1.8	1
	NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.					
14070	Perfluorobutanesulfonate	375-73-5	0.76 J	0.46	1.8	1
14070	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.8	1
14070	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.8	1
14070	Perfluoroheptanoic acid	375-85-9	0.87 J	0.46	1.8	1
14070	Perfluorohexanesulfonate	355-46-4	2.3	0.46	1.8	1
14070	Perfluorohexanoic acid	307-24-4	4.9	0.46	1.8	1
14070	Perfluorononanoic acid	375-95-1	N.D.	0.46	1.8	1
14070	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.46	1.8	1
14070	Perfluorooctanoic acid	335-67-1	6.0	0.46	1.8	1
14070	Perfluorotetradecanoic acid	376-06-7	N.D.	0.46	1.8	1
14070	Perfluorotridecanoic acid	72629-94-8	N.D.	0.46	1.8	1
14070	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.8	1

Sample Comments

State of Alaska Lab Certification No. UST-061

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14070	14 PFAS PW Water	EPA 537 Version 1.1	1	18363006	01/04/2019 02:39	Marissa C Drexinger	1
14381	DW PFAS Prep	EPA 537 Version 1.1	1	18363006	12/30/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

Quality Control Summary

Client Name: TestAmerica
Reported: 01/14/2019 11:17

Group Number: 2021414

Matrix QC may not be reported if insufficient sample or site-specific QC samples were not submitted. In these situations, to demonstrate precision and accuracy at a batch level, a LCS/LCSD was performed, unless otherwise specified in the method.

All Inorganic Initial Calibration and Continuing Calibration Blanks met acceptable method criteria unless otherwise noted on the Analysis Report.

Method Blank

Analysis Name	Result	MDL**	LOQ
	ng/l	ng/l	ng/l
Batch number: 18362013	Sample number(s): 9953226-9953245		
NEtFOSAA	N.D.	0.50	2.0
NMeFOSAA	N.D.	0.50	2.0
Perfluorobutanesulfonate	N.D.	0.50	2.0
Perfluorodecanoic acid	N.D.	0.50	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanoic acid	N.D.	0.50	2.0
Perfluorohexanesulfonate	N.D.	0.50	2.0
Perfluorohexanoic acid	N.D.	0.50	2.0
Perfluorononanoic acid	N.D.	0.50	2.0
Perfluoro-octanesulfonate	N.D.	0.50	2.0
Perfluorooctanoic acid	N.D.	0.50	2.0
Perfluorotetradecanoic acid	N.D.	0.50	2.0
Perfluorotridecanoic acid	N.D.	0.50	2.0
Perfluoroundecanoic acid	N.D.	0.50	2.0
Batch number: 18363006	Sample number(s): 9953246		
NEtFOSAA	N.D.	0.50	2.0
NMeFOSAA	N.D.	0.50	2.0
Perfluorobutanesulfonate	N.D.	0.50	2.0
Perfluorodecanoic acid	N.D.	0.50	2.0
Perfluorododecanoic acid	N.D.	0.50	2.0
Perfluoroheptanoic acid	N.D.	0.50	2.0
Perfluorohexanesulfonate	N.D.	0.50	2.0
Perfluorohexanoic acid	N.D.	0.50	2.0
Perfluorononanoic acid	N.D.	0.50	2.0
Perfluoro-octanesulfonate	N.D.	0.50	2.0
Perfluorooctanoic acid	N.D.	0.50	2.0
Perfluorotetradecanoic acid	N.D.	0.50	2.0
Perfluorotridecanoic acid	N.D.	0.50	2.0
Perfluoroundecanoic acid	N.D.	0.50	2.0

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: TestAmerica
Reported: 01/14/2019 11:17

Group Number: 2021414

LCS/LCSD

Analysis Name	LCS Spike Added ng/l	LCS Conc ng/l	LCSD Spike Added ng/l	LCSD Conc ng/l	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Max
Batch number: 18362013	Sample number(s): 9953226-9953245								
NEtFOSAA	80	96.93	80	88.19	121	110	70-130	9	30
NMeFOSAA	80	92.21	80	89.91	115	112	70-130	3	30
Perfluorobutanesulfonate	70.76	74.25	70.76	72.25	105	102	70-130	3	30
Perfluorodecanoic acid	80	88.68	80	83.54	111	104	70-130	6	30
Perfluorododecanoic acid	80	89.81	80	82.37	112	103	70-130	9	30
Perfluoroheptanoic acid	80	84.18	80	83.65	105	105	70-130	1	30
Perfluorohexanesulfonate	75.64	81.12	75.64	85.31	107	113	70-130	5	30
Perfluorohexanoic acid	80	82.76	80	83.45	103	104	70-130	1	30
Perfluorononanoic acid	80	83.17	80	83.37	104	104	70-130	0	30
Perfluoro-octanesulfonate	76.48	74.5	76.48	74.69	97	98	70-130	0	30
Perfluorooctanoic acid	80	87	80	82.61	109	103	70-130	5	30
Perfluorotetradecanoic acid	80	83.32	80	81.06	104	101	70-130	3	30
Perfluorotridecanoic acid	80	93.25	80	91.1	117	114	70-130	2	30
Perfluoroundecanoic acid	80	90.07	80	90.46	113	113	70-130	0	30
Batch number: 18363006	Sample number(s): 9953246								
NEtFOSAA	20	22.44			112		70-130		
NMeFOSAA	20	21.28			106		70-130		
Perfluorobutanesulfonate	18.12	17.2			95		70-130		
Perfluorodecanoic acid	20.48	21.08			103		70-130		
Perfluorododecanoic acid	20.48	20.88			102		70-130		
Perfluoroheptanoic acid	20.48	20.01			98		70-130		
Perfluorohexanesulfonate	19.36	19.37			100		70-130		
Perfluorohexanoic acid	20.48	19.61			96		70-130		
Perfluorononanoic acid	20.48	20.32			99		70-130		
Perfluoro-octanesulfonate	19.58	18.29			93		70-130		
Perfluorooctanoic acid	20.48	20.21			99		70-130		
Perfluorotetradecanoic acid	20.48	21.29			104		70-130		
Perfluorotridecanoic acid	20.48	20.5			100		70-130		
Perfluoroundecanoic acid	20.48	21.86			107		70-130		

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

Quality Control Summary

Client Name: TestAmerica
Reported: 01/14/2019 11:17

Group Number: 2021414

Surrogate Quality Control

Surrogate recoveries which are outside of the QC window are confirmed unless attributed to dilution or otherwise noted on the Analysis Report.

Analysis Name: 14 PFAS PW Water
Batch number: 18362013

	13C2-PFHxA	13C2-PFDA	D5-NetFOSAA
9953226	103	104	95
9953227	99	105	105
9953228	96	94	96
9953229	98	102	91
9953230	100	102	106
9953231	100	103	102
9953232	100	107	104
9953233	92	93	100
9953234	115	113	114
9953235	87	108	112
9953236	99	102	95
9953237	114	113	112
9953238	91	96	89
9953239	104	108	115
9953240	103	109	105
9953241	109	118	120
9953242	117	125	116
9953243	125	123	130
9953244	114	107	127
9953245	102	98	97
Blank	101	102	100
LCS	95	101	103
LCSD	102	99	95
Limits:	70-130	70-130	70-130

Analysis Name: 14 PFAS PW Water
Batch number: 18363006

	13C2-PFHxA	13C2-PFDA	D5-NetFOSAA
9953246	93	93	88
Blank	95	100	97
LCS	97	107	94
Limits:	70-130	70-130	70-130

*- Outside of specification
**-This limit was used in the evaluation of the final result for the blank
(1) The result for one or both determinations was less than five times the LOQ.
(2) The unspiked result was more than four times the spike added.

TestAmerica Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

30939 2071414 9953226-46 214965

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☒ Other: CERCLA

Client Contact	Project Manager: Annemarie Palmieri	Site Contact:	Date:	COC No:
Company Name: Alaska DEC	Tel/Fax: 907-746-3184	Lab Contact:	Carrier:	1 of 2 COCs
Address: 410 Willoughby Ave	Analysis Turnaround Time			Sampler:
City/State/Zip: Juneau, AK 99801	☐ CALENDAR DAYS 10 ☒ WORKING DAYS			For Lab Use Only:
Phone: 907-746-3184	TAT if different from Below _____			Walk-in Client:
Fax: 907-746-3185	☐ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Method 537	Sample Specific Notes:
DIL-01	12-17-18	0940	G	WA	1	N		X	
DIL-02	12-17-18	1140	G	WA	1	N		X	
DIL-03	12-17-18	1110	G	WA	1	N		X	
DIL-04	12-17-18	1120	G	WA	1	N		X	
DIL-05	12-17-18	1150	G	WA	1	N		X	
DIL-06	12-17-18	1150	G	WA	1	N		X	
DIL-07	12-17-18	1330	G	WA	1	N		X	
DIL-08	12-17-18	1400	G	WA	1	N		X	
DIL-09	12-17-18	1420	G	WA	1	N		X	
DIL-10	12-17-18	1515	G	WA	1	N		X	
KIN-01	12-18-18	1450	G	WA	1	N		X	
KIN-02 (field blank)	12-18-18	1450	G	WA	1	N		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months

Special Instructions/QC Requirements & Comments:
email results to: annemarie.palmieri@alaska.gov

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No.:	Cooler Temp. (°C): Obs'd: 5.0	Corr'd:	Therm ID No.:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
A. Cruciel	DEC	12/20/18 0900			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by:	Company: ELLE	Date/Time: 12-21-18 1120

1/16/2019

30939 2021414 9953226-46

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

Chain of Custody Record

214966

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☒ Other: LERLLA

Client Contact	Project Manager: Anne Marie Palmieri	Site Contact:	Date:	COC No:
Company Name: Alaska Dept. of Env. Cons.	Tel/Fax: 907-766-3184	Lab Contact:	Carrier:	2 of 2 COCs
Address: 410 Willoughby Ave	Analysis Turnaround Time			Sampler:
City/State/Zip: Juneau, AK 99801	☐ CALENDAR DAYS 10 ☒ WORKING DAYS			For Lab Use Only:
Phone: 907-766-3184	TAT if different from Below ______			Walk-in Client:
Fax: 907-766-3185	☐ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y / N)	Perform MS / MSD (Y / N)	537 / PFAS	Sample Specific Notes:
KIN-03	12/18/18	1510	G	WA	1	N		X	
KIN-04	12/18/18	1510	G	WA	1	N		X	
KIN-05	12/18/18	1550	G	WA	1	N		X	
KIN-06	12/18/18	1610	G	WA	1	N		X	
KIN-07	12/18/18	1640	G	WA	1	N		X	
KIN-08	12/18/18	1645	G	WA	1	N		X	
KIN-09 ([illegible] AMP)	12/18/18	1700	G	WA	1	N		X	
KIN-10	12/18/18	1730	G	WA	1	N		X	
KIN-11	12-19-18	10:15	G	WA	1	N		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other ______

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☒ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:
email results to: annemarie.palmieri@alaska.gov

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 5.0 Corr'd: ______ Therm ID No.: ______

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	DEC	12/20/18 0900			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Company: EUC	Date/Time: 12-21-18 1120

State/Province of Origin: AK

Arrival Condition Summary

Shipping Container Sealed:	Yes	Sample IDs on COC match Containers:	Yes
Custody Seal Present:	Yes	Sample Date/Times match COC:	Yes
Custody Seal Intact:	Yes	VOA Vial Headspace ≥ 6mm:	N/A
Samples Chilled:	Yes	Total Trip Blank Qty:	0
Paperwork Enclosed:	Yes	Air Quality Samples Present:	No
Samples Intact:	Yes		
Missing Samples:	No		
Extra Samples:	No		
Discrepancy in Container Qty on COC:	No		

Unpacked by Cory Jeremiah (10469) at 17:44 on 12/21/2018

Samples Chilled Details

Thermometer Types: DT = Digital (Temp. Bottle) IR = Infrared (Surface Temp) All Temperature

Cooler #	Thermometer ID	Corrected Temp	Therm. Type	Ice Type	Ice Present?	Ice Container	Elevated Temp?
1	DT42-02	5.0	DT	Wet	Y	Loose	N

Explanation of Symbols and Abbreviations

The following defines common symbols and abbreviations used in reporting technical data:

BMQL	Below Minimum Quantitation Level	**mL**	milliliter(s)
C	degrees Celsius	**MPN**	Most Probable Number
cfu	colony forming units	**N.D.**	non-detect
CP Units	cobalt-chloroplatinate units	**ng**	nanogram(s)
F	degrees Fahrenheit	**NTU**	nephelometric turbidity units
g	gram(s)	**pg/L**	picogram/liter
IU	International Units	**RL**	Reporting Limit
kg	kilogram(s)	**TNTC**	Too Numerous To Count
L	liter(s)	**µg**	microgram(s)
lb.	pound(s)	**µL**	microliter(s)
m3	cubic meter(s)	**umhos/cm**	micromhos/cm
meq	milliequivalents	**MCL**	Maximum Contamination Limit
mg	milligram(s)		

<	less than
>	greater than
ppm	parts per million - One ppm is equivalent to one milligram per kilogram (mg/kg) or one gram per million grams. For aqueous liquids, ppm is usually taken to be equivalent to milligrams per liter (mg/l), because one liter of water has a weight very close to a kilogram. For gases or vapors, one ppm is equivalent to one microliter per liter of gas.
ppb	parts per billion
Dry weight basis	Results printed under this heading have been adjusted for moisture content. This increases the analyte weight concentration to approximate the value present in a similar sample without moisture. All other results are reported on an as-received basis.

Analytical test results meet all requirements of the associated regulatory program (i.e., NELAC (TNI), DoD, and ISO 17025) unless otherwise noted under the individual analysis.

Measurement uncertainty values, as applicable, are available upon request.

Tests results relate only to the sample tested. Clients should be aware that a critical step in a chemical or microbiological analysis is the collection of the sample. Unless the sample analyzed is truly representative of the bulk of material involved, the test results will be meaningless. If you have questions regarding the proper techniques of collecting samples, please contact us. We cannot be held responsible for sample integrity, however, unless sampling has been performed by a member of our staff.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Times are local to the area of activity. Parameters listed in the 40 CFR Part 136 Table II as “analyze immediately” are not performed within 15 minutes.

WARRANTY AND LIMITS OF LIABILITY - In accepting analytical work, we warrant the accuracy of test results for the sample as submitted. THE FOREGOING EXPRESS WARRANTY IS EXCLUSIVE AND IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED. WE DISCLAIM ANY OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING A WARRANTY OF FITNESS FOR PARTICULAR PURPOSE AND WARRANTY OF MERCHANTABILITY. IN NO EVENT SHALL EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL, LLC BE LIABLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES INCLUDING, BUT NOT LIMITED TO, DAMAGES FOR LOSS OF PROFIT OR GOODWILL REGARDLESS OF (A) THE NEGLIGENCE (EITHER SOLE OR CONCURRENT) OF EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL AND (B) WHETHER EUROFINS LANCASTER LABORATORIES ENVIRONMENTAL HAS BEEN INFORMED OF THE POSSIBILITY OF SUCH DAMAGES. We accept no legal responsibility for the purposes for which the client uses the test results. No purchase order or other order for work shall be accepted by Eurofins Lancaster Laboratories Environmental which includes any conditions that vary from the Standard Terms and Conditions, and Eurofins Lancaster Laboratories Environmental hereby objects to any conflicting terms contained in any acceptance or order submitted by client.

Data Qualifiers

Qualifier	Definition
C	Result confirmed by reanalysis
D1	Indicates for dual column analyses that the result is reported from column 1
D2	Indicates for dual column analyses that the result is reported from column 2
E	Concentration exceeds the calibration range
K1	Initial Calibration Blank is above the QC limit and the sample result is ND
K2	Continuing Calibration Blank is above the QC limit and the sample result is ND
K3	Initial Calibration Verification is above the QC limit and the sample result is ND
K4	Continuing Calibration Verification is above the QC limit and the sample result is ND
J (or G, I, X)	Estimated value >= the Method Detection Limit (MDL or DL) and < the Limit of Quantitation (LOQ or RL)
P	Concentration difference between the primary and confirmation column >40%. The lower result is reported.
P^	Concentration difference between the primary and confirmation column > 40%. The higher result is reported.
U	Analyte was not detected at the value indicated
V	Concentration difference between the primary and confirmation column >100%. The reporting limit is raised due to this disparity and evident interference.
W	The dissolved oxygen uptake for the unseeded blank is greater than 0.20 mg/L.
Z	Laboratory Defined - see analysis report

Additional Organic and Inorganic CLP qualifiers may be used with Form 1 reports as defined by the CLP methods.
Qualifiers specific to Dioxin/Furans and PCB Congeners are detailed on the individual Analysis Report.

.estAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

30434 2021414 1/03226-46

Chain of Custody Record

214965

82900

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☒ Other: CERCLA

Client Contact	Project Manager: Annemarie Palmieri	Site Contact:	Date:	COC No:
Company Name: Alaska DEC	Tel/Fax: 907.766-3184	Lab Contact:	Carrier:	1 of 2 COCs
Address: 410 Willoughby Ave	Analysis Turnaround Time			Sampler:
City/State/Zip: Juneau, AK 99801	☐ CALENDAR DAYS 10 ☒ WORKING DAYS			For Lab Use Only:
Phone: 907-766-3184	TAT if different from Below ____			Walk-in Client:
Fax: 907-766-3185	☐ 2 weeks			Lab Sampling:
Project Name:	☐ 1 week			
Site:	☐ 2 days			Job / SDG No.:
P O #	☐ 1 day			

	Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)	Method 537	Sample Specific Notes:
1	DIL-01	12-17-18	0940	G	WA	1	N		X	
	DIL-02	12-17-18	1040	G	WA	1	N		X	
3	DIL-03	12-17-18	1110	G	WA	1	N		X	
	DIL-04	12-17-18	1120	G	WA	1	N		X	
5	DIL-05	12-17-18	1150	G	WA	1	N		X	
	DIL-06	12-17-18	1150	G	WA	1	N		X	
7	DIL-07	12-17-18	1330	G	WA	1	N		X	
	DIL-08	12-17-18	1400	G	WA	1	N		X	
9	DIL-09	12-17-18	1420	G	WA	1	N		X	
	DIL-10	12-17-18	1515	G	WA	1	N		X	
11	KIN-01	12-18-18	1450	G	WA	1	N		X	
	KIN-02 (field blank)	12-18-18	1450	G	WA	1	N		X	

580-82900 Chain of Custody

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☒ Disposal by Lab ☐ Archive for ______ Months

Special Instructions/QC Requirements & Comments:
email results to: annemarie.palmieri@alaska.gov

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.: | Cooler Temp. (°C): Obs'd: 5.0 Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	DEC	12/20/18 0900			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	Company: ELLE	Date/Time: 12-21-18 1120

TestAmerica Sacramento
880 Riverside Parkway

West Sacramento, CA 95605
Phone: 916.373.5600 Fax:

30939 2021414 4953226-46

Chain of Custody Record

214966

82900

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica Laboratories, Inc.
TAL-8210 (0713)

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☒ Other: CERCLA

Client Contact	
Company Name:	Alaska Dept. of Env. Cons.
Address:	410 Willoughby Ave
City/State/Zip:	Juneau, AK 99801
Phone:	907-766-3184
Fax:	907-766-3185
Project Name:	
Site:	
P O #	

Project Manager: Anne Marie Palmieri
Tel/Fax: 907-766-3184

Analysis Turnaround Time
☐ CALENDAR DAYS 10 ☒ WORKING DAYS
TAT if different from Below ____
☐ 2 weeks
☐ 1 week
☐ 2 days
☐ 1 day

Site Contact: Date:
Lab Contact: Carrier:

COC No: 2 of 2 COCs
Sampler:
For Lab Use Only:
Walk-in Client:
Lab Sampling:
Job / SDG No.:

	Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	537/PFAS	Sample Specific Notes:
13	KIN-03	12/18/18	1510	G	WA	1	N		X	
	KIN-04	12/18/18	1510	G	WA	1	N		X	
15	KIN-05	12/18/18	1550	G	WA	1	N		X	
	KIN-06	12/18/18	1610	G	WA	1	N		X	
17	KIN-07	12/18/18	1640	G	WA	1	N		X	
	KIN-08	12/18/18	1645	G	WA	1	N		X	
19	KIN-09 ([illegible])	12/18/18	1700	G	WA	1	N		X	
	KIN-10	12/18/18	1730	G	WA	1	N		X	
21	KIN-11	12/19/18	10:15	G	WA	1	N		X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other

Possible Hazard Identification:
Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return to Client ☒ Disposal by Lab ☐ Archive for ____ Months

Special Instructions/QC Requirements & Comments:
email results to: annemarie.palmieri@alaska.gov

Custody Seals Intact: ☐ Yes ☐ No
Custody Seal No.:
Cooler Temp. (°C): Obs'd: 5.0 Corr'd: ____ Therm ID No.: ____

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
[signature]	DEC	12/20/18 0900			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received in Laboratory by: [signature]	ELLE	12-21-18 1120

 1/16/2019

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: 320-48062-1
Client Project/Site: Dillingham

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

Attn: Marcy Nadel

Authorized for release by:
3/12/2019 2:13:11 PM

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

Table of Contents

Definitions/Glossary

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

TestAmerica Job ID: 320-48062-1

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.
I	Value is EMPC (estimated maximum possible concentration).

Glossary

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

Job ID: 320-48062-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-48062-1

Receipt
The samples were received on 3/5/2019 11:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5º 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 320-280409.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-280406.

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: Dillingham

TestAmerica Job ID: 320-48062-1

Client Sample ID: 180040 — Lab Sample ID: 320-48062-1

No Detections.

Client Sample ID: 172040 — Lab Sample ID: 320-48062-2

No Detections.

Client Sample ID: 191050 — Lab Sample ID: 320-48062-3

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
Perfluorohexanesulfonic acid (PFHxS)	170		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)	4.2		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	42		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 291050 — Lab Sample ID: 320-48062-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	54		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	160		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.2		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)	42		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191420 — Lab Sample ID: 320-48062-5

No Detections.

Client Sample ID: 191741 — Lab Sample ID: 320-48062-6

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
Perfluorohexanesulfonic acid (PFHxS)	46		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)	1.5	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.8		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 291741 — Lab Sample ID: 320-48062-7

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 291741 (Continued) — Lab Sample ID: 320-48062-7

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
Perfluorohexanesulfonic acid (PFHxS)	47		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.2	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.5		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191750 — Lab Sample ID: 320-48062-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	13		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	28		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.5		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191090 — Lab Sample ID: 320-48062-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.5	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191040 — Lab Sample ID: 320-48062-10

No Detections.

Client Sample ID: 191132 — Lab Sample ID: 320-48062-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	4.9		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	51		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191810 — Lab Sample ID: 320-48062-12

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

Client Sample ID: 191440 — Lab Sample ID: 320-48062-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.9	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191101 — Lab Sample ID: 320-48062-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.2	I	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	4.6		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.4	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200030 — Lab Sample ID: 320-48062-15

No Detections.

Client Sample ID: 200020 — Lab Sample ID: 320-48062-16

No Detections.

Client Sample ID: 200020.2 — Lab Sample ID: 320-48062-17

No Detections.

Client Sample ID: 200060 — Lab Sample ID: 320-48062-18

No Detections.

Client Sample ID: 300060 — Lab Sample ID: 320-48062-19

No Detections.

Client Sample ID: 133370 — Lab Sample ID: 320-48062-20

No Detections.

Client Sample ID: 133340 — Lab Sample ID: 320-48062-21

No Detections.

Client Sample ID: 191480 — Lab Sample ID: 320-48062-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	14		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.3		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191490 — Lab Sample ID: 320-48062-23

This Detection Summary does not include radiochemical test results.

Client Sample ID: 191490 (Continued) — Lab Sample ID: 320-48062-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.2		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172420 — Lab Sample ID: 320-48062-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.9		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.7	J	2.0	0.80	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: 172430 — Lab Sample ID: 320-48062-25

No Detections.

Client Sample ID: 191450 — Lab Sample ID: 320-48062-26

No Detections.

Client Sample ID: 172440 — Lab Sample ID: 320-48062-27

No Detections.

This Detection Summary does not include radiochemical test results.

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 180040
Date Collected: 02/26/19 10:19
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:11	03/08/19 22:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 22:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 22:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 22:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 22:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 22:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*
13C4 PFOS	*104*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*
13C5 PFNA	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:30*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 172040
Date Collected: 02/26/19 11:56
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:11	03/08/19 22:49	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 22:49	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 22:49	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 22:49	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 22:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 22:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*
13C5 PFNA	*100*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:11*	*03/08/19 22:49*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191050
Date Collected: 02/26/19 12:31
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**57**		2.0	0.92	ng/L		03/08/19 11:11	03/08/19 23:07	1
Perfluorohexanesulfonic acid (PFHxS)	**170**		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 23:07	1
Perfluoroheptanoic acid (PFHpA)	**3.4**		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 23:07	1
Perfluorooctanoic acid (PFOA)	**4.2**		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 23:07	1
Perfluorooctanesulfonic acid (PFOS)	**42**		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 23:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 23:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*94*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*
13C4 PFOS	*103*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*
13C5 PFNA	*103*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:07*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 291050
Date Collected: 02/26/19 12:34
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**54**		2.0	0.92	ng/L		03/08/19 11:11	03/08/19 23:26	1
Perfluorohexanesulfonic acid (PFHxS)	**160**		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 23:26	1
Perfluoroheptanoic acid (PFHpA)	**3.2**		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 23:26	1
Perfluorooctanoic acid (PFOA)	**3.8**		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 23:26	1
Perfluorooctanesulfonic acid (PFOS)	**42**		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 23:26	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 23:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*109*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*
13C4 PFHpA	*109*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*
13C4 PFOA	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*
13C4 PFOS	*104*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*
13C5 PFNA	*118*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*
13C3 PFBS	*107*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:26*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191420
Date Collected: 02/26/19 13:38
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-5
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		03/08/19 11:11	03/08/19 23:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 23:44	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 23:44	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 23:44	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 23:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 23:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*
13C4 PFHpA	*113*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*
13C4 PFOA	*106*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*
13C4 PFOS	*99*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*
13C5 PFNA	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*
13C3 PFBS	*103*		*25 - 150*	*03/08/19 11:11*	*03/08/19 23:44*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191741
Date Collected: 02/26/19 15:18
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**20**		2.0	0.92	ng/L		03/08/19 11:11	03/09/19 00:03	1
Perfluorohexanesulfonic acid (PFHxS)	**46**		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 00:03	1
Perfluoroheptanoic acid (PFHpA)	**1.3**	**J**	2.0	0.80	ng/L		03/08/19 11:11	03/09/19 00:03	1
Perfluorooctanoic acid (PFOA)	**1.5**	**J**	2.0	0.75	ng/L		03/08/19 11:11	03/09/19 00:03	1
Perfluorooctanesulfonic acid (PFOS)	**8.8**		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 00:03	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 00:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*
13C4 PFOA	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*
13C5 PFNA	*103*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:03*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 291741
Date Collected: 02/26/19 15:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**20**		2.0	0.92	ng/L		03/08/19 11:11	03/09/19 00:40	1
Perfluorohexanesulfonic acid (PFHxS)	**47**		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 00:40	1
Perfluoroheptanoic acid (PFHpA)	**1.2**	**J**	2.0	0.80	ng/L		03/08/19 11:11	03/09/19 00:40	1
Perfluorooctanoic acid (PFOA)	**1.4**	**J**	2.0	0.75	ng/L		03/08/19 11:11	03/09/19 00:40	1
Perfluorooctanesulfonic acid (PFOS)	**9.5**		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 00:40	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 00:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*
13C4 PFOS	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:40*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191750
Date Collected: 02/26/19 16:00
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**13**		2.0	0.92	ng/L		03/08/19 11:11	03/09/19 00:58	1
Perfluorohexanesulfonic acid (PFHxS)	**28**		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 00:58	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 00:58	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 00:58	1
Perfluorooctanesulfonic acid (PFOS)	**2.5**		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 00:58	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 00:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*
13C4 PFHpA	*113*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*
13C4 PFOA	*108*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*
13C5 PFNA	*113*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*
13C3 PFBS	*105*		*25 - 150*	*03/08/19 11:11*	*03/09/19 00:58*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191090
Date Collected: 02/27/19 11:17
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.1**	**J**	2.0	0.92	ng/L		03/08/19 11:11	03/09/19 01:16	1
Perfluorohexanesulfonic acid (PFHxS)	**1.5**	**J**	2.0	0.87	ng/L		03/08/19 11:11	03/09/19 01:16	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 01:16	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 01:16	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 01:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 01:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*
13C4 PFHpA	*110*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*
13C4 PFOA	*105*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*
13C4 PFOS	*103*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:16*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191040
Date Collected: 02/27/19 14:30
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-10
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		03/08/19 11:11	03/09/19 01:35	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 01:35	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 01:35	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 01:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 01:35	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 01:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*
13C4 PFHpA	*104*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:35*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191132
Date Collected: 02/27/19 15:05
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**4.9**		2.0	0.92	ng/L		03/08/19 11:11	03/09/19 01:53	1
Perfluorohexanesulfonic acid (PFHxS)	**51**		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 01:53	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 01:53	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 01:53	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 01:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 01:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*
13C4 PFOS	*94*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:11*	*03/09/19 01:53*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191810
Date Collected: 02/27/19 16:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-12
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		03/08/19 11:11	03/09/19 02:12	1
Perfluorohexanesulfonic acid (PFHxS)	**1.4**	**J**	2.0	0.87	ng/L		03/08/19 11:11	03/09/19 02:12	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 02:12	1
Perfluorooctanoic acid (PFOA)	**1.4**	**J**	2.0	0.75	ng/L		03/08/19 11:11	03/09/19 02:12	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 02:12	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 02:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*
13C4 PFHpA	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:12*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191440
Date Collected: 02/27/19 17:57
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-13
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		03/08/19 11:11	03/09/19 02:30	1
Perfluorohexanesulfonic acid (PFHxS)	**1.9**	**J**	2.0	0.87	ng/L		03/08/19 11:11	03/09/19 02:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 02:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 02:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 02:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 02:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:30*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191101
Date Collected: 02/28/19 10:08
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**2.2**	**I**	2.0	0.92	ng/L		03/08/19 11:11	03/09/19 02:49	1
Perfluorohexanesulfonic acid (PFHxS)	**4.6**		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 02:49	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 02:49	1
Perfluorooctanoic acid (PFOA)	**1.4**	**J**	2.0	0.75	ng/L		03/08/19 11:11	03/09/19 02:49	1
Perfluorooctanesulfonic acid (PFOS)	**2.3**		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 02:49	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 02:49	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*
13C4 PFHpA	*104*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*
13C4 PFOS	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 02:49*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 200030
Date Collected: 02/28/19 11:21
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-15
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		03/08/19 11:11	03/09/19 03:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 03:07	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 03:07	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 03:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 03:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 03:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*
13C4 PFHpA	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*
13C4 PFOA	*92*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*
13C3 PFBS	*91*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:07*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 200020
Date Collected: 02/28/19 14:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-16
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		03/08/19 11:11	03/09/19 03:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 03:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 03:25	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 03:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 03:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 03:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*
13C4 PFOS	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:11*	*03/09/19 03:25*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 200020.2
Date Collected: 02/28/19 14:55
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-17
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		03/08/19 11:11	03/09/19 04:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 04:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 04:02	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 04:02	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 04:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 04:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*
13C4 PFHpA	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*
13C4 PFOA	*95*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*
13C4 PFOS	*90*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*
13C5 PFNA	*90*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*
13C3 PFBS	*91*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:02*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 200060
Date Collected: 02/28/19 14:48
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-18
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		03/08/19 11:11	03/09/19 04:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 04:21	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 04:21	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 04:21	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 04:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 04:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*
13C4 PFOA	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*
13C4 PFOS	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*
13C3 PFBS	*96*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:21*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 300060
Date Collected: 02/28/19 14:50
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-19
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		03/08/19 11:11	03/09/19 04:39	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/09/19 04:39	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/09/19 04:39	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/09/19 04:39	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/09/19 04:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/09/19 04:39	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*
13C4 PFHpA	*105*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:11*	*03/09/19 04:39*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 133370
Date Collected: 02/28/19 17:53
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-20
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		03/08/19 11:15	03/09/19 06:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 06:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 06:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 06:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 06:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 06:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*
13C4 PFOS	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*
13C5 PFNA	*96*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:30*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 133340
Date Collected: 02/28/19 18:33
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-21
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		03/08/19 11:15	03/09/19 06:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 06:48	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 06:48	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 06:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 06:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 06:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*
13C4 PFOS	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 06:48*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191480
Date Collected: 02/27/19 09:25
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**5.7**		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 07:07	1
Perfluorohexanesulfonic acid (PFHxS)	**14**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 07:07	1
Perfluoroheptanoic acid (PFHpA)	**5.1**		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 07:07	1
Perfluorooctanoic acid (PFOA)	**2.7**		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 07:07	1
Perfluorooctanesulfonic acid (PFOS)	**4.3**		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 07:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 07:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*
13C4 PFOS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*
13C5 PFNA	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*
13C3 PFBS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:07*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191490
Date Collected: 02/27/19 09:38
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-23
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**3.2**		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 07:25	1
Perfluorohexanesulfonic acid (PFHxS)	**11**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 07:25	1
Perfluoroheptanoic acid (PFHpA)	**4.1**		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 07:25	1
Perfluorooctanoic acid (PFOA)	**2.4**		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 07:25	1
Perfluorooctanesulfonic acid (PFOS)	**5.0**		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 07:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 07:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*
13C4 PFHpA	*110*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*
13C4 PFOA	*95*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*
13C5 PFNA	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:25*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 172420
Date Collected: 02/27/19 11:18
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-24
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 07:44	1
Perfluorohexanesulfonic acid (PFHxS)	**2.9**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 07:44	1
Perfluoroheptanoic acid (PFHpA)	**1.7**	**J**	2.0	0.80	ng/L		03/08/19 11:15	03/09/19 07:44	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 07:44	1
Perfluorooctanesulfonic acid (PFOS)	**1.5**	**J**	2.0	1.3	ng/L		03/08/19 11:15	03/09/19 07:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 07:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 07:44*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 172430
Date Collected: 02/27/19 12:06
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-25
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 08:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 08:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 08:02	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 08:02	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 08:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 08:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*
13C4 PFHpA	*114*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*
13C4 PFOS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*
13C5 PFNA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:02*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191450
Date Collected: 02/27/19 15:36
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-26
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 08:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 08:21	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 08:21	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 08:21	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 08:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 08:21	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*
13C4 PFHpA	*116*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*
13C4 PFOA	*111*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*
13C4 PFOS	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*
13C3 PFBS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:21*	*1*

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 172440
Date Collected: 02/27/19 18:10
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-27
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 08:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 08:57	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 08:57	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 08:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 08:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 08:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*
13C4 PFHpA	*112*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*
13C4 PFOA	*110*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*
13C4 PFOS	*109*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*
13C5 PFNA	*114*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*
13C3 PFBS	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 08:57*	*1*

Isotope Dilution Summary

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

TestAmerica Job ID: 320-48062-1

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

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

		Percent Isotope Dilution Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)	3C3-PFBS (25-150)
320-48062-1	180040	101	108	102	104	108	97
320-48062-2	172040	99	101	99	101	100	97
320-48062-3	191050	94	103	100	103	103	95
320-48062-4	291050	109	109	108	104	118	107
320-48062-5	191420	108	113	106	99	108	103
320-48062-6	191741	102	101	96	96	103	95
320-48062-7	291741	101	107	99	98	105	97
320-48062-8	191750	106	113	108	105	113	105
320-48062-9	191090	106	110	105	103	106	102
320-48062-10	191040	102	104	102	100	101	98
320-48062-11	191132	95	100	97	94	99	93
320-48062-12	191810	100	99	98	93	102	93
320-48062-13	191440	106	103	99	101	106	102
320-48062-14	191101	103	104	100	98	101	99
320-48062-15	200030	95	96	92	96	97	91
320-48062-16	200020	97	100	98	97	99	94
320-48062-17	200020.2	95	97	95	90	90	91
320-48062-18	200060	98	102	96	98	97	96
320-48062-19	300060	103	105	98	100	101	94
320-48062-20	133370	103	103	99	99	96	98
320-48062-21	133340	105	102	102	104	106	102
320-48062-22	191480	106	107	100	103	98	100
320-48062-23	191490	104	110	95	95	98	99
320-48062-24	172420	106	103	97	100	104	102
320-48062-25	172430	108	114	103	103	107	102
320-48062-26	191450	111	116	111	106	106	108
320-48062-27	172440	121	112	110	109	114	107
LCS 320-280406/2-A	Lab Control Sample	106	109	102	109	113	103
LCS 320-280409/2-A	Lab Control Sample	102	102	101	101	108	102
LCSD 320-280406/3-A	Lab Control Sample Dup	103	106	103	104	99	105
LCSD 320-280409/3-A	Lab Control Sample Dup	99	99	93	97	97	96
MB 320-280406/1-A	Method Blank	101	111	100	101	108	97
MB 320-280409/1-A	Method Blank	108	107	102	102	101	105

Surrogate Legend

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

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

Lab Sample ID: MB 320-280406/1-A
Matrix: Water
Analysis Batch: 280586

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280406

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:11	03/08/19 21:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:11	03/08/19 21:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:11	03/08/19 21:17	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:11	03/08/19 21:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:11	03/08/19 21:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:11	03/08/19 21:17	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*
13C4 PFHpA	*111*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*
13C5 PFNA	*108*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:11*	*03/08/19 21:17*	*1*

Lab Sample ID: LCS 320-280406/2-A
Matrix: Water
Analysis Batch: 280586

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280406

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	16.9		ng/L		95	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.0		ng/L		93	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	18.0		ng/L		90	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	19.6		ng/L		98	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	16.2		ng/L		87	69 - 144
Perfluorononanoic acid (PFNA)	20.0	16.4		ng/L		82	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*106*		*25 - 150*
13C4 PFHpA	*109*		*25 - 150*
13C4 PFOA	*102*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
13C5 PFNA	*113*		*25 - 150*
13C3 PFBS	*103*		*25 - 150*

Lab Sample ID: LCSD 320-280406/3-A
Matrix: Water
Analysis Batch: 280586

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280406

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	16.7		ng/L		94	72 - 151	1	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.4		ng/L		95	73 - 157	2	30
Perfluoroheptanoic acid (PFHpA)	20.0	18.0		ng/L		90	71 - 138	0	30
Perfluorooctanoic acid (PFOA)	20.0	20.1		ng/L		101	70 - 140	3	30

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

Lab Sample ID: LCSD 320-280406/3-A
Matrix: Water
Analysis Batch: 280586

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280406

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			18.6	17.8		ng/L		96	69 - 144	9	30
Perfluorononanoic acid (PFNA)			20.0	20.2		ng/L		101	73 - 147	21	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*103*		*25 - 150*
13C4 PFHpA	*106*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C4 PFOS	*104*		*25 - 150*
13C5 PFNA	*99*		*25 - 150*
13C3 PFBS	*105*		*25 - 150*

Lab Sample ID: MB 320-280409/1-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280409

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 05:34	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFOS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C3 PFBS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*

Lab Sample ID: LCS 320-280409/2-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280409

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)			17.7	17.1		ng/L		97	72 - 151
Perfluorohexanesulfonic acid (PFHxS)			18.2	16.8		ng/L		92	73 - 157
Perfluoroheptanoic acid (PFHpA)			20.0	18.1		ng/L		91	71 - 138
Perfluorooctanoic acid (PFOA)			20.0	18.8		ng/L		94	70 - 140
Perfluorooctanesulfonic acid (PFOS)			18.6	16.2		ng/L		88	69 - 144
Perfluorononanoic acid (PFNA)			20.0	17.7		ng/L		89	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*102*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*

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

Lab Sample ID: LCS 320-280409/2-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280409

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C4 PFOA	*101*		*25 - 150*
13C4 PFOS	*101*		*25 - 150*
13C5 PFNA	*108*		*25 - 150*
13C3 PFBS	*102*		*25 - 150*

Lab Sample ID: LCSD 320-280409/3-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280409

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.8		ng/L		101	72 - 151	4	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.7		ng/L		92	73 - 157	0	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.0		ng/L		95	71 - 138	5	30
Perfluorooctanoic acid (PFOA)	20.0	20.9		ng/L		104	70 - 140	10	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.6		ng/L		95	69 - 144	8	30
Perfluorononanoic acid (PFNA)	20.0	19.4		ng/L		97	73 - 147	9	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*99*		*25 - 150*
13C4 PFHpA	*99*		*25 - 150*
13C4 PFOA	*93*		*25 - 150*
13C4 PFOS	*97*		*25 - 150*
13C5 PFNA	*97*		*25 - 150*
13C3 PFBS	*96*		*25 - 150*

LCMS

Prep Batch: 280406

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48062-1	180040	Total/NA	Water	PFAS Prep	
320-48062-2	172040	Total/NA	Water	PFAS Prep	
320-48062-3	191050	Total/NA	Water	PFAS Prep	
320-48062-4	291050	Total/NA	Water	PFAS Prep	
320-48062-5	191420	Total/NA	Water	PFAS Prep	
320-48062-6	191741	Total/NA	Water	PFAS Prep	
320-48062-7	291741	Total/NA	Water	PFAS Prep	
320-48062-8	191750	Total/NA	Water	PFAS Prep	
320-48062-9	191090	Total/NA	Water	PFAS Prep	
320-48062-10	191040	Total/NA	Water	PFAS Prep	
320-48062-11	191132	Total/NA	Water	PFAS Prep	
320-48062-12	191810	Total/NA	Water	PFAS Prep	
320-48062-13	191440	Total/NA	Water	PFAS Prep	
320-48062-14	191101	Total/NA	Water	PFAS Prep	
320-48062-15	200030	Total/NA	Water	PFAS Prep	
320-48062-16	200020	Total/NA	Water	PFAS Prep	
320-48062-17	200020.2	Total/NA	Water	PFAS Prep	
320-48062-18	200060	Total/NA	Water	PFAS Prep	
320-48062-19	300060	Total/NA	Water	PFAS Prep	
MB 320-280406/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280406/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280406/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 280409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48062-20	133370	Total/NA	Water	PFAS Prep	
320-48062-21	133340	Total/NA	Water	PFAS Prep	
320-48062-22	191480	Total/NA	Water	PFAS Prep	
320-48062-23	191490	Total/NA	Water	PFAS Prep	
320-48062-24	172420	Total/NA	Water	PFAS Prep	
320-48062-25	172430	Total/NA	Water	PFAS Prep	
320-48062-26	191450	Total/NA	Water	PFAS Prep	
320-48062-27	172440	Total/NA	Water	PFAS Prep	
MB 320-280409/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280409/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280409/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 280586

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48062-1	180040	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-2	172040	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-3	191050	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-4	291050	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-5	191420	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-6	191741	Total/NA	Water	WS-LC-0025 At1	280406

LCMS (Continued)

Analysis Batch: 280586 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48062-7	291741	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-8	191750	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-9	191090	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-10	191040	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-11	191132	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-12	191810	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-13	191440	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-14	191101	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-15	200030	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-16	200020	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-17	200020.2	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-18	200060	Total/NA	Water	WS-LC-0025 At1	280406
320-48062-19	300060	Total/NA	Water	WS-LC-0025 At1	280406
MB 320-280406/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280406
LCS 320-280406/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280406
LCSD 320-280406/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280406

Analysis Batch: 280588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48062-20	133370	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-21	133340	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-22	191480	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-23	191490	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-24	172420	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-25	172430	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-26	191450	Total/NA	Water	WS-LC-0025 At1	280409
320-48062-27	172440	Total/NA	Water	WS-LC-0025 At1	280409
MB 320-280409/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280409
LCS 320-280409/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280409
LCSD 320-280409/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280409

Lab Chronicle

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 180040
Date Collected: 02/26/19 10:19
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-1
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/08/19 22:30	D1R	TAL SAC

Client Sample ID: 172040
Date Collected: 02/26/19 11:56
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-2
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/08/19 22:49	D1R	TAL SAC

Client Sample ID: 191050
Date Collected: 02/26/19 12:31
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-3
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/08/19 23:07	D1R	TAL SAC

Client Sample ID: 291050
Date Collected: 02/26/19 12:34
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-4
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/08/19 23:26	D1R	TAL SAC

Client Sample ID: 191420
Date Collected: 02/26/19 13:38
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-5
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/08/19 23:44	D1R	TAL SAC

Client Sample ID: 191741
Date Collected: 02/26/19 15:18
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-6
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 00:03	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 291741
Date Collected: 02/26/19 15:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-7
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 00:40	D1R	TAL SAC

Client Sample ID: 191750
Date Collected: 02/26/19 16:00
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-8
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 00:58	D1R	TAL SAC

Client Sample ID: 191090
Date Collected: 02/27/19 11:17
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-9
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 01:16	D1R	TAL SAC

Client Sample ID: 191040
Date Collected: 02/27/19 14:30
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-10
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 01:35	D1R	TAL SAC

Client Sample ID: 191132
Date Collected: 02/27/19 15:05
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-11
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 01:53	D1R	TAL SAC

Client Sample ID: 191810
Date Collected: 02/27/19 16:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-12
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 02:12	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 191440
Date Collected: 02/27/19 17:57
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-13
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 02:30	D1R	TAL SAC

Client Sample ID: 191101
Date Collected: 02/28/19 10:08
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-14
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 02:49	D1R	TAL SAC

Client Sample ID: 200030
Date Collected: 02/28/19 11:21
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-15
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 03:07	D1R	TAL SAC

Client Sample ID: 200020
Date Collected: 02/28/19 14:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-16
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 03:25	D1R	TAL SAC

Client Sample ID: 200020.2
Date Collected: 02/28/19 14:55
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-17
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	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 04:02	D1R	TAL SAC

Client Sample ID: 200060
Date Collected: 02/28/19 14:48
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 04:21	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 300060
Date Collected: 02/28/19 14:50
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280406	03/08/19 11:11	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280586	03/09/19 04:39	D1R	TAL SAC

Client Sample ID: 133370
Date Collected: 02/28/19 17:53
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 06:30	D1R	TAL SAC

Client Sample ID: 133340
Date Collected: 02/28/19 18:33
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 06:48	D1R	TAL SAC

Client Sample ID: 191480
Date Collected: 02/27/19 09:25
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-22
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 07:07	D1R	TAL SAC

Client Sample ID: 191490
Date Collected: 02/27/19 09:38
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-23
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 07:25	D1R	TAL SAC

Client Sample ID: 172420
Date Collected: 02/27/19 11:18
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48062-24
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 07:44	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48062-1

Client Sample ID: 172430

Lab Sample ID: 320-48062-25

Date Collected: 02/27/19 12:06

Matrix: Water

Date Received: 03/05/19 11:25

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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 08:02	D1R	TAL SAC

Client Sample ID: 191450

Lab Sample ID: 320-48062-26

Date Collected: 02/27/19 15:36

Matrix: Water

Date Received: 03/05/19 11:25

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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 08:21	D1R	TAL SAC

Client Sample ID: 172440

Lab Sample ID: 320-48062-27

Date Collected: 02/27/19 18:10

Matrix: Water

Date Received: 03/05/19 11:25

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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 08:57	D1R	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

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

TestAmerica Job ID: 320-48062-1

Laboratory: TestAmerica Sacramento

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

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

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

Method Summary

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

TestAmerica Job ID: 320-48062-1

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: Dillingham

TestAmerica Job ID: 320-48062-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-48062-1	180040	Water	02/26/19 10:19	03/05/19 11:25
320-48062-2	172040	Water	02/26/19 11:56	03/05/19 11:25
320-48062-3	191050	Water	02/26/19 12:31	03/05/19 11:25
320-48062-4	291050	Water	02/26/19 12:34	03/05/19 11:25
320-48062-5	191420	Water	02/26/19 13:38	03/05/19 11:25
320-48062-6	191741	Water	02/26/19 15:18	03/05/19 11:25
320-48062-7	291741	Water	02/26/19 15:20	03/05/19 11:25
320-48062-8	191750	Water	02/26/19 16:00	03/05/19 11:25
320-48062-9	191090	Water	02/27/19 11:17	03/05/19 11:25
320-48062-10	191040	Water	02/27/19 14:30	03/05/19 11:25
320-48062-11	191132	Water	02/27/19 15:05	03/05/19 11:25
320-48062-12	191810	Water	02/27/19 16:27	03/05/19 11:25
320-48062-13	191440	Water	02/27/19 17:57	03/05/19 11:25
320-48062-14	191101	Water	02/28/19 10:08	03/05/19 11:25
320-48062-15	200030	Water	02/28/19 11:21	03/05/19 11:25
320-48062-16	200020	Water	02/28/19 14:20	03/05/19 11:25
320-48062-17	200020.2	Water	02/28/19 14:55	03/05/19 11:25
320-48062-18	200060	Water	02/28/19 14:48	03/05/19 11:25
320-48062-19	300060	Water	02/28/19 14:50	03/05/19 11:25
320-48062-20	133370	Water	02/28/19 17:53	03/05/19 11:25
320-48062-21	133340	Water	02/28/19 18:33	03/05/19 11:25
320-48062-22	191480	Water	02/27/19 09:25	03/05/19 11:25
320-48062-23	191490	Water	02/27/19 09:38	03/05/19 11:25
320-48062-24	172420	Water	02/27/19 11:18	03/05/19 11:25
320-48062-25	172430	Water	02/27/19 12:06	03/05/19 11:25
320-48062-26	191450	Water	02/27/19 15:36	03/05/19 11:25
320-48062-27	172440	Water	02/27/19 18:10	03/05/19 11:25

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

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: David Hitchcock

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	16 PFAS WS-LC-0024	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
180040		1019	2/26/19	2		Groundwater
172040		1154		2		
191050		1231		2		
291050		1234		2		
191420		1338		2		
191741		1518		2		
291741		1520		2		
191750		1600		2		
191090		1117	2/27/19	2		
191040		1430	2/27/19	2		

320-48062 Chain of Custody

Project Information		Sample Receipt	
Number:	102581-003	Total No. of Containers:	24
Name:	Dillingham PFAS	COC Seals/Intact? Y/N/NA	
Contact:	MDN	Received Good Cond./Cold	
Ongoing Project?	Yes [X] No [ ]	Temp:	
Sampler:	MDN/MXJ	Delivery Method:	Goldstreak

Notes:

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: [signature] Time: 1300	Signature: Time:	Signature: Time:
Printed Name: Mary Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Dallington Date: 3/6/19	Printed Name: Date:	Printed Name: Date:
Company: TAW SMC	Company:	Company:

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

1.5°C

No. 35686

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

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: Davin Alltucker

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

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	+6 PFAS WS-LC-0025	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
191132		1505	2/27/19	2		Groundwater
191810		1627	"	2		"
191440		1757	"	2		"
191101		1008	2/28/19	2		"
200030		1121	"	2		"
200020		1420	"	2		"
200620.2		1455	"	2		"
200060		1448	"	2		"
300060		1450	"	2		"
133370		1753	"	2		"

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project?	Yes ☐ No ☐
Sampler:	

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

Notes:

See PM

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: MNadel Time: 1300	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Addington Date: 5 March 19	Printed Name: Date:	Printed Name: Date:
Company: TAWSC	Company:	Company:

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

1.5°C

No. 35687

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
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Page 3 of 3

Laboratory Test America
Attn: David Hitchcock

Turn Around Time: ☒ Normal ☐ Rush — Please Specify

Quote No:

J-Flags: ☒ Yes ☐ No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	+6 PFAS WS-LC-0025	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
133340		1833	2/23/19	✓	2	groundwater
191480		0925	2/27/19	✓	2	
191490		0938		✓	2	
172420		1118		✓	2	
172430		1206		✓	2	
~~191381~~		~~1453~~		✓ (MS)	~~2~~	
191450		1536		✓	2	
~~200090~~		~~1725~~		✓ (FD)	~~2~~	
172440		1810		✓	2	
~~172410~~		~~1846~~		✓ (MS)	~~2~~	

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project?	Yes ☐ No ☐
Sampler:	

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

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1300	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Ballington Date:	Printed Name: Date:	Printed Name: Date:
Company: TAWSC	Company:	Company:

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

1.5°C

No. 35791

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-48062-1

Login Number: 48062
List Number: 1
Creator: Badhan, Manpreet

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	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	

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: 320-48064-1
Client Project/Site: Dillingham
Revision: 1

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

Attn: Marcy Nadel

Authorized for release by:
3/20/2019 12:04:52 PM

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

Table of Contents

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.
I	Value is EMPC (estimated maximum possible concentration).

Glossary

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

Job ID: 320-48064-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-48064-1

Revision:
This report has been revised to include re-extraction of sample 200150 (320-480604-21) at the client's request. Re-extraction confirms original results. Both sets of data are reported.

Receipt
The samples were received on 3/5/2019 11:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.3º C.

Receipt Exceptions

The container label for the following sample did not match the information listed on the Chain-of-Custody (COC): 191760 (320-48064-7). The container labels list time at 14:38, while COC lists 14:36. 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 320-280411.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-280409.

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: Dillingham

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172320 — Lab Sample ID: 320-48064-1

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)	6.8		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.7		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	9.7		2.0	0.75	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: 191841 — Lab Sample ID: 320-48064-2

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)	2.0		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.85	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200340 — Lab Sample ID: 320-48064-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.6		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)	1.2	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.2		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172340 — Lab Sample ID: 320-48064-4

No Detections.

Client Sample ID: 200380 — Lab Sample ID: 320-48064-5

No Detections.

Client Sample ID: 172030 — Lab Sample ID: 320-48064-6

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
Perfluorooctanoic acid (PFOA)	3.0		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191760 — Lab Sample ID: 320-48064-7

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample ID: 191760 (Continued) — Lab Sample ID: 320-48064-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.5		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.7	I	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 171345 — Lab Sample ID: 320-48064-8

No Detections.

Client Sample ID: 172300 — Lab Sample ID: 320-48064-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	6.6		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172399 — Lab Sample ID: 320-48064-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.4	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172392 — Lab Sample ID: 320-48064-11

No Detections.

Client Sample ID: 171352 — Lab Sample ID: 320-48064-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	3.9		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172241 — Lab Sample ID: 320-48064-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.6		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191770 — Lab Sample ID: 320-48064-14

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)	2.6		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 291770 — Lab Sample ID: 320-48064-15

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)	2.5		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172320.2 — Lab Sample ID: 320-48064-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.85	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.9	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 272320.2 — Lab Sample ID: 320-48064-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.86	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	2.1		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 171351 — Lab Sample ID: 320-48064-18

No Detections.

Client Sample ID: 191110 — Lab Sample ID: 320-48064-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	9.9		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	18		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)	1.5	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172410 — Lab Sample ID: 320-48064-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.6		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200150 — Lab Sample ID: 320-48064-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	7.9		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	53		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 200150 (Continued) — Lab Sample ID: 320-48064-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	60		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS) - RE	7.5		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS) - RE	52		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA) - RE	2.4		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA) - RE	5.3		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	60		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172250 — Lab Sample ID: 320-48064-22

No Detections.

Client Sample ID: 191381 — Lab Sample ID: 320-48064-23

No Detections.

Client Sample ID: 200090 — Lab Sample ID: 320-48064-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	5.0		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.5		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.2	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172320
Date Collected: 02/27/19 14:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-1
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		03/08/19 11:15	03/09/19 09:16	1
Perfluorohexanesulfonic acid (PFHxS)	**6.8**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 09:16	1
Perfluoroheptanoic acid (PFHpA)	**2.7**		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 09:16	1
Perfluorooctanoic acid (PFOA)	**9.7**		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 09:16	1
Perfluorooctanesulfonic acid (PFOS)	**1.5**	**J**	2.0	1.3	ng/L		03/08/19 11:15	03/09/19 09:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 09:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:16*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191841
Date Collected: 02/26/19 15:28
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-2
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		03/08/19 11:15	03/09/19 09:34	1
Perfluorohexanesulfonic acid (PFHxS)	**2.0**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 09:34	1
Perfluoroheptanoic acid (PFHpA)	**0.85**	**J**	2.0	0.80	ng/L		03/08/19 11:15	03/09/19 09:34	1
Perfluorooctanoic acid (PFOA)	**1.5**	**J**	2.0	0.75	ng/L		03/08/19 11:15	03/09/19 09:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 09:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 09:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*
13C4 PFHpA	*110*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*
13C4 PFOA	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:34*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 200340
Date Collected: 02/27/19 16:08
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**3.6**		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 09:53	1
Perfluorohexanesulfonic acid (PFHxS)	**12**		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 09:53	1
Perfluoroheptanoic acid (PFHpA)	**1.2**	**J**	2.0	0.80	ng/L		03/08/19 11:15	03/09/19 09:53	1
Perfluorooctanoic acid (PFOA)	**1.6**	**J**	2.0	0.75	ng/L		03/08/19 11:15	03/09/19 09:53	1
Perfluorooctanesulfonic acid (PFOS)	**7.2**		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 09:53	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 09:53	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*
13C5 PFNA	*95*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 09:53*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172340
Date Collected: 02/27/19 11:28
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-4
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		03/08/19 11:15	03/09/19 10:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 10:11	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 10:11	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 10:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 10:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 10:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:11*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 200380
Date Collected: 02/28/19 10:57
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-5
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		03/08/19 11:15	03/09/19 10:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 10:30	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 10:30	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 10:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 10:30	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 10:30	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*
13C4 PFOA	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*
13C4 PFOS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*
13C3 PFBS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:30*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172030
Date Collected: 02/28/19 10:11
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-6
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		03/08/19 11:15	03/09/19 10:48	1
Perfluorohexanesulfonic acid (PFHxS)	**1.2**	**J**	2.0	0.87	ng/L		03/08/19 11:15	03/09/19 10:48	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 10:48	1
Perfluorooctanoic acid (PFOA)	**3.0**		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 10:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 10:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 10:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*
13C4 PFOA	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*
13C4 PFOS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*
13C3 PFBS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 10:48*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191760
Date Collected: 02/26/19 14:36
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**3.5**		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 11:07	1
Perfluorohexanesulfonic acid (PFHxS)	**5.7**	**I**	2.0	0.87	ng/L		03/08/19 11:15	03/09/19 11:07	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 11:07	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 11:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 11:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 11:07	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*
13C4 PFHpA	*110*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*
13C3 PFBS	*103*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:07*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 171345
Date Collected: 02/28/19 14:43
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-8
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		03/08/19 11:15	03/09/19 11:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 11:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 11:25	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 11:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 11:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 11:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*
13C4 PFOA	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*
13C3 PFBS	*99*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:25*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172300
Date Collected: 02/28/19 11:59
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-9
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		03/08/19 11:15	03/09/19 11:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 11:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 11:43	1
Perfluorooctanoic acid (PFOA)	**6.6**		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 11:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 11:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 11:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*
13C4 PFHpA	*112*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*
13C5 PFNA	*115*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:15*	*03/09/19 11:43*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172399
Date Collected: 02/27/19 09:46
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-10
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		03/08/19 11:15	03/09/19 12:20	1
Perfluorohexanesulfonic acid (PFHxS)	**1.4**	**J**	2.0	0.87	ng/L		03/08/19 11:15	03/09/19 12:20	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 12:20	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 12:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 12:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 12:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*
13C4 PFOA	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*
13C4 PFOS	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*
13C3 PFBS	*100*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:20*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172392
Date Collected: 02/28/19 18:11
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-11
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		03/08/19 11:15	03/09/19 12:39	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 12:39	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 12:39	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 12:39	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 12:39	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 12:39	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*
13C4 PFHpA	*110*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*
13C4 PFOS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*
13C5 PFNA	*106*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*
13C3 PFBS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:39*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 171352
Date Collected: 02/28/19 16:10
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-12
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		03/08/19 11:15	03/09/19 12:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 12:57	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 12:57	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 12:57	1
Perfluorooctanesulfonic acid (PFOS)	**3.9**		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 12:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 12:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*
13C4 PFHpA	*111*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*
13C4 PFOS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*
13C5 PFNA	*111*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 12:57*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172241
Date Collected: 02/28/19 17:12
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-13
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		03/08/19 11:21	03/09/19 14:29	1
Perfluorohexanesulfonic acid (PFHxS)	**2.6**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 14:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 14:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 14:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 14:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 14:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*
13C5 PFNA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:29*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191770
Date Collected: 03/01/19 13:30
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.7**	**J**	2.0	0.92	ng/L		03/08/19 11:21	03/09/19 14:48	1
Perfluorohexanesulfonic acid (PFHxS)	**2.6**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 14:48	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 14:48	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 14:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 14:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 14:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 14:48*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 291770
Date Collected: 03/01/19 13:35
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.8**	**J**	2.0	0.92	ng/L		03/08/19 11:21	03/09/19 15:06	1
Perfluorohexanesulfonic acid (PFHxS)	**2.5**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 15:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 15:06	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 15:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 15:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 15:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*
13C4 PFOS	*90*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*
13C5 PFNA	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:06*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172320.2
Date Collected: 03/01/19 12:29
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-16
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		03/08/19 11:21	03/09/19 15:25	1
Perfluorohexanesulfonic acid (PFHxS)	**11**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 15:25	1
Perfluoroheptanoic acid (PFHpA)	**0.85**	**J**	2.0	0.80	ng/L		03/08/19 11:21	03/09/19 15:25	1
Perfluorooctanoic acid (PFOA)	**1.9**	**J**	2.0	0.75	ng/L		03/08/19 11:21	03/09/19 15:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 15:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 15:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*
13C4 PFHpA	*105*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*
13C4 PFOS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:25*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 272320.2
Date Collected: 03/01/19 12:35
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-17
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		03/08/19 11:21	03/09/19 15:43	1
Perfluorohexanesulfonic acid (PFHxS)	**11**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 15:43	1
Perfluoroheptanoic acid (PFHpA)	**0.86**	**J**	2.0	0.80	ng/L		03/08/19 11:21	03/09/19 15:43	1
Perfluorooctanoic acid (PFOA)	**2.1**		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 15:43	1
Perfluorooctanesulfonic acid (PFOS)	**1.6**	**J**	2.0	1.3	ng/L		03/08/19 11:21	03/09/19 15:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 15:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*
13C4 PFHpA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*
13C4 PFOA	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*
13C4 PFOS	*92*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 15:43*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 171351
Date Collected: 03/01/19 11:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-18
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		03/08/19 11:21	03/09/19 16:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 16:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 16:02	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 16:02	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 16:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 16:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*
13C4 PFOS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:02*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191110
Date Collected: 03/01/19 18:45
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**9.9**		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 16:20	1
Perfluorohexanesulfonic acid (PFHxS)	**18**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 16:20	1
Perfluoroheptanoic acid (PFHpA)	**1.8**	**J**	2.0	0.80	ng/L		03/08/19 11:21	03/09/19 16:20	1
Perfluorooctanoic acid (PFOA)	**1.5**	**J**	2.0	0.75	ng/L		03/08/19 11:21	03/09/19 16:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 16:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 16:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*
13C4 PFHpA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*
13C5 PFNA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:20*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172410
Date Collected: 02/27/19 18:46
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-20
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.9**	**J**	2.0	0.92	ng/L		03/08/19 11:21	03/09/19 16:57	1
Perfluorohexanesulfonic acid (PFHxS)	**2.6**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 16:57	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 16:57	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 16:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 16:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 16:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*
13C4 PFOA	*92*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*
13C5 PFNA	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 16:57*	*1*

Client Sample ID: 200150
Date Collected: 02/28/19 17:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-21
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.9		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 17:16	1
Perfluorohexanesulfonic acid (PFHxS)	53		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 17:16	1
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 17:16	1
Perfluorooctanoic acid (PFOA)	5.1		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 17:16	1
Perfluorooctanesulfonic acid (PFOS)	60		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 17:16	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 17:16	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*
13C4 PFOS	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:16*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	7.5		2.0	0.92	ng/L		03/15/19 13:10	03/16/19 09:47	1
Perfluorohexanesulfonic acid (PFHxS)	52		2.0	0.87	ng/L		03/15/19 13:10	03/16/19 09:47	1
Perfluoroheptanoic acid (PFHpA)	2.4		2.0	0.80	ng/L		03/15/19 13:10	03/16/19 09:47	1
Perfluorooctanoic acid (PFOA)	5.3		2.0	0.75	ng/L		03/15/19 13:10	03/16/19 09:47	1
Perfluorooctanesulfonic acid (PFOS)	60		2.0	1.3	ng/L		03/15/19 13:10	03/16/19 09:47	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/15/19 13:10	03/16/19 09:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*116*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*
13C4 PFHpA	*118*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*
13C4 PFOA	*113*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*
13C4 PFOS	*111*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*
13C5 PFNA	*107*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*
13C3 PFBS	*109*		*25 - 150*	*03/15/19 13:10*	*03/16/19 09:47*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172250
Date Collected: 02/28/19 18:12
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 17:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 17:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 17:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 17:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 17:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 17:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*
13C4 PFHpA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*
13C4 PFOA	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*
13C5 PFNA	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:34*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191381
Date Collected: 02/27/19 14:53
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-23
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 17:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 17:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 17:52	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 17:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 17:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 17:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*
13C5 PFNA	*91*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*
13C3 PFBS	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 17:52*	*1*

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 200090
Date Collected: 02/27/19 17:25
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-24
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**5.0**		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 18:11	1
Perfluorohexanesulfonic acid (PFHxS)	**2.5**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 18:11	1
Perfluoroheptanoic acid (PFHpA)	**1.4**	**J**	2.0	0.80	ng/L		03/08/19 11:21	03/09/19 18:11	1
Perfluorooctanoic acid (PFOA)	**1.2**	**J**	2.0	0.75	ng/L		03/08/19 11:21	03/09/19 18:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 18:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 18:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*
13C4 PFOA	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*
13C5 PFNA	*90*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*
13C3 PFBS	*91*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:11*	*1*

Isotope Dilution Summary

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

TestAmerica Job ID: 320-48064-1

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

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)	3C3-PFBS (25-150)		
320-48064-1	172320	102	108	100	101	105	99		
320-48064-2	191841	103	110	105	101	104	99		
320-48064-3	200340	100	101	98	96	95	98		
320-48064-4	172340	97	100	99	100	99	95		
320-48064-5	200380	106	107	104	102	105	102		
320-48064-6	172030	108	107	105	103	104	103		
320-48064-7	191760	108	110	100	105	106	103		
320-48064-8	171345	100	108	101	100	102	99		
320-48064-9	172300	104	112	107	101	115	98		
320-48064-10	172399	104	108	106	106	105	100		
320-48064-11	172392	108	110	107	102	106	105		
320-48064-12	171352	107	111	107	105	111	101		
320-48064-13	172241	100	102	100	93	98	94		
320-48064-14	191770	99	100	100	91	102	94		
320-48064-15	291770	102	102	98	90	94	94		
320-48064-16	172320.2	106	105	102	98	104	98		
320-48064-17	272320.2	96	98	94	92	97	95		
320-48064-18	171351	97	106	98	94	99	93		
320-48064-19	191110	96	98	99	95	100	94		
320-48064-20	172410	99	100	92	91	93	93		
320-48064-21	200150	99	101	99	100	97	98		
320-48064-21 - RE	200150	116	118	113	111	107	109		
320-48064-22	172250	98	97	96	95	98	93		
320-48064-23	191381	100	102	97	95	91	96		
320-48064-24	200090	97	100	101	91	90	91		
LCS 320-280409/2-A	Lab Control Sample	102	102	101	101	108	102		
LCS 320-280411/2-A	Lab Control Sample	109	107	103	109	98	103		
LCS 320-281963/2-A	Lab Control Sample	106	103	103	106	107	99		
LCSD 320-280409/3-A	Lab Control Sample Dup	99	99	93	97	97	96		
LCSD 320-280411/3-A	Lab Control Sample Dup	94	97	98	99	94	94		
LCSD 320-281963/3-A	Lab Control Sample Dup	103	102	104	103	104	102		
MB 320-280409/1-A	Method Blank	108	107	102	102	101	105		
MB 320-280411/1-A	Method Blank	108	102	107	101	102	101		
MB 320-281963/1-A	Method Blank	111	108	108	111	109	108		

Surrogate Legend

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

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

Lab Sample ID: MB 320-280409/1-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280409

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:15	03/09/19 05:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:15	03/09/19 05:34	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFHpA	*107*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFOA	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C4 PFOS	*102*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*
13C3 PFBS	*105*		*25 - 150*	*03/08/19 11:15*	*03/09/19 05:34*	*1*

Lab Sample ID: LCS 320-280409/2-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280409

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.1		ng/L		97	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.8		ng/L		92	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	18.1		ng/L		91	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	18.8		ng/L		94	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	16.2		ng/L		88	69 - 144
Perfluorononanoic acid (PFNA)	20.0	17.7		ng/L		89	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*102*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*
13C4 PFOA	*101*		*25 - 150*
13C4 PFOS	*101*		*25 - 150*
13C5 PFNA	*108*		*25 - 150*
13C3 PFBS	*102*		*25 - 150*

Lab Sample ID: LCSD 320-280409/3-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280409

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.8		ng/L		101	72 - 151	4	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.7		ng/L		92	73 - 157	0	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.0		ng/L		95	71 - 138	5	30
Perfluorooctanoic acid (PFOA)	20.0	20.9		ng/L		104	70 - 140	10	30

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

Lab Sample ID: LCSD 320-280409/3-A
Matrix: Water
Analysis Batch: 280588

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280409

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			18.6	17.6		ng/L		95	69 - 144	8	30
Perfluorononanoic acid (PFNA)			20.0	19.4		ng/L		97	73 - 147	9	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*99*		*25 - 150*
13C4 PFHpA	*99*		*25 - 150*
13C4 PFOA	*93*		*25 - 150*
13C4 PFOS	*97*		*25 - 150*
13C5 PFNA	*97*		*25 - 150*
13C3 PFBS	*96*		*25 - 150*

Lab Sample ID: MB 320-280411/1-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280411

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 13:34	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*

Lab Sample ID: LCS 320-280411/2-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280411

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)			17.7	17.1		ng/L		97	72 - 151
Perfluorohexanesulfonic acid (PFHxS)			18.2	16.7		ng/L		92	73 - 157
Perfluoroheptanoic acid (PFHpA)			20.0	18.2		ng/L		91	71 - 138
Perfluorooctanoic acid (PFOA)			20.0	21.0		ng/L		105	70 - 140
Perfluorooctanesulfonic acid (PFOS)			18.6	17.2		ng/L		93	69 - 144
Perfluorononanoic acid (PFNA)			20.0	21.1		ng/L		106	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*109*		*25 - 150*
13C4 PFHpA	*107*		*25 - 150*

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

Lab Sample ID: LCS 320-280411/2-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280411

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	103		25 - 150
13C4 PFOS	109		25 - 150
13C5 PFNA	98		25 - 150
13C3 PFBS	103		25 - 150

Lab Sample ID: LCSD 320-280411/3-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280411

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)			17.7	18.6		ng/L		105	72 - 151	8	30
Perfluorohexanesulfonic acid (PFHxS)			18.2	17.7		ng/L		97	73 - 157	6	30
Perfluoroheptanoic acid (PFHpA)			20.0	19.7		ng/L		98	71 - 138	8	30
Perfluorooctanoic acid (PFOA)			20.0	22.6		ng/L		113	70 - 140	7	30
Perfluorooctanesulfonic acid (PFOS)			18.6	17.7		ng/L		96	69 - 144	3	30
Perfluorononanoic acid (PFNA)			20.0	19.3		ng/L		96	73 - 147	9	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	94		25 - 150
13C4 PFHpA	97		25 - 150
13C4 PFOA	98		25 - 150
13C4 PFOS	99		25 - 150
13C5 PFNA	94		25 - 150
13C3 PFBS	94		25 - 150

Lab Sample ID: MB 320-281963/1-A
Matrix: Water
Analysis Batch: 282181

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 281963

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/15/19 13:10	03/16/19 08:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/15/19 13:10	03/16/19 08:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/15/19 13:10	03/16/19 08:52	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/15/19 13:10	03/16/19 08:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/15/19 13:10	03/16/19 08:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/15/19 13:10	03/16/19 08:52	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	111		25 - 150	03/15/19 13:10	03/16/19 08:52	1
13C4 PFHpA	108		25 - 150	03/15/19 13:10	03/16/19 08:52	1
13C4 PFOA	108		25 - 150	03/15/19 13:10	03/16/19 08:52	1
13C4 PFOS	111		25 - 150	03/15/19 13:10	03/16/19 08:52	1
13C5 PFNA	109		25 - 150	03/15/19 13:10	03/16/19 08:52	1
13C3 PFBS	108		25 - 150	03/15/19 13:10	03/16/19 08:52	1

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

Lab Sample ID: LCS 320-281963/2-A
Matrix: Water
Analysis Batch: 282181

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 281963

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.2		ng/L		97	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.4		ng/L		90	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	18.6		ng/L		93	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	19.9		ng/L		99	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	17.3		ng/L		93	69 - 144
Perfluorononanoic acid (PFNA)	20.0	16.7		ng/L		83	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*106*		*25 - 150*
13C4 PFHpA	*103*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C4 PFOS	*106*		*25 - 150*
13C5 PFNA	*107*		*25 - 150*
13C3 PFBS	*99*		*25 - 150*

Lab Sample ID: LCSD 320-281963/3-A
Matrix: Water
Analysis Batch: 282181

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 281963

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.5		ng/L		99	72 - 151	2	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.6		ng/L		97	73 - 157	7	30
Perfluoroheptanoic acid (PFHpA)	20.0	18.0		ng/L		90	71 - 138	3	30
Perfluorooctanoic acid (PFOA)	20.0	18.4		ng/L		92	70 - 140	8	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.9		ng/L		96	69 - 144	3	30
Perfluorononanoic acid (PFNA)	20.0	18.7		ng/L		94	73 - 147	11	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*103*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*
13C4 PFOA	*104*		*25 - 150*
13C4 PFOS	*103*		*25 - 150*
13C5 PFNA	*104*		*25 - 150*
13C3 PFBS	*102*		*25 - 150*

LCMS

Prep Batch: 280409

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-1	172320	Total/NA	Water	PFAS Prep	
320-48064-2	191841	Total/NA	Water	PFAS Prep	
320-48064-3	200340	Total/NA	Water	PFAS Prep	
320-48064-4	172340	Total/NA	Water	PFAS Prep	
320-48064-5	200380	Total/NA	Water	PFAS Prep	
320-48064-6	172030	Total/NA	Water	PFAS Prep	
320-48064-7	191760	Total/NA	Water	PFAS Prep	
320-48064-8	171345	Total/NA	Water	PFAS Prep	
320-48064-9	172300	Total/NA	Water	PFAS Prep	
320-48064-10	172399	Total/NA	Water	PFAS Prep	
320-48064-11	172392	Total/NA	Water	PFAS Prep	
320-48064-12	171352	Total/NA	Water	PFAS Prep	
MB 320-280409/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280409/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280409/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 280411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-13	172241	Total/NA	Water	PFAS Prep	
320-48064-14	191770	Total/NA	Water	PFAS Prep	
320-48064-15	291770	Total/NA	Water	PFAS Prep	
320-48064-16	172320.2	Total/NA	Water	PFAS Prep	
320-48064-17	272320.2	Total/NA	Water	PFAS Prep	
320-48064-18	171351	Total/NA	Water	PFAS Prep	
320-48064-19	191110	Total/NA	Water	PFAS Prep	
320-48064-20	172410	Total/NA	Water	PFAS Prep	
320-48064-21	200150	Total/NA	Water	PFAS Prep	
320-48064-22	172250	Total/NA	Water	PFAS Prep	
320-48064-23	191381	Total/NA	Water	PFAS Prep	
320-48064-24	200090	Total/NA	Water	PFAS Prep	
MB 320-280411/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280411/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280411/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 280588

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-1	172320	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-2	191841	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-3	200340	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-4	172340	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-5	200380	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-6	172030	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-7	191760	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-8	171345	Total/NA	Water	WS-LC-0025 At1	280409

LCMS (Continued)

Analysis Batch: 280588 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-9	172300	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-10	172399	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-11	172392	Total/NA	Water	WS-LC-0025 At1	280409
320-48064-12	171352	Total/NA	Water	WS-LC-0025 At1	280409
MB 320-280409/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280409
LCS 320-280409/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280409
LCSD 320-280409/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280409

Analysis Batch: 280591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-13	172241	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-14	191770	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-15	291770	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-16	172320.2	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-17	272320.2	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-18	171351	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-19	191110	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-20	172410	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-21	200150	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-22	172250	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-23	191381	Total/NA	Water	WS-LC-0025 At1	280411
320-48064-24	200090	Total/NA	Water	WS-LC-0025 At1	280411
MB 320-280411/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280411
LCS 320-280411/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280411
LCSD 320-280411/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280411

Prep Batch: 281963

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-21 - RE	200150	Total/NA	Water	PFAS Prep	
MB 320-281963/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-281963/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-281963/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

LCMS (Continued)

Analysis Batch: 282181

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48064-21 - RE	200150	Total/NA	Water	WS-LC-0025 At1	281963
MB 320-281963/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	281963
LCS 320-281963/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	281963
LCSD 320-281963/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	281963

Lab Chronicle

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172320
Date Collected: 02/27/19 14:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-1
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 09:16	D1R	TAL SAC

Client Sample ID: 191841
Date Collected: 02/26/19 15:28
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-2
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 09:34	D1R	TAL SAC

Client Sample ID: 200340
Date Collected: 02/27/19 16:08
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-3
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 09:53	D1R	TAL SAC

Client Sample ID: 172340
Date Collected: 02/27/19 11:28
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-4
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 10:11	D1R	TAL SAC

Client Sample ID: 200380
Date Collected: 02/28/19 10:57
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-5
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 10:30	D1R	TAL SAC

Client Sample ID: 172030
Date Collected: 02/28/19 10:11
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-6
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 10:48	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191760
Date Collected: 02/26/19 14:36
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-7
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 11:07	D1R	TAL SAC

Client Sample ID: 171345
Date Collected: 02/28/19 14:43
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-8
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 11:25	D1R	TAL SAC

Client Sample ID: 172300
Date Collected: 02/28/19 11:59
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-9
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 11:43	D1R	TAL SAC

Client Sample ID: 172399
Date Collected: 02/27/19 09:46
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-10
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 12:20	D1R	TAL SAC

Client Sample ID: 172392
Date Collected: 02/28/19 18:11
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-11
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 12:39	D1R	TAL SAC

Client Sample ID: 171352
Date Collected: 02/28/19 16:10
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-12
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	280409	03/08/19 11:15	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280588	03/09/19 12:57	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 172241
Date Collected: 02/28/19 17:12
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-13
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 14:29	D1R	TAL SAC

Client Sample ID: 191770
Date Collected: 03/01/19 13:30
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-14
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 14:48	D1R	TAL SAC

Client Sample ID: 291770
Date Collected: 03/01/19 13:35
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-15
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 15:06	D1R	TAL SAC

Client Sample ID: 172320.2
Date Collected: 03/01/19 12:29
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-16
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 15:25	D1R	TAL SAC

Client Sample ID: 272320.2
Date Collected: 03/01/19 12:35
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-17
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 15:43	D1R	TAL SAC

Client Sample ID: 171351
Date Collected: 03/01/19 11:27
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 16:02	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 191110
Date Collected: 03/01/19 18:45
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 16:20	D1R	TAL SAC

Client Sample ID: 172410
Date Collected: 02/27/19 18:46
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 16:57	D1R	TAL SAC

Client Sample ID: 200150
Date Collected: 02/28/19 17:20
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 17:16	D1R	TAL SAC
Total/NA	Prep	PFAS Prep	RE		1.00 mL	1.66 mL	281963	03/15/19 13:10	DTH	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1	RE	1			282181	03/16/19 09:47	D1R	TAL SAC

Client Sample ID: 172250
Date Collected: 02/28/19 18:12
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-22
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 17:34	D1R	TAL SAC

Client Sample ID: 191381
Date Collected: 02/27/19 14:53
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-23
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 17:52	D1R	TAL SAC

Client Sample ID: 200090
Date Collected: 02/27/19 17:25
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-24
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280411	03/08/19 11:21	JRM	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48064-1

Client Sample ID: 200090
Date Collected: 02/27/19 17:25
Date Received: 03/05/19 11:25

Lab Sample ID: 320-48064-24
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 18:11	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: Dillingham

TestAmerica Job ID: 320-48064-1

Laboratory: TestAmerica Sacramento

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

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

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

Method Summary

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

TestAmerica Job ID: 320-48064-1

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: Dillingham

TestAmerica Job ID: 320-48064-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-48064-1	172320	Water	02/27/19 14:27	03/05/19 11:25
320-48064-2	191841	Water	02/26/19 15:28	03/05/19 11:25
320-48064-3	200340	Water	02/27/19 16:08	03/05/19 11:25
320-48064-4	172340	Water	02/27/19 11:28	03/05/19 11:25
320-48064-5	200380	Water	02/28/19 10:57	03/05/19 11:25
320-48064-6	172030	Water	02/28/19 10:11	03/05/19 11:25
320-48064-7	191760	Water	02/26/19 14:36	03/05/19 11:25
320-48064-8	171345	Water	02/28/19 14:43	03/05/19 11:25
320-48064-9	172300	Water	02/28/19 11:59	03/05/19 11:25
320-48064-10	172399	Water	02/27/19 09:46	03/05/19 11:25
320-48064-11	172392	Water	02/28/19 18:11	03/05/19 11:25
320-48064-12	171352	Water	02/28/19 16:10	03/05/19 11:25
320-48064-13	172241	Water	02/28/19 17:12	03/05/19 11:25
320-48064-14	191770	Water	03/01/19 13:30	03/05/19 11:25
320-48064-15	291770	Water	03/01/19 13:35	03/05/19 11:25
320-48064-16	172320.2	Water	03/01/19 12:29	03/05/19 11:25
320-48064-17	272320.2	Water	03/01/19 12:35	03/05/19 11:25
320-48064-18	171351	Water	03/01/19 11:27	03/05/19 11:25
320-48064-19	191110	Water	03/01/19 18:45	03/05/19 11:25
320-48064-20	172410	Water	02/27/19 18:46	03/05/19 11:25
320-48064-21	200150	Water	02/28/19 17:20	03/05/19 11:25
320-48064-22	172250	Water	02/28/19 18:12	03/05/19 11:25
320-48064-23	191381	Water	02/27/19 14:53	03/05/19 11:25
320-48064-24	200090	Water	02/27/19 17:25	03/05/19 11:25

CHAIN-OF-CUSTODY RECORD

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

Page 1 of 3

Laboratory Test America
Attn: David Althaus

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

320-48064 Chain of Custody

Sample Identity	Lab No.	Time	Date Sampled	X 6 PFAS WS-LC-0025 ISOTOPE	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
172320		1427	2/27/19	X	2	groundwater
191841		1528	2/26/19	X	2	
200340		1608	2/27/19	X	2	
172340		1128	2/27/19	X	2	
200380		1057	2/28/19	X	2	
172030		1011	2/28/19	X	2	
191760		1436	2/26/19	X	2	
171345		1443	2/28/19	X	2	
172300		159	2/28/19	X	2	
172399		0946	2/27/19	X	2	

Project Information		Sample Receipt	
Number:	102581-003	Total No. of Containers:	48
Name:	Dillingham	COC Seals/Intact? Y/N/NA	
Contact:	MDN	Received Good Cond./Cold	
Ongoing Project?	Yes [X] No [ ]	Temp:	
Sampler:	ARM/MDN	Delivery Method:	Goldstreak

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Marcy Nadel Time: 1245	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Darlington S.March Date:	Printed Name: Date:	Printed Name: Date:
Company: AWSC	Company:	Company:

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

* time on container ID 1438 | COC 1436

1.3°C

No. 35796

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

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: David Althaker

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x6 WS-LC-0025	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
172392		1811	2/25/19	X	2	Groundwater
171352		1610	2/25/19	X	2	↓
172241		1712	2/28/19	X	2	↓
191770		1330	3/1/19	X	2	↓
291770		1335	↓	X	2	↓
172320.2		1229	↓	X	2	↓
272320.2		1235	↓	X	2	↓
171351		1127	↓	X	2	↓
191110		1845	↓	X	2	↓
172410		1846	2/27/19	X	2	↓

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project?	Yes ☐ No ☐
Sampler:	

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

Notes: See PO

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: [signature] Time: 1245	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Date:	Printed Name: Date:	Printed Name: Date:
Company: TAW Snc	Company:	Company:

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

1.3°C

No. 35794

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
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 Alltucker

Analytical Methods (include preservative if used): PFAS 8e 35-LC-0025 (?)

Turn Around Time: [x] Normal [ ] Rush
Please Specify

Quote No:

J-Flags: [x] Yes [ ] No

Sample Identity	Lab No.	Time	Date Sampled	PFAS	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
200150		1720	2/28/19	✓	2	groundwater
172250		1812	2/28/19	✓	2	
191381		1453	2/27/19	✓	2	
200090		1725	2/27/19	✓	2	
~~200170~~		~~1637~~	~~2/28/19~~	~~✓~~ (initials)	~~2~~	~~Sample~~ [illegible] not to analysis

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project?	Yes [ ] No [ ]
Sampler:	

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

Notes: See [illegible]

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: M. Nadel Time: 1245	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1125	Signature: Time:	Signature: Time:
Printed Name: [illegible] Date: 5 March 19	Printed Name: Date:	Printed Name: Date:
Company: TA WSac	Company:	Company:

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

1.3°C

No. 35797

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-48064-1

Login Number: 48064
List Number: 1
Creator: Horner, Nathaniel 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	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.	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 <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

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

TestAmerica Job ID: 320-48065-1
Client Project/Site: Dillingham

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

Attn: Amber Masters

Authorized for release by:
3/14/2019 12:51:59 PM

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

Table of Contents

Definitions/Glossary

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

TestAmerica Job ID: 320-48065-1

Qualifiers

LCMS

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Job ID: 320-48065-1

Laboratory: TestAmerica Sacramento

Narrative

Job Narrative
320-48065-1

Receipt
The samples were received on 3/5/2019 11:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 3.4º 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 320-280411.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-280414.

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: PFAS

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191240 — Lab Sample ID: 320-48065-1

No Detections.

Client Sample ID: 191320 — Lab Sample ID: 320-48065-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15		2.0	0.87	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)	13		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	43		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	2.8		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 291320 — Lab Sample ID: 320-48065-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	15		2.0	0.87	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)	12		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	38		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorononanoic acid (PFNA)	2.9		2.0	0.65	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191210.1 — Lab Sample ID: 320-48065-4

No Detections.

Client Sample ID: 191210 — Lab Sample ID: 320-48065-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	5.0		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191290 — Lab Sample ID: 320-48065-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.4		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	3.7		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191710 — Lab Sample ID: 320-48065-7

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Detection Summary

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191710 (Continued) — Lab Sample ID: 320-48065-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	48		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	140		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	24		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	25		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	64		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191170 — Lab Sample ID: 320-48065-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.93	J	2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 291170 — Lab Sample ID: 320-48065-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.76	J	2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191300 — Lab Sample ID: 320-48065-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.9	J I	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.6		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	39		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	36		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.7		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191720 — Lab Sample ID: 320-48065-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	47		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	140		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	22		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	22		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	58		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Detection Summary

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171260 — Lab Sample ID: 320-48065-12

No Detections.

Client Sample ID: 191280 — Lab Sample ID: 320-48065-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.8	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.2		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

Client Sample ID: 191700 — Lab Sample ID: 320-48065-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	34		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	88		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	16		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanoic acid (PFOA)	15		2.0	0.75	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorooctanesulfonic acid (PFOS)	37		2.0	1.3	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 171240 — Lab Sample ID: 320-48065-15

No Detections.

Client Sample ID: 171180 — Lab Sample ID: 320-48065-16

No Detections.

Client Sample ID: 200070 — Lab Sample ID: 320-48065-17

No Detections.

Client Sample ID: 200040 — Lab Sample ID: 320-48065-18

No Detections.

Client Sample ID: 171410 — Lab Sample ID: 320-48065-19

No Detections.

Client Sample ID: 171400 — Lab Sample ID: 320-48065-20

No Detections.

Client Sample ID: 171270 — Lab Sample ID: 320-48065-21

No Detections.

Client Sample ID: 162620 — Lab Sample ID: 320-48065-22

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

Client Sample ID: 162620 (Continued) — Lab Sample ID: 320-48065-22

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: 162620-POST — Lab Sample ID: 320-48065-23

No Detections.

This Detection Summary does not include radiochemical test results.

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191240
Date Collected: 02/26/19 15:19
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 18:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 18:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 18:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 18:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 18:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 18:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*
13C4 PFHpA	*104*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*
13C4 PFOS	*90*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:29*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191320
Date Collected: 02/26/19 12:46
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	10		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 18:48	1
Perfluorohexanesulfonic acid (PFHxS)	15		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 18:48	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 18:48	1
Perfluorooctanoic acid (PFOA)	13		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 18:48	1
Perfluorooctanesulfonic acid (PFOS)	43		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 18:48	1
Perfluorononanoic acid (PFNA)	2.8		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 18:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*
13C5 PFNA	*94*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*
13C3 PFBS	*92*		*25 - 150*	*03/08/19 11:21*	*03/09/19 18:48*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 291320
Date Collected: 02/26/19 12:36
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 19:06	1
Perfluorohexanesulfonic acid (PFHxS)	15		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 19:06	1
Perfluoroheptanoic acid (PFHpA)	13		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 19:06	1
Perfluorooctanoic acid (PFOA)	12		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 19:06	1
Perfluorooctanesulfonic acid (PFOS)	38		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 19:06	1
Perfluorononanoic acid (PFNA)	2.9		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 19:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*
13C4 PFHpA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:06*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191210.1
Date Collected: 02/26/19 11:45
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-4
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		03/08/19 11:21	03/09/19 19:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 19:25	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 19:25	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 19:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 19:25	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 19:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*
13C4 PFOA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*
13C4 PFOS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*
13C5 PFNA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:25*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191210
Date Collected: 02/26/19 11:11
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-5
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		03/08/19 11:21	03/09/19 19:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 19:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 19:43	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 19:43	1
Perfluorooctanesulfonic acid (PFOS)	**5.0**		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 19:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 19:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*
13C4 PFHpA	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*
13C4 PFOA	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*
13C3 PFBS	*83*		*25 - 150*	*03/08/19 11:21*	*03/09/19 19:43*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191290
Date Collected: 02/27/19 10:00
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-6
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		03/08/19 11:21	03/09/19 20:20	1
Perfluorohexanesulfonic acid (PFHxS)	**2.4**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 20:20	1
Perfluoroheptanoic acid (PFHpA)	**3.9**		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 20:20	1
Perfluorooctanoic acid (PFOA)	**3.7**		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 20:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 20:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 20:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*
13C4 PFOA	*104*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*
13C5 PFNA	*108*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:20*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191710
Date Collected: 02/27/19 15:14
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**48**		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 20:38	1
Perfluorohexanesulfonic acid (PFHxS)	**140**		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 20:38	1
Perfluoroheptanoic acid (PFHpA)	**24**		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 20:38	1
Perfluorooctanoic acid (PFOA)	**25**		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 20:38	1
Perfluorooctanesulfonic acid (PFOS)	**64**		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 20:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 20:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*
13C4 PFHpA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*
13C3 PFBS	*93*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:38*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191170
Date Collected: 02/27/19 16:39
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-8
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		03/08/19 11:21	03/09/19 20:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 20:57	1
Perfluoroheptanoic acid (PFHpA)	**0.93**	**J**	2.0	0.80	ng/L		03/08/19 11:21	03/09/19 20:57	1
Perfluorooctanoic acid (PFOA)	**1.6**	**J**	2.0	0.75	ng/L		03/08/19 11:21	03/09/19 20:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 20:57	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 20:57	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*
13C4 PFHpA	*100*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*
13C4 PFOA	*95*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*
13C4 PFOS	*90*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*
13C3 PFBS	*92*		*25 - 150*	*03/08/19 11:21*	*03/09/19 20:57*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 291170
Date Collected: 02/27/19 16:29
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-9
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		03/08/19 11:26	03/09/19 22:48	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/09/19 22:48	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/09/19 22:48	1
Perfluorooctanoic acid (PFOA)	**0.76**	**J**	2.0	0.75	ng/L		03/08/19 11:26	03/09/19 22:48	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/09/19 22:48	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/09/19 22:48	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*
13C4 PFOA	*95*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*
13C4 PFOS	*89*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*
13C3 PFBS	*88*		*25 - 150*	*03/08/19 11:26*	*03/09/19 22:48*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191300
Date Collected: 02/27/19 17:35
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**1.9**	**J I**	2.0	0.92	ng/L		03/08/19 11:26	03/09/19 23:06	1
Perfluorohexanesulfonic acid (PFHxS)	**7.6**		2.0	0.87	ng/L		03/08/19 11:26	03/09/19 23:06	1
Perfluoroheptanoic acid (PFHpA)	**39**		2.0	0.80	ng/L		03/08/19 11:26	03/09/19 23:06	1
Perfluorooctanoic acid (PFOA)	**36**		2.0	0.75	ng/L		03/08/19 11:26	03/09/19 23:06	1
Perfluorooctanesulfonic acid (PFOS)	**2.7**		2.0	1.3	ng/L		03/08/19 11:26	03/09/19 23:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/09/19 23:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*
13C4 PFHpA	*98*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*
13C4 PFOA	*93*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*
13C4 PFOS	*91*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:06*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191720
Date Collected: 02/28/19 10:40
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**47**		2.0	0.92	ng/L		03/08/19 11:26	03/09/19 23:24	1
Perfluorohexanesulfonic acid (PFHxS)	**140**		2.0	0.87	ng/L		03/08/19 11:26	03/09/19 23:24	1
Perfluoroheptanoic acid (PFHpA)	**22**		2.0	0.80	ng/L		03/08/19 11:26	03/09/19 23:24	1
Perfluorooctanoic acid (PFOA)	**22**		2.0	0.75	ng/L		03/08/19 11:26	03/09/19 23:24	1
Perfluorooctanesulfonic acid (PFOS)	**58**		2.0	1.3	ng/L		03/08/19 11:26	03/09/19 23:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/09/19 23:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*
13C4 PFOA	*96*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*
13C4 PFOS	*97*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:24*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171260
Date Collected: 02/28/19 13:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-12
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		03/08/19 11:26	03/09/19 23:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/09/19 23:43	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/09/19 23:43	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/09/19 23:43	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/09/19 23:43	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/09/19 23:43	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*
13C4 PFHpA	*104*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*
13C4 PFOS	*96*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*
13C5 PFNA	*91*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*
13C3 PFBS	*95*		*25 - 150*	*03/08/19 11:26*	*03/09/19 23:43*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191280
Date Collected: 02/28/19 15:23
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-13
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		03/08/19 11:26	03/10/19 00:01	1
Perfluorohexanesulfonic acid (PFHxS)	**1.8**	**J**	2.0	0.87	ng/L		03/08/19 11:26	03/10/19 00:01	1
Perfluoroheptanoic acid (PFHpA)	**2.2**		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 00:01	1
Perfluorooctanoic acid (PFOA)	**2.6**		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 00:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 00:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 00:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*
13C4 PFOS	*98*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:01*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191700
Date Collected: 02/28/19 16:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	**34**		2.0	0.92	ng/L		03/08/19 11:26	03/10/19 00:20	1
Perfluorohexanesulfonic acid (PFHxS)	**88**		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 00:20	1
Perfluoroheptanoic acid (PFHpA)	**16**		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 00:20	1
Perfluorooctanoic acid (PFOA)	**15**		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 00:20	1
Perfluorooctanesulfonic acid (PFOS)	**37**		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 00:20	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 00:20	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*95*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*
13C4 PFOA	*103*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*
13C3 PFBS	*92*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:20*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171240
Date Collected: 02/28/19 17:46
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-15
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		03/08/19 11:26	03/10/19 00:38	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 00:38	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 00:38	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 00:38	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 00:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 00:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*92*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*
13C4 PFHpA	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*
13C4 PFOA	*92*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*
13C3 PFBS	*89*		*25 - 150*	*03/08/19 11:26*	*03/10/19 00:38*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171180
Date Collected: 02/28/19 18:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-16
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		03/08/19 11:26	03/10/19 01:15	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 01:15	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 01:15	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 01:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 01:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 01:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*
13C4 PFHpA	*108*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*
13C4 PFOA	*106*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*
13C4 PFOS	*104*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*
13C5 PFNA	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*
13C3 PFBS	*98*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:15*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 200070
Date Collected: 03/01/19 18:56
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-17
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		03/08/19 11:26	03/10/19 01:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 01:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 01:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 01:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 01:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 01:34	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*
13C4 PFOA	*98*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*
13C4 PFOS	*99*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*
13C5 PFNA	*105*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:34*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 200040
Date Collected: 03/02/19 10:05
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-18
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		03/08/19 11:26	03/10/19 01:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 01:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 01:52	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 01:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 01:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 01:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*
13C4 PFHpA	*106*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*
13C5 PFNA	*104*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 01:52*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171410
Date Collected: 03/01/19 14:42
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-19
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		03/08/19 11:26	03/10/19 03:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 03:11	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 03:11	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 03:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 03:11	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 03:11	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*
13C4 PFOA	*100*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*
13C4 PFOS	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*
13C3 PFBS	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:11*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171400
Date Collected: 03/01/19 19:43
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-20
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		03/08/19 11:26	03/10/19 03:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 03:29	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 03:29	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 03:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 03:29	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 03:29	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*98*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*
13C4 PFHpA	*101*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*
13C4 PFOS	*92*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*
13C5 PFNA	*96*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:29*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171270
Date Collected: 03/01/19 13:01
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-21
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		03/08/19 11:26	03/10/19 03:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 03:47	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 03:47	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 03:47	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 03:47	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 03:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*
13C4 PFHpA	*103*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*
13C4 PFOA	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*
13C5 PFNA	*97*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*
13C3 PFBS	*94*		*25 - 150*	*03/08/19 11:26*	*03/10/19 03:47*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 162620
Date Collected: 03/01/19 11:04
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-22
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:26	03/10/19 04:06	1
Perfluorohexanesulfonic acid (PFHxS)	**1.1**	**J**	2.0	0.87	ng/L		03/08/19 11:26	03/10/19 04:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 04:06	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 04:06	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 04:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 04:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*73*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*
13C4 PFHpA	*71*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*
13C4 PFOA	*69*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*
13C4 PFOS	*54*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*
13C5 PFNA	*63*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*
13C3 PFBS	*68*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:06*	*1*

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 162620-POST
Date Collected: 03/01/19 11:15
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-23
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:26	03/10/19 04:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/10/19 04:24	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/10/19 04:24	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/10/19 04:24	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/10/19 04:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/10/19 04:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*65*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*
13C4 PFHpA	*67*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*
13C4 PFOA	*62*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*
13C4 PFOS	*52*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*
13C5 PFNA	*59*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*
13C3 PFBS	*62*		*25 - 150*	*03/08/19 11:26*	*03/10/19 04:24*	*1*

Isotope Dilution Summary

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

TestAmerica Job ID: 320-48065-1

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

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFHpA (25-150)	PFOA (25-150)	PFOS (25-150)	PFNA (25-150)	3C3-PFBS (25-150)		
320-48065-1	191240	102	104	103	90	102	94		
320-48065-2	191320	98	101	99	93	94	92		
320-48065-3	291320	96	97	97	95	99	93		
320-48065-4	191210.1	97	103	99	95	100	93		
320-48065-5	191210	95	96	93	93	97	83		
320-48065-6	191290	107	106	104	101	108	101		
320-48065-7	191710	99	99	97	96	102	93		
320-48065-8	191170	98	100	95	90	99	92		
320-48065-9	291170	95	103	95	89	97	88		
320-48065-10	191300	101	98	93	91	102	97		
320-48065-11	191720	98	106	96	97	102	94		
320-48065-12	171260	101	104	100	96	91	95		
320-48065-13	191280	104	106	100	98	104	97		
320-48065-14	191700	95	101	103	93	99	92		
320-48065-15	171240	92	97	92	93	101	89		
320-48065-16	171180	107	108	106	104	101	98		
320-48065-17	200070	102	106	98	99	105	97		
320-48065-18	200040	106	106	107	101	104	101		
320-48065-19	171410	102	101	100	97	99	97		
320-48065-20	171400	98	101	97	92	96	94		
320-48065-21	171270	100	103	97	93	97	94		
320-48065-22	162620	73	71	69	54	63	68		
320-48065-23	162620-POST	65	67	62	52	59	62		
LCS 320-280411/2-A	Lab Control Sample	109	107	103	109	98	103		
LCS 320-280414/2-A	Lab Control Sample	98	100	93	96	95	95		
LCSD 320-280411/3-A	Lab Control Sample Dup	94	97	98	99	94	94		
LCSD 320-280414/3-A	Lab Control Sample Dup	95	94	92	95	96	94		
MB 320-280411/1-A	Method Blank	108	102	107	101	102	101		
MB 320-280414/1-A	Method Blank	96	97	94	93	99	91		

Surrogate Legend

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

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

Lab Sample ID: MB 320-280411/1-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280411

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:21	03/09/19 13:34	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:21	03/09/19 13:34	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFHpA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFOA	*107*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C4 PFOS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C5 PFNA	*102*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*
13C3 PFBS	*101*		*25 - 150*	*03/08/19 11:21*	*03/09/19 13:34*	*1*

Lab Sample ID: LCS 320-280411/2-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280411

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	17.7	17.1		ng/L		97	72 - 151
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.7		ng/L		92	73 - 157
Perfluoroheptanoic acid (PFHpA)	20.0	18.2		ng/L		91	71 - 138
Perfluorooctanoic acid (PFOA)	20.0	21.0		ng/L		105	70 - 140
Perfluorooctanesulfonic acid (PFOS)	18.6	17.2		ng/L		93	69 - 144
Perfluorononanoic acid (PFNA)	20.0	21.1		ng/L		106	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*109*		*25 - 150*
13C4 PFHpA	*107*		*25 - 150*
13C4 PFOA	*103*		*25 - 150*
13C4 PFOS	*109*		*25 - 150*
13C5 PFNA	*98*		*25 - 150*
13C3 PFBS	*103*		*25 - 150*

Lab Sample ID: LCSD 320-280411/3-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280411

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	18.6		ng/L		105	72 - 151	8	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	17.7		ng/L		97	73 - 157	6	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.7		ng/L		98	71 - 138	8	30
Perfluorooctanoic acid (PFOA)	20.0	22.6		ng/L		113	70 - 140	7	30

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

Lab Sample ID: LCSD 320-280411/3-A
Matrix: Water
Analysis Batch: 280591

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280411

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)			18.6	17.7		ng/L		96	69 - 144	3	30
Perfluorononanoic acid (PFNA)			20.0	19.3		ng/L		96	73 - 147	9	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*94*		*25 - 150*
13C4 PFHpA	*97*		*25 - 150*
13C4 PFOA	*98*		*25 - 150*
13C4 PFOS	*99*		*25 - 150*
13C5 PFNA	*94*		*25 - 150*
13C3 PFBS	*94*		*25 - 150*

Lab Sample ID: MB 320-280414/1-A
Matrix: Water
Analysis Batch: 280593

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 280414

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		03/08/19 11:26	03/09/19 21:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		03/08/19 11:26	03/09/19 21:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		03/08/19 11:26	03/09/19 21:52	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.75	ng/L		03/08/19 11:26	03/09/19 21:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	1.3	ng/L		03/08/19 11:26	03/09/19 21:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		03/08/19 11:26	03/09/19 21:52	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*96*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*
13C4 PFHpA	*97*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*
13C4 PFOA	*94*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*
13C4 PFOS	*93*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*
13C5 PFNA	*99*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*
13C3 PFBS	*91*		*25 - 150*	*03/08/19 11:26*	*03/09/19 21:52*	*1*

Lab Sample ID: LCS 320-280414/2-A
Matrix: Water
Analysis Batch: 280593

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280414

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)			17.7	17.7		ng/L		100	72 - 151
Perfluorohexanesulfonic acid (PFHxS)			18.2	16.9		ng/L		93	73 - 157
Perfluoroheptanoic acid (PFHpA)			20.0	18.3		ng/L		92	71 - 138
Perfluorooctanoic acid (PFOA)			20.0	22.3		ng/L		111	70 - 140
Perfluorooctanesulfonic acid (PFOS)			18.6	17.9		ng/L		96	69 - 144
Perfluorononanoic acid (PFNA)			20.0	19.9		ng/L		100	73 - 147

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*98*		*25 - 150*
13C4 PFHpA	*100*		*25 - 150*

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

Lab Sample ID: LCS 320-280414/2-A
Matrix: Water
Analysis Batch: 280593

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 280414

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C4 PFOA	93		25 - 150
13C4 PFOS	96		25 - 150
13C5 PFNA	95		25 - 150
13C3 PFBS	95		25 - 150

Lab Sample ID: LCSD 320-280414/3-A
Matrix: Water
Analysis Batch: 280593

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 280414

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	17.7		ng/L		100	72 - 151	0	30
Perfluorohexanesulfonic acid (PFHxS)	18.2	18.0		ng/L		99	73 - 157	6	30
Perfluoroheptanoic acid (PFHpA)	20.0	19.1		ng/L		96	71 - 138	4	30
Perfluorooctanoic acid (PFOA)	20.0	21.8		ng/L		109	70 - 140	2	30
Perfluorooctanesulfonic acid (PFOS)	18.6	17.6		ng/L		95	69 - 144	2	30
Perfluorononanoic acid (PFNA)	20.0	19.7		ng/L		98	73 - 147	1	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
18O2 PFHxS	95		25 - 150
13C4 PFHpA	94		25 - 150
13C4 PFOA	92		25 - 150
13C4 PFOS	95		25 - 150
13C5 PFNA	96		25 - 150
13C3 PFBS	94		25 - 150

LCMS

Prep Batch: 280411

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48065-1	191240	Total/NA	Water	PFAS Prep	
320-48065-2	191320	Total/NA	Water	PFAS Prep	
320-48065-3	291320	Total/NA	Water	PFAS Prep	
320-48065-4	191210.1	Total/NA	Water	PFAS Prep	
320-48065-5	191210	Total/NA	Water	PFAS Prep	
320-48065-6	191290	Total/NA	Water	PFAS Prep	
320-48065-7	191710	Total/NA	Water	PFAS Prep	
320-48065-8	191170	Total/NA	Water	PFAS Prep	
MB 320-280411/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280411/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280411/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Prep Batch: 280414

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48065-9	291170	Total/NA	Water	PFAS Prep	
320-48065-10	191300	Total/NA	Water	PFAS Prep	
320-48065-11	191720	Total/NA	Water	PFAS Prep	
320-48065-12	171260	Total/NA	Water	PFAS Prep	
320-48065-13	191280	Total/NA	Water	PFAS Prep	
320-48065-14	191700	Total/NA	Water	PFAS Prep	
320-48065-15	171240	Total/NA	Water	PFAS Prep	
320-48065-16	171180	Total/NA	Water	PFAS Prep	
320-48065-17	200070	Total/NA	Water	PFAS Prep	
320-48065-18	200040	Total/NA	Water	PFAS Prep	
320-48065-19	171410	Total/NA	Water	PFAS Prep	
320-48065-20	171400	Total/NA	Water	PFAS Prep	
320-48065-21	171270	Total/NA	Water	PFAS Prep	
320-48065-22	162620	Total/NA	Water	PFAS Prep	
320-48065-23	162620-POST	Total/NA	Water	PFAS Prep	
MB 320-280414/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-280414/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-280414/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 280591

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48065-1	191240	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-2	191320	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-3	291320	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-4	191210.1	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-5	191210	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-6	191290	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-7	191710	Total/NA	Water	WS-LC-0025 At1	280411
320-48065-8	191170	Total/NA	Water	WS-LC-0025 At1	280411
MB 320-280411/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280411

LCMS (Continued)

Analysis Batch: 280591 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 320-280411/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280411
LCSD 320-280411/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280411

Analysis Batch: 280593

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-48065-9	291170	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-10	191300	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-11	191720	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-12	171260	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-13	191280	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-14	191700	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-15	171240	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-16	171180	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-17	200070	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-18	200040	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-19	171410	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-20	171400	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-21	171270	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-22	162620	Total/NA	Water	WS-LC-0025 At1	280414
320-48065-23	162620-POST	Total/NA	Water	WS-LC-0025 At1	280414
MB 320-280414/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	280414
LCS 320-280414/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	280414
LCSD 320-280414/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	280414

Lab Chronicle

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191240
Date Collected: 02/26/19 15:19
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-1
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 18:29	D1R	TAL SAC

Client Sample ID: 191320
Date Collected: 02/26/19 12:46
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-2
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 18:48	D1R	TAL SAC

Client Sample ID: 291320
Date Collected: 02/26/19 12:36
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-3
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 19:06	D1R	TAL SAC

Client Sample ID: 191210.1
Date Collected: 02/26/19 11:45
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-4
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 19:25	D1R	TAL SAC

Client Sample ID: 191210
Date Collected: 02/26/19 11:11
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-5
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 19:43	D1R	TAL SAC

Client Sample ID: 191290
Date Collected: 02/27/19 10:00
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-6
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 20:20	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191710
Date Collected: 02/27/19 15:14
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-7
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 20:38	D1R	TAL SAC

Client Sample ID: 191170
Date Collected: 02/27/19 16:39
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-8
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	280411	03/08/19 11:21	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280591	03/09/19 20:57	D1R	TAL SAC

Client Sample ID: 291170
Date Collected: 02/27/19 16:29
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-9
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/09/19 22:48	D1R	TAL SAC

Client Sample ID: 191300
Date Collected: 02/27/19 17:35
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-10
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/09/19 23:06	D1R	TAL SAC

Client Sample ID: 191720
Date Collected: 02/28/19 10:40
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-11
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/09/19 23:24	D1R	TAL SAC

Client Sample ID: 171260
Date Collected: 02/28/19 13:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-12
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/09/19 23:43	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 191280
Date Collected: 02/28/19 15:23
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-13
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 00:01	D1R	TAL SAC

Client Sample ID: 191700
Date Collected: 02/28/19 16:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-14
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 00:20	D1R	TAL SAC

Client Sample ID: 171240
Date Collected: 02/28/19 17:46
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-15
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 00:38	D1R	TAL SAC

Client Sample ID: 171180
Date Collected: 02/28/19 18:50
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-16
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 01:15	D1R	TAL SAC

Client Sample ID: 200070
Date Collected: 03/01/19 18:56
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-17
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	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 01:34	D1R	TAL SAC

Client Sample ID: 200040
Date Collected: 03/02/19 10:05
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 01:52	D1R	TAL SAC

Lab Chronicle

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

TestAmerica Job ID: 320-48065-1

Client Sample ID: 171410
Date Collected: 03/01/19 14:42
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-19
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 03:11	D1R	TAL SAC

Client Sample ID: 171400
Date Collected: 03/01/19 19:43
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-20
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 03:29	D1R	TAL SAC

Client Sample ID: 171270
Date Collected: 03/01/19 13:01
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-21
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 03:47	D1R	TAL SAC

Client Sample ID: 162620
Date Collected: 03/01/19 11:04
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-22
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 04:06	D1R	TAL SAC

Client Sample ID: 162620-POST
Date Collected: 03/01/19 11:15
Date Received: 03/05/19 16:05

Lab Sample ID: 320-48065-23
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	280414	03/08/19 11:26	JRM	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			280593	03/10/19 04:24	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: PFAS

TestAmerica Job ID: 320-48065-1

Laboratory: TestAmerica Sacramento

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

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

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

Method Summary

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

TestAmerica Job ID: 320-48065-1

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: PFAS

TestAmerica Job ID: 320-48065-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-48065-1	191240	Water	02/26/19 15:19	03/05/19 16:05
320-48065-2	191320	Water	02/26/19 12:46	03/05/19 16:05
320-48065-3	291320	Water	02/26/19 12:36	03/05/19 16:05
320-48065-4	191210.1	Water	02/26/19 11:45	03/05/19 16:05
320-48065-5	191210	Water	02/26/19 11:11	03/05/19 16:05
320-48065-6	191290	Water	02/27/19 10:00	03/05/19 16:05
320-48065-7	191710	Water	02/27/19 15:14	03/05/19 16:05
320-48065-8	191170	Water	02/27/19 16:39	03/05/19 16:05
320-48065-9	291170	Water	02/27/19 16:29	03/05/19 16:05
320-48065-10	191300	Water	02/27/19 17:35	03/05/19 16:05
320-48065-11	191720	Water	02/28/19 10:40	03/05/19 16:05
320-48065-12	171260	Water	02/28/19 13:50	03/05/19 16:05
320-48065-13	191280	Water	02/28/19 15:23	03/05/19 16:05
320-48065-14	191700	Water	02/28/19 16:50	03/05/19 16:05
320-48065-15	171240	Water	02/28/19 17:46	03/05/19 16:05
320-48065-16	171180	Water	02/28/19 18:50	03/05/19 16:05
320-48065-17	200070	Water	03/01/19 18:56	03/05/19 16:05
320-48065-18	200040	Water	03/02/19 10:05	03/05/19 16:05
320-48065-19	171410	Water	03/01/19 14:42	03/05/19 16:05
320-48065-20	171400	Water	03/01/19 19:43	03/05/19 16:05
320-48065-21	171270	Water	03/01/19 13:01	03/05/19 16:05
320-48065-22	162620	Water	03/01/19 11:04	03/05/19 16:05
320-48065-23	162620-POST	Water	03/01/19 11:15	03/05/19 16:05

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

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: D. Alltucker

Analytical Methods (include preservative if used)

320-48065 Chain of Custody

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

Sample Identity	Lab No.	Time	Date Sampled	46 PFAS WS-LC-0025	Total	Remarks/Matrix Composition/Grab? Sample Containers
191240		1519	2/26/19	X	2	Groundwater
191320		1246		X	2	
291320		1236		X	2	
191210.1		1145		X	2	
191210		1111		X	2	
191290		1000	2/27/19	X	2	
191710		1514		X	2	
191170		1639		X	2	
291170		1629		X	2	
191300		1735		X	2	

Project Information	
Number:	102581-003
Name:	Dillingham
Contact:	MDN
Ongoing Project?	Yes ☒ No ☐
Sampler:	SMH

Sample Receipt	
Total No. of Containers:	46
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	
Delivery Method:	

Notes:

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1245	Signature: Time:	Signature: Time:
Printed Name: H. Masters Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Darlington Date: 5/4/19	Printed Name: Date:	Printed Name: Date:
Company: TAWSC	Company:	Company:

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

340C

No. 35717

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

CHAIN-OF-CUSTODY RECORD

Laboratory _____
Attn: _____

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

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	16 PFAS WS-LC-0025	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
- 191720		1040	2/28/19	X	2	groundwater
- 171260		1350		X	2	
- 191280		1523		X	2	
- 191700		1650		X	2	
- 171240		1746		X	2	
- 171180		1850		X	2	
200070		1856	3/1/19	X	2	
200040		1005	3/2/19	X	2	
171410		1442	3/1/19	X	2	
171400		1943	3/1/19	X	2	

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project? Yes ☐ No ☐	
Sampler:	

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

Notes:

See

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1245	Signature: Time:	Signature: Time:
Printed Name: A. Masters Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Sullivan Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: TA WSac	Company:	Company:

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

3.4°C

No. 35718

CHAIN-OF-CUSTODY RECORD

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

Laboratory Test America
Attn: D. Alltucker

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	+6 PFAS WS-LC-0025	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
171270		1301	3/1/19	X	2	groundwater
162620		1104	3/1/19	X	2	
162620-POST		1115	3/1/19	X	2	

Project Information	
Number:	
Name:	
Contact:	
Ongoing Project? Yes [ ] No [ ]	
Sampler:	

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

Notes:
See PO

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1245	Signature: Time:	Signature: Time:
Printed Name: A. Masters Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 1125	Signature: Time:	Signature: Time:
Printed Name: Jennifer Allington Date: 3/4/19	Printed Name: Date:	Printed Name: Date:
Company: TAWSAC	Company:	Company:

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

3.4°C

No. 35798

3/14/2019

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-48065-1

Login Number: 48065
List Number: 1
Creator: Horner, Nathaniel 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	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.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 320-51358-1
Client Project/Site: Dillingham PFAS
Revision: 3

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

Attn: Marcy Nadel

Authorized for release by:
12/12/2019 11:44:28 AM

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

Table of Contents

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Qualifiers

LCMS

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

Glossary

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

Job ID: 320-51358-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-51358-1

Revision - 11/6/19
This report has been revised to report additional analytes at client request.

Receipt
The samples were received on 6/14/2019 1:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.0º C and 4.5º 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 320-303052.

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: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172220 — Lab Sample ID: 320-51358-1

No Detections.

Client Sample ID: 172230 — Lab Sample ID: 320-51358-2

No Detections.

Client Sample ID: 172155 — Lab Sample ID: 320-51358-3

No Detections.

Client Sample ID: 172090 — Lab Sample ID: 320-51358-4

No Detections.

Client Sample ID: 272090 — Lab Sample ID: 320-51358-5

No Detections.

Client Sample ID: 172060 — Lab Sample ID: 320-51358-6

No Detections.

Client Sample ID: 172180 — Lab Sample ID: 320-51358-7

No Detections.

Client Sample ID: 172245 — Lab Sample ID: 320-51358-8

No Detections.

Client Sample ID: 172150 — Lab Sample ID: 320-51358-9

No Detections.

Client Sample ID: 172243 — Lab Sample ID: 320-51358-10

No Detections.

Client Sample ID: 272243 — Lab Sample ID: 320-51358-11

No Detections.

Client Sample ID: 172170 — Lab Sample ID: 320-51358-12

No Detections.

Client Sample ID: 172100 — Lab Sample ID: 320-51358-13

No Detections.

Client Sample ID: 191430 — Lab Sample ID: 320-51358-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.9		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191520 — Lab Sample ID: 320-51358-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.95	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172220
Date Collected: 06/10/19 15:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 22:19	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 22:19	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 22:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 22:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*120*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:19*	*1*
13C5 PFNA	*94*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:19*	*1*
13C4 PFHpA	*121*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:19*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:19*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172230
Date Collected: 06/10/19 16:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 22:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 22:38	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 22:38	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 22:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:38*	*1*
13C5 PFNA	*101*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:38*	*1*
13C4 PFHpA	*116*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:38*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:38*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172155
Date Collected: 06/10/19 17:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 22:56	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 22:56	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 22:56	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 22:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*119*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:56*	*1*
13C5 PFNA	*97*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:56*	*1*
13C4 PFHpA	*114*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:56*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/22/19 13:10*	*06/27/19 22:56*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172090
Date Collected: 06/11/19 11:35
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 23:15	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 23:15	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 23:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 23:15	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*122*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:15*	*1*
13C5 PFNA	*111*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:15*	*1*
13C4 PFHpA	*126*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:15*	*1*
13C3 PFBS	*115*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:15*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 272090
Date Collected: 06/11/19 11:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 23:33	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 23:33	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 23:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 23:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*119*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:33*	*1*
13C5 PFNA	*105*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:33*	*1*
13C4 PFHpA	*109*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:33*	*1*
13C3 PFBS	*110*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:33*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172060
Date Collected: 06/11/19 13:10
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 23:52	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 23:52	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 23:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 23:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*120*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:52*	*1*
13C5 PFNA	*99*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:52*	*1*
13C4 PFHpA	*121*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:52*	*1*
13C3 PFBS	*110*		*25 - 150*	*06/22/19 13:10*	*06/27/19 23:52*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172180
Date Collected: 06/11/19 16:05
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 00:10	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 00:10	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 00:10	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 00:10	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*123*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:10*	*1*
13C5 PFNA	*109*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:10*	*1*
13C4 PFHpA	*122*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:10*	*1*
13C3 PFBS	*116*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:10*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172245
Date Collected: 06/11/19 18:03
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 00:47	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 00:47	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 00:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 00:47	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*127*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:47*	*1*
13C5 PFNA	*107*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:47*	*1*
13C4 PFHpA	*131*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:47*	*1*
13C3 PFBS	*121*		*25 - 150*	*06/22/19 13:10*	*06/28/19 00:47*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172150
Date Collected: 06/12/19 18:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 01:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 01:06	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 01:06	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 01:06	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*125*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:06*	*1*
13C5 PFNA	*102*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:06*	*1*
13C4 PFHpA	*122*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:06*	*1*
13C3 PFBS	*114*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:06*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172243
Date Collected: 06/12/19 11:15
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 01:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 01:24	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 01:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 01:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*117*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:24*	*1*
13C5 PFNA	*105*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:24*	*1*
13C4 PFHpA	*125*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:24*	*1*
13C3 PFBS	*110*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:24*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 272243
Date Collected: 06/12/19 11:20
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 01:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 01:42	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 01:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 01:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*121*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:42*	*1*
13C5 PFNA	*95*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:42*	*1*
13C4 PFHpA	*120*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:42*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/22/19 13:10*	*06/28/19 01:42*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172170
Date Collected: 06/12/19 14:46
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-12
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 02:01	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 02:01	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 02:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 02:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*125*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:01*	*1*
13C5 PFNA	*95*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:01*	*1*
13C4 PFHpA	*125*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:01*	*1*
13C3 PFBS	*122*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:01*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172100
Date Collected: 06/12/19 13:30
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 02:19	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 02:19	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 02:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 02:19	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*119*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:19*	*1*
13C5 PFNA	*112*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:19*	*1*
13C4 PFHpA	*111*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:19*	*1*
13C3 PFBS	*108*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:19*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 191430
Date Collected: 06/12/19 17:29
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**2.9**		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 02:38	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 02:38	1
Perfluoroheptanoic acid (PFHpA)	**2.9**		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 02:38	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/28/19 02:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*119*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:38*	*1*
13C5 PFNA	*104*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:38*	*1*
13C4 PFHpA	*113*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:38*	*1*
13C3 PFBS	*112*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:38*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 191520
Date Collected: 06/13/19 09:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/28/19 02:56	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/28/19 02:56	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/28/19 02:56	1
Perfluorobutanesulfonic acid (PFBS)	**0.95**	**J**	2.0	0.92	ng/L		06/22/19 13:10	06/28/19 02:56	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*123*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:56*	*1*
13C5 PFNA	*89*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:56*	*1*
13C4 PFHpA	*120*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:56*	*1*
13C3 PFBS	*116*		*25 - 150*	*06/22/19 13:10*	*06/28/19 02:56*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFNA (25-150)	PFHpA (25-150)	3C3-PFBS (25-150)				
320-51358-1	172220	120	94	121	112				
320-51358-2	172230	121	101	116	112				
320-51358-3	172155	119	97	114	112				
320-51358-4	172090	122	111	126	115				
320-51358-5	272090	119	105	109	110				
320-51358-6	172060	120	99	121	110				
320-51358-7	172180	123	109	122	116				
320-51358-8	172245	127	107	131	121				
320-51358-9	172150	125	102	122	114				
320-51358-10	172243	117	105	125	110				
320-51358-11	272243	121	95	120	112				
320-51358-12	172170	125	95	125	122				
320-51358-13	172100	119	112	111	108				
320-51358-14	191430	119	104	113	112				
320-51358-15	191520	123	89	120	116				
LCS 320-303052/2-A	Lab Control Sample	121	97	122	110				
LCSD 320-303052/3-A	Lab Control Sample Dup	120	101	117	117				
MB 320-303052/1-A	Method Blank	122	103	121	111				

Surrogate Legend

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

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

Lab Sample ID: MB 320-303052/1-A
Matrix: Water
Analysis Batch: 304484

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 303052

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/22/19 13:10	06/27/19 21:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/22/19 13:10	06/27/19 21:24	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/22/19 13:10	06/27/19 21:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/22/19 13:10	06/27/19 21:24	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*122*		*25 - 150*	*06/22/19 13:10*	*06/27/19 21:24*	*1*
13C5 PFNA	*103*		*25 - 150*	*06/22/19 13:10*	*06/27/19 21:24*	*1*
13C4 PFHpA	*121*		*25 - 150*	*06/22/19 13:10*	*06/27/19 21:24*	*1*
13C3 PFBS	*111*		*25 - 150*	*06/22/19 13:10*	*06/27/19 21:24*	*1*

Lab Sample ID: LCS 320-303052/2-A
Matrix: Water
Analysis Batch: 304484

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 303052

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.1		ng/L		89	73 - 157
Perfluorononanoic acid (PFNA)	20.0	15.8		ng/L		79	73 - 147
Perfluoroheptanoic acid (PFHpA)	20.0	15.7		ng/L		79	71 - 138
Perfluorobutanesulfonic acid (PFBS)	17.7	15.5		ng/L		88	72 - 151

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*121*		*25 - 150*
13C5 PFNA	*97*		*25 - 150*
13C4 PFHpA	*122*		*25 - 150*
13C3 PFBS	*110*		*25 - 150*

Lab Sample ID: LCSD 320-303052/3-A
Matrix: Water
Analysis Batch: 304484

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 303052

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.1		ng/L		88	73 - 157	0	30
Perfluorononanoic acid (PFNA)	20.0	16.6		ng/L		83	73 - 147	5	30
Perfluoroheptanoic acid (PFHpA)	20.0	17.4		ng/L		87	71 - 138	10	30
Perfluorobutanesulfonic acid (PFBS)	17.7	14.9		ng/L		84	72 - 151	4	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*120*		*25 - 150*
13C5 PFNA	*101*		*25 - 150*
13C4 PFHpA	*117*		*25 - 150*
13C3 PFBS	*117*		*25 - 150*

LCMS

Prep Batch: 303052

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51358-1	172220	Total/NA	Water	PFAS Prep	
320-51358-2	172230	Total/NA	Water	PFAS Prep	
320-51358-3	172155	Total/NA	Water	PFAS Prep	
320-51358-4	172090	Total/NA	Water	PFAS Prep	
320-51358-5	272090	Total/NA	Water	PFAS Prep	
320-51358-6	172060	Total/NA	Water	PFAS Prep	
320-51358-7	172180	Total/NA	Water	PFAS Prep	
320-51358-8	172245	Total/NA	Water	PFAS Prep	
320-51358-9	172150	Total/NA	Water	PFAS Prep	
320-51358-10	172243	Total/NA	Water	PFAS Prep	
320-51358-11	272243	Total/NA	Water	PFAS Prep	
320-51358-12	172170	Total/NA	Water	PFAS Prep	
320-51358-13	172100	Total/NA	Water	PFAS Prep	
320-51358-14	191430	Total/NA	Water	PFAS Prep	
320-51358-15	191520	Total/NA	Water	PFAS Prep	
MB 320-303052/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303052/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303052/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 304484

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51358-1	172220	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-2	172230	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-3	172155	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-4	172090	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-5	272090	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-6	172060	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-7	172180	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-8	172245	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-9	172150	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-10	172243	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-11	272243	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-12	172170	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-13	172100	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-14	191430	Total/NA	Water	WS-LC-0025 At1	303052
320-51358-15	191520	Total/NA	Water	WS-LC-0025 At1	303052
MB 320-303052/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303052
LCS 320-303052/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303052

LCMS (Continued)

Analysis Batch: 304484 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-303052/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303052

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172220
Date Collected: 06/10/19 15:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-1
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 22:19	D1R	TAL SAC

Client Sample ID: 172230
Date Collected: 06/10/19 16:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-2
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 22:38	D1R	TAL SAC

Client Sample ID: 172155
Date Collected: 06/10/19 17:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-3
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 22:56	D1R	TAL SAC

Client Sample ID: 172090
Date Collected: 06/11/19 11:35
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-4
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 23:15	D1R	TAL SAC

Client Sample ID: 272090
Date Collected: 06/11/19 11:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-5
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 23:33	D1R	TAL SAC

Client Sample ID: 172060
Date Collected: 06/11/19 13:10
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-6
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/27/19 23:52	D1R	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172180
Date Collected: 06/11/19 16:05
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-7
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 00:10	D1R	TAL SAC

Client Sample ID: 172245
Date Collected: 06/11/19 18:03
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-8
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 00:47	D1R	TAL SAC

Client Sample ID: 172150
Date Collected: 06/12/19 18:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-9
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 01:06	D1R	TAL SAC

Client Sample ID: 172243
Date Collected: 06/12/19 11:15
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-10
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 01:24	D1R	TAL SAC

Client Sample ID: 272243
Date Collected: 06/12/19 11:20
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-11
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 01:42	D1R	TAL SAC

Client Sample ID: 172170
Date Collected: 06/12/19 14:46
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-12
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 02:01	D1R	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Client Sample ID: 172100
Date Collected: 06/12/19 13:30
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-13
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 02:19	D1R	TAL SAC

Client Sample ID: 191430
Date Collected: 06/12/19 17:29
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-14
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 02:38	D1R	TAL SAC

Client Sample ID: 191520
Date Collected: 06/13/19 09:40
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51358-15
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	303052	06/22/19 13:10	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304484	06/28/19 02:56	D1R	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	09-04-19
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
New Hampshire	NELAP	2997	04-18-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	09-05-19
Texas	NELAP	T104704399-19-13	05-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

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

Protocol References:

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

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51358-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-51358-1	172220	Water	06/10/19 15:19	06/14/19 13:10	
320-51358-2	172230	Water	06/10/19 16:50	06/14/19 13:10	
320-51358-3	172155	Water	06/10/19 17:50	06/14/19 13:10	
320-51358-4	172090	Water	06/11/19 11:35	06/14/19 13:10	
320-51358-5	272090	Water	06/11/19 11:40	06/14/19 13:10	
320-51358-6	172060	Water	06/11/19 13:10	06/14/19 13:10	
320-51358-7	172180	Water	06/11/19 16:05	06/14/19 13:10	
320-51358-8	172245	Water	06/11/19 18:03	06/14/19 13:10	
320-51358-9	172150	Water	06/12/19 18:40	06/14/19 13:10	
320-51358-10	172243	Water	06/12/19 11:15	06/14/19 13:10	
320-51358-11	272243	Water	06/12/19 11:20	06/14/19 13:10	
320-51358-12	172170	Water	06/12/19 14:46	06/14/19 13:10	
320-51358-13	172100	Water	06/12/19 13:30	06/14/19 13:10	
320-51358-14	191430	Water	06/12/19 17:29	06/14/19 13:10	
320-51358-15	191520	Water	06/13/19 09:40	06/14/19 13:10	

CHAIN-OF-CUSTODY RECORD

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

Page 1 of 2

Laboratory TestAmerica Sacramento
Attn: David Alltucker

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS/PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
172220		1519	6/10/19	X	2	ground water
172230		1650		X		
172155		1750		X		
172090		1135	6/11/19	X		
272090		1140		X		
172060		1310		X		
172180		1605		X		
172245		1803		X		
172150		1840	6/12/19	X		
172243		1115				

320-51358 Chain of Custody

Project Information	
Number:	102581-003
Name:	Dillingham PFAS
Contact:	MDN
Ongoing Project?	Yes [X] No [ ]
Sampler:	ADV

Sample Receipt	
Total No. of Containers:	25
COC Seals/Intact? Y/N/NA	—
Received Good Cond./Cold	—
Temp:	—
Delivery Method:	Goldstreak

Notes:

Bill to 102581-003
(in x2 coolers)

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Mary Nadel Time: 1030	Signature: Time:	Signature: Time:
Printed Name: Mary Nadel Date: 6/13/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 1310	Signature: Time:	Signature: Time:
Printed Name: Jennifer Dillingham Date: 14 Jun 19	Printed Name: Date:	Printed Name: Date:
Company: ETAWSC	Company:	Company:

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

3.0°C 4.5°C

No. 35980

CHAIN-OF-CUSTODY RECORD

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

Page 2 of 2

Laboratory: Test America Sacramento
Attn: David Alltucker

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS / PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
272243		1120	6/12/19	X	2	Water/groundwater
172170		1446		X		
172100		1330		X		
191430		1729		X		
191520		9:40	6/13/19	X		

Project Information	
Number:	102581-003
Name:	Dillingham PFAS
Contact:	MDN
Ongoing Project?	Yes [X] No [ ]
Sampler:	ADV

Sample Receipt	
Total No. of Containers:	25
COC Seals/Intact? Y/N/NA	—
Received Good Cond./Cold	—
Temp:	—
Delivery Method:	Goldstreak

Notes:

Bill to 102581-003

(in x2 coolers)

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: [signature] Time: 1030	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 6/13/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: [signature] Time: 1310	Signature: Time:	Signature: Time:
Printed Name: Jennifer Dorlington Date: 13 June 19	Printed Name: Date:	Printed Name: Date:
Company: ETA WSK	Company:	Company:

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

3.0° 4.5°C

No. 35982

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-51358-1

Login Number: 51358
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
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?	False	
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	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 320-51359-1
Client Project/Site: Dillingham PFAS
Revision: 3

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

Attn: Marcy Nadel

Authorized for release by:
12/3/2019 12:28:19 PM

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

Table of Contents

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Qualifiers

LCMS

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Job ID: 320-51359-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-51359-1

Revision - 12/3/19
This report has been revised to report additional analytes at client request.

Receipt
The samples were received on 6/14/2019 1:10 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 3.0º C and 4.5º C.

LCMS
Method WS-LC-0025 At1: The “I” qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. 200390 (320-51359-6)

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

Organic Prep
Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-304813.

Method(s) PFAS Prep: The following sample is observed to be of a mid-dark orange color with visible sediment.: 172020 (320-51359-5).

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: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172280 — Lab Sample ID: 320-51359-1

No Detections.

Client Sample ID: 172200 — Lab Sample ID: 320-51359-2

No Detections.

Client Sample ID: 200320 — Lab Sample ID: 320-51359-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	22		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.9		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200132 — Lab Sample ID: 320-51359-4

No Detections.

Client Sample ID: 172020 — Lab Sample ID: 320-51359-5

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

Client Sample ID: 200390 — Lab Sample ID: 320-51359-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	8.7		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.5	I	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 172050 — Lab Sample ID: 320-51359-7

No Detections.

Client Sample ID: 200100 — Lab Sample ID: 320-51359-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	1.6	J	2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200420.1 — Lab Sample ID: 320-51359-9

No Detections.

Client Sample ID: 200420.2 — Lab Sample ID: 320-51359-10

No Detections.

Client Sample ID: 172390 — Lab Sample ID: 320-51359-11

No Detections.

Client Sample ID: 172190 — Lab Sample ID: 320-51359-12

No Detections.

This Detection Summary does not include radiochemical test results.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 272190 — Lab Sample ID: 320-51359-13

No Detections.

Client Sample ID: 200310 — Lab Sample ID: 320-51359-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	17		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	3.2		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200140 — Lab Sample ID: 320-51359-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	11		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 300150 — Lab Sample ID: 320-51359-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	61		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.9		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	7.5		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200150 — Lab Sample ID: 320-51359-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	59		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.6		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	7.6		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200410 — Lab Sample ID: 320-51359-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	6.3		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.6	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 200400 — Lab Sample ID: 320-51359-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.7		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

Client Sample ID: 191861 — Lab Sample ID: 320-51359-20

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172280
Date Collected: 06/10/19 10:42
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-1
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 04:08	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 04:08	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 04:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 04:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*97*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:08*	*1*
13C5 PFNA	*86*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:08*	*1*
13C4 PFHpA	*98*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:08*	*1*
13C3 PFBS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:08*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172200
Date Collected: 06/10/19 11:36
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-2
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 04:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 04:27	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 04:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 04:27	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*104*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:27*	*1*
13C5 PFNA	*83*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:27*	*1*
13C4 PFHpA	*108*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:27*	*1*
13C3 PFBS	*99*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200320
Date Collected: 06/10/19 15:53
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-3
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**22**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 04:45	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 04:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 04:45	1
Perfluorobutanesulfonic acid (PFBS)	**3.9**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 04:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:45*	*1*
13C5 PFNA	*84*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:45*	*1*
13C4 PFHpA	*106*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:45*	*1*
13C3 PFBS	*97*		*25 - 150*	*07/01/19 08:52*	*07/02/19 04:45*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200132
Date Collected: 06/10/19 17:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-4
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 05:03	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 05:03	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 05:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 05:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*108*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:03*	*1*
13C5 PFNA	*92*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:03*	*1*
13C4 PFHpA	*109*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:03*	*1*
13C3 PFBS	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:03*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172020
Date Collected: 06/11/19 12:00
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-5
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**2.0**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 05:22	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 05:22	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 05:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 05:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:22*	*1*
13C5 PFNA	*86*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:22*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:22*	*1*
13C3 PFBS	*97*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200390
Date Collected: 06/12/19 09:53
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-6
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**8.7**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 05:40	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 05:40	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 05:40	1
Perfluorobutanesulfonic acid (PFBS)	**2.5**	**I**	2.0	0.92	ng/L		07/01/19 08:52	07/02/19 05:40	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:40*	*1*
13C5 PFNA	*85*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:40*	*1*
13C4 PFHpA	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:40*	*1*
13C3 PFBS	*98*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:40*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172050
Date Collected: 06/12/19 10:27
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-7
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 05:59	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 05:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 05:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 05:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:59*	*1*
13C5 PFNA	*95*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:59*	*1*
13C4 PFHpA	*108*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:59*	*1*
13C3 PFBS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 05:59*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200100
Date Collected: 06/12/19 11:21
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-8
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**1.6**	**J**	2.0	0.87	ng/L		07/01/19 08:52	07/02/19 06:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 06:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 06:36	1
Perfluorobutanesulfonic acid (PFBS)	**2.7**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 06:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:36*	*1*
13C5 PFNA	*99*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:36*	*1*
13C4 PFHpA	*110*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:36*	*1*
13C3 PFBS	*104*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:36*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200420.1
Date Collected: 06/12/19 13:07
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-9
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 06:54	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 06:54	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 06:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 06:54	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*101*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:54*	*1*
13C5 PFNA	*89*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:54*	*1*
13C4 PFHpA	*102*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:54*	*1*
13C3 PFBS	*98*		*25 - 150*	*07/01/19 08:52*	*07/02/19 06:54*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200420.2
Date Collected: 06/12/19 13:54
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-10
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 07:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 07:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 07:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 07:13	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:13*	*1*
13C5 PFNA	*85*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:13*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:13*	*1*
13C3 PFBS	*103*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:13*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172390
Date Collected: 06/10/19 10:34
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-11
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 07:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 07:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 07:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 07:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*99*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:31*	*1*
13C5 PFNA	*87*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:31*	*1*
13C4 PFHpA	*108*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:31*	*1*
13C3 PFBS	*97*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:31*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172190
Date Collected: 06/10/19 12:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-12
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 07:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 07:50	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 07:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 07:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:50*	*1*
13C5 PFNA	*92*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:50*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:50*	*1*
13C3 PFBS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 07:50*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 272190
Date Collected: 06/10/19 12:55
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-13
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 08:08	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 08:08	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 08:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 08:08	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*115*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:08*	*1*
13C5 PFNA	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:08*	*1*
13C4 PFHpA	*112*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:08*	*1*
13C3 PFBS	*107*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:08*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200310
Date Collected: 06/10/19 16:05
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-14
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**17**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 08:26	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 08:26	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 08:26	1
Perfluorobutanesulfonic acid (PFBS)	**3.2**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 08:26	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:26*	*1*
13C5 PFNA	*89*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:26*	*1*
13C4 PFHpA	*97*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:26*	*1*
13C3 PFBS	*95*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:26*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200140
Date Collected: 06/11/19 10:45
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-15
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**11**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 08:45	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 08:45	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 08:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 08:45	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:45*	*1*
13C5 PFNA	*95*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:45*	*1*
13C4 PFHpA	*107*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:45*	*1*
13C3 PFBS	*96*		*25 - 150*	*07/01/19 08:52*	*07/02/19 08:45*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 300150
Date Collected: 06/11/19 11:22
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-16
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**61**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 09:03	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 09:03	1
Perfluoroheptanoic acid (PFHpA)	**2.9**		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 09:03	1
Perfluorobutanesulfonic acid (PFBS)	**7.5**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 09:03	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:03*	*1*
13C5 PFNA	*90*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:03*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:03*	*1*
13C3 PFBS	*99*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:03*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200150
Date Collected: 06/11/19 11:32
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-17
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**59**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 09:22	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 09:22	1
Perfluoroheptanoic acid (PFHpA)	**2.6**		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 09:22	1
Perfluorobutanesulfonic acid (PFBS)	**7.6**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 09:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*103*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:22*	*1*
13C5 PFNA	*79*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:22*	*1*
13C4 PFHpA	*109*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:22*	*1*
13C3 PFBS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:22*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200410
Date Collected: 06/11/19 15:38
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-18
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**6.3**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 09:59	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 09:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 09:59	1
Perfluorobutanesulfonic acid (PFBS)	**1.6**	**J**	2.0	0.92	ng/L		07/01/19 08:52	07/02/19 09:59	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*111*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:59*	*1*
13C5 PFNA	*102*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:59*	*1*
13C4 PFHpA	*114*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:59*	*1*
13C3 PFBS	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 09:59*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200400
Date Collected: 06/11/19 17:08
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-19
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	**10**		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 10:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 10:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 10:17	1
Perfluorobutanesulfonic acid (PFBS)	**2.7**		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 10:17	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*106*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:17*	*1*
13C5 PFNA	*91*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:17*	*1*
13C4 PFHpA	*110*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:17*	*1*
13C3 PFBS	*104*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:17*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 191861
Date Collected: 06/12/19 17:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-20
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 10:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 10:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 10:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 10:36	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*107*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:36*	*1*
13C5 PFNA	*98*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:36*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:36*	*1*
13C3 PFBS	*100*		*25 - 150*	*07/01/19 08:52*	*07/02/19 10:36*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

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

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFNA (25-150)	PFHpA (25-150)	3C3-PFBS (25-150)				
320-51359-1	172280	97	86	98	100				
320-51359-2	172200	104	83	108	99				
320-51359-3	200320	100	84	106	97				
320-51359-4	200132	108	92	109	105				
320-51359-5	172020	100	86	105	97				
320-51359-6	200390	102	85	100	98				
320-51359-7	172050	106	95	108	100				
320-51359-8	200100	105	99	110	104				
320-51359-9	200420.1	101	89	102	98				
320-51359-10	200420.2	103	85	105	103				
320-51359-11	172390	99	87	108	97				
320-51359-12	172190	103	92	105	100				
320-51359-13	272190	115	100	112	107				
320-51359-14	200310	100	89	97	95				
320-51359-15	200140	105	95	107	96				
320-51359-16	300150	100	90	105	99				
320-51359-17	200150	103	79	109	100				
320-51359-18	200410	111	102	114	105				
320-51359-19	200400	106	91	110	104				
320-51359-20	191861	107	98	105	100				
LCS 320-304813/2-A	Lab Control Sample	101	84	102	96				
LCSD 320-304813/3-A	Lab Control Sample Dup	102	86	100	96				
MB 320-304813/1-A	Method Blank	102	92	105	102				

Surrogate Legend

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

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

Lab Sample ID: MB 320-304813/1-A
Matrix: Water
Analysis Batch: 305011

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 304813

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		07/01/19 08:52	07/02/19 03:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		07/01/19 08:52	07/02/19 03:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		07/01/19 08:52	07/02/19 03:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		07/01/19 08:52	07/02/19 03:13	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
18O2 PFHxS	*102*		*25 - 150*	*07/01/19 08:52*	*07/02/19 03:13*	*1*
13C5 PFNA	*92*		*25 - 150*	*07/01/19 08:52*	*07/02/19 03:13*	*1*
13C4 PFHpA	*105*		*25 - 150*	*07/01/19 08:52*	*07/02/19 03:13*	*1*
13C3 PFBS	*102*		*25 - 150*	*07/01/19 08:52*	*07/02/19 03:13*	*1*

Lab Sample ID: LCS 320-304813/2-A
Matrix: Water
Analysis Batch: 305011

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 304813

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorohexanesulfonic acid (PFHxS)			18.2	16.0		ng/L		88	73 - 157		
Perfluorononanoic acid (PFNA)			20.0	21.8		ng/L		109	73 - 147		
Perfluoroheptanoic acid (PFHpA)			20.0	18.3		ng/L		92	71 - 138		
Perfluorobutanesulfonic acid (PFBS)			17.7	17.0		ng/L		96	72 - 151		

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
18O2 PFHxS	*101*		*25 - 150*
13C5 PFNA	*84*		*25 - 150*
13C4 PFHpA	*102*		*25 - 150*
13C3 PFBS	*96*		*25 - 150*

Lab Sample ID: LCSD 320-304813/3-A
Matrix: Water
Analysis Batch: 305011

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 304813

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanesulfonic acid (PFHxS)			18.2	16.6		ng/L		91	73 - 157	4	30
Perfluorononanoic acid (PFNA)			20.0	22.3		ng/L		112	73 - 147	2	30
Perfluoroheptanoic acid (PFHpA)			20.0	19.5		ng/L		97	71 - 138	6	30
Perfluorobutanesulfonic acid (PFBS)			17.7	17.0		ng/L		96	72 - 151	0	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
18O2 PFHxS	*102*		*25 - 150*
13C5 PFNA	*86*		*25 - 150*
13C4 PFHpA	*100*		*25 - 150*
13C3 PFBS	*96*		*25 - 150*

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

LCMS

Prep Batch: 304813

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51359-1	172280	Total/NA	Water	PFAS Prep	
320-51359-2	172200	Total/NA	Water	PFAS Prep	
320-51359-3	200320	Total/NA	Water	PFAS Prep	
320-51359-4	200132	Total/NA	Water	PFAS Prep	
320-51359-5	172020	Total/NA	Water	PFAS Prep	
320-51359-6	200390	Total/NA	Water	PFAS Prep	
320-51359-7	172050	Total/NA	Water	PFAS Prep	
320-51359-8	200100	Total/NA	Water	PFAS Prep	
320-51359-9	200420.1	Total/NA	Water	PFAS Prep	
320-51359-10	200420.2	Total/NA	Water	PFAS Prep	
320-51359-11	172390	Total/NA	Water	PFAS Prep	
320-51359-12	172190	Total/NA	Water	PFAS Prep	
320-51359-13	272190	Total/NA	Water	PFAS Prep	
320-51359-14	200310	Total/NA	Water	PFAS Prep	
320-51359-15	200140	Total/NA	Water	PFAS Prep	
320-51359-16	300150	Total/NA	Water	PFAS Prep	
320-51359-17	200150	Total/NA	Water	PFAS Prep	
320-51359-18	200410	Total/NA	Water	PFAS Prep	
320-51359-19	200400	Total/NA	Water	PFAS Prep	
320-51359-20	191861	Total/NA	Water	PFAS Prep	
MB 320-304813/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-304813/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-304813/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

Analysis Batch: 305011

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51359-1	172280	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-2	172200	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-3	200320	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-4	200132	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-5	172020	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-6	200390	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-7	172050	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-8	200100	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-9	200420.1	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-10	200420.2	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-11	172390	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-12	172190	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-13	272190	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-14	200310	Total/NA	Water	WS-LC-0025 At1	304813

LCMS (Continued)

Analysis Batch: 305011 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51359-15	200140	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-16	300150	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-17	200150	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-18	200410	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-19	200400	Total/NA	Water	WS-LC-0025 At1	304813
320-51359-20	191861	Total/NA	Water	WS-LC-0025 At1	304813
MB 320-304813/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	304813
LCS 320-304813/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	304813
LCSD 320-304813/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	304813

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172280
Date Collected: 06/10/19 10:42
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-1
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 04:08	GMK	TAL SAC

Client Sample ID: 172200
Date Collected: 06/10/19 11:36
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-2
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 04:27	GMK	TAL SAC

Client Sample ID: 200320
Date Collected: 06/10/19 15:53
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-3
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 04:45	GMK	TAL SAC

Client Sample ID: 200132
Date Collected: 06/10/19 17:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-4
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 05:03	GMK	TAL SAC

Client Sample ID: 172020
Date Collected: 06/11/19 12:00
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-5
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 05:22	GMK	TAL SAC

Client Sample ID: 200390
Date Collected: 06/12/19 09:53
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-6
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 05:40	GMK	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 172050
Date Collected: 06/12/19 10:27
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-7
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 05:59	GMK	TAL SAC

Client Sample ID: 200100
Date Collected: 06/12/19 11:21
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-8
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 06:36	GMK	TAL SAC

Client Sample ID: 200420.1
Date Collected: 06/12/19 13:07
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-9
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 06:54	GMK	TAL SAC

Client Sample ID: 200420.2
Date Collected: 06/12/19 13:54
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-10
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 07:13	GMK	TAL SAC

Client Sample ID: 172390
Date Collected: 06/10/19 10:34
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-11
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 07:31	GMK	TAL SAC

Client Sample ID: 172190
Date Collected: 06/10/19 12:50
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-12
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 07:50	GMK	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 272190
Date Collected: 06/10/19 12:55
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-13
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 08:08	GMK	TAL SAC

Client Sample ID: 200310
Date Collected: 06/10/19 16:05
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-14
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 08:26	GMK	TAL SAC

Client Sample ID: 200140
Date Collected: 06/11/19 10:45
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-15
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 08:45	GMK	TAL SAC

Client Sample ID: 300150
Date Collected: 06/11/19 11:22
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-16
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 09:03	GMK	TAL SAC

Client Sample ID: 200150
Date Collected: 06/11/19 11:32
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-17
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	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 09:22	GMK	TAL SAC

Client Sample ID: 200410
Date Collected: 06/11/19 15:38
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-18
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 09:59	GMK	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Client Sample ID: 200400

Date Collected: 06/11/19 17:08
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-19

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 10:17	GMK	TAL SAC

Client Sample ID: 191861

Date Collected: 06/12/19 17:19
Date Received: 06/14/19 13:10

Lab Sample ID: 320-51359-20

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	PFAS Prep			1.00 mL	1.66 mL	304813	07/01/19 08:52	RDR	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			305011	07/02/19 10:36	GMK	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	09-04-19
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-19
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
New Hampshire	NELAP	2997	04-18-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	09-05-19
Texas	NELAP	T104704399-19-13	05-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

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

Protocol References:

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

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham PFAS

Job ID: 320-51359-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-51359-1	172280	Water	06/10/19 10:42	06/14/19 13:10	
320-51359-2	172200	Water	06/10/19 11:36	06/14/19 13:10	
320-51359-3	200320	Water	06/10/19 15:53	06/14/19 13:10	
320-51359-4	200132	Water	06/10/19 17:19	06/14/19 13:10	
320-51359-5	172020	Water	06/11/19 12:00	06/14/19 13:10	
320-51359-6	200390	Water	06/12/19 09:53	06/14/19 13:10	
320-51359-7	172050	Water	06/12/19 10:27	06/14/19 13:10	
320-51359-8	200100	Water	06/12/19 11:21	06/14/19 13:10	
320-51359-9	200420.1	Water	06/12/19 13:07	06/14/19 13:10	
320-51359-10	200420.2	Water	06/12/19 13:54	06/14/19 13:10	
320-51359-11	172390	Water	06/10/19 10:34	06/14/19 13:10	
320-51359-12	172190	Water	06/10/19 12:50	06/14/19 13:10	
320-51359-13	272190	Water	06/10/19 12:55	06/14/19 13:10	
320-51359-14	200310	Water	06/10/19 16:05	06/14/19 13:10	
320-51359-15	200140	Water	06/11/19 10:45	06/14/19 13:10	
320-51359-16	300150	Water	06/11/19 11:22	06/14/19 13:10	
320-51359-17	200150	Water	06/11/19 11:32	06/14/19 13:10	
320-51359-18	200410	Water	06/11/19 15:38	06/14/19 13:10	
320-51359-19	200400	Water	06/11/19 17:08	06/14/19 13:10	
320-51359-20	191861	Water	06/12/19 17:19	06/14/19 13:10	

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

CHAIN-OF-CUSTODY RECORD

Page 1 of 2

Laboratory TestAmerica Sacramento
Attn: David Hilltucker

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFOS / PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
172280		1042	6/10/19	X	2	Water/groundwater
172200		1136		X		
200320		1553		X		
200132		1719		X		
~~172080~~ 172020		1200	6/11/19	X		
200390		0953	6/12/19	X		
172050		1027		X		
200100		~~1121~~		X		
200420.1		1307		X		
200420.2		1354		X		

320-51359 Chain of Custody

Project Information	
Number:	102581-003
Name:	Dillingham PFAS
Contact:	MDN
Ongoing Project?	Yes [X] No [ ]
Sampler:	MDN

Sample Receipt	
Total No. of Containers:	20
COC Seals/Intact? Y/N/NA	—
Received Good Cond./Cold	—
Temp:	—
Delivery Method:	Goldstreak

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature:	Signature:	Signature:
Time: 1000	Time: 1316	Time:
Printed Name: Mary Nadel	Printed Name: Jennifer Arlington	Printed Name:
Date: 6/13/19	Date: 14 June 19	Date:
Company: Shannon & Wilson, Inc.	Company: ETA W Sac	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature:	Signature:	Signature:
Time: 1310	Time:	Time:
Printed Name: Jennifer Arlington	Printed Name:	Printed Name:
Date: 14 June 19	Date:	Date:
Company: ETA W Sac	Company:	Company:

Notes:

Bill to 102581-003

(In x2 Coolers)

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

4.5°C

No. 35979

CHAIN-OF-CUSTODY RECORD

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

Page 2 of 2

Laboratory TestAmerica Sacramento
Attn: David Alltucker

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

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

	Sample Identity	Lab No.	Time	Date Sampled	PFOS/PFOA	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
1	172390		1034	6/10/19	X	2	Water
2	172190		1250		X		
3	272190		1255		X		
4	200310		1605		X		
5	200140		1045	6/11/19	X		
6	300150		1122		X		
7	200150		1132		X		
8	200410		1538		X		
9	200400		1708		X		
10	191861		1719	6/12/19	X	2	Water

Project Information		Sample Receipt	
Number:	102581-003	Total No. of Containers:	18 2
Name:	Dillingham PFAS	COC Seals/Intact? Y/N/NA	— (GCD)
Contact:	MDN	Received Good Cond./Cold	—
Ongoing Project?	Yes [X] No [ ]	Temp:	—
Sampler:	GCD	Delivery Method:	Goldstreak

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1000	Signature: Time: 1310	Signature: Time:
Printed Name: Mary Nadel Date: 6/13/19	Printed Name: Jennifer Darlington Date: 6/14/19	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: ETAW Sac	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1310	Signature: Time:	Signature: Time:
Printed Name: Jennifer Darlington Date: 6/14/19	Printed Name: Date:	Printed Name: Date:
Company: ETAW Sac	Company:	Company:

Notes:

Bill to 102581-003

(In x2 coolers)

4.5°C

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

No. 35706

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-51359-1

Login Number: 51359
List Number: 1
Creator: Oropeza, Salvador

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
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?	False	
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	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 320-56435-1
Client Project/Site: DLG quarterly + 1st time

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

Attn: Marcy Nadel

Authorized for release by:
12/3/2019 1:56:23 PM

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

Table of Contents

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Qualifiers

LCMS

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

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

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Job ID: 320-56435-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-56435-1

Receipt
The samples were received on 11/20/2019 10:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.5º C.

LCMS
Method 537 (modified): Due to a shortage in the marketplace for 13C3-PFBS, the target analytes Perfluorobutanesulfonic acid (PFBS) and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and PFPeS were quantitated versus 18O2-PFHxS instead.

Method 537 (modified): The “I” qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. 191700 (320-56435-2), 291700 (320-56435-3) and SW-001 (320-56435-7)

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

Organic Prep
Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-341264.

Method 3535: The following samples were observed to be light yellow and contain sediment prior to extraction: 172370 (320-56435-1), 191700 (320-56435-2), 291700 (320-56435-3), 191300 (320-56435-4), 172210 (320-56435-5), 191290 (320-56435-6) and SW-001 (320-56435-7)

Method 3535: The following sample contains non-settleable particulate matter which clogged the solid-phase extraction column: SW-001 (320-56435-7)

Method 3535: The following samples were observed to be turbid after final voluming: 191700 (320-56435-2), 291700 (320-56435-3), 191300 (320-56435-4) and 191290 (320-56435-6)

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: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 172370 — Lab Sample ID: 320-56435-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	2.0		1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	J B	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	1.8	J	1.9	0.81	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.77	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.2	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: 191700 — Lab Sample ID: 320-56435-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	78		2.0	0.58	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	18	B	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	16		2.0	0.85	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	24		2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	81	B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	31	I	2.0	0.54	ng/L	1		537 (modified)	Total/NA

Client Sample ID: 291700 — Lab Sample ID: 320-56435-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	81		1.9	0.56	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	17	B	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	15		1.9	0.82	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	24		1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	79	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	33	I	1.9	0.52	ng/L	1		537 (modified)	Total/NA

Client Sample ID: 191300 — Lab Sample ID: 320-56435-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	67		2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	33	B	2.0	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	34		2.0	0.83	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	1.9	J	2.0	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorodecanoic acid (PFDA)	1.1	J	2.0	0.30	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.3	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.5	B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.5		2.0	0.53	ng/L	1		537 (modified)	Total/NA

Client Sample ID: 172210 — Lab Sample ID: 320-56435-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.1	J	1.9	0.55	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.24	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.47	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA

Client Sample ID: 191290 — Lab Sample ID: 320-56435-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	11		1.9	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.4	B	1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.9		1.9	0.83	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.34	J	1.9	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.64	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample ID: 191290 (Continued)

Lab Sample ID: 320-56435-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	2.4	B	1.9	0.17	ng/L	1		537 (modified)	Total/NA

Client Sample ID: SW-001

Lab Sample ID: 320-56435-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.6	J	2.0	0.57	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.4	J B	2.0	0.25	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.63	J I	2.0	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.65	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.6	J	2.0	0.53	ng/L	1		537 (modified)	Total/NA
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	4.0		3.9	1.5	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 172370
Date Collected: 11/15/19 15:40
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-1
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**2.0**		1.9	0.55	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluoroheptanoic acid (PFHpA)	**1.1**	**J B**	1.9	0.24	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorooctanoic acid (PFOA)	**1.8**	**J**	1.9	0.81	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorobutanesulfonic acid (PFBS)	**0.77**	**J**	1.9	0.19	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorohexanesulfonic acid (PFHxS)	**1.2**	**J B**	1.9	0.16	ng/L		11/25/19 05:19	11/28/19 21:32	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		11/25/19 05:19	11/28/19 21:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		11/25/19 05:19	11/28/19 21:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		11/25/19 05:19	11/28/19 21:32	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		11/25/19 05:19	11/28/19 21:32	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		11/25/19 05:19	11/28/19 21:32	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		11/25/19 05:19	11/28/19 21:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		11/25/19 05:19	11/28/19 21:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C4 PFHpA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C4 PFOA	*102*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C5 PFNA	*96*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C2 PFDA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C2 PFUnA	*91*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C2 PFDoA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C2 PFTeDA	*76*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
18O2 PFHxS	*101*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C4 PFOS	*89*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
d3-NMeFOSAA	*83*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
d5-NEtFOSAA	*81*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*
13C3 HFPO-DA	*117*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:32*	*1*

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 191700
Date Collected: 11/15/19 14:55
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-2
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**78**		2.0	0.58	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluoroheptanoic acid (PFHpA)	**18**	**B**	2.0	0.25	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorooctanoic acid (PFOA)	**16**		2.0	0.85	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorobutanesulfonic acid (PFBS)	**24**		2.0	0.20	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorohexanesulfonic acid (PFHxS)	**81**	**B**	2.0	0.17	ng/L		11/25/19 05:19	11/28/19 21:42	1
Perfluorooctanesulfonic acid (PFOS)	**31**	**I**	2.0	0.54	ng/L		11/25/19 05:19	11/28/19 21:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		11/25/19 05:19	11/28/19 21:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		11/25/19 05:19	11/28/19 21:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		11/25/19 05:19	11/28/19 21:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		11/25/19 05:19	11/28/19 21:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		11/25/19 05:19	11/28/19 21:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		11/25/19 05:19	11/28/19 21:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C4 PFHpA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C4 PFOA	*94*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C5 PFNA	*94*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C2 PFDA	*94*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C2 PFUnA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C2 PFDoA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C2 PFTeDA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
18O2 PFHxS	*99*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C4 PFOS	*90*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
d3-NMeFOSAA	*84*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
d5-NEtFOSAA	*85*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*
13C3 HFPO-DA	*109*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:42*	*1*

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 291700
Date Collected: 11/15/19 14:45
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-3
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**81**		1.9	0.56	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluoroheptanoic acid (PFHpA)	**17**	**B**	1.9	0.24	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorooctanoic acid (PFOA)	**15**		1.9	0.82	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorobutanesulfonic acid (PFBS)	**24**		1.9	0.19	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorohexanesulfonic acid (PFHxS)	**79**	**B**	1.9	0.16	ng/L		11/25/19 05:19	11/28/19 21:52	1
Perfluorooctanesulfonic acid (PFOS)	**33**	**I**	1.9	0.52	ng/L		11/25/19 05:19	11/28/19 21:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		11/25/19 05:19	11/28/19 21:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		11/25/19 05:19	11/28/19 21:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		11/25/19 05:19	11/28/19 21:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		11/25/19 05:19	11/28/19 21:52	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		11/25/19 05:19	11/28/19 21:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		11/25/19 05:19	11/28/19 21:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C4 PFHpA	*101*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C4 PFOA	*102*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C5 PFNA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C2 PFDA	*94*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C2 PFUnA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C2 PFDoA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C2 PFTeDA	*92*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
18O2 PFHxS	*105*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C4 PFOS	*87*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
d3-NMeFOSAA	*89*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
d5-NEtFOSAA	*82*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*
13C3 HFPO-DA	*113*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:52*	*1*

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 191300
Date Collected: 11/16/19 11:25
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-4
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**67**		2.0	0.57	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluoroheptanoic acid (PFHpA)	**33**	**B**	2.0	0.24	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorooctanoic acid (PFOA)	**34**		2.0	0.83	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorononanoic acid (PFNA)	**1.9**	**J**	2.0	0.26	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorodecanoic acid (PFDA)	**1.1**	**J**	2.0	0.30	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.28	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorobutanesulfonic acid (PFBS)	**1.3**	**J**	2.0	0.20	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorohexanesulfonic acid (PFHxS)	**8.5**	**B**	2.0	0.17	ng/L		11/25/19 05:19	11/28/19 22:02	1
Perfluorooctanesulfonic acid (PFOS)	**6.5**		2.0	0.53	ng/L		11/25/19 05:19	11/28/19 22:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		11/25/19 05:19	11/28/19 22:02	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.0	ng/L		11/25/19 05:19	11/28/19 22:02	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.23	ng/L		11/25/19 05:19	11/28/19 22:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		11/25/19 05:19	11/28/19 22:02	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		11/25/19 05:19	11/28/19 22:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		11/25/19 05:19	11/28/19 22:02	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*96*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C4 PFHpA	*98*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C4 PFOA	*96*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C5 PFNA	*91*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C2 PFDA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C2 PFUnA	*94*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C2 PFDoA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C2 PFTeDA	*92*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
18O2 PFHxS	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C4 PFOS	*88*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
d3-NMeFOSAA	*87*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
d5-NEtFOSAA	*81*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*
13C3 HFPO-DA	*101*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:02*	*1*

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 172210
Date Collected: 11/15/19 10:25
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-5
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**1.1**	**J**	1.9	0.55	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorobutanesulfonic acid (PFBS)	**0.24**	**J**	1.9	0.19	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorohexanesulfonic acid (PFHxS)	**0.47**	**J B**	1.9	0.16	ng/L		11/25/19 05:19	11/28/19 22:12	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		11/25/19 05:19	11/28/19 22:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		11/25/19 05:19	11/28/19 22:12	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		11/25/19 05:19	11/28/19 22:12	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		11/25/19 05:19	11/28/19 22:12	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		11/25/19 05:19	11/28/19 22:12	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		11/25/19 05:19	11/28/19 22:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		11/25/19 05:19	11/28/19 22:12	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*86*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C4 PFHpA	*90*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C4 PFOA	*91*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C5 PFNA	*88*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C2 PFDA	*86*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C2 PFUnA	*86*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C2 PFDoA	*85*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C2 PFTeDA	*81*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
18O2 PFHxS	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C4 PFOS	*82*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
d3-NMeFOSAA	*78*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
d5-NEtFOSAA	*74*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*
13C3 HFPO-DA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:12*	*1*

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 191290
Date Collected: 11/16/19 10:15
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-6
Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**11**		1.9	0.57	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluoroheptanoic acid (PFHpA)	**4.4**	**B**	1.9	0.24	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorooctanoic acid (PFOA)	**4.9**		1.9	0.83	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorononanoic acid (PFNA)	**0.34**	**J**	1.9	0.26	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.54	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.3	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorobutanesulfonic acid (PFBS)	**0.64**	**J**	1.9	0.19	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorohexanesulfonic acid (PFHxS)	**2.4**	**B**	1.9	0.17	ng/L		11/25/19 05:19	11/28/19 22:22	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.53	ng/L		11/25/19 05:19	11/28/19 22:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.9	ng/L		11/25/19 05:19	11/28/19 22:22	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		11/25/19 05:19	11/28/19 22:22	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		11/25/19 05:19	11/28/19 22:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		11/25/19 05:19	11/28/19 22:22	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		11/25/19 05:19	11/28/19 22:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.18	ng/L		11/25/19 05:19	11/28/19 22:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*98*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C4 PFHpA	*98*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C4 PFOA	*96*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C5 PFNA	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C2 PFDA	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C2 PFUnA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C2 PFDoA	*98*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C2 PFTeDA	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
18O2 PFHxS	*105*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C4 PFOS	*95*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
d3-NMeFOSAA	*84*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
d5-NEtFOSAA	*85*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*
13C3 HFPO-DA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:22*	*1*

Client Sample ID: SW-001

Date Collected: 11/14/19 15:55
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-7

Matrix: Water

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**1.6**	**J**	2.0	0.57	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluoroheptanoic acid (PFHpA)	**1.4**	**J B**	2.0	0.25	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.83	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorononanoic acid (PFNA)	**0.63**	**J I**	2.0	0.26	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.30	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.28	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorohexanesulfonic acid (PFHxS)	**0.65**	**J B**	2.0	0.17	ng/L		11/25/19 05:19	11/28/19 22:32	1
Perfluorooctanesulfonic acid (PFOS)	**1.6**	**J**	2.0	0.53	ng/L		11/25/19 05:19	11/28/19 22:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		11/25/19 05:19	11/28/19 22:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.0	ng/L		11/25/19 05:19	11/28/19 22:32	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		11/25/19 05:19	11/28/19 22:32	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	**4.0**		3.9	1.5	ng/L		11/25/19 05:19	11/28/19 22:32	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		11/25/19 05:19	11/28/19 22:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		11/25/19 05:19	11/28/19 22:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*71*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C4 PFHpA	*75*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C4 PFOA	*78*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C5 PFNA	*76*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C2 PFDA	*74*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C2 PFUnA	*66*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C2 PFDoA	*65*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C2 PFTeDA	*39*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
18O2 PFHxS	*75*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C4 PFOS	*70*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
d3-NMeFOSAA	*61*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
d5-NEtFOSAA	*60*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*
13C3 HFPO-DA	*81*		*25 - 150*	*11/25/19 05:19*	*11/28/19 22:32*	*1*

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Method: 537 (modified) - Fluorinated Alkyl Substances

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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxA (25-150)	PFHpA (25-150)	PFOA (25-150)	PFNA (25-150)	PFDA (25-150)	PFUnA (25-150)	PFDoA (25-150)	PFTDA (25-150)
320-56435-1	172370	95	100	102	96	93	91	93	76
320-56435-2	191700	95	97	94	94	94	93	93	93
320-56435-3	291700	97	101	102	97	94	97	100	92
320-56435-4	191300	96	98	96	91	93	94	97	92
320-56435-5	172210	86	90	91	88	86	86	85	81
320-56435-6	191290	98	98	96	95	95	93	98	95
320-56435-7	SW-001	71	75	78	76	74	66	65	39
LCS 320-341264/2-A	Lab Control Sample	101	107	109	102	100	103	109	106
LCSD 320-341264/3-A	Lab Control Sample Dup	87	91	92	88	85	86	91	89
MB 320-341264/1-A	Method Blank	100	106	105	101	101	100	107	100

		Percent Isotope Dilution Recovery (Acceptance Limits)				
Lab Sample ID	Client Sample ID	PFHxS (25-150)	PFOS (25-150)	-NMeFOS/ (25-150)	-NEtFOS/ (25-150)	HFPODA (25-150)
320-56435-1	172370	101	89	83	81	117
320-56435-2	191700	99	90	84	85	109
320-56435-3	291700	105	87	89	82	113
320-56435-4	191300	100	88	87	81	101
320-56435-5	172210	93	82	78	74	100
320-56435-6	191290	105	95	84	85	100
320-56435-7	SW-001	75	70	61	60	81
LCS 320-341264/2-A	Lab Control Sample	109	100	93	95	124
LCSD 320-341264/3-A	Lab Control Sample Dup	93	84	79	81	106
MB 320-341264/1-A	Method Blank	110	93	97	93	106

Surrogate Legend

PFHxA = 13C2 PFHxA
PFHpA = 13C4 PFHpA
PFOA = 13C4 PFOA
PFNA = 13C5 PFNA
PFDA = 13C2 PFDA
PFUnA = 13C2 PFUnA
PFDoA = 13C2 PFDoA
PFTDA = 13C2 PFTeDA
PFHxS = 18O2 PFHxS
PFOS = 13C4 PFOS
d3-NMeFOSAA = d3-NMeFOSAA
d5-NEtFOSAA = d5-NEtFOSAA
HFPODA = 13C3 HFPO-DA

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-341264/1-A
Matrix: Water
Analysis Batch: 342109

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 341264

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluoroheptanoic acid (PFHpA)	0.339	J	2.0	0.25	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorohexanesulfonic acid (PFHxS)	0.460	J	2.0	0.17	ng/L		11/25/19 05:19	11/28/19 21:02	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		11/25/19 05:19	11/28/19 21:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		11/25/19 05:19	11/28/19 21:02	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		11/25/19 05:19	11/28/19 21:02	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		11/25/19 05:19	11/28/19 21:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		11/25/19 05:19	11/28/19 21:02	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		11/25/19 05:19	11/28/19 21:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	0.184	J	2.0	0.18	ng/L		11/25/19 05:19	11/28/19 21:02	1

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C4 PFHpA	*106*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C4 PFOA	*105*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C5 PFNA	*101*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C2 PFDA	*101*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C2 PFUnA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C2 PFDoA	*107*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C2 PFTeDA	*100*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
18O2 PFHxS	*110*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C4 PFOS	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
d3-NMeFOSAA	*97*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
d5-NEtFOSAA	*93*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*
13C3 HFPO-DA	*106*		*25 - 150*	*11/25/19 05:19*	*11/28/19 21:02*	*1*

Lab Sample ID: LCS 320-341264/2-A
Matrix: Water
Analysis Batch: 342109

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 341264

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	40.0	38.1		ng/L		95	73 - 133
Perfluoroheptanoic acid (PFHpA)	40.0	39.3		ng/L		98	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	37.6		ng/L		94	70 - 130
Perfluorononanoic acid (PFNA)	40.0	39.5		ng/L		99	75 - 135
Perfluorodecanoic acid (PFDA)	40.0	42.5		ng/L		106	76 - 136

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

Lab Sample ID: LCS 320-341264/2-A
Matrix: Water
Analysis Batch: 342109

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 341264

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluoroundecanoic acid (PFUnA)	40.0	35.0		ng/L		87	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	37.4		ng/L		93	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	35.2		ng/L		88	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	32.8		ng/L		82	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	31.1		ng/L		88	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	32.1		ng/L		88	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	33.3		ng/L		90	70 - 130
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	34.3		ng/L		92	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	31.8		ng/L		80	51 - 173
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	37.1		ng/L		99	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	42.1		ng/L		112	79 - 139

Isotope Dilution	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*101*		*25 - 150*
13C4 PFHpA	*107*		*25 - 150*
13C4 PFOA	*109*		*25 - 150*
13C5 PFNA	*102*		*25 - 150*
13C2 PFDA	*100*		*25 - 150*
13C2 PFUnA	*103*		*25 - 150*
13C2 PFDoA	*109*		*25 - 150*
13C2 PFTeDA	*106*		*25 - 150*
18O2 PFHxS	*109*		*25 - 150*
13C4 PFOS	*100*		*25 - 150*
d3-NMeFOSAA	*93*		*25 - 150*
d5-NEtFOSAA	*95*		*25 - 150*
13C3 HFPO-DA	*124*		*25 - 150*

Lab Sample ID: LCSD 320-341264/3-A
Matrix: Water
Analysis Batch: 342109

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 341264

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	38.8		ng/L		97	73 - 133	2	30
Perfluoroheptanoic acid (PFHpA)	40.0	38.2		ng/L		96	72 - 132	3	30
Perfluorooctanoic acid (PFOA)	40.0	38.0		ng/L		95	70 - 130	1	30
Perfluorononanoic acid (PFNA)	40.0	40.4		ng/L		101	75 - 135	2	30
Perfluorodecanoic acid (PFDA)	40.0	42.6		ng/L		107	76 - 136	0	30
Perfluoroundecanoic acid (PFUnA)	40.0	36.6		ng/L		92	68 - 128	5	30
Perfluorododecanoic acid (PFDoA)	40.0	38.2		ng/L		95	71 - 131	2	30

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

Lab Sample ID: LCSD 320-341264/3-A
Matrix: Water
Analysis Batch: 342109

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 341264

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorotridecanoic acid (PFTriA)			40.0	36.2		ng/L		91	71 - 131	3	30
Perfluorotetradecanoic acid (PFTeA)			40.0	34.3		ng/L		86	70 - 130	5	30
Perfluorobutanesulfonic acid (PFBS)			35.4	31.1		ng/L		88	67 - 127	0	30
Perfluorohexanesulfonic acid (PFHxS)			36.4	31.1		ng/L		85	59 - 119	3	30
Perfluorooctanesulfonic acid (PFOS)			37.1	33.3		ng/L		90	70 - 130	0	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid			37.3	38.7		ng/L		104	75 - 135	12	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)			40.0	32.4		ng/L		81	51 - 173	2	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid			37.7	35.7		ng/L		95	54 - 114	4	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)			37.7	41.4		ng/L		110	79 - 139	2	30

Isotope Dilution	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*87*		*25 - 150*
13C4 PFHpA	*91*		*25 - 150*
13C4 PFOA	*92*		*25 - 150*
13C5 PFNA	*88*		*25 - 150*
13C2 PFDA	*85*		*25 - 150*
13C2 PFUnA	*86*		*25 - 150*
13C2 PFDoA	*91*		*25 - 150*
13C2 PFTeDA	*89*		*25 - 150*
18O2 PFHxS	*93*		*25 - 150*
13C4 PFOS	*84*		*25 - 150*
d3-NMeFOSAA	*79*		*25 - 150*
d5-NEtFOSAA	*81*		*25 - 150*
13C3 HFPO-DA	*106*		*25 - 150*

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

LCMS

Prep Batch: 341264

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-56435-1	172370	Total/NA	Water	3535	
320-56435-2	191700	Total/NA	Water	3535	
320-56435-3	291700	Total/NA	Water	3535	
320-56435-4	191300	Total/NA	Water	3535	
320-56435-5	172210	Total/NA	Water	3535	
320-56435-6	191290	Total/NA	Water	3535	
320-56435-7	SW-001	Total/NA	Water	3535	
MB 320-341264/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-341264/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-341264/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 342109

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-56435-1	172370	Total/NA	Water	537 (modified)	341264
320-56435-2	191700	Total/NA	Water	537 (modified)	341264
320-56435-3	291700	Total/NA	Water	537 (modified)	341264
320-56435-4	191300	Total/NA	Water	537 (modified)	341264
320-56435-5	172210	Total/NA	Water	537 (modified)	341264
320-56435-6	191290	Total/NA	Water	537 (modified)	341264
320-56435-7	SW-001	Total/NA	Water	537 (modified)	341264
MB 320-341264/1-A	Method Blank	Total/NA	Water	537 (modified)	341264
LCS 320-341264/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	341264
LCSD 320-341264/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	341264

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: 172370
Date Collected: 11/15/19 15:40
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-1
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	3535			261.9 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 21:32	S1M	TAL SAC

Client Sample ID: 191700
Date Collected: 11/15/19 14:55
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-2
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	3535			249.1 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 21:42	S1M	TAL SAC

Client Sample ID: 291700
Date Collected: 11/15/19 14:45
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-3
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	3535			258 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 21:52	S1M	TAL SAC

Client Sample ID: 191300
Date Collected: 11/16/19 11:25
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-4
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	3535			256.4 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 22:02	S1M	TAL SAC

Client Sample ID: 172210
Date Collected: 11/15/19 10:25
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-5
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	3535			262.2 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 22:12	S1M	TAL SAC

Client Sample ID: 191290
Date Collected: 11/16/19 10:15
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-6
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	3535			256.6 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 22:22	S1M	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Client Sample ID: SW-001

Date Collected: 11/14/19 15:55
Date Received: 11/20/19 10:10

Lab Sample ID: 320-56435-7

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	3535			254.9 mL	10 mL	341264	11/25/19 05:19	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			342109	11/28/19 22:32	S1M	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Job ID: 320-56435-1
Project/Site: DLG quarterly + 1st time

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: DLG quarterly + 1st time

Job ID: 320-56435-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-56435-1	172370	Water	11/15/19 15:40	11/20/19 10:10	
320-56435-2	191700	Water	11/15/19 14:55	11/20/19 10:10	
320-56435-3	291700	Water	11/15/19 14:45	11/20/19 10:10	
320-56435-4	191300	Water	11/16/19 11:25	11/20/19 10:10	
320-56435-5	172210	Water	11/15/19 10:25	11/20/19 10:10	
320-56435-6	191290	Water	11/16/19 10:15	11/20/19 10:10	
320-56435-7	SW-001	Water	11/14/19 15:55	11/20/19 10:10	

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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

CHAIN-OF-CUSTODY RECORD

Laboratory Test America
Attn: D. Allfuckas

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

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS 537.1	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
172370		1540	11/15/19	X	2	groundwater
191700		1455	11/15/19	X		
291700		1445	11/15/19	X		
191300		1125	11/16/19	X		
172210		1025	11/15/19	X		
191290		1015	11/16/19	X		
SW-001		1555	11/14/19	X	1	surface water

320-56435 Chain of Custody

Project Information		Sample Receipt	
Number:	102581-	Total No. of Containers:	14
Name:	DLG quarterly + 15t time	COC Seals/Intact? Y/N/NA	
Contact:	MDN	Received Good Cond./Cold	
Ongoing Project?	Yes ☒ No ☐	Temp:	
Sampler:	AEM, RLW	Delivery Method:	

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1130	Signature: Time:	Signature: Time:
Printed Name: Rachel Willis Date: 11/19/19	Printed Name: Date:	Printed Name: Date:
Company: Shannon + Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 10:10	Signature: Time:	Signature: Time:
Printed Name: Jennifer Sullington Date: 20 Nov 19	Printed Name: Date:	Printed Name: Date:
Company: ETAWSAC	Company:	Company:

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

0.7°c / 0.5°c

No. 35983

DOD LC/MS/MS list QSM 5.1 Table B-15

Name	CAS Number
Perfluorobutyric acid (PFBA)	375-22-4
Perfluoropentanoic acid (PFPA)	2706-90-3
Perfluorohexanoic acid (PFHxA)	307-24-4
Perfluoroheptanoic acid (PFHpA)	375-85-9
Perfluorooctanoic acid (PFOA)	335-67-1
Perfluorononanoic acid (PFNA)	375-95-1
Perfluorodecanoic acid (PFDA)	335-76-2
Perfluoroundecanoic acid (PFUDA)	2058-94-8
Perfluorododecanoic acid (PFDoDA)	307-55-1
Perfluorotridecanoic acid (PFTriA)	72629-94-8
Perfluorotetradecanoic acid (PDTeA)	376-06-7
Perfluorobutane Sulfonic Acid (PFBS)	375-73-5
Perfluoropentane Sulfonic acid (PFPS)	2706-91-4
Perfluorohexane Sulfonic Acid (PFHxS)	355-46-4
Perfluoroheptane Sulfonic Acid (PFHpS)	375-92-8
Perfluorooctane Sulfonic Acid (PFOS)	1763-23-1
Perfluorononane Sulfonic acid (PFNS)	68259-12-1
Perfluorodecane Sulfonic Acid (PFDS)	335-77-3
Perfluoroocatane Sulfonamide (FOSA)	754-91-6
N-Methyl perfluorooctanesulfon amidoacetic acid (MeFOSAA)	2355-31-9
N-Ethyl perfluorooctanesulfon amidacetic acid (EtFOSAA)	2991-50-6
4:2 Fluorotelomer sulfonate (4:2 FTS)	757124-72-4
6:2 Fluorotelomer sulfonate (6:2 FTS)	27619-97-2
8:2 Fluorotelomer sulfonate (8:2 FTS)	39108-34-4
10:2 Fluorotelomer sulfonate (10:2 FTS)	
Ammonium perfluoro-2-methyl-3-oxahexanoate (HPFO-DA, GenX)	13252-13-6
Ammonium 4,8-dioxa-3H-perfluorononanoate (ADONA)	919005-14-4
Perfluorohexadecanoic acid (PFHxDA)	
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	
Perfluoro-2-propoxypropionic acid (GenX Parent Acid)	

Add missing compounds from EPA 537.1

11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	763051-92-9
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid	756426-58-1
4,8-dioxa-3H-perfluorononanoic acid	919005-14-4

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-56435-1

Login Number: 56435
List Number: 1
Creator: Thompson, Sarah W

List Source: Eurofins TestAmerica, Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	Seal present with no number.
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
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	

eurofins | Environment Testing TestAmerica

ANALYTICAL REPORT

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

Laboratory Job ID: 320-58637-1
Client Project/Site: Dillingham DOTAPF

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

Attn: Marcy Nadel

Authorized for release by:
2/28/2020 1:54:01 PM

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

Table of Contents

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

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.
X	Surrogate is outside control limits

Glossary

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

Job ID: 320-58637-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative
320-58637-1

Comments
No additional comments.

Receipt
The samples were received on 2/14/2020 2:20 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 4.9º C.

LCMS
Method 537.1 DW: Surrogate recovery for the following samples were outside control limits: 191290 (320-58637-1), 191320 (320-58637-2), 191170 (320-58637-5) and 191700 (320-58637-6). Re-analysis was performed with concurring results. The original analysis has been reported.

Method 537.1 DW: Surrogate recovery for the following sample was outside control limits: 191300 (320-58637-3). Re-analysis was performed with concurring results.

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

Organic Prep
Method 537.1 DW: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-359403 and 320-359403.

Method 537.1 DW: The following samples 191290 (320-58637-1), 191320 (320-58637-2), 191300 (320-58637-3), 191170 (320-58637-5), 191700 (320-58637-6) and 291700 (320-58637-7) in preparation batch 320-359403 and 320-359403 were observed to be orange in color with brown sediments at the bottom of the bottle prior to extraction.

Method 537.1 DW: The following samples 191300 (320-58637-3), 191170 (320-58637-5), 191700 (320-58637-6) and 291700 (320-58637-7) in preparation batch 320-359403 and 320-359403 were observed to be pale yellow after final voluming.

Method 537.1 DW: The following samples 191290 (320-58637-1) and 191320 (320-58637-2) in preparation batch 320-359403 were observed to be yellow after final voluming.

Method 537.1 DW: The following samples were filtered using a 0.22um filter due to heavy particulates present after concentration of the sample: 191290 (320-58637-1), 191320 (320-58637-2), 191300 (320-58637-3), 191170 (320-58637-5), 191700 (320-58637-6) and 291700 (320-58637-7).

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: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191290 — Lab Sample ID: 320-58637-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0082		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0034		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0039		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0019		0.0018	0.00045	ug/L	1		537.1 DW	Total/NA

Client Sample ID: 191320 — Lab Sample ID: 320-58637-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.046		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0090		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0014	J	0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.011		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0057		0.0019	0.00048	ug/L	1		537.1 DW	Total/NA

Client Sample ID: 191300 — Lab Sample ID: 320-58637-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.062		0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.036		0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.032		0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorononanoic acid (PFNA)	0.00048	J	0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.0012	J	0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.0075		0.0018	0.00046	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.0015	J	0.0018	0.00046	ug/L	1		537.1 DW	Total/NA

Client Sample ID: 191050 — Lab Sample ID: 320-58637-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.028		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.0024		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0030		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.041		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.14		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.031		0.0020	0.00049	ug/L	1		537.1 DW	Total/NA

Client Sample ID: 191170 — Lab Sample ID: 320-58637-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.0023		0.0017	0.00043	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.00045	J	0.0017	0.00043	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.00053	J	0.0017	0.00043	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.00071	J	0.0017	0.00043	ug/L	1		537.1 DW	Total/NA

Client Sample ID: 191700 — Lab Sample ID: 320-58637-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.047		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.010		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0094		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.017		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.059		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.018		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 291700

Lab Sample ID: 320-58637-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.050		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.011		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanoic acid (PFOA)	0.0087		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.017		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.060		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.019		0.0019	0.00047	ug/L	1		537.1 DW	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191290
Date Collected: 02/10/20 10:30
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-1
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0082**		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluoroheptanoic acid (PFHpA)	**0.0034**		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorooctanoic acid (PFOA)	**0.0039**		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorononanoic acid (PFNA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorodecanoic acid (PFDA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorododecanoic acid (PFDoA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0019**		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0018	0.00045	ug/L		02/24/20 04:24	02/25/20 21:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:19*	*1*
13C2 PFDA	*65*	*X*	*70 - 130*	*02/24/20 04:24*	*02/25/20 21:19*	*1*
d5-NEtFOSAA	*91*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:19*	*1*
13C3 HFPO-DA	*96*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:19*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191320
Date Collected: 02/10/20 11:38
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-2
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.046**		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluoroheptanoic acid (PFHpA)	**0.0090**		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorooctanoic acid (PFOA)	**0.0014**	**J**	0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorobutanesulfonic acid (PFBS)	**0.011**		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0057**		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00048	ug/L		02/24/20 04:24	02/25/20 21:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:27*	*1*
13C2 PFDA	*70*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:27*	*1*
d5-NEtFOSAA	*83*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:27*	*1*
13C3 HFPO-DA	*65*	*X*	*70 - 130*	*02/24/20 04:24*	*02/25/20 21:27*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191300
Date Collected: 02/10/20 16:21
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-3
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.062**		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluoroheptanoic acid (PFHpA)	**0.036**		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorooctanoic acid (PFOA)	**0.032**		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorononanoic acid (PFNA)	**0.00048**	**J**	0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorodecanoic acid (PFDA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorododecanoic acid (PFDoA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorobutanesulfonic acid (PFBS)	**0.0012**	**J**	0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorohexanesulfonic acid (PFHxS)	**0.0075**		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Perfluorooctanesulfonic acid (PFOS)	**0.0015**	**J**	0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0018	0.00046	ug/L		02/24/20 04:24	02/27/20 10:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*82*		*70 - 130*	*02/24/20 04:24*	*02/27/20 10:58*	*1*
13C2 PFDA	*63*	*X*	*70 - 130*	*02/24/20 04:24*	*02/27/20 10:58*	*1*
d5-NEtFOSAA	*83*		*70 - 130*	*02/24/20 04:24*	*02/27/20 10:58*	*1*
13C3 HFPO-DA	*89*		*70 - 130*	*02/24/20 04:24*	*02/27/20 10:58*	*1*

Client Sample ID: 191050

Date Collected: 02/11/20 11:09
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-4

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.028**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluoroheptanoic acid (PFHpA)	**0.0024**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorooctanoic acid (PFOA)	**0.0030**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorobutanesulfonic acid (PFBS)	**0.041**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorohexanesulfonic acid (PFHxS)	**0.14**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Perfluorooctanesulfonic acid (PFOS)	**0.031**		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0020	0.00049	ug/L		02/24/20 04:24	02/25/20 21:42	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*74*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:42*	*1*
13C2 PFDA	*73*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:42*	*1*
d5-NEtFOSAA	*89*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:42*	*1*
13C3 HFPO-DA	*75*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:42*	*1*

Client Sample ID: 191170

Date Collected: 02/11/20 16:25
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-5

Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.0023**		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluoroheptanoic acid (PFHpA)	**0.00045**	**J**	0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorooctanoic acid (PFOA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorononanoic acid (PFNA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorodecanoic acid (PFDA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorododecanoic acid (PFDoA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorobutanesulfonic acid (PFBS)	**0.00053**	**J**	0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorohexanesulfonic acid (PFHxS)	**0.00071**	**J**	0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0017	0.00043	ug/L		02/24/20 04:24	02/25/20 21:50	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*80*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:50*	*1*
13C2 PFDA	*61*	*X*	*70 - 130*	*02/24/20 04:24*	*02/25/20 21:50*	*1*
d5-NEtFOSAA	*87*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:50*	*1*
13C3 HFPO-DA	*78*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:50*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191700
Date Collected: 02/11/20 17:12
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-6
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.047**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluoroheptanoic acid (PFHpA)	**0.010**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorooctanoic acid (PFOA)	**0.0094**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorobutanesulfonic acid (PFBS)	**0.017**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorohexanesulfonic acid (PFHxS)	**0.059**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Perfluorooctanesulfonic acid (PFOS)	**0.018**		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/25/20 21:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*81*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:58*	*1*
13C2 PFDA	*63*	*X*	*70 - 130*	*02/24/20 04:24*	*02/25/20 21:58*	*1*
d5-NEtFOSAA	*85*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:58*	*1*
13C3 HFPO-DA	*82*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:58*	*1*

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 291700
Date Collected: 02/11/20 17:18
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-7
Matrix: Water

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**0.050**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluoroheptanoic acid (PFHpA)	**0.011**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorooctanoic acid (PFOA)	**0.0087**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorononanoic acid (PFNA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorodecanoic acid (PFDA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorododecanoic acid (PFDoA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorobutanesulfonic acid (PFBS)	**0.017**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorohexanesulfonic acid (PFHxS)	**0.060**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Perfluorooctanesulfonic acid (PFOS)	**0.019**		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0019	0.00047	ug/L		02/24/20 04:24	02/27/20 11:29	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*70 - 130*	*02/24/20 04:24*	*02/27/20 11:29*	*1*
13C2 PFDA	*72*		*70 - 130*	*02/24/20 04:24*	*02/27/20 11:29*	*1*
d5-NEtFOSAA	*82*		*70 - 130*	*02/24/20 04:24*	*02/27/20 11:29*	*1*
13C3 HFPO-DA	*73*		*70 - 130*	*02/24/20 04:24*	*02/27/20 11:29*	*1*

Surrogate Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Matrix: Water

Prep Type: Total/NA

		Percent Surrogate Recovery (Acceptance Limits)			
Lab Sample ID	Client Sample ID	PFHxA (70-130)	PFDA (70-130)	-NEtFOS/ (70-130)	HFPODA (70-130)
320-58637-1	191290	79	65 X	91	96
320-58637-2	191320	79	70	83	65 X
320-58637-3	191300	82	63 X	83	89
320-58637-4	191050	74	73	89	75
320-58637-5	191170	80	61 X	87	78
320-58637-6	191700	81	63 X	85	82
320-58637-7	291700	79	72	82	73
LCS 320-359403/2-A	Lab Control Sample	89	88	87	85
LCSD 320-359403/3-A	Lab Control Sample Dup	86	85	83	71
MB 320-359403/1-A	Method Blank	86	84	89	83

Surrogate Legend

PFHxA = 13C2 PFHxA
PFDA = 13C2 PFDA
d5-NEtFOSAA = d5-NEtFOSAA
HFPODA = 13C3 HFPO-DA

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS)

Lab Sample ID: MB 320-359403/1-A
Matrix: Water
Analysis Batch: 359965

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 359403

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluoroheptanoic acid (PFHpA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorooctanoic acid (PFOA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorononanoic acid (PFNA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorodecanoic acid (PFDA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluoroundecanoic acid (PFUnA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorododecanoic acid (PFDoA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorotridecanoic acid (PFTriA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.0020	0.00050	ug/L		02/24/20 04:24	02/25/20 21:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*86*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:11*	*1*
13C2 PFDA	*84*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:11*	*1*
d5-NEtFOSAA	*89*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:11*	*1*
13C3 HFPO-DA	*83*		*70 - 130*	*02/24/20 04:24*	*02/25/20 21:11*	*1*

Lab Sample ID: LCS 320-359403/2-A
Matrix: Water
Analysis Batch: 359965

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 359403

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanoic acid (PFHxA)	0.100	0.0899		ug/L		90	70 - 130
Perfluoroheptanoic acid (PFHpA)	0.100	0.0919		ug/L		92	70 - 130
Perfluorooctanoic acid (PFOA)	0.100	0.0919		ug/L		92	70 - 130
Perfluorononanoic acid (PFNA)	0.100	0.0822		ug/L		82	70 - 130
Perfluorodecanoic acid (PFDA)	0.100	0.0849		ug/L		85	70 - 130
Perfluoroundecanoic acid (PFUnA)	0.100	0.0888		ug/L		89	70 - 130
Perfluorododecanoic acid (PFDoA)	0.100	0.0735		ug/L		73	70 - 130
Perfluorotridecanoic acid (PFTriA)	0.100	0.0831		ug/L		83	70 - 130
Perfluorotetradecanoic acid (PFTeA)	0.100	0.0774		ug/L		77	70 - 130
Perfluorobutanesulfonic acid (PFBS)	0.0884	0.0737		ug/L		83	70 - 130

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCS 320-359403/2-A
Matrix: Water
Analysis Batch: 359965

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 359403

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Perfluorohexanesulfonic acid (PFHxS)			0.0910	0.0788		ug/L		87	70 - 130		
Perfluorooctanesulfonic acid (PFOS)			0.0928	0.0744		ug/L		80	70 - 130		
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			0.100	0.0837		ug/L		84	70 - 130		
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			0.100	0.0820		ug/L		82	70 - 130		
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O			0.0932	0.0819		ug/L		88	70 - 130		
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF			0.0942	0.0800		ug/L		85	70 - 130		
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)			0.100	0.0873		ug/L		87	70 - 130		
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)			0.0942	0.0925		ug/L		98	70 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
13C2 PFHxA	*89*		*70 - 130*
13C2 PFDA	*88*		*70 - 130*
d5-NEtFOSAA	*87*		*70 - 130*
13C3 HFPO-DA	*85*		*70 - 130*

Lab Sample ID: LCSD 320-359403/3-A
Matrix: Water
Analysis Batch: 359965

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 359403

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)			0.100	0.0857		ug/L		86	70 - 130	5	30
Perfluoroheptanoic acid (PFHpA)			0.100	0.0921		ug/L		92	70 - 130	0	30
Perfluorooctanoic acid (PFOA)			0.100	0.0869		ug/L		87	70 - 130	6	30
Perfluorononanoic acid (PFNA)			0.100	0.0862		ug/L		86	70 - 130	5	30
Perfluorodecanoic acid (PFDA)			0.100	0.0832		ug/L		83	70 - 130	2	30
Perfluoroundecanoic acid (PFUnA)			0.100	0.0786		ug/L		79	70 - 130	12	30
Perfluorododecanoic acid (PFDoA)			0.100	0.0763		ug/L		76	70 - 130	4	30
Perfluorotridecanoic acid (PFTriA)			0.100	0.0790		ug/L		79	70 - 130	5	30
Perfluorotetradecanoic acid (PFTeA)			0.100	0.0820		ug/L		82	70 - 130	6	30
Perfluorobutanesulfonic acid (PFBS)			0.0884	0.0700		ug/L		79	70 - 130	5	30
Perfluorohexanesulfonic acid (PFHxS)			0.0910	0.0795		ug/L		87	70 - 130	1	30
Perfluorooctanesulfonic acid (PFOS)			0.0928	0.0770		ug/L		83	70 - 130	3	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			0.100	0.0840		ug/L		84	70 - 130	0	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			0.100	0.0857		ug/L		86	70 - 130	4	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3O			0.0932	0.0793		ug/L		85	70 - 130	3	30

Method: 537.1 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LCSD 320-359403/3-A
Matrix: Water
Analysis Batch: 359965

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 359403

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF			0.0942	0.0807		ug/L		86	70 - 130	1	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)			0.100	0.0780		ug/L		78	70 - 130	11	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)			0.0942	0.0920		ug/L		98	70 - 130	1	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
13C2 PFHxA	*86*		*70 - 130*
13C2 PFDA	*85*		*70 - 130*
d5-NEtFOSAA	*83*		*70 - 130*
13C3 HFPO-DA	*71*		*70 - 130*

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

LCMS

Prep Batch: 359403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-58637-1	191290	Total/NA	Water	537.1 DW	
320-58637-2	191320	Total/NA	Water	537.1 DW	
320-58637-3	191300	Total/NA	Water	537.1 DW	
320-58637-4	191050	Total/NA	Water	537.1 DW	
320-58637-5	191170	Total/NA	Water	537.1 DW	
320-58637-6	191700	Total/NA	Water	537.1 DW	
320-58637-7	291700	Total/NA	Water	537.1 DW	
MB 320-359403/1-A	Method Blank	Total/NA	Water	537.1 DW	
LCS 320-359403/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	
LCSD 320-359403/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	

Analysis Batch: 359965

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-58637-1	191290	Total/NA	Water	537.1 DW	359403
320-58637-2	191320	Total/NA	Water	537.1 DW	359403
320-58637-4	191050	Total/NA	Water	537.1 DW	359403
320-58637-5	191170	Total/NA	Water	537.1 DW	359403
320-58637-6	191700	Total/NA	Water	537.1 DW	359403
MB 320-359403/1-A	Method Blank	Total/NA	Water	537.1 DW	359403
LCS 320-359403/2-A	Lab Control Sample	Total/NA	Water	537.1 DW	359403
LCSD 320-359403/3-A	Lab Control Sample Dup	Total/NA	Water	537.1 DW	359403

Analysis Batch: 360241

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-58637-3	191300	Total/NA	Water	537.1 DW	359403
320-58637-7	291700	Total/NA	Water	537.1 DW	359403

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 191290
Date Collected: 02/10/20 10:30
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-1
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	537.1 DW			277.2 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			359965	02/25/20 21:19	P1N	TAL SAC

Client Sample ID: 191320
Date Collected: 02/10/20 11:38
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-2
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	537.1 DW			262.9 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			359965	02/25/20 21:27	P1N	TAL SAC

Client Sample ID: 191300
Date Collected: 02/10/20 16:21
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-3
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	537.1 DW			271.4 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			360241	02/27/20 10:58	P1N	TAL SAC

Client Sample ID: 191050
Date Collected: 02/11/20 11:09
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-4
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	537.1 DW			256.3 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			359965	02/25/20 21:42	P1N	TAL SAC

Client Sample ID: 191170
Date Collected: 02/11/20 16:25
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-5
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	537.1 DW			291.2 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			359965	02/25/20 21:50	P1N	TAL SAC

Client Sample ID: 191700
Date Collected: 02/11/20 17:12
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-6
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	537.1 DW			267.8 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			359965	02/25/20 21:58	P1N	TAL SAC

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Client Sample ID: 291700
Date Collected: 02/11/20 17:18
Date Received: 02/14/20 14:20

Lab Sample ID: 320-58637-7
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	537.1 DW			266.7 mL	1.0 mL	359403	02/24/20 04:24	MM	TAL SAC
Total/NA	Analysis	537.1 DW		1			360241	02/27/20 11:29	P1N	TAL SAC

Laboratory References:

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

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20 *
California	State	2897	01-31-22
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-30-21
Hawaii	State	<cert No.>	01-29-20 *
Hawaii	State	<cert No.>	01-29-21
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20 *
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-21
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-29-20
Vermont	State	VT-4040	04-16-20
Virginia	NELAP	460278	03-14-20 *
Washington	State	C581	05-05-20
West Virginia (DW)	State	9930C	12-31-19 *
West Virginia (DW)	State	9930C	12-31-20
Wyoming	State Program	8TMS-L	01-28-19 *

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Method	Method Description	Protocol	Laboratory
537.1 DW	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537.1 DW	Extraction of Perfluorinated Alkyl Acids	EPA	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: Dillingham DOTAPF

Job ID: 320-58637-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-58637-1	191290	Water	02/10/20 10:30	02/14/20 14:20	
320-58637-2	191320	Water	02/10/20 11:38	02/14/20 14:20	
320-58637-3	191300	Water	02/10/20 16:21	02/14/20 14:20	
320-58637-4	191050	Water	02/11/20 11:09	02/14/20 14:20	
320-58637-5	191170	Water	02/11/20 16:25	02/14/20 14:20	
320-58637-6	191700	Water	02/11/20 17:12	02/14/20 14:20	
320-58637-7	291700	Water	02/11/20 17:18	02/14/20 14:20	

CHAIN-OF-CUSTODY RECORD

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

Page 1 of 1

Laboratory: Test America
Attn: David Alltucker

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

Quote No: —

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	EPA 537.1 +18 PFAS	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
191290		2/10/20	1030	X	2	Drinking water / Groundwater
191320			1138	X	2	
191300			1621	X	2	
191050		2/11/20	1109	X	2	
191170			1625	X	2	
191700			1712	X	2	
291700			1718	X	2	

320-58637 Chain of Custody

Project Information	
Number:	102581-006
Name:	Dillingham DOT&PF
Contact:	MDN
Ongoing Project?	Yes [X] No [ ]
Sampler:	MDN

Sample Receipt	
Total No. of Containers:	14
COC Seals/Intact? Y/N/NA	Y
Received Good Cond./Cold	Y
Temp:	4.9 °C 14Feb20
Delivery Method:	Goldstreak

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: M. Nadel Time: 1210	Signature: Time:	Signature: Time:
Printed Name: Marcy Nadel Date: 2/13/20	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1420	Signature: Time:	Signature: Time:
Printed Name: Jennifer Darlington Date: 14Feb20	Printed Name: Date:	Printed Name: Date:
Company: ETA WSac	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. 411426

027 ANC 2165 0705 | 027-2165 0705

Shipper's Name and Address Test America Laboratories 880 Riverside Parkway West Sacramento, CA 95605 USA Tel: 330-497-9396	Shipper's Account Number: 27442464535 Customer's ID Number: 35221
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 TEST AMERICA ATTN: DAVID ALLTUCKER 880 RIVERSIDE PARKWAY WEST SACRAMENTO, CA 95605 USA Tel: 916 373-5600	Consignee's Account Number
Also notify Print Jennifer Darling Sign 60596 ETA W SAC Tel: 14 feb 20 1420	
Issuing Carrier's Agent and City	
Agent's IATA Code	Account No.
Accounting Information Test America Laboratories Inc 880 Riverside Parkway West Sacramento, CA 95605 USA GoldStreak	35221
Airport of Departure (Addr. of First Carrier) and Requested Routing Anchorage	

To	By First Carrier	To / By	To / By	Currency	WT/VAL	Other	Declared Value For Carriage	Declared Value For Customs
SEA	Alaska Airlines	SMF AS		USD PX	X	X	NVD	NCV

Airport of Destination	Flight/Date	Flight/Date	Amount of Insurance
SACRAMENTO	AS 136/13	AS 3405/14	XXX

Handling Information
STORE IN COOLER WHEN POSSIBLE
102581-006
SCI

No of Pieces	Gross Weight	kg lb	Commodity Item No.	Chargeable Weight	Rate / Charge	Total	Nature and Quantity of Goods (Incl. Dimensions or Volume)
1	36.0	L		36.0		67.00	WATER SAMPLES Dims: 24 x 14 x14 x 1 GSX COL
1	36.0					67.00	Volume: 2.722

Prepaid	Weight Charge	Collect
67.00		
	Valuation Charge	
	Tax	
1.80		
	Total Other Charges Due Agent	
	Total Other Charges Due Carrier	
10.00		
Total Prepaid		Total Collect
78.80		

Other Charges
XBC 10.00

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: Test America Laboratories Inc

Signature of Shipper or his Agent: [signature]

[ASV] THIS SHIPMENT DOES NOT CONTAIN DANGEROUS GOODS

[ ] THIS SHIPMENT DOES CONTAIN DANGEROUS GOODS

Executed On (Date)	at (Place)	Signature of Issuing Carrier or its Agent
13 Feb 2020 13:24	Anchorage	Alaska Airlines

027-2165 0705

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-58637-1

Login Number: 58637
List Number: 1
Creator: Her, David A

List Source: Eurofins TestAmerica, Sacramento

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

APPENDIX D: QA/QC SUMMARY AND DEC LDRCS

Appendix D

QA/QC Summary and DEC LDRCs

CONTENTS

QA/QC SUMMARY

Quality Assurance/Quality Control (QA/QC) procedures assist in producing data of acceptable quality and reliability. Shannon & Wilson reviewed the analytical results for laboratory QC samples and conducted a QA assessment for this project. Staff reviewed the COC records and laboratory-receipt forms to verify 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. QA review procedures 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. Environmental staff reviewed the data using the current DEC LDRC and applied a standardized set of flags to data brought into question during the review. During the QC review flags were applied to indicate estimated data or analytical bias as applicable.

The following analytical data was considered estimated and flagged 'J' in the analytical table due to isotope dilution analyte (IDA) recovery failures:

- the PFDA results for samples *191170, 191290, 191300*, and *191700*;
- the PFOA results for samples *191170* and *291170*;
- the PFOS results for samples *191700* and *291700*;
- the PFNA results for samples *SW-001*;
- the PFBS results for samples *191320*, and *291320*;
- the PFHxS results for samples *191290*; and
- the HFPO-DA results for samples *191320*.

The following analytical data was considered estimated and flagged 'B' in the analytical table due to a laboratory blank detection:

- the PFHpA results for samples *172370* and *SW-001*; and
- the PFHxS results for samples *172210, 172370*, and *SW-001*.

Shannon & Wilson reviewed analytical sample results for TestAmerica WOs 48062, 48064, 48065, 51358, 51359, 56435, and 58637. The laboratory reports, including case narratives describing laboratory QA results, and completed DEC data-review, are included in Appendix C. Laboratory QC procedures included evaluating surrogate recovery,

APPENDIX D: QA/QC SUMMARY AND DEC LDRCS

performing continuing calibration checks, analyzing method blanks, and checking laboratory control samples to assess accuracy. Appendix C contains laboratory reports and completed LDRCs for these work orders. The analytical data for samples collected by DEC in December 2018 (WO 82900) is also included in Appendix C.

By working in general accordance with the proposed scope of services, Shannon & Wilson considers the samples collected for this project to be representative of site conditions at the locations and times they were obtained. Based on the 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 the assessment.

Laboratory Data Review Checklist

Completed By:

Amber Masters

Title:

Environmental Scientist

Date:

January 21, 2019

CS Report Name:

Dillingham DOT&PF PFAS

Report Date:

January 16, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

580-82900-1

ADEC File Number:

100.38.277

Hazard Identification Number:

26816

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 PFAS. 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:

ADEC has not approved an analytical laboratory for analysis of all submitted PFAS. However, Eurofins Lancaster Laboratories is certified for PFOS and PFOA in drinking water analysis by ADEC.

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 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 documented by the laboratory.

e. Data quality or usability affected?

Comments:

The data quality and/or usability were not affected.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

The samples arrived in good condition, properly preserved, and that the temperature of the sample cooler upon receipt at the laboratory was 5.0º C.

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

○ Yes ◉ No Comments:

There were no discrepancies, errors, or QC failures documented in the case narrative.

c. Were all corrective actions documented?

○ Yes ◉ No Comments:

N/A; 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/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:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis 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 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/or 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:

LCS/LCSD samples were reported for PFAS analyses.

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:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(•) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (•) No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

( ) Yes (•) No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

( ) Yes (•) No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

( ) Yes (•) No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and 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 pairs *DIL-05 / DIL-06* and *KIN-03 / KIN-04* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

(•) Yes ( ) No Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and usability were not affected; see above.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

(•) Yes ( ) No ( ) Not Applicable

The field-blank sample *KIN-02* was submitted with this work order.

i. All results less than LOQ?

(•) Yes ( ) No Comments:

ii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the field-blank sample.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

( ) Yes (•) No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Adam Wyborny

Title:

Environmental Engineering Staff

Date:

March 14, 2019

CS Report Name:

Dillingham DOT&PF PFAS

Report Date:

March 12, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-48062-1

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

320-48062-1

1. Laboratory

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

   (●) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (●) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (●) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (●) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (●) Yes ( ) No Comments:

The temperature blank was measured within the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory (1.5 °C).

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

   (●) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

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

   (●) Yes ( ) No Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

○ Yes ◉ No Comments:

There were no discrepancies documented by the laboratory.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

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

◉ Yes ○ No Comments:

The samples arrived in good condition, properly preserved, and that the corrected temperature of a reference sample upon receipt at the laboratory was 1.5º C.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-280409 and 320-280406.

c. Were all corrective actions documented?

○ Yes ◉ No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

◉ Yes ○ No Comments:

b. All applicable holding times met?

(●) Yes ( ) No Comments:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

( ) Yes (●) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(●) Yes ( ) No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water and soil.

e. Data quality or usability affected?

( ) Yes (●) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(●) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(●) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank samples.

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

( ) Yes (●) No Comments:

No samples are affected; therefore, qualification of the results was not required

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(•) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (•) No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

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

( ) Yes (•) No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(●) Yes ( ) No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(●) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (●) No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

( ) Yes (●) No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

( ) Yes (●) No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

The field duplicate pairs *191050* / *291050* and *191741* / *291741* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

The relative precision demonstrated between the detected PFAS results of the field duplicate samples was within the recommended DQO of 30% for all analytes.

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 with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Adam Wyborny

Title:

Environmental Engineering Staff

Date:

March 14, 2019

CS Report Name:

Dillingham DOT&PF PFAS

Report Date:

March 12, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-48064-1

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

320-48064-1

1. Laboratory

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

   (•) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (•) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (•) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (•) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (•) Yes ( ) No Comments:

The temperature blank was measured within the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory (1.3 °C).

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

   (•) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

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

   (•) Yes ( ) No Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

(•) Yes ( ) No Comments:

The sample receipt form and case narrative note a two-minute discrepancy between the sample times listed on the label and COC for the sample 191760. The sample was logged-in per the COC.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected. The samples were analyzed within holding time.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

The samples arrived in good condition, properly preserved, and that the corrected temperature of a reference sample upon receipt at the laboratory was 1.3º C.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-280411 and 320-280409.

c. Were all corrective actions documented?

( ) Yes (•) No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(●) Yes ( ) No Comments:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

( ) Yes (●) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(●) Yes ( ) No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water and soil.

e. Data quality or usability affected?

( ) Yes (●) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(●) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(●) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank samples.

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

( ) Yes (●) No Comments:

No samples are affected; therefore, qualification of the results was not required

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(•) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (•) No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

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

( ) Yes (•) No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(●) Yes ( ) No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(●) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (●) No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

( ) Yes (●) No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

( ) Yes (●) No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

The field duplicate pairs *172320.2* / *272320.2* and *191770* / *291770* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

The relative precision demonstrated between the detected PFAS results of the field duplicate samples was within the recommended DQO of 30%, where calculable, for all analytes.

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 with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Adam Wyborny

Title:

Environmental Engineering Staff

Date:

March 14, 2019

CS Report Name:

Dillingham DOT&PF PFAS

Report Date:

March 14, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-48065-1

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

320-48065-1

1. Laboratory

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

   (●) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (●) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (●) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (●) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (●) Yes ( ) No Comments:

The temperature blank was measured within the acceptable temperature range of 0° C to 6° C upon receipt at the laboratory (3.4° C).

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

   (●) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

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

   (●) Yes ( ) No Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

○ Yes ◉ No Comments:

There were no discrepancies noted by the laboratory in the sample receipt documentation.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

4. Case Narrative

a. Present and understandable?

◉ Yes ○ No Comments:

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

◉ Yes ○ No Comments:

The samples arrived in good condition, properly preserved, and that the corrected temperature of a reference sample upon receipt at the laboratory was 3.4º C.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batches 320-280411 and 320-280414.

c. Were all corrective actions documented?

○ Yes ◉ No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

◉ Yes ○ No Comments:

b. All applicable holding times met?

◉ Yes ○ No Comments:

The laboratory indicates that the water samples were analyzed using direct injection and in-line analysis. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

○ Yes ◉ No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

◉ Yes ○ No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water and soil.

e. Data quality or usability affected?

○ Yes ◉ No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

◉ Yes ○ No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

◉ Yes ○ No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank samples.

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

○ Yes ◉ No Comments:

No samples are affected; therefore, qualification of the results was not required

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(•) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (•) No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

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

( ) Yes (•) No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(•) Yes ( ) No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(•) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (•) No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

( ) Yes (•) No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

( ) Yes (•) No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

◉ Yes ○ No Comments:

The field duplicate pairs *191170* / *291170* and *191320* / *291320* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

○ Yes ◉ No Comments:

The relative precision demonstrated between the detected PFAS results of the field duplicate samples *191170* and *291170* was within the recommended DQO of 30%, where calculable, for all analytes except PFOA.

The relative precision demonstrated between the detected PFAS results of the field duplicate samples *191320* and *291320* was within the recommended DQO of 30% for all analytes except PFBS.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data PFOA results of the field duplicate samples *191170* and *291170* are considered estimated due to the precision failure. These results are flagged 'J' for reporting purposes.

The data PFBS results of the field duplicate samples *191320* and *291320* are considered estimated due to the precision failure. These results are flagged 'J' for reporting purposes.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

○ Yes ○ No ◉ Not Applicable

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ?

◉ Yes ○ No Comments:

N/A; an equipment blank was not submitted with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Marcy Nadel

Title:

Geologist

Date:

12/11/19

CS Report Name:

Dillingham PFAS

Report Date:

12/3/2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-51359-1 REV3

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

1. Laboratory

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

   (•) Yes ( ) No Comments:

The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ( ) Yes (•) No Comments:

Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (•) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (•) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (•) Yes ( ) No Comments:

The temperature blank was measured within the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory. The temperatures of the two sample coolers were 3.0 °C and 4.5 °C.

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

   (•) Yes ( ) No Comments:

Analysis of PFAS compounds does not require chemical preservation.

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

   (•) Yes ( ) No Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

(●) Yes ( ) No Comments:

The laboratory sample receipt checklist notes the field sampler's name is not present on the COC. Sampler initials are included in the "Project Information" section of each page of the COC. No other sample receipt discrepancies were documented.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

4. Case Narrative

a. Present and understandable?

(●) Yes ( ) No Comments:

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

(●) Yes ( ) No Comments:

The samples arrived in good condition, properly preserved, and within the required temperature range.

The laboratory notes the "I" qualifier indicates the transition mass ratio for the indicated analyte was outside of established limits. PFBS for sample *200390* has been flagged by the laboratory.

The laboratory notes sample *172020* was orange in color and had visible sediment.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with laboratory preparation batch 320-304813.

c. Were all corrective actions documented?

( ) Yes (●) No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(•) Yes ( ) No Comments:

The laboratory indicates that the water samples were analyzed using direct injection. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

( ) Yes (•) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(•) Yes ( ) No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water in each sample.

e. Data quality or usability affected?

( ) Yes (•) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(•) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(•) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank.

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

○ Yes ◉ No Comments:

No samples are affected; therefore, results qualification is not required.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

◉ Yes ○ No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

○ Yes ◉ No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

◉ Yes ○ No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

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

○ Yes ◉ No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

◉ Yes ○ No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

◉ Yes ○ No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

○ Yes ◉ No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

○ Yes ◉ No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

○ Yes ◉ No Comments:

The field duplicate pairs *172190* / *272190* and *200150 / 300150* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

The relative precision between the PFOS and PFOA results of field-duplicate pair *200150 / 300150* were within the recommended DQO of 30%. PFAS analytes were not detected in field-duplicate pair *172190* / *272090*, therefore an RPD could not be calculated.

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 with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Brittany Blood

Title:

Environmental Professional I

Date:

12/3/2019

Consultant Firm:

Shannon and Wilson, Inc.

Laboratory Name:

TestAmerica

Laboratory Report Number:

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   The ADEC certified the TestAmerica/Eurofins Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   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☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

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

   Yes☒ No☐ N/A☐ Comments:

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

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

Yes☒ No☐ N/A☐ Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

No discrepancies were noted by the laboratory at sample login.

e. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected; see above.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

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

Yes☒ No☐ N/A☐ Comments:

Due to a shortage in the marketplace for 13C3-PFBS, the target analytes Perfluorobutanesulfonic acid (PFBS) and/or Perfluoropentanesulfonic acid (PFPeS) could not be quantitated against 13C3-PFBS (its labeled variant) as listed in the SOP. PFBS and PFPeS were quantitated versus 18O2-PFHxS instead.

The "I" qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgement was used to positively identify the analyte. PFOS in samples *191700 and 291700* and PFNA is sample *SW-001* have been qualified 'J', due to the uncertainty of these sample results.

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-341264.

The following samples were observed to be light yellow and contain sediment prior to extraction: *172370, 191700, 291700, 191300, 172210, 191290 and SW-001.*

The following sample contains non-settleable particulate matter which clogged the solid-phase extraction column: *SW-001*

The following samples were observed to be turbid after final voluming: *191700, 291700, 191300 and 191290.*

An MS/MSD was not reported with this work order as there was insufficient sample volume.

c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality and or usability were not affected; see above.

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

All samples in this work order are water samples.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

Data quality and/or usability were not affected; see above.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

All method blank results were less than the LOQ, however, PFHpA, PFHxS, and ADONA were detected in the method blank sample below the LOQ.

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Samples *172370* and *SW-001* were affected for the detection of PFHpA.

Samples *172370, 172210,191290* and *SW-001* were affected for the detection of, PFHxS.

ADONA was not detected in an associated project sample.

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

Yes☒ No☐ N/A☐ Comments:

Samples *172370* and *SW-001* were flagged 'UB' at the LOQ for the analyte, PFHpA.

Samples *172370, 172210*, and *SW-001* were flagged 'UB' at the LOQ for the analyte, PFHxS.

Sample *191290* was flagged 'JH' for PFHxS as the concentration of PFHxS was just above 5 times the concentration of PFHxS found within the method blank.

v. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals and inorganics were not analyzed as a part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

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

Yes☐ No☐ N/A☒ Comments:

No LCS or LCSD sample was reported outside of the laboratory limits.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and/or usability were not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

There was insufficient sample volume to perform a MS/MSD associated with the samples in this work order.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals and inorganics were not analyzed as a part of this work order.

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

There was insufficient sample volume to perform a MS/MSD associated with the samples in this work order.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

There was insufficient sample volume to perform a MS/MSD associated with the samples in this work order.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Not applicable, there was insufficient sample volume to perform a MS/MSD associated with the samples in this work order.

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

Yes☐ No☐ N/A☒ Comments:

See above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and/or usability were not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

All samples were within the method/laboratory limits.

iv. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

A trip blank is not required for the analysis of PFAS as PFAS is not a volatile compound.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

A trip blank is not required.

iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

See above.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable, see above.

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

v. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected.

f. Field Duplicate

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

Yes☒ No☐ N/A☐ Comments:

Field duplicate pair *191700* and *291700* were submitted with this work order.

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and/or usability were not affected; see above.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

Reusable equipment was not used for sampling.

320-56435-1

Laboratory Report Date:

12/3/2019

CS Site Name:

ADOT&PF Dillingham Airport Sitewide PFAS

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

See above.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable, see above.

iii. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected.

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

a. Defined and appropriate?

Yes☒ No☐ N/A☐ Comments:

See Section 4b.

Laboratory Data Review Checklist

Completed By:

Brittany Blood

Title:

Environmental Professional 1

Date:

January 15, 2020

CS Report Name:

Dillingham PFAS

Report Date:

December 12, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-51358-1 REV3

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

1. Laboratory

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

   (•) Yes ( ) No Comments:

   The ADEC certified the TestAmerica Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   (•) Yes ( ) No Comments:

   Analyses were performed by TestAmerica Laboratories, Inc. in West Sacramento, CA.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   (•) Yes ( ) No Comments:

   b. Correct Analyses requested?

   (•) Yes ( ) No Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   (•) Yes ( ) No Comments:

   The temperature blank was measured within the acceptable temperature range of 0 °C to 6 °C upon receipt at the laboratory. The temperatures of the two sample coolers were 3.0 °C and 4.5 °C.

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

   (•) Yes ( ) No Comments:

   Analysis of PFAS compounds does not require chemical preservation.

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

   (•) Yes ( ) No Comments:

   The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

(•) Yes ( ) No Comments:

The laboratory sample receipt checklist notes the field sampler's name is not present on the COC. Sampler initials are included in the "Project Information" section of each page of the COC. No other sample receipt discrepancies were documented.

e. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

4. Case Narrative

a. Present and understandable?

(•) Yes ( ) No Comments:

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

(•) Yes ( ) No Comments:

This report has been revised to report additional analytes at client request.

The samples arrived in good condition, properly preserved, and within the required temperature range.

The case narrative notes that there was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with laboratory preparation batch 320-303052.

c. Were all corrective actions documented?

( ) Yes (•) No Comments:

No corrective actions were documented in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not note an effect on data quality.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

(•) Yes ( ) No Comments:

b. All applicable holding times met?

(●) Yes ( ) No Comments:

The laboratory indicates that the water samples were analyzed using direct injection. The 28-day hold time for analysis using direct aqueous injection (DAI) was met for all samples.

c. All soils reported on a dry weight basis?

( ) Yes (●) No Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

(●) Yes ( ) No Comments:

The LOQ, equivalent to the TestAmerica Reporting Limit (RL), is less than the applicable ADEC regulatory limits for drinking water in each sample.

e. Data quality or usability affected?

( ) Yes (●) No Comments:

The data quality and/or usability are not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

(●) Yes ( ) No Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

(●) Yes ( ) No Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in the method blank.

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

( ) Yes (●) No Comments:

No samples are affected; therefore, results qualification is not required.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

(•) Yes ( ) No Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

( ) Yes (•) No Comments:

N/A; metals and/or inorganics were not analyzed as part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

(•) Yes ( ) No Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; analytical accuracy and precision were demonstrated to be within acceptable limits.

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

( ) Yes (•) No Comments:

Qualification of the data was not required; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability are not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

(•) Yes ( ) No Comments:

The analytical method WS-LC-0025 uses IDA recovery, which entails adding a 13C-isotope of each target analyte, and assessing the recovery of each analyte. The isotopically-labeled compounds are discussed as surrogates for this method.

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

(•) Yes ( ) No Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

( ) Yes (•) No Comments:

N/A; there were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality and usability are not affected; see above.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples?
(If not, enter explanation below.)

( ) Yes (•) No Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

( ) Yes (•) No Comments:

N/A; a trip blank is not required.

iii. All results less than LOQ?

○ Yes ◉ No Comments:

N/A; a trip blank is not required.

iv. If above LOQ, what samples are affected?

Comments:

None; a trip blank was not submitted with this work order.

v. Data quality or usability affected?

Comments:

The data quality and/or usability are not affected; see above.

e. Field Duplicate

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

◉ Yes ○ No Comments:

ii. Submitted blind to lab?

○ Yes ◉ No Comments:

The field duplicate pairs *172190 / 272190* and *172243 / 272243* were submitted with this work order.

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

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

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

◉ Yes ○ No Comments:

Relative precision was not calculable for the field-duplicate pairs associated with this work order, because PFAS analytes were not detected.

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 with this work order.

ii. If above LOQ, what samples are affected?

Comments:

None; see above.

iii. Data quality or usability affected?

Comments:

The data quality and usability were not affected; see above.

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

a. Defined and appropriate?

○ Yes ◉ No Comments:

There were no additional flags/qualifiers required for this work order.

Laboratory Data Review Checklist

Completed By:

Veselina Yakimova

Title:

Geologist I

Date:

3/03/2020

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica

Laboratory Report Number:

320-58637-1

Laboratory Report Date:

2/28/2020

CS Site Name:

Dillingham DOT&PF

ADEC File Number:

2540.38.023

Hazard Identification Number:

26971

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Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

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

   Yes☒ No☐ N/A☐ Comments:

   The ADEC certified the TestAmerica/Eurofins Laboratories West Sacramento, CA location for the analysis of perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) on February 6, 2018. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Samples were not transferred or sub-contracted to an alternate laboratory.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   Samples were received at 4.9°C.

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

   Yes☐ No☐ N/A☒ Comments:

   Analysis of PFAS compounds does not require chemical preservation.

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

Yes☒ No☐ N/A☐ Comments:

The sample receipt form notes that the samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

There were no discrepancies noted in this work order.

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☐ N/A☐ Comments:

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

Yes☒ No☐ N/A☐ Comments:

Surrogate recovery for the following samples were outside control limits: 191290, 191320, 191170 and 191700. Re-analysis was performed with concurring results. The original analysis has been reported.

Surrogate recovery for the following sample was outside control limits: 191300. Re-analysis was performed with concurring results.

There was insufficient sample volume available to perform a matrix spike (MS) and MS duplicate (MSD) in conjunction with preparation batch 320-359403.

The samples 191290, 191320, 191300, 191170, 191700 and 291700 were observed to contain sediment and an orange hue prior to extraction.

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c. Were all corrective actions documented?

Yes☒ No☐ N/A☐ Comments:

The following samples were filtered using a 0.22um filter due to heavy particulates present after concentration of the sample: 191290, 191320, 191300, 191170, 191700 and 291700. The laboratory observed a yellowish hue after decanting the samples.

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/usability; see section 6.d for further assessment.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

The matrix of this sample is water.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☒ No☐ N/A☐ Comments:

e. Data quality or usability affected?

The data quality/usability is not affected.

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6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples are affected; see above.

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

Yes☐ No☐ N/A☒ Comments:

See above.

v. Data quality or usability affected?

Comments:

Data quality and/or usability are not affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals and/or inorganics were not analyzed as part of this work order.

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iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples are affected. Method accuracy and precision was demonstrated to be within acceptance criteria.

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

Yes☐ No☐ N/A☒ Comments:

No samples are affected; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality/usability is not affected.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☒ N/A☐ Comments:

Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-359403.

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ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals and/or inorganics were not analyzed as a part of this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

An MS/MSD was not analyzed with this preparation batch. However, method accuracy and precision were demonstrated by the LCS/LCSD.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☐ N/A☒ Comments:

See above.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

N/A; MS/MSD samples were not reported.

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

Yes☐ No☐ N/A☒ Comments:

MS/MSD samples were not reported; see above.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality/usability is not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

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ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

The method EPA 537.1 IDA 13C2 PFDA was recovered below the lower control limit in the samples 191290, 191300, 191170, and 191700.

The method EPA 537.1 IDA 13C3 HFPO-DA was recovered below the lower control limit in the sample 191320.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☒ No☐ N/A☐ Comments:

The non-detect PFDA results of the samples 191290, 191300, 191170, and 191700 are considered estimated. These results have been flagged 'J' to identify the uncertainty.

The non-detect HFPO-DA result of the sample 191320 is considered estimated. This result has been flagged 'J' to identify the uncertainty.

iv. Data quality or usability affected?

Comments:

The data quality/usability is affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☐ No☐ N/A☒ Comments:

PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☐ No☐ N/A☒ Comments:

See above.

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iii. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

See above.

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples were affected.

v. Data quality or usability affected?

Comments:

The data quality/usability is not affected.

f. Field Duplicate

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

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The field duplicate samples 191700 and 291700 were submitted with this work order.

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (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☐ N/A☐ Comments:

The relative precision demonstrated between the detected results of the field duplicate samples was within the recommended DQO of 30% for all analytes.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and/or usability are not affected; see above.

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g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

Samples for this project are not collected with reusable equipment, therefore a practical potential for equipment based cross-contamination does not exist.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

See above.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No samples affected; see above.

iii. Data quality or usability affected?

Comments:

Data quality and/or usability were not affected; see above.

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

a. Defined and appropriate?

Yes☐ No☐ N/A☒ Comments:

No other data flags or qualifiers

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