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REVISION 1

SUMMARY REPORT

# February 2019 to June 2020 Water Supply Well Monitoring

YAKUTAT, ALASKA

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Submitted To: Alaska Department of Transportation & Public Facilities  
PO Box 112506  
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Attn: Samantha Cummings and Marcus Zimmerman

Subject: REVISION 1 SUMMARY REPORT, FEBRUARY 2019 TO JUNE 2020 WATER  
SUPPLY WELL MONITORING, YAKUTAT, ALASKA

Shannon & Wilson prepared this report to summarize the water supply well efforts performed between February 2019 and June 2020 at the Yakutat Airport (YAK) in Yakutat Alaska. The services were conducted on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF). Shannon & Wilson's scope of services was specified in proposals dated May 20, 2019 and November 9, 2019 and authorized on May 31, 2019 and December 5, 2019, respectively, by DOT&PF under Professional Services Agreement Number 25-19-1-013 Per- and Polyfluoroalkyl Substance (PFAS) Related Environmental & Engineering Services. This report was prepared for the DOT&PF in accordance with the terms and conditions of Shannon & Wilson's contract, relevant Alaska Department of Environmental Conservation (DEC) guidance documents, and Title 18 of the Alaska Administrative Code (AAC) Chapter 75.335. This Final Report addresses the comments received from DOT&PF on the July 2020 Draft Report.

Shannon & Wilson appreciates the opportunity to be of service to the DOT&PF on this project. If there are questions concerning this report, please contact us.

Sincerely,

SHANNON & WILSON, INC.



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CONTENTS

1 Introduction ..... 1

    1.1 Purpose and Objective..... 1

    1.2 Background ..... 1

    1.3 Geology and Hydrology ..... 4

    1.4 Contaminants of Potential Concern and Action Levels..... 4

    1.5 Scope of Services ..... 5

2 Water Supply Well Activities ..... 7

    2.1 Water Supply Well Search ..... 7

    2.2 Water Supply Well Survey ..... 7

    2.3 Initial Water Supply Well Sampling..... 9

    2.4 Sample Custody, Storage, and Transport ..... 10

    2.5 Special Considerations for PFAS Sampling..... 11

    2.6 Notification of Results ..... 11

    2.7 Water Supply Well Monitoring Criteria ..... 11

    2.8 Quarterly and Annual Monitoring ..... 13

    2.9 Alternative Water Sources ..... 13

    2.10 Public Information ..... 13

    2.11 Deviations..... 14

3 Analytical Results ..... 14

    3.1 June 2019 Initial Sampling Results..... 14

    3.2 Quarterly Sampling ..... 15

4 Quality Assurance and Quality Control ..... 15

5 Planned and Future Work ..... 16

6 Recommendations..... 16

7 References ..... 17

**Exhibits**

Exhibit 1-1: DEC Sampling Summary ..... 3

Exhibit 1-2: Applicable Regulatory Action Levels ..... 5

Exhibit 2-1: Water Supply Wells Identified in the Well Search Area ..... 8

Exhibit 2-2: Photographs of Water Supply Well Sample Locations in Yakutat, Alaska. .... 9



Exhibit 2-3: Water Supply Wells Meeting Initial Monitoring Criteria .....12  
 Exhibit 3-1: YK-09/33066 February and June 2019 Results Comparison .....15

Tables

Table 1: Summary of February 2019 DEC Water Supply Well Analytical Results  
 Table 2: Summary of June 2019 Initial Water Supply Well Analytical Results  
 Table 3: Summary of December 2019 Quarterly Water Supply Well Analytical Results

Figures

Figure 1: Site Vicinity  
 Figure 2: Well Search Extent  
 Figure 3: Highest Reported Water Supply Well Analytical Results

Appendices

Appendix A: Analytical Reports and Associated LDRCs  
 Appendix B: Field Logs  
 Appendix C: Public Information  
 Appendix D: QA/QC Summary  
 Important Information

CONTENTS

## ACRONYMS

AAC	Alaska Administrative Code
ADF&G	Alaska Department of Fish & Game
AFFF	aqueous film-forming foam
ARFF	aircraft rescue and firefighting
bgs	below ground surface
°C	degrees Celsius
CDV	Cordova Airport
CFR	Code of Federal Regulations
COC	chain-of-custody
COVID-19	Coronavirus
CSP	Contaminated Sites Program
DEC	Alaska Department of Environmental Conservation
DHSS	Alaska Department of Health & Social Services
DONA	4,8-dioxa-3H-perfluorononanoic acid
DOT&PF	Alaska Department of Transportation & Public Facilities
DRM	Alaska Department of Administration Division of Risk Management
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
HFPO-DA	hexafluoropropylene oxide dimer acid
LDRC	Laboratory Data Review Checklist
LHA	Lifetime Health Advisory
LCS	laboratory control spike
LCSD	laboratory control spike duplicate
LOD	limit of detection
LOQ	limit of quantitation
MS	matrix spike
MSD	matrix spike duplicate
μS/cm	microsiemens per centimeter
N-EtFOSAA	N-ethyl perfluorooctane sulfonamidoacetic acid
N-MeFOSAA	N-methyl perfluorooctane sulfonamidoacetic acid
NOAA	National Oceanic and Atmospheric Administration
NPS	National Parks Service
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFDA	perfluorodecanoic acid
PFDoA	perfluorododecanoic acid
PFHpA	perfluoroheptanoic acid
PFHxA	perfluorohexanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

## ACRONYMS

PFTeA	perfluorotetradecanoic acid
PFTTrDA	perfluorotridecanoic acid
PFUnA	perfluoroundecanoic acid
POET	point-of-entry treatment
ppt	parts per trillion
PSDI	PFAS Site Discovery Investigation
QA	quality assurance
QC	quality control
RPD	relative percent difference
SREB	snow removal equipment building
TestAmerica	Test-America Labs, Inc./Eurofins
TSA	Transportation Security Administration
UCMR	Unregulated Contaminant Monitoring Rule
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USGS	U.S. Geological Survey
WO	work order
YAK	Yakutat Airport
YSI	multiprobe water quality meter
11Cl-PF3OUdS	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid
9Cl-PF3ONS	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid

# 1 INTRODUCTION

Shannon & Wilson has prepared this summary report to document water supply well efforts at and near the Yakutat Airport (YAK) in Yakutat, Alaska. This report describes the initial sampling event conducted by the Alaska Department of Environmental Conservation (DEC) in February of 2019 and addresses activities conducted by Shannon & Wilson between June 2019 and June 2020 for this ongoing project. The YAK is an active, DEC listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFAS) in water supply well samples (DEC File Number 1530.38.022, Hazard ID 27090).

## 1.1 Purpose and Objective

The purpose of the services described in this report was to evaluate the potential for human exposure to PFAS-containing water in water supply wells. Shannon & Wilson's objectives were to identify properties/water supply wells potentially affected by PFAS contamination at and near the YAK, collect analytical groundwater samples for the analysis of PFAS from potentially affected water supply wells, and establish and implement quarterly and annual monitoring criteria. Section 1.5 outlines the scope of services implemented to achieve these objectives.

## 1.2 Background

The YAK is located at 1 Airport Road in Yakutat, Alaska. The City of Yakutat is located at the mouth of Yakutat Bay. The Borough of Yakutat lies in isolated lowlands along the Gulf of Alaska, 212 miles northwest of Juneau (Figure 1). Figure 2 shows the extent of the airport boundary and identifies known aircraft rescue and firefighting (ARFF) sites associated with aqueous film-forming foam (AFFF) releases. The geographic coordinates of the YAK terminal are latitude 59.5033° N, longitude -139.9928° W.

In the 1940s the YAK was utilized as the Yakutat Army Airfield, which was constructed as part of the United States Army's Alaska long-range defense program. Until the late 1970s, the Federal Aviation Administration (FAA) operated the airport. After this, the State of Alaska took over ownership and management of the YAK.

The YAK meets the requirements defined in Title 14, Code of Federal Regulations (CFR), Part 139, which requires specific certification through the FAA. This certification requires, among other things, ARFF to ensure safety in air transportation. As part of this certification, Part 139 airports are required to conduct annual ARFF training for emergency response situations using AFFF and demonstrate compliance with federal regulations. The FAA lifted

the requirement to use PFAS-containing AFFF during training exercises at the beginning of 2019; alternate FAA approved testing units have been implemented to test fire apparatus systems without discharging AFFF.

PFAS-containing AFFF has been known to be stored and used for emergency and training purposes at various locations on the YAK property. AFFF was first used on the YAK property by DOT&PF in the 1990s. Discussions with Robert Lekanof (Alaska Department of Transportation & Public Facilities [DOT&PF] YAK foreman) during Shannon & Wilson's initial site visit in June 2019, revealed fire training activities using AFFF have been mostly conducted at the end of Runway 2/20 since 2000. Fire training activities included annual training and triennial training events. During annual events, approximately 500 gallons of 3% mixed AFFF were released and during triennial events, approximately 1,500 gallons of 3% mixed AFFF were released. An unlined burn pit was also located at the airport and used for annual live fire training events near the northern end of Taxiway A. Training at the burn pit occurred between 1996 and 1999. The burn pit has been covered with soil and is currently vegetated.

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 AFFF has been used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. The U.S. Environmental Protection Agency (EPA) published a Lifetime Health Advisory (LHA) level for PFOS and PFOA in drinking water in May 2016 of 70 parts per trillion (ppt) for the sum of PFOS and PFOA. The DEC Contaminated Sites Program (CSP) published groundwater-cleanup levels for PFOS and PFOA in November 2016 of 400 ppt for each compound individually. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS.

On August 20, 2018, the DEC published a Technical Memorandum outlining a new action level for the sum of five PFAS (PFOS, PFOS, perfluorohexanesulfonic acid [PFHxS], perfluoroheptanoic acid [PFHpA], and perfluorononanoic acid [PFNA]) in drinking water. The action levels proposed in the August 2018 Technical Memorandum were submitted as proposed regulation. PFAS projects for the State of Alaska adopted the proposed regulatory action level from August 2018 to March 2019, per DEC direction. On April 9, 2019, DEC issued an amendment to its August 20, 2018 Technical Memorandum to align DEC's action level with the EPA LHA of 70 ppt for the sum of PFOS and PFOA. On October 2, 2019, DEC published a Technical Memorandum amending the April 9, 2019 Technical Memorandum and adding an additional testing requirement to analyze for and report all analytes for the appropriate PFAS analytical method, although the action level remains 70 ppt for the sum of PFOS and PFOA.

In late 2018, as part of a Cooperative Agreement with the EPA, the DEC’s CSP conducted a limited PFAS Site Discovery Investigation (PSDI). This included identifying potentially PFAS impacted communities in Alaska, conducting a risk analysis of identified communities, collecting water supply well samples for the analysis of PFAS, and reporting those results. The YAK was identified as a potentially PFAS affected community and DEC sampled 12 water supply wells at and near the YAK in February of 2019 (Exhibit 1-1, below). Of the water supply wells sampled, only one well had PFAS concentrations exceeding the then current DEC PFAS action level for the sum of five PFAS (70 ppt, PFOS + PFOA + PFHxS + PFHpA + PFNA). Shannon & Wilson reviewed the analytical data provided by DEC and performed an internal quality assurance/quality control (QA/QC) assessment of the analytical data and completed a DEC Laboratory Data Review Checklist (LDRC). The Eurofins/TestAmerica (TestAmerica) work order (WO) 320-47461-1 and the associated LDRC are included in Appendix A. Table 1 summarizes the PFAS analytical results from DEC's PSDI efforts at the YAK. DEC submitted PFAS samples collected at the YAK and the Merle K (Mudhole) Smith Airport (Cordova Airport [CDV]) concurrently. WO 320-47461-1 contains PFAS results for both the YAK and CDV. This report does not discuss the CDV or the PFAS data obtained by DEC.

**Exhibit 1-1: DEC Sampling Summary**

DEC Sample Name		Exceeds DEC Action Level <sup>1</sup>
YK-01		No
YK-02		No
YK-03		No
YK-04		No
YK-05		No
YK-06		No
YK-07		No
YK-08		Yes
YK-09		No
YK-10		No
YK-11		No
YK-12		No

Notes:

1 DEC PFAS action level for the sum of five PFAS (70 ppt, PFOS + PFOA + PFHxS + PFHpA + PFNA) at the time of sampling.  
ADF&G = Alaska Department of Fish & Game, ARFF = aircraft rescue and firefighting, DEC = Alaska Department of Environmental Conservation, DOT&PF = Alaska Department of Transportation & Public Facilities, NOAA = National Oceanic and Atmospheric Administration, NPS = National Park Service, ppt = parts per trillion, PFAS = per- and polyfluoroalkyl substances, ppt = parts per trillion  
SREB = snow removal equipment building, TSA = Transportation Security Administration, USFS = United States Forest Service

### 1.3 Geology and Hydrology

Yakutat is located on the Yakutat foreland, a gently sloping glacial outwash plain between the Saint Elias Mountains and the Gulf of Alaska. Eight dominant surficial deposits have been mapped in the Yakutat area, including artificial fill, organic, eolian, beach, delta-estuarine, alluvial, outwash, and moraine deposits. Artificial fill is predominant under the airport runways and areas of the YAK that have been extensively modified during construction (U.S. Army Corps of Engineers [USACE], 2008).

The absence of continuous confining layers in the unconsolidated deposits allows the groundwater to move both vertically and horizontally with little impedance to flow. Unconfined groundwater in the Yakutat area has been found to range in depth from within the top 10 feet below ground surface (bgs) to greater than 70 feet bgs. This fluctuation appears to be a function of the surface topography. The groundwater flow also appears to be generally dictated by topography, with flow towards the principal surface water bodies, including streams, lakes, the coastline, and constructed drains (USACE, 2016). The U.S. Geological Survey (USGS) investigated groundwater flow near the YAK (USGS, 1994). Their measurements indicated a shallow water table ranging from 2 to 30 feet bgs with a flow from northeast to southwest.

### 1.4 Contaminants of Potential Concern and Action Levels

The primary contaminants of potential concern are PFOS and PFOA. As previously mentioned in Section 1.2, the October 2, 2019 DEC Technical Memorandum requires reporting for all PFAS analytes listed in a given analytical method. For the purposes of this project, samples were submitted for analytical method EPA Method 537.1 which includes the following list of 18 PFAS.

- PFOS
- PFOA
- PFHpA
- PFNA
- PFHxS
- perfluorobutanesulfonic acid (PFBS)
- perfluorodecanoic acid (PFDA)
- perfluorododecanoic acid (PFDoA)
- perfluorohexanoic acid (PFHxA)
- perfluorotetradecanoic acid (PFTeA)

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

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

**Exhibit 1-2: Applicable Regulatory Action Levels**

Media	Analyte	Action Level <sup>1</sup>
Drinking Water <sup>2</sup>	PFOS + PFOA	70 ppt
Groundwater <sup>3</sup>	PFOS	400 ppt
	PFOA	400 ppt
Soil <sup>4</sup>	PFOS	3.0 µg/kg
	PFOA	1.7 µg/kg

Notes:

- 1 ppt is equivalent to ng/L and ng/kg
  - 2 Drinking water action level reported in DEC October 2019 Technical Memorandum.
  - 3 DEC groundwater cleanup level reported in 18 AAC 75.345, Table C.
  - 4 DEC migration to groundwater soil cleanup levels reported in 18 AAC 75.341, Table B1.
- µg/kg = micrograms per kilogram, ng/kg = nanograms per kilogram, ng/L = nanograms per liter, ppt = parts per trillion

## 1.5 Scope of Services

Shannon & Wilson’s scope of services summarized in this report includes the following:

- Conducting a water supply well search at and near the YAK to identify potentially PFAS impacted properties (Section 2.1);
- As practicable, completing water supply well surveys for each identified property within the search area in order to determine the presence or absence of a well. In addition to categorizing said well based on water usage as defined by the well owner/user (Section 2.2);
- Conducting initial water supply well sampling for PFAS for the wells identified in the search area (Section 2.3). Sample custody, storage, and transport is described in Section 2.4;



- Notifying the project team (DOT&PF, DEC, the Alaska Department of Health & Social Services [DHSS], and the Alaska Department of Risk Management [DRM], as applicable) and residents of the analytical results of the PFAS sampling (Section 2.6).
- Establishing quarterly and annual water supply well monitoring criteria (Section 2.7);
- Implementing PFAS monitoring for those water supply wells meeting monitoring criteria (Section 2.8);
- Performing a QA/QC evaluation of the analytical data and field forms completed for this project; (Section 4); and
- Reporting findings.

This report provides a summary of the scope of services described above in addition to the source of alternative water provided to water supply well owners/users with wells exceeding the action level (Section 2.9), and public information provided (Section 2.10). Planned and future work and recommendations are described in Sections 5 and 6, respectively.

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 activities Shannon & Wilson 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 our recommendations. This report should not be used for other purposes without Shannon & Wilson's review. If a service is not specifically indicated in this report, do not assume it was performed.

## 2 WATER SUPPLY WELL ACTIVITIES

This section summarizes water supply well activities performed by Shannon & Wilson as a part of this project from June 2019 through June 2020.

### 2.1 Water Supply Well Search

In June 2019, Shannon & Wilson staff began the initial water supply well search by gathering information about the YAK, including but not limited to groundwater flow direction, surface water flow direction, suspected source area locations, DEC's PSDI analytical results (Section 1.2 and Table 1), well depths, and other relevant information available for the site to identify potentially PFAS-impacted properties and water supply wells. Based on this information and in coordination with DOT&PF and DEC, a well search area was defined prior to the sampling event (Figure 2). Eighty-nine properties were identified within the search area.

### 2.2 Water Supply Well Survey

In June 2019, Shannon & Wilson staff began the water supply well survey which involved contacting owners/occupants of the 89 properties identified in the search area, as practicable, to determine the presence or absence of a water supply well on the property and obtain pertinent water supply well information. This was accomplished over the telephone, via email, and during the initial sampling event (Section 2.3) through door-to-door visits using Private Well Inventory Survey Forms. During the door-to-door effort a reasonable attempt was made to contact the owner or occupant of each identified property in the search area. If occupants were not present at the time the property was visited, personalized door tags were left in a location where it would be noticed. Copies of the completed Private Well Inventory Survey Forms are included in Appendix B.

During the water supply well survey effort, 21 wells were identified as described in Exhibit 2-1 below.

**Exhibit 2-1: Water Supply Wells Identified in the Well Search Area**

Parcel/Sample ID Number <sup>1</sup>	DEC Sample ID	Water Supply Well Category
32606	—	1
32608	—	1
32609	—	1
32615	YK-05	1
32616	YK-04	1
32617	YK-07	1
32618	—	1
33002	YK-02	2
33004	YK-06	1
33045	YK-10	1
33052	—	2
33053	—	4
33056	YK-11	1
33059	—	1
33060	YK-01	2
33061	YK-03	1
33063	YK-08	2
33064	—	2
33065	—	1
33066	YK-09	1
33068	YK-12	1

**Notes:**

<sup>1</sup> Parcel ID numbers were assigned by Shannon & Wilson staff during the water supply well search.

ADF&G = Alaska Department of Fish & Game, ARFF = aircraft rescue and firefighting, DEC = Alaska Department of Environmental Conservation, DOT&PF = Alaska Department of Transportation & Public Facilities, NOAA = National Oceanic and Atmospheric Administration, NPS = National Park Service, PFAS = per- and polyfluoroalkyl substances, ppt = parts per trillion SREB = snow removal equipment building, TSA = Transportation Security Administration, USFS = United States Forest Service

Water supply wells were categorized by use as follows based on information provided by the water supply well owner/user.

- 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 nondrinking 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 nondrinking water wells.

Water supply wells are categorized in this manner to facilitate sorting of wells by use and provide level of priority. Wells in Categories 1 and 2 are given a higher priority with respect to alternative water and additional monitoring.

## 2.3 Initial Water Supply Well Sampling

In June 11-13, 2019, Shannon & Wilson staff sampled 21 water supply wells identified during the well search and survey (Exhibit 2-1).

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
- Sheila Hinckley, Senior Environmental Scientist



**Exhibit 2-2: Photographs of Water Supply Well Sample Locations in Yakutat, Alaska.**

Shannon & Wilson field staff collected water supply well samples from a location in the plumbing upstream of water treatment systems or water softeners, where possible. Samples 32617 and 33002 were collected downstream of water softeners or other in-home treatment systems. 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.

During the collection of sample ID 33066 (DEC sample ID YK-09) the owner provided Shannon & Wilson staff details regarding where the original sample was collected by DEC in February 2019. Based on this information from the well owner and upon further investigation by field staff it appears that sample was collected after a carbon filter. Shannon & Wilson staff collected a sample for this location upstream of this filter.

Water supply well systems were purged prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. Shannon & Wilson field staff measured these parameters using a multiprobe water quality meter (YSI) and recorded pH, temperature, and conductivity approximately once every three to five minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings:  $\pm 0.1$  pH,  $\pm 0.5$  degrees Celsius ( $^{\circ}\text{C}$ ) temperature, and  $\pm 3$  percent conductivity (microsiemens per centimeter [ $\mu\text{S}/\text{cm}$ ]). Shannon & Wilson field staff discharged purge water to indoor sinks or to the ground surface depending on the water supply well's location. In most cases, indoor plumbing led to a private septic system.

Following parameter stabilization, field staff collected water samples for the analysis of PFOS and PFOA by Method WS-LC-0025, the laboratory's in-house method using laboratory-supplied containers. Copies of the Residential Well Sampling Logs are included in Appendix B.

## 2.4 Sample Custody, Storage, and Transport

Immediately after collection, the sample bottles for each water supply well were placed in Ziploc bags and stored in a designated sample cooler maintained between  $0^{\circ}\text{C}$  and  $6^{\circ}\text{C}$  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. Analytical samples and chain-of-custody (COC) forms were packaged for shipping in a hard-plastic cooler with an adequate quantity of frozen-ice substitute and packing material to prevent bottle breakage. Shannon & Wilson field staff applied custody seals to the cooler, which were observed to be intact upon receipt by the laboratory. Field staff shipped sample coolers to TestAmerica in West Sacramento, California for analysis of PFAS.

## 2.5 Special Considerations for PFAS Sampling

Shannon & Wilson field staff took appropriate precautions to prevent cross contamination during sampling, including 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.

## 2.6 Notification of Results

Following validation of the analytical data, Shannon & Wilson prepared analytical-data tables for the project team (DOT&PF, DEC, DHSS, and DRM) and then called property owners and occupants to notify them of the results of the PFAS water testing.

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

- sample name;
- comparison of analytical results to DEC's or EPA's current action levels;
- description of the project; and
- pages of the TestAmerica laboratory report that apply to the owner or occupant's water supply well sample, including other PFAS results.

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

A copy of the letter template used to report results to well owners/users is included in Appendix C.

## 2.7 Water Supply Well Monitoring Criteria

Through coordination with the DOT&PF and DEC and DEC's PFAS guidance and technical memorandums, Shannon & Wilson established the following quarterly and annual water supply well monitoring criteria after the June 2019 sampling event.

- Quarterly Criteria
  - Active category 1 and 2 water supply wells with a maximum combined PFOS and PFOA concentration greater than or equal to 35 ppt during a previous sampling event, per DEC guidance; and
  - Active category 1 and 2 water supplies wells within 500 lateral feet of water supply wells with a combined PFOS and PFOA concentration greater than or equal to 35 ppt during a previous sampling event.



- Annual Criteria
  - Active category 1 and 2 water supplies wells with a maximum combined PFOS and PFOA concentration greater than or equal to 17.5 ppt during a previous sampling event, per DEC guidance; and
  - Active category 1 and 2 water supplies wells within 500 lateral feet of water supply wells with a combined PFOS and PFOA concentration greater than or equal to 17.5 ppt during a previous sampling event.

Lateral distance was measured from the GPS points collected during the initial round of sampling.

Exhibit 2-3 outlines the 10 water supply wells meeting quarterly and/or annual monitoring criteria.

**Exhibit 2-3: Water Supply Wells Meeting Initial Monitoring Criteria**

Parcel ID Number <sup>1</sup>	Sample ID	DEC Sample ID	Monitoring Criteria
33053	33053	—	Q/A
33056	33056	YK-11	A
33059	33059	—	A
33060	33060	YK-01	Q/A
33061	33061	YK-03	Q/A
33063	33063	YK-08	Q/A
33064	33064	—	Q/A
33065	33065	—	Q/A
33066	33066	YK-09	Q/A
33068	33068	YK-12	Q/A

Notes:

1 Parcel ID numbers were assigned by Shannon & Wilson staff during the water supply well search.

A = annual, ARFF = aircraft rescue and firefighting, DEC = Alaska Department of Environmental Conservation, DOT&PF = Alaska Department of Transportation & Public Facilities, NOAA = National Oceanic and Atmospheric Administration, NPS = National Park Service, Q = quarterly, TSA = Transportation Security Administration

These criteria were modified after the December 2019 quarterly monitoring event (Section 2.8) to no longer include wells that previously exceeded the PFAS action level (only sample 33063 previously exceeded the PFAS action level). This is the current quarterly and annual monitoring criteria in place for the YAK.

## 2.8 Quarterly and Annual Monitoring

The first quarterly sampling event for the YAK occurred in December 2019. Shannon & Wilson employee, Amber Masters, attempted to collect water supply well samples from each well meeting the quarterly criteria (Exhibit 2-3), however, not all wells were available for sampling. Water supply wells which were sampled during the December 2019 quarterly event include: 33060, 33061, 33064, and 33068. These samples were collected using the methods described in Section 2.3. Sample custody, storage, and transport was conducted as outlined in Section 2.4. Shannon & Wilson field staff followed the special considerations for PFAS sample included in Section 2.5. Shannon & Wilson field staff collected water samples for the analysis of 18 PFAS analytes reported by EPA Method 537.1 (PFOS, PFOA, PFHpA, PFNA, PFHxS, PFBS, PFDA, PFDoA, PFHxA, PFTeA, PFTrDA, PFUnA, HFPO-DA, N-EtFOSAA, N-MeFOSAA, 11CL-PF3OUdS, 9CL-PF3ONS and DONA), using laboratory-supplied containers. Copies of the Residential Well Sampling Logs are included in Appendix B. Following validation of the analytical data, Shannon & Wilson made notification of results as described in Section 2.6.

Additional quarterly and annual monitoring events were planned for March 2020 and June 2020, respectively; however, these events were postponed due to the Coronavirus (COVID-19) global pandemic. A proposal has been submitted to DOT&PF for three quarterly events and one annual event to be completed between July 1, 2020 and June 30, 2020. This schedule is subject to change following guidance by the U.S. Centers for Disease Control and Prevention, DHSS, and City of Yakutat regarding the COVID-19 outbreak.

## 2.9 Alternative Water Sources

Interim alternative bottled water has been supplied to well owners/users whose PFAS concentration exceeded the current action level at the time of sampling and/or as determined necessary by DOT&PF. DOT&PF has been coordinating deliveries of bottled water with Pure Alaskan Water in Ketchikan, Alaska and/or barged from Costco out of Seattle, Washington.

## 2.10 Public Information

The DOT&PF hosts a webpage ( <http://dot.alaska.gov/airportwater> ) describing the PFAS water-testing project. The webpage includes a project summary, list of contacts, simplified regional results map, and links to additional resources. The map is updated after each sampling event following the receipt of analytical data. Appendix C includes results notification letter templates and other information provided during the initial sampling event in June 2019 and the quarterly monitoring event in December 2019.



## 2.11 Deviations

In general, Shannon & Wilson conducted the work in accordance with the sampling procedures noted above, and based on ongoing discussion with DRM, DEC and DOT&PF. There are no deviations from the procedures described in Section 2, unless otherwise noted.

## 3 ANALYTICAL RESULTS

The TestAmerica WOs are included in chronological order in Appendix A. The highest reported water supply well PFAS analytical results to date are shown on Figure 3.

### 3.1 June 2019 Initial Sampling Results

The June 2019 samples were submitted for analysis by Method WS-LC-0025. Although this method analyzes for the PFAS listed in the EPA Unregulated Contaminant Monitoring Rule (UCMR): PFOS, PFOA, PFHpA, PFNA, PFBS, and PFHxS, only PFOS and PFOA results were initially reported. Following the October 2019 Technical Memorandum, DEC requested that Shannon & Wilson have the laboratory re-report the PFAS results to include the remaining PFAS available from the method (PFHpA, PFNA, PFHxS, and PFBS). The laboratory provided this information in December 2019.

Table 2 summarizes the PFAS concentrations for samples collected from water supply wells during the initial June 2019 sampling event. No wells sampled during the June event exceeded the action level of 70 ppt for the sum of PFOS and PFOA.

As noted in Section 2.3 above, in June 2019 during the collection of sample ID 33066 (DEC sample ID YK-09) the well owner provided Shannon & Wilson staff details regarding where the original sample was collected by DEC in February 2019. Based on this information from the well owner and upon further investigation by field staff it appears that sample was collected after a carbon filter. Shannon & Wilson staff collected a sample for this location upstream of this filter. Exhibit 3-1, below, compares the results for sample ID 33066 (DEC sample ID YK-09) between February and June 2019.

Although sample ID 33066 did not exceed the action level at that time (sum of five PFAS above 70 ppt, PFOS + PFOA + PFHxS + PFHpA + PFNA), the presence of a carbon filter may have artificially biased the February 2019 detected PFAS concentrations below the DEC PFAS action level at the time of sampling.. Therefore DOT&PF treats the sample ID 33066 ( [REDACTED] ) as an exceedance. This location has been provided with alternative water.

**Exhibit 3-1: YK-09/33066 February and June 2019 Results Comparison**

PFAS	Feb 2019 Results (ppt) <sup>1</sup>	June 2019 Result (ppt) <sup>2</sup>
PFBS	1.4 J	2.3
PFHpA	2.0 J	4.3
PFNA	ND	ND
PFHxS	9.4	36
PFOA	ND	4.7
PFOS	18	55

**Notes:**

1 DEC PFAS action level at the time of sample collection = the sum of 2 PFAS (70 ppt, PFOS + PFOA).

2 DEC PFAS action level at the time of sample collection = the sum of 5 PFAS (70 ppt, PFOS + PFOA + PFHxS + PFHpA + PFNA).

J = Estimated concentration, flag applied by the laboratory. ND – non-detect, PFAS = per- and polyfluoroalkyl substances, PFBS = perfluorobutanesulfonic acid, PFHpA = perfluoroheptanoic acid, PFHxS = perfluorohexanesulfonic acid, PFNA = perfluorononanoic acid, PFOA = perfluorooctanoic acid, PFOS = perfluorooctanesulfonic acid, ppt = parts per trillion

## 3.2 Quarterly Sampling

The December 2019 quarterly samples were submitted for the analysis of 18 PFAS (PFOS, PFOA, PFHpA, PFNA, PFHxS, PFBS, PFDA, PFDoA, PFHxA, PFTeA, PFTTrDA, PFUnA, HFPO-DA, N-EtFOSAA, N-MeFOSAA, 11CL-PF3OUdS, 9CL-PF3ONS and DONA) by EPA Method 537.1. Although all PFAS results for the analytical method are reported, PFAS concentrations are only compared to the action level for PFOS and PFOA (70 ppt).

Table 3 summarizes the PFAS concentrations for samples collected from water supply wells during the December 2019 quarterly sampling event. No wells sampled during this event exceeded the action level of 70 ppt for the sum of PFOS and PFOA.

## 4 QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC procedures assist in producing data of acceptable quality and reliability. Shannon & Wilson reviewed the analytical results provided by TestAmerica for laboratory QC samples and conducted our own QA assessment for this project. Shannon & Wilson completed LDRCs for the PFAS WOs from DEC's sampling event in February 2019, the initial sampling event in June 2019, and the quarterly monitoring event in December 2019. These LDRCs are included in Appendix A after the corresponding analytical report.

By working in accordance with the proposed scope of services, Shannon & Wilson considers the samples collected to be representative of site conditions at the locations and times they were obtained. The quality of the analytical data for this project does not appear to have

been compromised, and those results affected by QC anomalies were qualified with appropriate flags. See Appendix D for a QA/QC summary of the analytical data.

## 5 PLANNED AND FUTURE WORK

As stated in Section 2.8, a proposal has been submitted to DOT&PF for three quarterly events and one annual event to be completed between July 1, 2020 and June 30, 2021. This schedule is subject to change following guidance by the U.S. Centers for Disease Control and Prevention, DHSS, and City of Yakutat regarding the COVID-19 outbreak.

On May 21, 2020, DOT&PF authorized Shannon & Wilson to begin an Alternative Water Feasibility Study to investigate the viability of four different long-term alternative water options. These options include holding tanks and deliveries from Yakutat Municipal Water, expansion of the Yakutat Municipal Water system, individual point-of-entry water treatment (POET) systems, and a small-scale water distribution system either from an existing or new source.

## 6 RECOMMENDATIONS

Based on the previously completed work, Shannon & Wilson recommends the DOT&PF continue to:

- attempt to identify wells at properties where well status is unknown, as appropriate (we note that we are currently unaware of properties meeting this criterion); sample wells meeting the quarterly and annual sampling criteria;
- work with the DEC and the DHSS to continue educating the public regarding the potential health effects of exposure to PFAS-containing water, as new information becomes available; and
- develop procedures to limit discharges of PFAS-containing AFFF to the ground, surface water bodies or groundwater from ARFF training or equipment testing where possible. This recommendation is not intended to limit or restrict AFFF use in any way during an emergency response.

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 Environmental Report* has been prepared and included as an Appendix to assist you and others in understanding the use and limitations of this report.

## 7 REFERENCES

- Alaska Department of Environmental Conservation (DEC), 2017, Site characterization work plan and reporting guidance for investigation of contaminated sites: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, March, available:  
[http://dec.alaska.gov/spar/csp/guidance\\_forms/csguidance.htm](http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm).
- Alaska Department of Environmental Conservation (DEC), 2019a, 18 AAC 75, Oil and other hazardous substances pollution control: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, January available:  
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<http://dec.alaska.gov/commish/regulations/>.
- Alaska Department of Environmental Conservation (DEC), 2019c, 18 AAC 80, Drinking water: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 80, May, available: <http://dec.alaska.gov/eh/dw/regulations>.
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[http://dec.alaska.gov/spar/csp/guidance\\_forms/csguidance.htm](http://dec.alaska.gov/spar/csp/guidance_forms/csguidance.htm).
- Alaska Department of Environmental Conservation (DEC), 2019e, Technical memorandum - action levels for PFAS in water and guidance on sampling groundwater and drinking water (updated): Juneau, Alaska, DEC Division of Spill Prevention and Response Contaminated Sites Program and Division of Environmental Health Drinking Water Program, 4 p., October 2.
- U.S. Army Corps of Engineers (USACE), 2008. Military Munitions Response Program Preliminary Assessment for Yakutat Air Base, Yakutat, Alaska, Property Number F10AK0606. July.
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[https://www.epa.gov/sites/production/files/2016-05/documents/pfoa\\_health\\_advisory\\_final\\_508.pdf](https://www.epa.gov/sites/production/files/2016-05/documents/pfoa_health_advisory_final_508.pdf)

U. S. Geological Survey (USGS), 1994, Overview of Environmental and Hydrogeologic Conditions at Yakutat, Alaska, and publishing data—all the information necessary for unique identification and library search, Open-file report 94-713.

**Table 1 - Summary of February 2019 DEC Water Supply Well Analytical Results**

Analyte		Perfluorobutane sulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)	Sum of 5 PFAS§
Action Level		2,000	70§					70†	70§
Sample Name	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt	ppt
YK-01	2/4/2019	<2.0	2.4 J	<2.0	9.3	<6.1	9.3	9.3 ‡	21 J‡
YK-02	2/4/2019	<2.1	<3.1	<2.1	0.96 J	<6.3	1.7 J	1.7 J‡	2.7 J‡
YK-03	2/4/2019	<2.0	<2.9	<2.0	<2.0	<5.9	<2.0	N/A	N/A
YK-04	2/4/2019	<2.1	<3.1	<2.1	<2.1	<6.2	<2.1	N/A	N/A
YK-05	2/4/2019	<2.1	<3.1	<2.1	<2.1	<6.2	<2.1	N/A	N/A
YK-06	2/4/2019	<2.0	<3.0	<2.0	<2.0	<6.1	<2.0	N/A	N/A
YK-07	2/4/2019	<2.1	<3.2	<2.1	<2.1	<6.4	<2.1	N/A	N/A
YK-08	2/4/2019	2.4	4.7	0.76 J	36	4.1 J	44	48 J	<b>90 J</b>
YK-09	2/4/2019	1.4 J	2.0 J	<2.0	9.4	<6.0	18	18 ‡	29 J‡
YK-10	2/5/2019	<2.0	<3.1	<2.0	<2.0	<6.1	<2.0	N/A	N/A
YK-11	2/5/2019	1.1 J	1.6 J	1.4 J	10	2.9 J	11	14 J	27 J
YK-12	2/5/2019	<2.0	<2.9	<2.0	<2.0	<5.9	<2.0	N/A	N/A
YK-13	2/5/2019	<2.0	<3.1	<2.0	<2.0	<6.1	<2.0	N/A	N/A
YK-14	2/5/2019	<2.0	<2.9	<2.0	<2.0	<5.9	<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.  
**Bold** Concentration exceeds action level.  
 DUP Field-duplicate sample  
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.  
 J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.  
 ‡ Minimum concentration, the LHA Combined or Sum of 5 PFAS concentration includes one or more result that is not detected greater than the MDL.  
 N/A Not applicable. The 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 - Summary of June 2019 Initial Water Supply Well Analytical Results

Analyte		Perfluorobutane sulfonic acid (PFBS)	Perfluoroheptanoic acid (PFHpA)	Perfluorononanoic acid (PFNA)	Perfluorohexane sulfonic acid (PFHxS)	Perfluorooctanoic acid (PFOA)	Perfluorooctane sulfonate (PFOS)	LHA Combined (PFOS + PFOA)
Action Level		--	--	--	--	70†		70†
Sample Name	Sample Date	ppt	ppt	ppt	ppt	ppt	ppt	ppt
32606	6/11/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32608	6/11/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32609	6/11/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32615	6/12/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32616	6/12/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32617	6/13/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
32618	6/13/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33002	6/12/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33004	6/13/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33045	6/12/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33052	6/13/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33053	6/12/2019	1.4 J	<2.0	<2.0	35	1.5 J	9.7	11 J
33056	6/13/2019	<2.0	2.3	<2.0	13	3.5	11	15
93056	6/13/2019	<2.0	2.4	<2.0	13	3.8	12	16
33059	6/12/2019	<2.0	<2.0	<2.0	<2.0	1.1 J*	4.6	5.7 J*
33060	6/12/2019	<2.0	2.1	<2.0	8.1	2.6	13	16
33061	6/13/2019	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	N/A
33063	6/12/2019	1.9 J	3.4	<2.0	21	3.5	28	32
93063	6/12/2019	1.9 J	3.1	<2.0	22	3.1	27	30
33064	6/13/2019	1.4 J*	1.7 J	<2.0	12	2.0	8.0	10
33065	6/13/2019	2.4	4.5	<2.0	25	6.3	15	21
33066	6/12/2019	2.3	4.3	<2.0	36	4.7	55	60
33068	6/13/2019	<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.  
DUP Field-duplicate sample  
< Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.  
J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.  
J\* Result considered an estimate 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 3 - Summary of December 2019 Quarterly Water Supply Well Analytical Results**

Sample Name			33060	33061	33064	33068	
Address							
Well Category			2	1	2	1	
Analyte	Action Level	Units	ppt	ppt	ppt	ppt	ppt
Perfluorohexanesulfonic acid (PFHxS)	--	ppt	10	<1.9 B*	14	<2.0 B*	<1.9 B*
Perfluorohexanoic acid (PFHxA)	--	ppt	41	<1.9	<2.0	<2.0	<1.9
Perfluoroheptanoic acid (PFHpA)	--	ppt	5.0	<1.9	<2.0	<2.0	<1.9
Perfluorononanoic acid (PFNA)	--	ppt	0.86 J*	<1.9	<2.0	<2.0	<1.9
Perfluorobutanesulfonic acid (PFBS)	--	ppt	1.8 J	<1.9	0.35 J	<2.0	<1.9
Perfluorodecanoic acid (PFDA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
Perfluoroundecanoic acid (PFUnA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
Perfluorododecanoic acid (PFDoA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
Perfluorotridecanoic acid (PFTrDA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
Perfluorotetradecanoic acid (PFTeA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	--	ppt	<19	<19	<20	<20	<19
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	--	ppt	<19	<19	<20	<20	<19
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	--	ppt	<1.9	<1.9	<2.0	<2.0	<1.9
Hexafluoropropylene oxide dimer acid (HFPO-DA)	--	ppt	<3.8 J*	<3.8 J*	<4.0 J*	<3.9 J*	<3.8 J*
Perfluorooctanesulfonic acid (PFOS)	70†	ppt	11	<1.9	5.8	<2.0	<1.9
Perfluorooctanoic acid (PFOA)		ppt	4.1	<1.9	<2.0	<2.0	<1.9
LHA Combined (PFOS + PFOA)		ppt	15	N/A	5.8 ‡	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.  
 DUP Field-duplicate sample  
 < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control (QC) failures.  
 B\* Result is considered not detected due to quality control failures; see checklist for details. Flag applied by Shannon & Wilson, Inc.  
 J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.  
 J\* Result considered an estimate due to a QC failure. Flag applied by Shannon & Wilson, Inc.  
 N/A Not applicable. The LHA Combined PFAS concentration could not be calculated because one or more PFAS was not detected in the project sample.

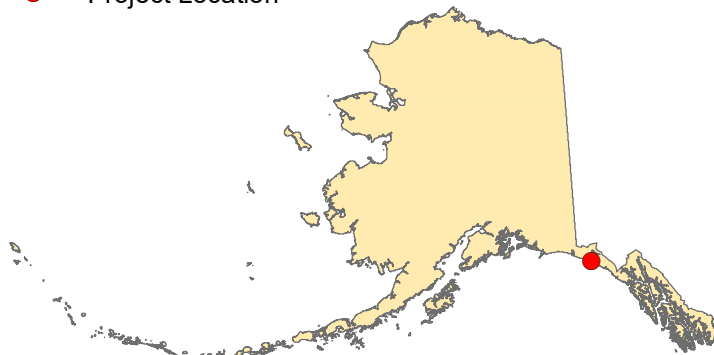
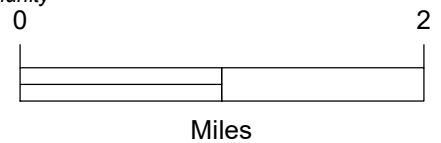




Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

**LEGEND**

-  Airport Property Boundary
-  Project Location



February 2019 to June 2020  
Water Supply Well Summary  
Report Yakutat, Alaska

**SITE VICINITY**

February 2021

102896-004

**SHANNON & WILSON, INC.**  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

**Figure 1**

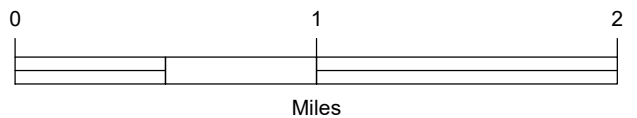




Map adapted from aerial and satellite imagery provided through the Alaska Department of Natural Resources. (Satellite Imagery: Spot 5 © CNES, SPOT 6 & 7 © Airbus DS).

**LEGEND**

- |  |  |
|--|--|
|  Well Search Area                             |  Extent 1 |
|  Airport Property Boundary                    |  Extent 2 |
|  Yakutat Tax Parcels                          |  Extent 3 |
|  Aircraft Rescue and Firefighting (ARFF) Site |  Extent 4 |
|  |  Extent 5 |
|  |  Extent 6 |
|  |  Extent 7 |



February 2019 to June 2020  
Water Supply Well Summary  
Report Yakutat, Alaska

**Well Search Extent**

February 2021

102896-004

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**Figure 2**





**LEGEND**

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

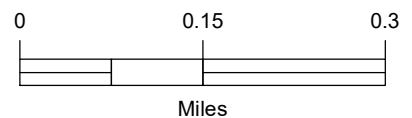
- ≤17 parts per trillion (ppt)
- 18 to 69 ppt
- ≥70 ppt (over former action level)

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

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 former action level)

■ Aircraft Rescue and Firefighting (ARFF) Training Site



February 2019 to June 2020  
Water Supply Well Summary  
Report Yakutat, Alaska

**Updated Highest Water Supply  
Well Analytical Results  
August 2020**

February 2021

102896-004

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**Figure 3**

Appendix A

# Analytical Reports and Associated LDRCS

## CONTENTS

- Analytical Laboratory Reports
- DEC Laboratory Data Review Checklists

## ANALYTICAL REPORT

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

TestAmerica Job ID: 320-47461-1  
Client Project/Site: PFAS, AK - Yakutat/Cordova

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

Attn: Anne Marie Palmieri

*M. Elaine Walker*

Authorized for release by:  
2/25/2019 11:05:49 AM

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

### LINKS

Review your project  
results through  
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[www.testamericainc.com](http://www.testamericainc.com)

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

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

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





# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Definitions/Glossary . . . . .	3
Case Narrative . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	8
Surrogate Summary . . . . .	19
QC Sample Results . . . . .	20
QC Association Summary . . . . .	24
Lab Chronicle . . . . .	26
Certification Summary . . . . .	30
Method Summary . . . . .	31
Sample Summary . . . . .	32
Chain of Custody . . . . .	33
Receipt Checklists . . . . .	35
Correspondence . . . . .	36

# Definitions/Glossary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Qualifiers

### LCMS

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

## Glossary

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

# Case Narrative

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

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**Job ID: 320-47461-1**

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**Laboratory: TestAmerica Sacramento**

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**Narrative**

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**Job Narrative  
320-47461-1**

**Receipt**

Twenty-two samples were received on 2/7/2019 9:00 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.0° C.

**LCMS**

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

**Organic Prep**

Method(s) 537 DW: The following samples were observed to be a yellow color after elution: YK-10 (320-47461-10), YK-11 (320-47461-11), YK-12 (320-47461-12), YK-13 (320-47461-13), CO-01 (320-47461-15) and CO-02 (320-47461-16).

Method(s) 537 DW: Sample CO-03 (320-47461-17) was centrifuged prior to extraction due to having sediment.

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

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# Detection Summary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Client Sample ID: YK-01

Lab Sample ID: 320-47461-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	9.3		2.0	0.97	ng/L	1		537 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.3		2.0	0.65	ng/L	1		537 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.4	J	3.1	1.3	ng/L	1		537 DW	Total/NA
Perfluorohexanoic acid	4.6		2.0	0.30	ng/L	1		537 DW	Total/NA

## Client Sample ID: YK-02

Lab Sample ID: 320-47461-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	1.7	J	2.1	0.99	ng/L	1		537 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.96	J	2.1	0.67	ng/L	1		537 DW	Total/NA

## Client Sample ID: YK-03

Lab Sample ID: 320-47461-3

No Detections.

## Client Sample ID: YK-04

Lab Sample ID: 320-47461-4

No Detections.

## Client Sample ID: YK-05

Lab Sample ID: 320-47461-5

No Detections.

## Client Sample ID: YK-06

Lab Sample ID: 320-47461-6

No Detections.

## Client Sample ID: YK-07

Lab Sample ID: 320-47461-7

No Detections.

## Client Sample ID: YK-08

Lab Sample ID: 320-47461-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	44		2.1	0.98	ng/L	1		537 DW	Total/NA
Perfluorooctanoic acid (PFOA)	4.1	J	6.2	2.8	ng/L	1		537 DW	Total/NA
Perfluorononanoic acid (PFNA)	0.76	J	2.1	0.49	ng/L	1		537 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	36		2.1	0.66	ng/L	1		537 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.7		3.1	1.3	ng/L	1		537 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.4		2.1	0.83	ng/L	1		537 DW	Total/NA
Perfluorohexanoic acid	13		2.1	0.30	ng/L	1		537 DW	Total/NA

## Client Sample ID: YK-09

Lab Sample ID: 320-47461-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	18		2.0	0.95	ng/L	1		537 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.4		2.0	0.64	ng/L	1		537 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0	J	3.0	1.3	ng/L	1		537 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.80	ng/L	1		537 DW	Total/NA
Perfluorohexanoic acid	8.2		2.0	0.29	ng/L	1		537 DW	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# Detection Summary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Client Sample ID: YK-10

Lab Sample ID: 320-47461-10

No Detections.

## Client Sample ID: YK-11

Lab Sample ID: 320-47461-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil	Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	11		2.0	0.96	ng/L	1			537 DW	Total/NA
Perfluorooctanoic acid (PFOA)	2.9	J	6.0	2.7	ng/L	1			537 DW	Total/NA
Perfluorononanoic acid (PFNA)	1.4	J	2.0	0.47	ng/L	1			537 DW	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.65	ng/L	1			537 DW	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.6	J	3.0	1.3	ng/L	1			537 DW	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.1	J	2.0	0.81	ng/L	1			537 DW	Total/NA
Perfluorohexanoic acid	2.6		2.0	0.29	ng/L	1			537 DW	Total/NA

## Client Sample ID: YK-12

Lab Sample ID: 320-47461-12

No Detections.

## Client Sample ID: YK-13

Lab Sample ID: 320-47461-13

No Detections.

## Client Sample ID: YK-14

Lab Sample ID: 320-47461-14

No Detections.

## Client Sample ID: CO-01

Lab Sample ID: 320-47461-15

No Detections.

## Client Sample ID: CO-02

Lab Sample ID: 320-47461-16

No Detections.

## Client Sample ID: CO-03

Lab Sample ID: 320-47461-17

No Detections.

## Client Sample ID: CO-04

Lab Sample ID: 320-47461-18

No Detections.

## Client Sample ID: CO-05

Lab Sample ID: 320-47461-19

No Detections.

## Client Sample ID: CO-06

Lab Sample ID: 320-47461-20

No Detections.

## Client Sample ID: CO-07

Lab Sample ID: 320-47461-21

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# Detection Summary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-08**

**Lab Sample ID: 320-47461-22**

No Detections.

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This Detection Summary does not include radiochemical test results.

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-01**  
**Date Collected: 02/04/19 15:45**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-1**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>9.3</b>		2.0	0.97	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorooctanoic acid (PFOA)	ND		6.1	2.8	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.48	ng/L		02/15/19 07:52	02/19/19 14:06	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>9.3</b>		2.0	0.65	ng/L		02/15/19 07:52	02/19/19 14:06	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>2.4 J</b>		3.1	1.3	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.82	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorodecanoic acid	ND		2.0	0.54	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorododecanoic acid	ND		2.0	0.84	ng/L		02/15/19 07:52	02/19/19 14:06	1
<b>Perfluorohexanoic acid</b>	<b>4.6</b>		2.0	0.30	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorotetradecanoic acid	ND		2.0	0.91	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/15/19 07:52	02/19/19 14:06	1
Perfluoroundecanoic acid	ND		2.0	0.61	ng/L		02/15/19 07:52	02/19/19 14:06	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.52	ng/L		02/15/19 07:52	02/19/19 14:06	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/15/19 07:52	02/19/19 14:06	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	93		70 - 130				02/15/19 07:52	02/19/19 14:06	1
13C2 PFDA	103		70 - 130				02/15/19 07:52	02/19/19 14:06	1

**Client Sample ID: YK-02**  
**Date Collected: 02/04/19 15:55**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-2**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>1.7 J</b>		2.1	0.99	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorooctanoic acid (PFOA)	ND		6.3	2.8	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.49	ng/L		02/15/19 07:52	02/19/19 14:14	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.96 J</b>		2.1	0.67	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.4	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.83	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorododecanoic acid	ND		2.1	0.86	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorohexanoic acid	ND		2.1	0.30	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorotetradecanoic acid	ND		2.1	0.93	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluorotridecanoic acid	ND		2.1	0.68	ng/L		02/15/19 07:52	02/19/19 14:14	1
Perfluoroundecanoic acid	ND		2.1	0.63	ng/L		02/15/19 07:52	02/19/19 14:14	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/15/19 07:52	02/19/19 14:14	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/15/19 07:52	02/19/19 14:14	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	104		70 - 130				02/15/19 07:52	02/19/19 14:14	1
13C2 PFDA	104		70 - 130				02/15/19 07:52	02/19/19 14:14	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-03**  
**Date Collected: 02/04/19 16:05**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-3**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.93	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorooctanoic acid (PFOA)	ND		5.9	2.7	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.46	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.63	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluoroheptanoic acid (PFHpA)	ND		2.9	1.3	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.79	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorodecanoic acid	ND		2.0	0.52	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorododecanoic acid	ND		2.0	0.81	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorotetradecanoic acid	ND		2.0	0.87	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluorotridecanoic acid	ND		2.0	0.64	ng/L		02/15/19 07:52	02/19/19 14:21	1
Perfluoroundecanoic acid	ND		2.0	0.59	ng/L		02/15/19 07:52	02/19/19 14:21	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.50	ng/L		02/15/19 07:52	02/19/19 14:21	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.9	1.1	ng/L		02/15/19 07:52	02/19/19 14:21	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	101		70 - 130				02/15/19 07:52	02/19/19 14:21	1
13C2 PFDA	98		70 - 130				02/15/19 07:52	02/19/19 14:21	1

**Client Sample ID: YK-04**  
**Date Collected: 02/04/19 16:20**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-4**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	0.98	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorooctanoic acid (PFOA)	ND		6.2	2.8	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.49	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.66	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.3	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.83	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorododecanoic acid	ND		2.1	0.85	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorohexanoic acid	ND		2.1	0.30	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorotetradecanoic acid	ND		2.1	0.92	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluorotridecanoic acid	ND		2.1	0.67	ng/L		02/15/19 07:52	02/19/19 14:29	1
Perfluoroundecanoic acid	ND		2.1	0.62	ng/L		02/15/19 07:52	02/19/19 14:29	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/15/19 07:52	02/19/19 14:29	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/15/19 07:52	02/19/19 14:29	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	105		70 - 130				02/15/19 07:52	02/19/19 14:29	1
13C2 PFDA	101		70 - 130				02/15/19 07:52	02/19/19 14:29	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-05**  
**Date Collected: 02/04/19 16:30**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-5**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	0.98	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorooctanoic acid (PFOA)	ND		6.2	2.8	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.48	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.66	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.3	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.82	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorododecanoic acid	ND		2.1	0.85	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorohexanoic acid	ND		2.1	0.30	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorotetradecanoic acid	ND		2.1	0.92	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluorotridecanoic acid	ND		2.1	0.67	ng/L		02/15/19 07:52	02/19/19 14:36	1
Perfluoroundecanoic acid	ND		2.1	0.62	ng/L		02/15/19 07:52	02/19/19 14:36	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/15/19 07:52	02/19/19 14:36	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/15/19 07:52	02/19/19 14:36	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	100		70 - 130				02/15/19 07:52	02/19/19 14:36	1
13C2 PFDA	97		70 - 130				02/15/19 07:52	02/19/19 14:36	1

**Client Sample ID: YK-06**  
**Date Collected: 02/04/19 16:45**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-6**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.96	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorooctanoic acid (PFOA)	ND		6.1	2.7	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.48	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.65	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluoroheptanoic acid (PFHpA)	ND		3.0	1.3	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.81	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorodecanoic acid	ND		2.0	0.54	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorododecanoic acid	ND		2.0	0.83	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorotetradecanoic acid	ND		2.0	0.90	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/15/19 07:52	02/19/19 14:44	1
Perfluoroundecanoic acid	ND		2.0	0.61	ng/L		02/15/19 07:52	02/19/19 14:44	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.52	ng/L		02/15/19 07:52	02/19/19 14:44	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/15/19 07:52	02/19/19 14:44	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	102		70 - 130				02/15/19 07:52	02/19/19 14:44	1
13C2 PFDA	101		70 - 130				02/15/19 07:52	02/19/19 14:44	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-07**  
**Date Collected: 02/04/19 17:00**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-7**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	1.0	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorooctanoic acid (PFOA)	ND		6.4	2.9	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.50	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.68	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluoroheptanoic acid (PFHpA)	ND		3.2	1.4	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.85	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorodecanoic acid	ND		2.1	0.56	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorododecanoic acid	ND		2.1	0.87	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorohexanoic acid	ND		2.1	0.31	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorotetradecanoic acid	ND		2.1	0.94	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluorotridecanoic acid	ND		2.1	0.69	ng/L		02/15/19 07:52	02/19/19 14:51	1
Perfluoroundecanoic acid	ND		2.1	0.64	ng/L		02/15/19 07:52	02/19/19 14:51	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.54	ng/L		02/15/19 07:52	02/19/19 14:51	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.2	1.2	ng/L		02/15/19 07:52	02/19/19 14:51	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	99		70 - 130				02/15/19 07:52	02/19/19 14:51	1
13C2 PFDA	103		70 - 130				02/15/19 07:52	02/19/19 14:51	1

**Client Sample ID: YK-08**  
**Date Collected: 02/04/19 17:25**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-8**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	44		2.1	0.98	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorooctanoic acid (PFOA)	4.1	J	6.2	2.8	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorononanoic acid (PFNA)	0.76	J	2.1	0.49	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorohexanesulfonic acid (PFHxS)	36		2.1	0.66	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluoroheptanoic acid (PFHpA)	4.7		3.1	1.3	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorobutanesulfonic acid (PFBS)	2.4		2.1	0.83	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorododecanoic acid	ND		2.1	0.85	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorohexanoic acid	13		2.1	0.30	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorotetradecanoic acid	ND		2.1	0.92	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluorotridecanoic acid	ND		2.1	0.67	ng/L		02/15/19 07:52	02/19/19 15:14	1
Perfluoroundecanoic acid	ND		2.1	0.62	ng/L		02/15/19 07:52	02/19/19 15:14	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/15/19 07:52	02/19/19 15:14	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/15/19 07:52	02/19/19 15:14	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	104		70 - 130				02/15/19 07:52	02/19/19 15:14	1
13C2 PFDA	94		70 - 130				02/15/19 07:52	02/19/19 15:14	1

TestAmerica Sacramento



# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-09**  
**Date Collected: 02/04/19 17:30**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-9**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>18</b>		2.0	0.95	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorooctanoic acid (PFOA)	ND		6.0	2.7	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.47	ng/L		02/15/19 07:52	02/19/19 15:21	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>9.4</b>		2.0	0.64	ng/L		02/15/19 07:52	02/19/19 15:21	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>2.0 J</b>		3.0	1.3	ng/L		02/15/19 07:52	02/19/19 15:21	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>1.4 J</b>		2.0	0.80	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorodecanoic acid	ND		2.0	0.53	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorododecanoic acid	ND		2.0	0.82	ng/L		02/15/19 07:52	02/19/19 15:21	1
<b>Perfluorohexanoic acid</b>	<b>8.2</b>		2.0	0.29	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorotetradecanoic acid	ND		2.0	0.89	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluorotridecanoic acid	ND		2.0	0.65	ng/L		02/15/19 07:52	02/19/19 15:21	1
Perfluoroundecanoic acid	ND		2.0	0.60	ng/L		02/15/19 07:52	02/19/19 15:21	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.51	ng/L		02/15/19 07:52	02/19/19 15:21	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/15/19 07:52	02/19/19 15:21	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	103		70 - 130				02/15/19 07:52	02/19/19 15:21	1
13C2 PFDA	102		70 - 130				02/15/19 07:52	02/19/19 15:21	1

**Client Sample ID: YK-10**  
**Date Collected: 02/05/19 09:45**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-10**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.97	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorooctanoic acid (PFOA)	ND		6.1	2.8	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.48	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.65	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.3	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.82	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorodecanoic acid	ND		2.0	0.54	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorododecanoic acid	ND		2.0	0.84	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorohexanoic acid	ND		2.0	0.30	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorotetradecanoic acid	ND		2.0	0.91	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/19/19 08:33	02/20/19 19:40	1
Perfluoroundecanoic acid	ND		2.0	0.61	ng/L		02/19/19 08:33	02/20/19 19:40	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.52	ng/L		02/19/19 08:33	02/20/19 19:40	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/19/19 08:33	02/20/19 19:40	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	96		70 - 130				02/19/19 08:33	02/20/19 19:40	1
13C2 PFDA	89		70 - 130				02/19/19 08:33	02/20/19 19:40	1

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# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-11**  
**Date Collected: 02/05/19 10:00**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-11**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	11		2.0	0.96	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorooctanoic acid (PFOA)	2.9	J	6.0	2.7	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorononanoic acid (PFNA)	1.4	J	2.0	0.47	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorohexanesulfonic acid (PFHxS)	10		2.0	0.65	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluoroheptanoic acid (PFHpA)	1.6	J	3.0	1.3	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorobutanesulfonic acid (PFBS)	1.1	J	2.0	0.81	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorodecanoic acid	ND		2.0	0.53	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorododecanoic acid	ND		2.0	0.83	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorohexanoic acid	2.6		2.0	0.29	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorotetradecanoic acid	ND		2.0	0.90	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/19/19 08:33	02/20/19 19:47	1
Perfluoroundecanoic acid	ND		2.0	0.60	ng/L		02/19/19 08:33	02/20/19 19:47	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.51	ng/L		02/19/19 08:33	02/20/19 19:47	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/19/19 08:33	02/20/19 19:47	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	99		70 - 130				02/19/19 08:33	02/20/19 19:47	1
13C2 PFDA	94		70 - 130				02/19/19 08:33	02/20/19 19:47	1

**Client Sample ID: YK-12**  
**Date Collected: 02/05/19 11:00**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-12**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.93	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorooctanoic acid (PFOA)	ND		5.9	2.6	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.46	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.62	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluoroheptanoic acid (PFHpA)	ND		2.9	1.3	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.78	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorodecanoic acid	ND		2.0	0.52	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorododecanoic acid	ND		2.0	0.80	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorohexanoic acid	ND		2.0	0.28	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorotetradecanoic acid	ND		2.0	0.87	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluorotridecanoic acid	ND		2.0	0.63	ng/L		02/19/19 08:33	02/20/19 19:55	1
Perfluoroundecanoic acid	ND		2.0	0.59	ng/L		02/19/19 08:33	02/20/19 19:55	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.50	ng/L		02/19/19 08:33	02/20/19 19:55	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.9	1.1	ng/L		02/19/19 08:33	02/20/19 19:55	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	81		70 - 130				02/19/19 08:33	02/20/19 19:55	1
13C2 PFDA	92		70 - 130				02/19/19 08:33	02/20/19 19:55	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: YK-13**  
**Date Collected: 02/05/19 11:00**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-13**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.97	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorooctanoic acid (PFOA)	ND		6.1	2.8	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.48	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.65	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.3	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.82	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorodecanoic acid	ND		2.0	0.54	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorododecanoic acid	ND		2.0	0.84	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorohexanoic acid	ND		2.0	0.30	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorotetradecanoic acid	ND		2.0	0.91	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/19/19 08:33	02/20/19 20:02	1
Perfluoroundecanoic acid	ND		2.0	0.61	ng/L		02/19/19 08:33	02/20/19 20:02	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.52	ng/L		02/19/19 08:33	02/20/19 20:02	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/19/19 08:33	02/20/19 20:02	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	85		70 - 130				02/19/19 08:33	02/20/19 20:02	1
13C2 PFDA	93		70 - 130				02/19/19 08:33	02/20/19 20:02	1

**Client Sample ID: YK-14**  
**Date Collected: 02/05/19 10:45**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-14**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.93	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorooctanoic acid (PFOA)	ND		5.9	2.7	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.46	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.63	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluoroheptanoic acid (PFHpA)	ND		2.9	1.3	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.79	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorodecanoic acid	ND		2.0	0.52	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorododecanoic acid	ND		2.0	0.81	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorohexanoic acid	ND		2.0	0.28	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorotetradecanoic acid	ND		2.0	0.87	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluorotridecanoic acid	ND		2.0	0.64	ng/L		02/19/19 08:33	02/20/19 20:10	1
Perfluoroundecanoic acid	ND		2.0	0.59	ng/L		02/19/19 08:33	02/20/19 20:10	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.50	ng/L		02/19/19 08:33	02/20/19 20:10	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.9	1.1	ng/L		02/19/19 08:33	02/20/19 20:10	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	77		70 - 130				02/19/19 08:33	02/20/19 20:10	1
13C2 PFDA	97		70 - 130				02/19/19 08:33	02/20/19 20:10	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-01**  
**Date Collected: 02/05/19 13:50**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-15**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.87	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorooctanoic acid (PFOA)	ND		5.5	2.5	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.43	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.58	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.7	1.2	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.73	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorodecanoic acid	ND		1.8	0.48	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorododecanoic acid	ND		1.8	0.75	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorohexanoic acid	ND		1.8	0.26	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorotetradecanoic acid	ND		1.8	0.81	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluorotridecanoic acid	ND		1.8	0.59	ng/L		02/19/19 08:33	02/20/19 20:17	1
Perfluoroundecanoic acid	ND		1.8	0.55	ng/L		02/19/19 08:33	02/20/19 20:17	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		1.8	0.47	ng/L		02/19/19 08:33	02/20/19 20:17	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.7	1.0	ng/L		02/19/19 08:33	02/20/19 20:17	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	95		70 - 130				02/19/19 08:33	02/20/19 20:17	1
13C2 PFDA	86		70 - 130				02/19/19 08:33	02/20/19 20:17	1

**Client Sample ID: CO-02**  
**Date Collected: 02/05/19 13:50**  
**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-16**  
**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	1.0	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorooctanoic acid (PFOA)	ND		6.4	2.9	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.50	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.68	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluoroheptanoic acid (PFHpA)	ND		3.2	1.4	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.85	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorodecanoic acid	ND		2.1	0.56	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorododecanoic acid	ND		2.1	0.87	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorohexanoic acid	ND		2.1	0.31	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorotetradecanoic acid	ND		2.1	0.94	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluorotridecanoic acid	ND		2.1	0.69	ng/L		02/19/19 08:33	02/20/19 20:25	1
Perfluoroundecanoic acid	ND		2.1	0.64	ng/L		02/19/19 08:33	02/20/19 20:25	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.54	ng/L		02/19/19 08:33	02/20/19 20:25	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.2	1.2	ng/L		02/19/19 08:33	02/20/19 20:25	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	95		70 - 130				02/19/19 08:33	02/20/19 20:25	1
13C2 PFDA	93		70 - 130				02/19/19 08:33	02/20/19 20:25	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-03**

**Date Collected: 02/05/19 14:10**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-17**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	0.99	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorooctanoic acid (PFOA)	ND		6.3	2.8	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.49	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.67	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.4	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.84	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorododecanoic acid	ND		2.1	0.86	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorohexanoic acid	ND		2.1	0.30	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorotetradecanoic acid	ND		2.1	0.93	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluorotridecanoic acid	ND		2.1	0.68	ng/L		02/19/19 08:33	02/20/19 20:47	1
Perfluoroundecanoic acid	ND		2.1	0.63	ng/L		02/19/19 08:33	02/20/19 20:47	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/19/19 08:33	02/20/19 20:47	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.2	ng/L		02/19/19 08:33	02/20/19 20:47	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	96		70 - 130				02/19/19 08:33	02/20/19 20:47	1
13C2 PFDA	90		70 - 130				02/19/19 08:33	02/20/19 20:47	1

**Client Sample ID: CO-04**

**Date Collected: 02/05/19 14:20**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-18**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.1	0.98	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorooctanoic acid (PFOA)	ND		6.2	2.8	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorononanoic acid (PFNA)	ND		2.1	0.48	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.1	0.66	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluoroheptanoic acid (PFHpA)	ND		3.1	1.3	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.1	0.82	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorodecanoic acid	ND		2.1	0.55	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorododecanoic acid	ND		2.1	0.84	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorohexanoic acid	ND		2.1	0.30	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorotetradecanoic acid	ND		2.1	0.92	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluorotridecanoic acid	ND		2.1	0.67	ng/L		02/19/19 08:33	02/20/19 20:55	1
Perfluoroundecanoic acid	ND		2.1	0.62	ng/L		02/19/19 08:33	02/20/19 20:55	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.1	0.53	ng/L		02/19/19 08:33	02/20/19 20:55	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.1	1.1	ng/L		02/19/19 08:33	02/20/19 20:55	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	98		70 - 130				02/19/19 08:33	02/20/19 20:55	1
13C2 PFDA	96		70 - 130				02/19/19 08:33	02/20/19 20:55	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-05**

**Date Collected: 02/05/19 14:35**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-19**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.93	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorooctanoic acid (PFOA)	ND		5.9	2.6	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.46	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.63	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluoroheptanoic acid (PFHpA)	ND		2.9	1.3	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.78	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorodecanoic acid	ND		2.0	0.52	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorododecanoic acid	ND		2.0	0.80	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorohexanoic acid	ND		2.0	0.28	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorotetradecanoic acid	ND		2.0	0.87	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluorotridecanoic acid	ND		2.0	0.64	ng/L		02/19/19 08:33	02/20/19 21:02	1
Perfluoroundecanoic acid	ND		2.0	0.59	ng/L		02/19/19 08:33	02/20/19 21:02	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.50	ng/L		02/19/19 08:33	02/20/19 21:02	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.9	1.1	ng/L		02/19/19 08:33	02/20/19 21:02	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	93		70 - 130				02/19/19 08:33	02/20/19 21:02	1
13C2 PFDA	91		70 - 130				02/19/19 08:33	02/20/19 21:02	1

**Client Sample ID: CO-06**

**Date Collected: 02/05/19 14:55**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-20**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.94	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorooctanoic acid (PFOA)	ND		6.0	2.7	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.47	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.64	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluoroheptanoic acid (PFHpA)	ND		3.0	1.3	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.79	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorodecanoic acid	ND		2.0	0.53	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorododecanoic acid	ND		2.0	0.81	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorotetradecanoic acid	ND		2.0	0.88	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluorotridecanoic acid	ND		2.0	0.65	ng/L		02/19/19 08:33	02/20/19 21:09	1
Perfluoroundecanoic acid	ND		2.0	0.60	ng/L		02/19/19 08:33	02/20/19 21:09	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.51	ng/L		02/19/19 08:33	02/20/19 21:09	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/19/19 08:33	02/20/19 21:09	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	99		70 - 130				02/19/19 08:33	02/20/19 21:09	1
13C2 PFDA	94		70 - 130				02/19/19 08:33	02/20/19 21:09	1

TestAmerica Sacramento

# Client Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-07**

**Date Collected: 02/05/19 15:15**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-21**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.91	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorooctanoic acid (PFOA)	ND		5.7	2.6	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.45	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.61	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.9	1.2	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.76	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorodecanoic acid	ND		1.9	0.51	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorododecanoic acid	ND		1.9	0.78	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorohexanoic acid	ND		1.9	0.28	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorotetradecanoic acid	ND		1.9	0.85	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluorotridecanoic acid	ND		1.9	0.62	ng/L		02/19/19 08:33	02/20/19 21:17	1
Perfluoroundecanoic acid	ND		1.9	0.57	ng/L		02/19/19 08:33	02/20/19 21:17	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		1.9	0.49	ng/L		02/19/19 08:33	02/20/19 21:17	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		2.9	1.0	ng/L		02/19/19 08:33	02/20/19 21:17	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	91		70 - 130				02/19/19 08:33	02/20/19 21:17	1
13C2 PFDA	96		70 - 130				02/19/19 08:33	02/20/19 21:17	1

**Client Sample ID: CO-08**

**Date Collected: 02/05/19 16:00**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-22**

**Matrix: Water**

**Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.96	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorooctanoic acid (PFOA)	ND		6.1	2.7	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.48	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.65	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluoroheptanoic acid (PFHpA)	ND		3.0	1.3	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.81	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorodecanoic acid	ND		2.0	0.54	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorododecanoic acid	ND		2.0	0.83	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorotetradecanoic acid	ND		2.0	0.90	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluorotridecanoic acid	ND		2.0	0.66	ng/L		02/19/19 08:34	02/20/19 21:24	1
Perfluoroundecanoic acid	ND		2.0	0.61	ng/L		02/19/19 08:34	02/20/19 21:24	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.52	ng/L		02/19/19 08:34	02/20/19 21:24	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/19/19 08:34	02/20/19 21:24	1
<b>Surrogate</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C2 PFHxA	95		70 - 130				02/19/19 08:34	02/20/19 21:24	1
13C2 PFDA	86		70 - 130				02/19/19 08:34	02/20/19 21:24	1

TestAmerica Sacramento



# Surrogate Summary

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Method: 537 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)
320-47461-1	YK-01	93	103
320-47461-2	YK-02	104	104
320-47461-3	YK-03	101	98
320-47461-4	YK-04	105	101
320-47461-5	YK-05	100	97
320-47461-6	YK-06	102	101
320-47461-7	YK-07	99	103
320-47461-8	YK-08	104	94
320-47461-9	YK-09	103	102
320-47461-10	YK-10	96	89
320-47461-11	YK-11	99	94
320-47461-12	YK-12	81	92
320-47461-13	YK-13	85	93
320-47461-14	YK-14	77	97
320-47461-15	CO-01	95	86
320-47461-16	CO-02	95	93
320-47461-17	CO-03	96	90
320-47461-18	CO-04	98	96
320-47461-19	CO-05	93	91
320-47461-20	CO-06	99	94
320-47461-21	CO-07	91	96
320-47461-22	CO-08	95	86
LCS 320-276178/2-A	Lab Control Sample	97	99
LCSD 320-276178/3-A	Lab Control Sample Dup	109	106
LLCS 320-276777/2-A	Lab Control Sample	96	94
LLCSD 320-276777/3-A	Lab Control Sample Dup	92	95
MB 320-276178/1-A	Method Blank	106	104
MB 320-276777/1-A	Method Blank	115	106

**Surrogate Legend**

PFHxA = 13C2 PFHxA

PFDA = 13C2 PFDA

# QC Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS)

**Lab Sample ID: MB 320-276178/1-A**

**Matrix: Water**

**Analysis Batch: 276787**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 276178**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.95	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorooctanoic acid (PFOA)	ND		6.0	2.7	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.47	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.64	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluoroheptanoic acid (PFHpA)	ND		3.0	1.3	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.80	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorodecanoic acid	ND		2.0	0.53	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorododecanoic acid	ND		2.0	0.82	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorotetradecanoic acid	ND		2.0	0.89	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluorotridecanoic acid	ND		2.0	0.65	ng/L		02/15/19 07:52	02/19/19 13:44	1
Perfluoroundecanoic acid	ND		2.0	0.60	ng/L		02/15/19 07:52	02/19/19 13:44	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.51	ng/L		02/15/19 07:52	02/19/19 13:44	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/15/19 07:52	02/19/19 13:44	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	106		70 - 130	02/15/19 07:52	02/19/19 13:44	1
13C2 PFDA	104		70 - 130	02/15/19 07:52	02/19/19 13:44	1

**Lab Sample ID: LCS 320-276178/2-A**

**Matrix: Water**

**Analysis Batch: 276787**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 276178**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanesulfonic acid (PFOS)	92.8	100		ng/L		108	70 - 130
Perfluorooctanoic acid (PFOA)	100	107		ng/L		107	70 - 130
Perfluorononanoic acid (PFNA)	100	105		ng/L		105	70 - 130
Perfluorohexanesulfonic acid (PFHxS)	91.0	92.0		ng/L		101	70 - 130
Perfluoroheptanoic acid (PFHpA)	100	110		ng/L		110	70 - 130
Perfluorobutanesulfonic acid (PFBS)	88.4	69.4		ng/L		78	70 - 130
Perfluorodecanoic acid	100	111		ng/L		111	70 - 130
Perfluorododecanoic acid	100	110		ng/L		110	70 - 130
Perfluorohexanoic acid	100	95.3		ng/L		95	70 - 130
Perfluorotetradecanoic acid	100	93.6		ng/L		94	70 - 130
Perfluorotridecanoic acid	100	110		ng/L		110	70 - 130
Perfluoroundecanoic acid	100	113		ng/L		113	70 - 130
N-ethylperfluorooctanesulfonamidoacetic acid	100	114		ng/L		114	70 - 130
N-methylperfluorooctanesulfonamidoacetic acid	100	107		ng/L		107	70 - 130

Surrogate	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	97		70 - 130
13C2 PFDA	99		70 - 130

TestAmerica Sacramento

# QC Sample Results

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Lab Sample ID: LCSD 320-276178/3-A**

**Matrix: Water**

**Analysis Batch: 276787**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

**Prep Batch: 276178**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	92.8	93.6		ng/L		101	70 - 130	7	30
Perfluorooctanoic acid (PFOA)	100	103		ng/L		103	70 - 130	4	30
Perfluorononanoic acid (PFNA)	100	99.0		ng/L		99	70 - 130	6	30
Perfluorohexanesulfonic acid (PFHxS)	91.0	86.3		ng/L		95	70 - 130	6	30
Perfluoroheptanoic acid (PFHpA)	100	102		ng/L		102	70 - 130	8	30
Perfluorobutanesulfonic acid (PFBS)	88.4	78.5		ng/L		89	70 - 130	12	30
Perfluorodecanoic acid	100	99.6		ng/L		100	70 - 130	11	30
Perfluorododecanoic acid	100	107		ng/L		107	70 - 130	3	30
Perfluorohexanoic acid	100	101		ng/L		101	70 - 130	6	30
Perfluorotetradecanoic acid	100	89.4		ng/L		89	70 - 130	5	30
Perfluorotridecanoic acid	100	102		ng/L		102	70 - 130	8	30
Perfluoroundecanoic acid	100	105		ng/L		105	70 - 130	6	30
N-ethylperfluorooctanesulfonamidoacetic acid	100	96.1		ng/L		96	70 - 130	17	30
N-methylperfluorooctanesulfonamidoacetic acid	100	100		ng/L		100	70 - 130	6	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
13C2 PFHxA	109		70 - 130
13C2 PFDA	106		70 - 130

**Lab Sample ID: MB 320-276777/1-A**

**Matrix: Water**

**Analysis Batch: 277184**

**Client Sample ID: Method Blank**

**Prep Type: Total/NA**

**Prep Batch: 276777**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.95	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorooctanoic acid (PFOA)	ND		6.0	2.7	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.47	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.64	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluoroheptanoic acid (PFHpA)	ND		3.0	1.3	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.80	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorodecanoic acid	ND		2.0	0.53	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorododecanoic acid	ND		2.0	0.82	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorohexanoic acid	ND		2.0	0.29	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorotetradecanoic acid	ND		2.0	0.89	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluorotridecanoic acid	ND		2.0	0.65	ng/L		02/19/19 08:33	02/20/19 19:18	1
Perfluoroundecanoic acid	ND		2.0	0.60	ng/L		02/19/19 08:33	02/20/19 19:18	1
N-ethylperfluorooctanesulfonamidoacetic acid	ND		2.0	0.51	ng/L		02/19/19 08:33	02/20/19 19:18	1
N-methylperfluorooctanesulfonamidoacetic acid	ND		3.0	1.1	ng/L		02/19/19 08:33	02/20/19 19:18	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	115		70 - 130	02/19/19 08:33	02/20/19 19:18	1
13C2 PFDA	106		70 - 130	02/19/19 08:33	02/20/19 19:18	1

TestAmerica Sacramento

# QC Sample Results

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

**Lab Sample ID: LLCS 320-276777/2-A**

**Matrix: Water**

**Analysis Batch: 277184**

**Client Sample ID: Lab Control Sample**

**Prep Type: Total/NA**

**Prep Batch: 276777**

Analyte	Spike Added	LLCS Result	LLCS Qualifier	Unit	D	%Rec	Limits
Perfluorooctanesulfonic acid (PFOS)	3.71	3.41		ng/L		92	50 - 150
Perfluorooctanoic acid (PFOA)	4.00	3.74	J	ng/L		93	50 - 150
Perfluorononanoic acid (PFNA)	4.00	3.69		ng/L		92	50 - 150
Perfluorohexanesulfonic acid (PFHxS)	3.64	3.33		ng/L		91	50 - 150
Perfluoroheptanoic acid (PFHpA)	4.00	3.79		ng/L		95	50 - 150
Perfluorobutanesulfonic acid (PFBS)	3.54	3.05		ng/L		86	50 - 150
Perfluorodecanoic acid	4.00	3.67		ng/L		92	50 - 150
Perfluorododecanoic acid	4.00	3.57		ng/L		89	50 - 150
Perfluorohexanoic acid	4.00	3.52		ng/L		88	50 - 150
Perfluorotetradecanoic acid	4.00	3.49		ng/L		87	50 - 150
Perfluorotridecanoic acid	4.00	3.74		ng/L		94	50 - 150
Perfluoroundecanoic acid	4.00	3.74		ng/L		93	50 - 150
N-ethylperfluorooctanesulfonamidoacetic acid	4.00	3.76		ng/L		94	50 - 150
N-methylperfluorooctanesulfonamidoacetic acid	4.00	3.98		ng/L		100	50 - 150

Surrogate	LLCS %Recovery	LLCS Qualifier	LLCS Limits
13C2 PFHxA	96		70 - 130
13C2 PFDA	94		70 - 130

**Lab Sample ID: LLCSD 320-276777/3-A**

**Matrix: Water**

**Analysis Batch: 277184**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

**Prep Batch: 276777**

Analyte	Spike Added	LLCSD Result	LLCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanesulfonic acid (PFOS)	3.71	3.64		ng/L		98	50 - 150	6	50
Perfluorooctanoic acid (PFOA)	4.00	3.91	J	ng/L		98	50 - 150	4	50
Perfluorononanoic acid (PFNA)	4.00	3.77		ng/L		94	50 - 150	2	50
Perfluorohexanesulfonic acid (PFHxS)	3.64	3.54		ng/L		97	50 - 150	6	50
Perfluoroheptanoic acid (PFHpA)	4.00	3.82		ng/L		95	50 - 150	0.8	50
Perfluorobutanesulfonic acid (PFBS)	3.54	2.89		ng/L		82	50 - 150	5	50
Perfluorodecanoic acid	4.00	3.78		ng/L		94	50 - 150	3	50
Perfluorododecanoic acid	4.00	3.97		ng/L		99	50 - 150	11	50
Perfluorohexanoic acid	4.00	3.29		ng/L		82	50 - 150	7	50
Perfluorotetradecanoic acid	4.00	3.37		ng/L		84	50 - 150	3	50
Perfluorotridecanoic acid	4.00	4.03		ng/L		101	50 - 150	7	50
Perfluoroundecanoic acid	4.00	3.88		ng/L		97	50 - 150	4	50
N-ethylperfluorooctanesulfonamidoacetic acid	4.00	4.16		ng/L		104	50 - 150	10	50
N-methylperfluorooctanesulfonamidoacetic acid	4.00	4.22		ng/L		105	50 - 150	6	50

TestAmerica Sacramento

# QC Sample Results

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Method: 537 DW - Perfluorinated Alkyl Acids (LC/MS) (Continued)

Lab Sample ID: LLCSD 320-276777/3-A

Matrix: Water

Analysis Batch: 277184

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 276777

Surrogate	LLCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	92		70 - 130
13C2 PFDA	95		70 - 130

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

# QC Association Summary

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## LCMS

### Prep Batch: 276178

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-1	YK-01	Total/NA	Water	537 DW	
320-47461-2	YK-02	Total/NA	Water	537 DW	
320-47461-3	YK-03	Total/NA	Water	537 DW	
320-47461-4	YK-04	Total/NA	Water	537 DW	
320-47461-5	YK-05	Total/NA	Water	537 DW	
320-47461-6	YK-06	Total/NA	Water	537 DW	
320-47461-7	YK-07	Total/NA	Water	537 DW	
320-47461-8	YK-08	Total/NA	Water	537 DW	
320-47461-9	YK-09	Total/NA	Water	537 DW	
MB 320-276178/1-A	Method Blank	Total/NA	Water	537 DW	
LCS 320-276178/2-A	Lab Control Sample	Total/NA	Water	537 DW	
LCSD 320-276178/3-A	Lab Control Sample Dup	Total/NA	Water	537 DW	

### Prep Batch: 276777

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-10	YK-10	Total/NA	Water	537 DW	
320-47461-11	YK-11	Total/NA	Water	537 DW	
320-47461-12	YK-12	Total/NA	Water	537 DW	
320-47461-13	YK-13	Total/NA	Water	537 DW	
320-47461-14	YK-14	Total/NA	Water	537 DW	
320-47461-15	CO-01	Total/NA	Water	537 DW	
320-47461-16	CO-02	Total/NA	Water	537 DW	
320-47461-17	CO-03	Total/NA	Water	537 DW	
320-47461-18	CO-04	Total/NA	Water	537 DW	
320-47461-19	CO-05	Total/NA	Water	537 DW	
320-47461-20	CO-06	Total/NA	Water	537 DW	
320-47461-21	CO-07	Total/NA	Water	537 DW	
320-47461-22	CO-08	Total/NA	Water	537 DW	
MB 320-276777/1-A	Method Blank	Total/NA	Water	537 DW	
LLCS 320-276777/2-A	Lab Control Sample	Total/NA	Water	537 DW	
LLCSD 320-276777/3-A	Lab Control Sample Dup	Total/NA	Water	537 DW	

### Analysis Batch: 276787

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-1	YK-01	Total/NA	Water	537 DW	276178
320-47461-2	YK-02	Total/NA	Water	537 DW	276178
320-47461-3	YK-03	Total/NA	Water	537 DW	276178
320-47461-4	YK-04	Total/NA	Water	537 DW	276178
320-47461-5	YK-05	Total/NA	Water	537 DW	276178
320-47461-6	YK-06	Total/NA	Water	537 DW	276178
320-47461-7	YK-07	Total/NA	Water	537 DW	276178
MB 320-276178/1-A	Method Blank	Total/NA	Water	537 DW	276178
LCS 320-276178/2-A	Lab Control Sample	Total/NA	Water	537 DW	276178
LCSD 320-276178/3-A	Lab Control Sample Dup	Total/NA	Water	537 DW	276178

### Analysis Batch: 276788

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-8	YK-08	Total/NA	Water	537 DW	276178
320-47461-9	YK-09	Total/NA	Water	537 DW	276178

TestAmerica Sacramento



# QC Association Summary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## LCMS (Continued)

### Analysis Batch: 277184

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-10	YK-10	Total/NA	Water	537 DW	276777
320-47461-11	YK-11	Total/NA	Water	537 DW	276777
320-47461-12	YK-12	Total/NA	Water	537 DW	276777
320-47461-13	YK-13	Total/NA	Water	537 DW	276777
320-47461-14	YK-14	Total/NA	Water	537 DW	276777
320-47461-15	CO-01	Total/NA	Water	537 DW	276777
320-47461-16	CO-02	Total/NA	Water	537 DW	276777
MB 320-276777/1-A	Method Blank	Total/NA	Water	537 DW	276777
LLCS 320-276777/2-A	Lab Control Sample	Total/NA	Water	537 DW	276777
LLCSD 320-276777/3-A	Lab Control Sample Dup	Total/NA	Water	537 DW	276777

### Analysis Batch: 277185

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-47461-17	CO-03	Total/NA	Water	537 DW	276777
320-47461-18	CO-04	Total/NA	Water	537 DW	276777
320-47461-19	CO-05	Total/NA	Water	537 DW	276777
320-47461-20	CO-06	Total/NA	Water	537 DW	276777
320-47461-21	CO-07	Total/NA	Water	537 DW	276777
320-47461-22	CO-08	Total/NA	Water	537 DW	276777

# Lab Chronicle

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Client Sample ID: YK-01

Date Collected: 02/04/19 15:45

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-1

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 DW			244.5 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:06	AAR	TAL SAC

## Client Sample ID: YK-02

Date Collected: 02/04/19 15:55

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-2

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 DW			239.7 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:14	AAR	TAL SAC

## Client Sample ID: YK-03

Date Collected: 02/04/19 16:05

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-3

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 DW			254.3 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:21	AAR	TAL SAC

## Client Sample ID: YK-04

Date Collected: 02/04/19 16:20

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-4

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 DW			241.3 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:29	AAR	TAL SAC

## Client Sample ID: YK-05

Date Collected: 02/04/19 16:30

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-5

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 DW			242.6 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:36	AAR	TAL SAC

## Client Sample ID: YK-06

Date Collected: 02/04/19 16:45

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-6

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 DW			246.6 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:44	AAR	TAL SAC

TestAmerica Sacramento

# Lab Chronicle

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Client Sample ID: YK-07

Date Collected: 02/04/19 17:00

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-7

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 DW			235.9 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276787	02/19/19 14:51	AAR	TAL SAC

## Client Sample ID: YK-08

Date Collected: 02/04/19 17:25

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-8

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	537 DW			241.5 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276788	02/19/19 15:14	AAR	TAL SAC

## Client Sample ID: YK-09

Date Collected: 02/04/19 17:30

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-9

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	537 DW			251.2 mL	10.0 mL	276178	02/15/19 07:52	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			276788	02/19/19 15:21	AAR	TAL SAC

## Client Sample ID: YK-10

Date Collected: 02/05/19 09:45

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-10

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	537 DW			245 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 19:40	GK	TAL SAC

## Client Sample ID: YK-11

Date Collected: 02/05/19 10:00

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-11

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	537 DW			248 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 19:47	GK	TAL SAC

## Client Sample ID: YK-12

Date Collected: 02/05/19 11:00

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-12

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	537 DW			256.3 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 19:55	GK	TAL SAC

TestAmerica Sacramento

# Lab Chronicle

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## Client Sample ID: YK-13

Date Collected: 02/05/19 11:00

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-13

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	537 DW			245 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 20:02	GK	TAL SAC

## Client Sample ID: YK-14

Date Collected: 02/05/19 10:45

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-14

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	537 DW			254.6 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 20:10	GK	TAL SAC

## Client Sample ID: CO-01

Date Collected: 02/05/19 13:50

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-15

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	537 DW			273.6 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 20:17	GK	TAL SAC

## Client Sample ID: CO-02

Date Collected: 02/05/19 13:50

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-16

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	537 DW			236.1 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277184	02/20/19 20:25	GK	TAL SAC

## Client Sample ID: CO-03

Date Collected: 02/05/19 14:10

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-17

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	537 DW			239 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 20:47	GK	TAL SAC

## Client Sample ID: CO-04

Date Collected: 02/05/19 14:20

Date Received: 02/07/19 09:00

## Lab Sample ID: 320-47461-18

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	537 DW			242.7 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 20:55	GK	TAL SAC

TestAmerica Sacramento

# Lab Chronicle

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

**Client Sample ID: CO-05**

**Date Collected: 02/05/19 14:35**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-19**

**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	537 DW			255.7 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 21:02	GK	TAL SAC

**Client Sample ID: CO-06**

**Date Collected: 02/05/19 14:55**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-20**

**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	537 DW			251.8 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 21:09	GK	TAL SAC

**Client Sample ID: CO-07**

**Date Collected: 02/05/19 15:15**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-21**

**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	537 DW			262 mL	10.0 mL	276777	02/19/19 08:33	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 21:17	GK	TAL SAC

**Client Sample ID: CO-08**

**Date Collected: 02/05/19 16:00**

**Date Received: 02/07/19 09:00**

**Lab Sample ID: 320-47461-22**

**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	537 DW			246.8 mL	10.0 mL	276777	02/19/19 08:34	HJA	TAL SAC
Total/NA	Analysis	537 DW		1			277185	02/20/19 21:24	GK	TAL SAC

**Laboratory References:**

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

# Accreditation/Certification Summary

Client: Alaska Department of Env. Conservation  
 Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

## 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: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

Method	Method Description	Protocol	Laboratory
537 DW	Perfluorinated Alkyl Acids (LC/MS)	EPA	TAL SAC
537 DW	Extraction of Perfluorinated Alkyl Acids	EPA	TAL SAC

**Protocol References:**

EPA = US Environmental Protection Agency

**Laboratory References:**

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



# Sample Summary

Client: Alaska Department of Env. Conservation  
Project/Site: PFAS, AK - Yakutat/Cordova

TestAmerica Job ID: 320-47461-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-47461-1	YK-01	Water	02/04/19 15:45	02/07/19 09:00
320-47461-2	YK-02	Water	02/04/19 15:55	02/07/19 09:00
320-47461-3	YK-03	Water	02/04/19 16:05	02/07/19 09:00
320-47461-4	YK-04	Water	02/04/19 16:20	02/07/19 09:00
320-47461-5	YK-05	Water	02/04/19 16:30	02/07/19 09:00
320-47461-6	YK-06	Water	02/04/19 16:45	02/07/19 09:00
320-47461-7	YK-07	Water	02/04/19 17:00	02/07/19 09:00
320-47461-8	YK-08	Water	02/04/19 17:25	02/07/19 09:00
320-47461-9	YK-09	Water	02/04/19 17:30	02/07/19 09:00
320-47461-10	YK-10	Water	02/05/19 09:45	02/07/19 09:00
320-47461-11	YK-11	Water	02/05/19 10:00	02/07/19 09:00
320-47461-12	YK-12	Water	02/05/19 11:00	02/07/19 09:00
320-47461-13	YK-13	Water	02/05/19 11:00	02/07/19 09:00
320-47461-14	YK-14	Water	02/05/19 10:45	02/07/19 09:00
320-47461-15	CO-01	Water	02/05/19 13:50	02/07/19 09:00
320-47461-16	CO-02	Water	02/05/19 13:50	02/07/19 09:00
320-47461-17	CO-03	Water	02/05/19 14:10	02/07/19 09:00
320-47461-18	CO-04	Water	02/05/19 14:20	02/07/19 09:00
320-47461-19	CO-05	Water	02/05/19 14:35	02/07/19 09:00
320-47461-20	CO-06	Water	02/05/19 14:55	02/07/19 09:00
320-47461-21	CO-07	Water	02/05/19 15:15	02/07/19 09:00
320-47461-22	CO-08	Water	02/05/19 16:00	02/07/19 09:00

West Sacramento, CA 95605  
Phone: 916.373.5600 Fax:

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

Regulatory Program:  DW  NPDES  RCRA  Other: CELLULA

**Client Contact**  
Company Name: Alaska Dept. of Env. Cons.  
Address: 410 W. Loughlin Blvd  
City/State/Zip: Tunehead, AZ 99801  
Phone: 907-746-3184  
Fax:

**Site Contact**  
Project Name: ALASKA PFAS  
Site: Yakutat / Cordova  
PO #

**Project Manager:** Ann Marie Palmieri **Site Contact:** PFAS.537.1  
Tel/Fax: 907-746-3184

**Analysis Turnaround Time**  
 CALENDAR DAYS  WORKING DAYS  
TAT if different from Below \_\_\_\_\_  
 2 weeks  
 1 week  
 2 days  
 1 day

**Carrier:** \_\_\_\_\_  
**Date:** \_\_\_\_\_

**COC No:** \_\_\_\_\_ of \_\_\_\_\_ 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.	Sample Specific Notes:	
						Filtered Sample (Y/N)	Perform MS/MSD (Y/N)
YK-01	2/4/19	1545	G	WA	1	X	
YK-02	2/4/19	1555	G	WA	1	X	
YK-03	2/4/19	1605	G	WA	1	X	
YK-04	2/4/19	1620	G	WA	1	X	
YK-05	2/4/19	1630	G	WA	1	X	
YK-06	2/4/19	1645	G	WA	1	X	
YK-07	2/4/19	1700	G	WA	1	X	
YK-08	2/4/19	1725	G	WA	1	X	
YK-09	2/4/19	1730	G	WA	1	X	
YK-10	2/5/19	945	G	WA	1	X	
YK-11	2/5/19	1600	G	WA	1	X	
YK-12	2/5/19	1600	G	WA	1	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

Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

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

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

**Custody Seal No.:** \_\_\_\_\_  
Company: APCC

**Relinquished by:** [Signature] Date/Time: 2/16/19 16:00

**Relinquished by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Relinquished by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Received by:** [Signature] Date/Time: 2/19 09:00

**Received by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Received in Laboratory by:** \_\_\_\_\_ Date/Time: \_\_\_\_\_

**Cooler Temp. (°C):** 1.0 **Obs'd:** 1.0 **Corrd:** 1.0 **Therm ID No.:** AK-7





Regulatory Program:  DW  NPDES  RCRA  Other: CERCLA

Project Manager: Anne Marie Palmieri Site Contact: \_\_\_\_\_ Date: \_\_\_\_\_  
 Tel/Fax: 907-306-3184 Lab Contact: \_\_\_\_\_ Carrier: \_\_\_\_\_  
 Analysis Turnaround Time: \_\_\_\_\_  
 CALENDAR DAYS  WORKING DAYS  
 TAT if different from Below: \_\_\_\_\_  
 2 weeks  1 week  2 days  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)	Sample Specific Notes:
YK-13	2/5/19	1100	G	WA	1	N	X	
YK-14	2/5/19	1100	G	WA	1	N	X	
CO-01	2/5/19	1350	G	WA	1	N	X	
CO-02	2/5/19	1350	G	WA	1	N	X	
CO-03	2/5/19	1410	G	WA	1	N	X	
CO-04	2/5/19	1420	G	WA	1	N	X	
CO-05	2/5/19	1435	G	WA	1	N	X	
CO-06	2/5/19	1455	G	WA	1	N	X	
CO-07	2/5/19	1515	G	WA	1	N	X	
CO-08	2/5/19	1600	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  
 Return to Client  Disposal by Lab  Archive for \_\_\_\_\_ Months

Special Instructions/QC Requirements & Comments:  
email results to: annemarie.palmieri@alaska.gov  
 Cooler Temp. (°C): Obs'd: 1.0°C Corr'd: 1.0°C Therm ID No.: AK-2  
 Custody Seal No.: \_\_\_\_\_  
 Relinquished by: [Signature] Date/Time: 2/6/19 16:00  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Relinquished by: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Received by: [Signature] Date/Time: 7 Feb 19 0900  
 Received by: \_\_\_\_\_ Date/Time: \_\_\_\_\_  
 Received in Laboratory by: \_\_\_\_\_ Date/Time: \_\_\_\_\_



## Login Sample Receipt Checklist

Client: Alaska Department of Env. Conservation

Job Number: 320-47461-1

**Login Number: 47461**

**List Source: TestAmerica Sacramento**

**List Number: 1**

**Creator: McCabe, Nicole M**

Question	Answer	Comment
Radioactivity wasn't checked or is <math>\leq</math> background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	SEAL
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.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <math><6\text{mm}</math> (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	True	

## Walker, M Elaine

---

**From:** Palmieri, Anne Marie G (DEC) <annemarie.palmieri@alaska.gov>  
**Sent:** Friday, February 08, 2019 10:45 AM  
**To:** Walker, M Elaine  
**Subject:** RE: TestAmerica sample confirmation files from 320-47461-1 PFAS, AK - Yakutat/Cordova

### -External Email-

---

Hi Elaine,  
Sorry about the lack of clarity on the COC – YK-12 is 1100 and YK-14 is 1045.  
Thanks, Anne Marie.

**From:** Walker, Elaine [<mailto:elaine.walker@testamericainc.com>]  
**Sent:** Friday, February 8, 2019 9:41 AM  
**To:** Bethe, Amber N (DEC) <[amber.bethe@alaska.gov](mailto:amber.bethe@alaska.gov)>; Palmieri, Anne Marie G (DEC) <[annemarie.palmieri@alaska.gov](mailto:annemarie.palmieri@alaska.gov)>; Lomax, Terri J (DEC) <[terri.lomax@alaska.gov](mailto:terri.lomax@alaska.gov)>  
**Subject:** TestAmerica sample confirmation files from 320-47461-1 PFAS, AK - Yakutat/Cordova

Hello,

Attached please find the sample confirmation files for job 320-47461-1; PFAS, AK - Yakutat/Cordova.

I know these are on hold but can you please check the sample times for YK-12 and YK-14 for me please? The COC is a little unlegible for these two.

Please note that the hold time for these samples expire on 2/18 and 2/19/19.

Please feel free to contact me if you have any questions.

Thank you.

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: [Project Feedback](#)

**ELAINE M WALKER**  
Project Manager

**TestAmerica Seattle**  
THE LEADER IN ENVIRONMENTAL TESTING

Tel: 253.248.4972  
[www.testamericainc.com](http://www.testamericainc.com)

Reference: [277178]  
Attachments: 2



## Walker, M Elaine

---

**From:** Palmieri, Anne Marie G (DEC) <annemarie.palmieri@alaska.gov>  
**Sent:** Friday, February 08, 2019 6:01 PM  
**To:** Walker, M Elaine  
**Cc:** Caudill, Gretchen E (DEC)  
**Subject:** RE: TestAmerica sample confirmation files from 320-47461-1 PFAS, AK - Yakutat/Cordova

### -External Email-

---

Hi Elaine,  
Please take these samples off of hold and proceed with the analysis.  
Thanks, Anne Marie.

-----  
Anne Marie Palmieri  
ADEC-Contaminated Sites Program  
Post Office Box 1542  
Haines, Alaska 99827  
907.766.3184

**From:** Walker, Elaine [<mailto:elaine.walker@testamericainc.com>]  
**Sent:** Friday, February 8, 2019 9:41 AM  
**To:** Bethe, Amber N (DEC) <[amber.bethe@alaska.gov](mailto:amber.bethe@alaska.gov)>; Palmieri, Anne Marie G (DEC) <[annemarie.palmieri@alaska.gov](mailto:annemarie.palmieri@alaska.gov)>; Lomax, Terri J (DEC) <[terri.lomax@alaska.gov](mailto:terri.lomax@alaska.gov)>  
**Subject:** TestAmerica sample confirmation files from 320-47461-1 PFAS, AK - Yakutat/Cordova

Hello,

Attached please find the sample confirmation files for job 320-47461-1; PFAS, AK - Yakutat/Cordova.

I know these are on hold but can you please check the sample times for YK-12 and YK-14 for me please? The COC is a little unlegible for these two.

Please note that the hold time for these samples expire on 2/18 and 2/19/19.

Please feel free to contact me if you have any questions.

Thank you.

Please let us know if we met your expectations by rating the service you received from TestAmerica on this project by visiting our website at: [Project Feedback](#)

**ELAINE M WALKER**  
Project Manager

# TestAmerica Seattle

THE LEADER IN ENVIRONMENTAL TESTING

Tel: 253.248.4972

[www.testamericainc.com](http://www.testamericainc.com)

Reference: [277178]

Attachments: 2

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16

**Laboratory Data Review Checklist**

Completed By:

Michael Jaramillo

Title:

Senior Environmental Chemist

Date:

April 9, 2019

Laboratory Report Name:

PFAS, AK – Yakutat/Cordova

Report Date:

February 25, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

TestAmerica

Laboratory Report Number:

320-47461-1

ADEC File Number:

NA

Hazard Identification Number:

NA

1. Laboratory

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

 Yes  No

Comments:

The TestAmerica Laboratory of Sacramento, CA is certified by the ADEC Contaminated Sites Program (Laboratory Certification No. 17-020) to perform the requested analyses. However, the ADEC currently only certifies for the analytes PFOS and PFOA.

- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

 Yes  No

Comments:

The requested analysis was performed at the TestAmerica Laboratory of Sacramento, CA. A “network” or sub-contracted laboratory was not used.

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 (1.0 °C).

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

 Yes  No

Comments:

Analysis of Per- and Polyfluoroalkyl Substances (PFAS) 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 does not specify the field sampler's name on the COC. The samples were collected by the ADEC CSP staff. This omission does not affect the sample results.

- 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:

Several samples had a yellow color after sample extraction.

- c. Were all corrective actions documented?

Yes  No

Comments:

Corrective actions were not required.

- d. What is the effect on data quality/usability according to the case narrative?

Comments:

The data quality and/or usability was not affected.

#### 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 EPA Health Advisory Levels for drinking water.

e. Data quality or usability affected?

Yes  No

Comments:

The data quality and/or usability was 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 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:

NA; PFAS were not detected in the method blank samples.

v. Data quality or usability affected?

Comments:

The data quality and/or usability was 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 analysis.

- ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

 Yes  No

Comments:

Metals/Inorganic analyses were not requested with 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 the laboratory acceptance limits.

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

 Yes  No

Comments:

N/A; analytical accuracy and precision were within the laboratory acceptance limits.

- vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability was 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:

Surrogate recoveries were within laboratory acceptance criteria.

iv. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

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; a trip blank is not required for the requested analysis.

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 for the requested analysis.

iii. All results less than LOQ?

Yes  No

Comments:

N/A; a trip blank is not required for the requested analysis.

iv. If above LOQ, what samples are affected?

Comments:

N/A; a trip blank is not required for the requested analysis.

v. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

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:

Sample *YK-13* is a field-duplicate of sample *YK-12*.

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

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

Where  $R_1$  = Sample Concentration

$R_2$  = Field Duplicate Concentration

Yes  No

Comments:

The project analytes were not detected in the field-duplicate samples. An RPD could not be calculated. The sample results are not affected.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability was not affected.

f. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below).

Yes  No  Not Applicable

Samples were collected with non-reusable equipment. An equipment blank is not required. However, sample *YK-14* is a field blank sample which is discussed in this section.

i. All results less than LOQ?

Yes  No

Comments:

ii. If above LOQ, what samples are affected?

Comments:

Project analytes were not detected in the field blank sample.

iii. Data quality or usability affected?

Comments:

The data quality and/or usability was not affected.

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.

## ANALYTICAL REPORT

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

Laboratory Job ID: 320-51422-1  
Client Project/Site: Yakutat PFAS  
Revision: 3

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

Attn: Michael X Jaramillo



Authorized for release by:  
12/3/2019 12:29:59 PM

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### LINKS

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Definitions/Glossary . . . . .	3
Case Narrative . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	8
Isotope Dilution Summary . . . . .	31
QC Sample Results . . . . .	32
QC Association Summary . . . . .	36
Lab Chronicle . . . . .	39
Certification Summary . . . . .	43
Method Summary . . . . .	44
Sample Summary . . . . .	45
Chain of Custody . . . . .	46
Receipt Checklists . . . . .	49



# Definitions/Glossary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## 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)

# Case Narrative

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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**Job ID: 320-51422-1**

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**Laboratory: Eurofins TestAmerica, Sacramento**

## Narrative

### Job Narrative 320-51422-1

Revision - 11/6/19

This report has been revised to report additional analytes at client request.

### Receipt

The samples were received on 6/18/2019 10:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.0° 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. 33064 (320-51422-21)

Method WS-LC-0025 At1: A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: Due to analyst oversight 11 samples were analyzed between the Continuing Calibration Verification (CCV) standards. The bracketing CCVs were within control limits; therefore there is no impact on the data.

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 320-303445.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-303758.

Method(s) PFAS Prep: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-303759.

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: Yakutat PFAS

Job ID: 320-51422-1

## Client Sample ID: 32616

Lab Sample ID: 320-51422-1

No Detections.

## Client Sample ID: 33045

Lab Sample ID: 320-51422-2

No Detections.

## Client Sample ID: 32615

Lab Sample ID: 320-51422-3

No Detections.

## Client Sample ID: 33053

Lab Sample ID: 320-51422-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	35		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.4	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33060

Lab Sample ID: 320-51422-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	8.1		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33059

Lab Sample ID: 320-51422-6

No Detections.

## Client Sample ID: 93063

Lab Sample ID: 320-51422-7

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
Perfluoroheptanoic acid (PFHpA)	3.1		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33063

Lab Sample ID: 320-51422-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	21		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
Perfluorobutanesulfonic acid (PFBS)	1.9	J	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33002

Lab Sample ID: 320-51422-9

No Detections.

## Client Sample ID: 33066

Lab Sample ID: 320-51422-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	36		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.3		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

# Detection Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## Client Sample ID: 33066 (Continued)

Lab Sample ID: 320-51422-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.3		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33061

Lab Sample ID: 320-51422-11

No Detections.

## Client Sample ID: 32617

Lab Sample ID: 320-51422-12

No Detections.

## Client Sample ID: 33068

Lab Sample ID: 320-51422-13

No Detections.

## Client Sample ID: 33052

Lab Sample ID: 320-51422-14

No Detections.

## Client Sample ID: 32609

Lab Sample ID: 320-51422-15

No Detections.

## Client Sample ID: 32606

Lab Sample ID: 320-51422-16

No Detections.

## Client Sample ID: 32608

Lab Sample ID: 320-51422-17

No Detections.

## Client Sample ID: 33065

Lab Sample ID: 320-51422-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	25		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.5		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluorobutanesulfonic acid (PFBS)	2.4		2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 93056

Lab Sample ID: 320-51422-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	13		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

## Client Sample ID: 33056

Lab Sample ID: 320-51422-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	13		2.0	0.87	ng/L	1		WS-LC-0025 At1	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		2.0	0.80	ng/L	1		WS-LC-0025 At1	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

# Detection Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## Client Sample ID: 33064

## Lab Sample ID: 320-51422-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	12		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
Perfluorobutanesulfonic acid (PFBS)	1.4	J I	2.0	0.92	ng/L	1		WS-LC-0025 At1	Total/NA

## Client Sample ID: 33004

## Lab Sample ID: 320-51422-22

No Detections.

## Client Sample ID: 32618

## Lab Sample ID: 320-51422-23

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32616**  
**Date Collected: 06/12/19 13:41**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-1**  
**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		06/24/19 18:51	06/26/19 00:31	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 00:31	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 00:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 00:31	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	94		25 - 150	06/24/19 18:51	06/26/19 00:31	1
13C4 PFOS	82		25 - 150	06/24/19 18:51	06/26/19 00:31	1
18O2 PFHxS	99		25 - 150	06/24/19 18:51	06/26/19 00:31	1
13C5 PFNA	78		25 - 150	06/24/19 18:51	06/26/19 00:31	1
13C4 PFHpA	95		25 - 150	06/24/19 18:51	06/26/19 00:31	1
13C3 PFBS	88		25 - 150	06/24/19 18:51	06/26/19 00:31	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33045**

**Lab Sample ID: 320-51422-2**

**Date Collected: 06/12/19 17:12**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/24/19 18:51	06/26/19 00:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 00:50	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 00:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 00:50	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	106		25 - 150	06/24/19 18:51	06/26/19 00:50	1
13C4 PFOS	89		25 - 150	06/24/19 18:51	06/26/19 00:50	1
18O2 PFHxS	103		25 - 150	06/24/19 18:51	06/26/19 00:50	1
13C5 PFNA	81		25 - 150	06/24/19 18:51	06/26/19 00:50	1
13C4 PFHpA	106		25 - 150	06/24/19 18:51	06/26/19 00:50	1
13C3 PFBS	99		25 - 150	06/24/19 18:51	06/26/19 00:50	1



# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32615**

**Lab Sample ID: 320-51422-3**

**Date Collected: 06/12/19 12:22**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/24/19 18:51	06/26/19 01:08	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 01:08	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 01:08	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 01:08	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	105		25 - 150	06/24/19 18:51	06/26/19 01:08	1
13C4 PFOS	84		25 - 150	06/24/19 18:51	06/26/19 01:08	1
18O2 PFHxS	111		25 - 150	06/24/19 18:51	06/26/19 01:08	1
13C5 PFNA	77		25 - 150	06/24/19 18:51	06/26/19 01:08	1
13C4 PFHpA	120		25 - 150	06/24/19 18:51	06/26/19 01:08	1
13C3 PFBS	106		25 - 150	06/24/19 18:51	06/26/19 01:08	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33053**  
**Date Collected: 06/12/19 11:40**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-4**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>35</b>		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 01:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 01:27	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 01:27	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>1.4</b>	<b>J</b>	2.0	0.92	ng/L		06/24/19 18:51	06/26/19 01:27	1
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	108		25 - 150				06/24/19 18:51	06/26/19 01:27	1
13C4 PFOS	94		25 - 150				06/24/19 18:51	06/26/19 01:27	1
18O2 PFHxS	110		25 - 150				06/24/19 18:51	06/26/19 01:27	1
13C5 PFNA	82		25 - 150				06/24/19 18:51	06/26/19 01:27	1
13C4 PFHpA	120		25 - 150				06/24/19 18:51	06/26/19 01:27	1
13C3 PFBS	109		25 - 150				06/24/19 18:51	06/26/19 01:27	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33060**  
**Date Collected: 06/12/19 15:43**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-5**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>8.1</b>		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 01:45	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 01:45	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>2.1</b>		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 01:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 01:45	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOA	99		25 - 150				06/24/19 18:51	06/26/19 01:45	1
13C4 PFOS	88		25 - 150				06/24/19 18:51	06/26/19 01:45	1
18O2 PFHxS	107		25 - 150				06/24/19 18:51	06/26/19 01:45	1
13C5 PFNA	88		25 - 150				06/24/19 18:51	06/26/19 01:45	1
13C4 PFHpA	110		25 - 150				06/24/19 18:51	06/26/19 01:45	1
13C3 PFBS	102		25 - 150				06/24/19 18:51	06/26/19 01:45	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33059**  
**Date Collected: 06/12/19 16:15**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-6**  
**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		06/24/19 18:51	06/26/19 02:04	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 02:04	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 02:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 02:04	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	100		25 - 150	06/24/19 18:51	06/26/19 02:04	1
13C4 PFOS	90		25 - 150	06/24/19 18:51	06/26/19 02:04	1
18O2 PFHxS	104		25 - 150	06/24/19 18:51	06/26/19 02:04	1
13C5 PFNA	75		25 - 150	06/24/19 18:51	06/26/19 02:04	1
13C4 PFHpA	108		25 - 150	06/24/19 18:51	06/26/19 02:04	1
13C3 PFBS	99		25 - 150	06/24/19 18:51	06/26/19 02:04	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 93063**  
**Date Collected: 06/12/19 13:20**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-7**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>22</b>		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 02:22	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 02:22	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>3.1</b>		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 02:22	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>1.9</b>	<b>J</b>	2.0	0.92	ng/L		06/24/19 18:51	06/26/19 02:22	1
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	104		25 - 150				06/24/19 18:51	06/26/19 02:22	1
13C4 PFOS	95		25 - 150				06/24/19 18:51	06/26/19 02:22	1
18O2 PFHxS	106		25 - 150				06/24/19 18:51	06/26/19 02:22	1
13C5 PFNA	91		25 - 150				06/24/19 18:51	06/26/19 02:22	1
13C4 PFHpA	111		25 - 150				06/24/19 18:51	06/26/19 02:22	1
13C3 PFBS	101		25 - 150				06/24/19 18:51	06/26/19 02:22	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33063**  
**Date Collected: 06/12/19 13:30**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-8**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>21</b>		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 02:40	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 02:40	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>3.4</b>		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 02:40	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>1.9 J</b>		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 02:40	1
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	99		25 - 150				06/24/19 18:51	06/26/19 02:40	1
13C4 PFOS	104		25 - 150				06/24/19 18:51	06/26/19 02:40	1
18O2 PFHxS	110		25 - 150				06/24/19 18:51	06/26/19 02:40	1
13C5 PFNA	98		25 - 150				06/24/19 18:51	06/26/19 02:40	1
13C4 PFHpA	114		25 - 150				06/24/19 18:51	06/26/19 02:40	1
13C3 PFBS	101		25 - 150				06/24/19 18:51	06/26/19 02:40	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33002**  
**Date Collected: 06/12/19 16:50**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-9**  
**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		06/24/19 18:51	06/26/19 02:59	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 02:59	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 02:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 02:59	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	101		25 - 150	06/24/19 18:51	06/26/19 02:59	1
13C4 PFOS	69		25 - 150	06/24/19 18:51	06/26/19 02:59	1
18O2 PFHxS	107		25 - 150	06/24/19 18:51	06/26/19 02:59	1
13C5 PFNA	62		25 - 150	06/24/19 18:51	06/26/19 02:59	1
13C4 PFHpA	111		25 - 150	06/24/19 18:51	06/26/19 02:59	1
13C3 PFBS	101		25 - 150	06/24/19 18:51	06/26/19 02:59	1



# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33066**

**Lab Sample ID: 320-51422-10**

Date Collected: 06/12/19 12:56

Matrix: Water

Date Received: 06/18/19 10:30

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>36</b>		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 03:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 03:17	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>4.3</b>		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 03:17	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>2.3</b>		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 03:17	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOA	100		25 - 150				06/24/19 18:51	06/26/19 03:17	1
13C4 PFOS	80		25 - 150				06/24/19 18:51	06/26/19 03:17	1
18O2 PFHxS	105		25 - 150				06/24/19 18:51	06/26/19 03:17	1
13C5 PFNA	73		25 - 150				06/24/19 18:51	06/26/19 03:17	1
13C4 PFHpA	109		25 - 150				06/24/19 18:51	06/26/19 03:17	1
13C3 PFBS	101		25 - 150				06/24/19 18:51	06/26/19 03:17	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33061**

**Lab Sample ID: 320-51422-11**

**Date Collected: 06/13/19 09:46**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/24/19 18:51	06/26/19 03:54	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 03:54	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 03:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 03:54	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	92		25 - 150	06/24/19 18:51	06/26/19 03:54	1
13C4 PFOS	51		25 - 150	06/24/19 18:51	06/26/19 03:54	1
18O2 PFHxS	105		25 - 150	06/24/19 18:51	06/26/19 03:54	1
13C5 PFNA	54		25 - 150	06/24/19 18:51	06/26/19 03:54	1
13C4 PFHpA	110		25 - 150	06/24/19 18:51	06/26/19 03:54	1
13C3 PFBS	102		25 - 150	06/24/19 18:51	06/26/19 03:54	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32617**  
**Date Collected: 06/13/19 10:47**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-12**  
**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		06/24/19 18:51	06/26/19 04:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 04:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 04:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 04:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	89		25 - 150				06/24/19 18:51	06/26/19 04:13	1
13C4 PFOS	65		25 - 150				06/24/19 18:51	06/26/19 04:13	1
18O2 PFHxS	109		25 - 150				06/24/19 18:51	06/26/19 04:13	1
13C5 PFNA	56		25 - 150				06/24/19 18:51	06/26/19 04:13	1
13C4 PFHpA	109		25 - 150				06/24/19 18:51	06/26/19 04:13	1
13C3 PFBS	100		25 - 150				06/24/19 18:51	06/26/19 04:13	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33068**  
**Date Collected: 06/13/19 14:08**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-13**  
**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		06/26/19 05:54	06/29/19 10:00	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 05:54	06/29/19 10:00	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 05:54	06/29/19 10:00	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 05:54	06/29/19 10:00	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	86		25 - 150	06/26/19 05:54	06/29/19 10:00	1
13C4 PFOS	51		25 - 150	06/26/19 05:54	06/29/19 10:00	1
18O2 PFHxS	104		25 - 150	06/26/19 05:54	06/29/19 10:00	1
13C5 PFNA	44		25 - 150	06/26/19 05:54	06/29/19 10:00	1
13C4 PFHpA	108		25 - 150	06/26/19 05:54	06/29/19 10:00	1
13C3 PFBS	102		25 - 150	06/26/19 05:54	06/29/19 10:00	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33052**  
**Date Collected: 06/13/19 15:41**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-14**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/26/19 05:54	06/29/19 10:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 05:54	06/29/19 10:18	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 05:54	06/29/19 10:18	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 05:54	06/29/19 10:18	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	90		25 - 150	06/26/19 05:54	06/29/19 10:18	1
13C4 PFOS	50		25 - 150	06/26/19 05:54	06/29/19 10:18	1
18O2 PFHxS	107		25 - 150	06/26/19 05:54	06/29/19 10:18	1
13C5 PFNA	51		25 - 150	06/26/19 05:54	06/29/19 10:18	1
13C4 PFHpA	106		25 - 150	06/26/19 05:54	06/29/19 10:18	1
13C3 PFBS	103		25 - 150	06/26/19 05:54	06/29/19 10:18	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32609**

**Lab Sample ID: 320-51422-15**

**Date Collected: 06/11/19 18:10**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/24/19 18:51	06/25/19 23:17	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/25/19 23:17	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/25/19 23:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/25/19 23:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	104		25 - 150	06/24/19 18:51	06/25/19 23:17	1
13C4 PFOS	92		25 - 150	06/24/19 18:51	06/25/19 23:17	1
18O2 PFHxS	119		25 - 150	06/24/19 18:51	06/25/19 23:17	1
13C5 PFNA	94		25 - 150	06/24/19 18:51	06/25/19 23:17	1
13C4 PFHpA	113		25 - 150	06/24/19 18:51	06/25/19 23:17	1
13C3 PFBS	108		25 - 150	06/24/19 18:51	06/25/19 23:17	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32606**  
**Date Collected: 06/11/19 18:56**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-16**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/24/19 18:51	06/25/19 23:36	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/25/19 23:36	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/25/19 23:36	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/25/19 23:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	109		25 - 150				06/24/19 18:51	06/25/19 23:36	1
13C4 PFOS	99		25 - 150				06/24/19 18:51	06/25/19 23:36	1
18O2 PFHxS	106		25 - 150				06/24/19 18:51	06/25/19 23:36	1
13C5 PFNA	93		25 - 150				06/24/19 18:51	06/25/19 23:36	1
13C4 PFHpA	111		25 - 150				06/24/19 18:51	06/25/19 23:36	1
13C3 PFBS	101		25 - 150				06/24/19 18:51	06/25/19 23:36	1



# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32608**  
**Date Collected: 06/11/19 17:29**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-17**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/24/19 18:51	06/26/19 00:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/26/19 00:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/26/19 00:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/26/19 00:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA	101		25 - 150				06/24/19 18:51	06/26/19 00:13	1
13C4 PFOS	89		25 - 150				06/24/19 18:51	06/26/19 00:13	1
18O2 PFHxS	104		25 - 150				06/24/19 18:51	06/26/19 00:13	1
13C5 PFNA	80		25 - 150				06/24/19 18:51	06/26/19 00:13	1
13C4 PFHpA	107		25 - 150				06/24/19 18:51	06/26/19 00:13	1
13C3 PFBS	100		25 - 150				06/24/19 18:51	06/26/19 00:13	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33065**  
Date Collected: 06/13/19 12:12  
Date Received: 06/18/19 10:30

**Lab Sample ID: 320-51422-18**  
Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>25</b>		2.0	0.87	ng/L		06/26/19 06:02	06/29/19 12:09	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 12:09	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>4.5</b>		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 12:09	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>2.4</b>		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 12:09	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C4 PFOA	97		25 - 150				06/26/19 06:02	06/29/19 12:09	1
13C4 PFOS	79		25 - 150				06/26/19 06:02	06/29/19 12:09	1
18O2 PFHxS	113		25 - 150				06/26/19 06:02	06/29/19 12:09	1
13C5 PFNA	74		25 - 150				06/26/19 06:02	06/29/19 12:09	1
13C4 PFHpA	118		25 - 150				06/26/19 06:02	06/29/19 12:09	1
13C3 PFBS	103		25 - 150				06/26/19 06:02	06/29/19 12:09	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 93056**  
**Date Collected: 06/13/19 14:58**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-19**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>13</b>		2.0	0.87	ng/L		06/26/19 06:02	06/29/19 12:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 12:27	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>2.4</b>		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 12:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 12:27	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	95		25 - 150	06/26/19 06:02	06/29/19 12:27	1
13C4 PFOS	89		25 - 150	06/26/19 06:02	06/29/19 12:27	1
18O2 PFHxS	109		25 - 150	06/26/19 06:02	06/29/19 12:27	1
13C5 PFNA	81		25 - 150	06/26/19 06:02	06/29/19 12:27	1
13C4 PFHpA	113		25 - 150	06/26/19 06:02	06/29/19 12:27	1
13C3 PFBS	103		25 - 150	06/26/19 06:02	06/29/19 12:27	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33056**  
**Date Collected: 06/13/19 15:08**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-20**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>13</b>		2.0	0.87	ng/L		06/26/19 06:02	06/29/19 12:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 12:46	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>2.3</b>		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 12:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 12:46	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	105		25 - 150	06/26/19 06:02	06/29/19 12:46	1
13C4 PFOS	90		25 - 150	06/26/19 06:02	06/29/19 12:46	1
18O2 PFHxS	111		25 - 150	06/26/19 06:02	06/29/19 12:46	1
13C5 PFNA	78		25 - 150	06/26/19 06:02	06/29/19 12:46	1
13C4 PFHpA	111		25 - 150	06/26/19 06:02	06/29/19 12:46	1
13C3 PFBS	104		25 - 150	06/26/19 06:02	06/29/19 12:46	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33064**  
**Date Collected: 06/13/19 13:34**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-21**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>12</b>		2.0	0.87	ng/L		06/26/19 06:02	06/29/19 13:04	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 13:04	1
<b>Perfluoroheptanoic acid (PFHpA)</b>	<b>1.7</b>	<b>J</b>	2.0	0.80	ng/L		06/26/19 06:02	06/29/19 13:04	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>1.4</b>	<b>J I</b>	2.0	0.92	ng/L		06/26/19 06:02	06/29/19 13:04	1
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	108		25 - 150				06/26/19 06:02	06/29/19 13:04	1
13C4 PFOS	91		25 - 150				06/26/19 06:02	06/29/19 13:04	1
18O2 PFHxS	116		25 - 150				06/26/19 06:02	06/29/19 13:04	1
13C5 PFNA	94		25 - 150				06/26/19 06:02	06/29/19 13:04	1
13C4 PFHpA	117		25 - 150				06/26/19 06:02	06/29/19 13:04	1
13C3 PFBS	109		25 - 150				06/26/19 06:02	06/29/19 13:04	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33004**

**Lab Sample ID: 320-51422-22**

**Date Collected: 06/13/19 15:53**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/26/19 06:02	06/29/19 13:23	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 13:23	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 13:23	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 13:23	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	104		25 - 150	06/26/19 06:02	06/29/19 13:23	1
13C4 PFOS	77		25 - 150	06/26/19 06:02	06/29/19 13:23	1
18O2 PFHxS	111		25 - 150	06/26/19 06:02	06/29/19 13:23	1
13C5 PFNA	79		25 - 150	06/26/19 06:02	06/29/19 13:23	1
13C4 PFHpA	109		25 - 150	06/26/19 06:02	06/29/19 13:23	1
13C3 PFBS	107		25 - 150	06/26/19 06:02	06/29/19 13:23	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32618**

**Lab Sample ID: 320-51422-23**

**Date Collected: 06/13/19 11:32**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

**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		06/26/19 06:02	06/29/19 13:41	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 13:41	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 13:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 13:41	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOA	92		25 - 150	06/26/19 06:02	06/29/19 13:41	1
13C4 PFOS	90		25 - 150	06/26/19 06:02	06/29/19 13:41	1
18O2 PFHxS	117		25 - 150	06/26/19 06:02	06/29/19 13:41	1
13C5 PFNA	82		25 - 150	06/26/19 06:02	06/29/19 13:41	1
13C4 PFHpA	114		25 - 150	06/26/19 06:02	06/29/19 13:41	1
13C3 PFBS	104		25 - 150	06/26/19 06:02	06/29/19 13:41	1



# Isotope Dilution Summary

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFOA (25-150)	PFOS (25-150)	PFHxS (25-150)	PFNA (25-150)	PFHpA (25-150)	3C3-PFBs (25-150)
320-51422-1	32616	94	82	99	78	95	88
320-51422-2	33045	106	89	103	81	106	99
320-51422-3	32615	105	84	111	77	120	106
320-51422-4	33053	108	94	110	82	120	109
320-51422-5	33060	99	88	107	88	110	102
320-51422-6	33059	100	90	104	75	108	99
320-51422-7	93063	104	95	106	91	111	101
320-51422-8	33063	99	104	110	98	114	101
320-51422-9	33002	101	69	107	62	111	101
320-51422-10	33066	100	80	105	73	109	101
320-51422-11	33061	92	51	105	54	110	102
320-51422-12	32617	89	65	109	56	109	100
320-51422-13	33068	86	51	104	44	108	102
320-51422-14	33052	90	50	107	51	106	103
320-51422-15	32609	104	92	119	94	113	108
320-51422-16	32606	109	99	106	93	111	101
320-51422-17	32608	101	89	104	80	107	100
320-51422-18	33065	97	79	113	74	118	103
320-51422-19	93056	95	89	109	81	113	103
320-51422-20	33056	105	90	111	78	111	104
320-51422-21	33064	108	91	116	94	117	109
320-51422-22	33004	104	77	111	79	109	107
320-51422-23	32618	92	90	117	82	114	104
LCS 320-303445/2-A	Lab Control Sample	96	92	97	85	99	90
LCS 320-303758/2-A	Lab Control Sample	104	101	112	91	109	99
LCS 320-303759/2-A	Lab Control Sample	112	105	120	91	124	110
LCSD 320-303445/3-A	Lab Control Sample Dup	107	101	109	101	109	101
LCSD 320-303758/3-A	Lab Control Sample Dup	109	109	118	87	119	111
LCSD 320-303759/3-A	Lab Control Sample Dup	106	96	116	97	116	111
MB 320-303445/1-A	Method Blank	115	102	113	99	111	106
MB 320-303758/1-A	Method Blank	101	105	116	93	120	107
MB 320-303759/1-A	Method Blank	117	112	116	96	113	107

### Surrogate Legend

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

# QC Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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

**Lab Sample ID: MB 320-303445/1-A**  
**Matrix: Water**  
**Analysis Batch: 303736**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 303445**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/24/19 18:51	06/25/19 20:50	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/24/19 18:51	06/25/19 20:50	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/24/19 18:51	06/25/19 20:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/24/19 18:51	06/25/19 20:50	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFOA	115		25 - 150	06/24/19 18:51	06/25/19 20:50	1
13C4 PFOS	102		25 - 150	06/24/19 18:51	06/25/19 20:50	1
18O2 PFHxS	113		25 - 150	06/24/19 18:51	06/25/19 20:50	1
13C5 PFNA	99		25 - 150	06/24/19 18:51	06/25/19 20:50	1
13C4 PFHpA	111		25 - 150	06/24/19 18:51	06/25/19 20:50	1
13C3 PFBS	106		25 - 150	06/24/19 18:51	06/25/19 20:50	1

**Lab Sample ID: LCS 320-303445/2-A**  
**Matrix: Water**  
**Analysis Batch: 303736**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 303445**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorononanoic acid (PFNA)	20.0	17.9		ng/L		89	73 - 147
Perfluoroheptanoic acid (PFHpA)	20.0	15.5		ng/L		77	71 - 138
Perfluorobutanesulfonic acid (PFBS)	17.7	15.8		ng/L		89	72 - 151

Isotope Dilution	LCS	LCS	Limits
	%Recovery	Qualifier	
13C4 PFOA	96		25 - 150
13C4 PFOS	92		25 - 150
18O2 PFHxS	97		25 - 150
13C5 PFNA	85		25 - 150
13C4 PFHpA	99		25 - 150
13C3 PFBS	90		25 - 150

**Lab Sample ID: LCSD 320-303445/3-A**  
**Matrix: Water**  
**Analysis Batch: 303736**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 303445**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	RPD
									Limit
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.6		ng/L		86	73 - 157	5	30
Perfluorononanoic acid (PFNA)	20.0	17.7		ng/L		88	73 - 147	1	30
Perfluoroheptanoic acid (PFHpA)	20.0	17.6		ng/L		88	71 - 138	13	30
Perfluorobutanesulfonic acid (PFBS)	17.7	15.6		ng/L		88	72 - 151	1	30

Isotope Dilution	LCSD	LCSD	Limits
	%Recovery	Qualifier	
13C4 PFOA	107		25 - 150
13C4 PFOS	101		25 - 150
18O2 PFHxS	109		25 - 150
13C5 PFNA	101		25 - 150

Eurofins TestAmerica, Sacramento

# QC Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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

**Lab Sample ID: LCSD 320-303445/3-A**  
**Matrix: Water**  
**Analysis Batch: 303736**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 303445**

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C4 PFHpA	109		25 - 150
13C3 PFBS	101		25 - 150

**Lab Sample ID: MB 320-303758/1-A**  
**Matrix: Water**  
**Analysis Batch: 304587**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 303758**

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/26/19 05:54	06/29/19 03:14	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 05:54	06/29/19 03:14	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 05:54	06/29/19 03:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 05:54	06/29/19 03:14	1

Isotope Dilution	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C4 PFOA	101		25 - 150	06/26/19 05:54	06/29/19 03:14	1
13C4 PFOS	105		25 - 150	06/26/19 05:54	06/29/19 03:14	1
18O2 PFHxS	116		25 - 150	06/26/19 05:54	06/29/19 03:14	1
13C5 PFNA	93		25 - 150	06/26/19 05:54	06/29/19 03:14	1
13C4 PFHpA	120		25 - 150	06/26/19 05:54	06/29/19 03:14	1
13C3 PFBS	107		25 - 150	06/26/19 05:54	06/29/19 03:14	1

**Lab Sample ID: LCS 320-303758/2-A**  
**Matrix: Water**  
**Analysis Batch: 304587**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 303758**

Analyte	Spike Added	LCS		Unit	D	%Rec	%Rec.	Limits
		Result	Qualifier					
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.1		ng/L		83		73 - 157
Perfluorononanoic acid (PFNA)	20.0	19.0		ng/L		95		73 - 147
Perfluoroheptanoic acid (PFHpA)	20.0	17.6		ng/L		88		71 - 138
Perfluorobutanesulfonic acid (PFBS)	17.7	15.5		ng/L		88		72 - 151

Isotope Dilution	LCS		Limits
	%Recovery	Qualifier	
13C4 PFOA	104		25 - 150
13C4 PFOS	101		25 - 150
18O2 PFHxS	112		25 - 150
13C5 PFNA	91		25 - 150
13C4 PFHpA	109		25 - 150
13C3 PFBS	99		25 - 150

**Lab Sample ID: LCSD 320-303758/3-A**  
**Matrix: Water**  
**Analysis Batch: 304587**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 303758**

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec.	Limits	RPD	
		Result	Qualifier						RPD	Limit
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.0		ng/L		82		73 - 157	1	30
Perfluorononanoic acid (PFNA)	20.0	18.3		ng/L		91		73 - 147	4	30
Perfluoroheptanoic acid (PFHpA)	20.0	16.1		ng/L		81		71 - 138	9	30

Eurofins TestAmerica, Sacramento

# QC Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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

**Lab Sample ID: LCSD 320-303758/3-A**  
**Matrix: Water**  
**Analysis Batch: 304587**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 303758**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	17.7	13.6		ng/L		77	72 - 151	13	30
<b>LCSD LCSD</b>									
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>						
13C4 PFOA	109		25 - 150						
13C4 PFOS	109		25 - 150						
18O2 PFHxS	118		25 - 150						
13C5 PFNA	87		25 - 150						
13C4 PFHpA	119		25 - 150						
13C3 PFBS	111		25 - 150						

**Lab Sample ID: MB 320-303759/1-A**  
**Matrix: Water**  
**Analysis Batch: 304589**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 303759**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.87	ng/L		06/26/19 06:02	06/29/19 11:13	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.65	ng/L		06/26/19 06:02	06/29/19 11:13	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.80	ng/L		06/26/19 06:02	06/29/19 11:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.92	ng/L		06/26/19 06:02	06/29/19 11:13	1
<b>MB MB</b>									
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				<b>Prepared</b>	<b>Analyzed</b>	<b>Dil Fac</b>
13C4 PFOA	117		25 - 150				06/26/19 06:02	06/29/19 11:13	1
13C4 PFOS	112		25 - 150				06/26/19 06:02	06/29/19 11:13	1
18O2 PFHxS	116		25 - 150				06/26/19 06:02	06/29/19 11:13	1
13C5 PFNA	96		25 - 150				06/26/19 06:02	06/29/19 11:13	1
13C4 PFHpA	113		25 - 150				06/26/19 06:02	06/29/19 11:13	1
13C3 PFBS	107		25 - 150				06/26/19 06:02	06/29/19 11:13	1

**Lab Sample ID: LCS 320-303759/2-A**  
**Matrix: Water**  
**Analysis Batch: 304589**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 303759**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorohexanesulfonic acid (PFHxS)	18.2	15.0		ng/L		82	73 - 157
Perfluorononanoic acid (PFNA)	20.0	19.1		ng/L		96	73 - 147
Perfluoroheptanoic acid (PFHpA)	20.0	16.5		ng/L		82	71 - 138
Perfluorobutanesulfonic acid (PFBS)	17.7	14.5		ng/L		82	72 - 151
<b>LCS LCS</b>							
<b>Isotope Dilution</b>	<b>%Recovery</b>	<b>Qualifier</b>	<b>Limits</b>				
13C4 PFOA	112		25 - 150				
13C4 PFOS	105		25 - 150				
18O2 PFHxS	120		25 - 150				
13C5 PFNA	91		25 - 150				
13C4 PFHpA	124		25 - 150				
13C3 PFBS	110		25 - 150				

# QC Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakutat PFAS

Job ID: 320-51422-1

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

**Lab Sample ID: LCSD 320-303759/3-A**

**Matrix: Water**

**Analysis Batch: 304589**

**Client Sample ID: Lab Control Sample Dup**

**Prep Type: Total/NA**

**Prep Batch: 303759**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits		RPD	
							Lower	Upper	RPD	Limit
Perfluorohexanesulfonic acid (PFHxS)	18.2	16.0		ng/L		88	73	157	7	30
Perfluorononanoic acid (PFNA)	20.0	17.0		ng/L		85	73	147	12	30
Perfluoroheptanoic acid (PFHpA)	20.0	16.8		ng/L		84	71	138	2	30
Perfluorobutanesulfonic acid (PFBS)	17.7	14.9		ng/L		84	72	151	2	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
<sup>13</sup> C4 PFOA	106		25 - 150
<sup>13</sup> C4 PFOS	96		25 - 150
<sup>18</sup> O2 PFHxS	116		25 - 150
<sup>13</sup> C5 PFNA	97		25 - 150
<sup>13</sup> C4 PFHpA	116		25 - 150
<sup>13</sup> C3 PFBS	111		25 - 150

# QC Association Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## LCMS

### Prep Batch: 303445

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-1	32616	Total/NA	Water	PFAS Prep	
320-51422-2	33045	Total/NA	Water	PFAS Prep	
320-51422-3	32615	Total/NA	Water	PFAS Prep	
320-51422-4	33053	Total/NA	Water	PFAS Prep	
320-51422-5	33060	Total/NA	Water	PFAS Prep	
320-51422-6	33059	Total/NA	Water	PFAS Prep	
320-51422-7	93063	Total/NA	Water	PFAS Prep	
320-51422-8	33063	Total/NA	Water	PFAS Prep	
320-51422-9	33002	Total/NA	Water	PFAS Prep	
320-51422-10	33066	Total/NA	Water	PFAS Prep	
320-51422-11	33061	Total/NA	Water	PFAS Prep	
320-51422-12	32617	Total/NA	Water	PFAS Prep	
320-51422-15	32609	Total/NA	Water	PFAS Prep	
320-51422-16	32606	Total/NA	Water	PFAS Prep	
320-51422-17	32608	Total/NA	Water	PFAS Prep	
MB 320-303445/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303445/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303445/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### Analysis Batch: 303736

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-1	32616	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-2	33045	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-3	32615	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-4	33053	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-5	33060	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-6	33059	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-7	93063	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-8	33063	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-9	33002	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-10	33066	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-11	33061	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-12	32617	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-15	32609	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-16	32606	Total/NA	Water	WS-LC-0025	303445
				At1	
320-51422-17	32608	Total/NA	Water	WS-LC-0025	303445
				At1	
MB 320-303445/1-A	Method Blank	Total/NA	Water	WS-LC-0025	303445
				At1	
LCS 320-303445/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025	303445
				At1	

Eurofins TestAmerica, Sacramento

# QC Association Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## LCMS (Continued)

### Analysis Batch: 303736 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-303445/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303445

### Prep Batch: 303758

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-13	33068	Total/NA	Water	PFAS Prep	
320-51422-14	33052	Total/NA	Water	PFAS Prep	
MB 320-303758/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303758/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303758/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### Prep Batch: 303759

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-18	33065	Total/NA	Water	PFAS Prep	
320-51422-19	93056	Total/NA	Water	PFAS Prep	
320-51422-20	33056	Total/NA	Water	PFAS Prep	
320-51422-21	33064	Total/NA	Water	PFAS Prep	
320-51422-22	33004	Total/NA	Water	PFAS Prep	
320-51422-23	32618	Total/NA	Water	PFAS Prep	
MB 320-303759/1-A	Method Blank	Total/NA	Water	PFAS Prep	
LCS 320-303759/2-A	Lab Control Sample	Total/NA	Water	PFAS Prep	
LCSD 320-303759/3-A	Lab Control Sample Dup	Total/NA	Water	PFAS Prep	

### Analysis Batch: 304587

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-13	33068	Total/NA	Water	WS-LC-0025 At1	303758
320-51422-14	33052	Total/NA	Water	WS-LC-0025 At1	303758
MB 320-303758/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303758
LCS 320-303758/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303758
LCSD 320-303758/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303758

### Analysis Batch: 304589

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-51422-18	33065	Total/NA	Water	WS-LC-0025 At1	303759
320-51422-19	93056	Total/NA	Water	WS-LC-0025 At1	303759
320-51422-20	33056	Total/NA	Water	WS-LC-0025 At1	303759
320-51422-21	33064	Total/NA	Water	WS-LC-0025 At1	303759
320-51422-22	33004	Total/NA	Water	WS-LC-0025 At1	303759
320-51422-23	32618	Total/NA	Water	WS-LC-0025 At1	303759
MB 320-303759/1-A	Method Blank	Total/NA	Water	WS-LC-0025 At1	303759
LCS 320-303759/2-A	Lab Control Sample	Total/NA	Water	WS-LC-0025 At1	303759

Eurofins TestAmerica, Sacramento

# QC Association Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

## LCMS (Continued)

### Analysis Batch: 304589 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 320-303759/3-A	Lab Control Sample Dup	Total/NA	Water	WS-LC-0025 At1	303759

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# Lab Chronicle

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 32616**  
**Date Collected: 06/12/19 13:41**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-1**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 00:31	P1N	TAL SAC

**Client Sample ID: 33045**  
**Date Collected: 06/12/19 17:12**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-2**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 00:50	P1N	TAL SAC

**Client Sample ID: 32615**  
**Date Collected: 06/12/19 12:22**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-3**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 01:08	P1N	TAL SAC

**Client Sample ID: 33053**  
**Date Collected: 06/12/19 11:40**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-4**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 01:27	P1N	TAL SAC

**Client Sample ID: 33060**  
**Date Collected: 06/12/19 15:43**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-5**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 01:45	P1N	TAL SAC

**Client Sample ID: 33059**  
**Date Collected: 06/12/19 16:15**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-6**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 02:04	P1N	TAL SAC

# Lab Chronicle

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 93063**  
**Date Collected: 06/12/19 13:20**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-7**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 02:22	P1N	TAL SAC

**Client Sample ID: 33063**  
**Date Collected: 06/12/19 13:30**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-8**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 02:40	P1N	TAL SAC

**Client Sample ID: 33002**  
**Date Collected: 06/12/19 16:50**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-9**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 02:59	P1N	TAL SAC

**Client Sample ID: 33066**  
**Date Collected: 06/12/19 12:56**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-10**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 03:17	P1N	TAL SAC

**Client Sample ID: 33061**  
**Date Collected: 06/13/19 09:46**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-11**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 03:54	P1N	TAL SAC

**Client Sample ID: 32617**  
**Date Collected: 06/13/19 10:47**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-12**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 04:13	P1N	TAL SAC

# Lab Chronicle

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 33068**  
**Date Collected: 06/13/19 14:08**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-13**  
**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	303758	06/26/19 05:54	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304587	06/29/19 10:00	GMK	TAL SAC

**Client Sample ID: 33052**  
**Date Collected: 06/13/19 15:41**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-14**  
**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	303758	06/26/19 05:54	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304587	06/29/19 10:18	GMK	TAL SAC

**Client Sample ID: 32609**  
**Date Collected: 06/11/19 18:10**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-15**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/25/19 23:17	P1N	TAL SAC

**Client Sample ID: 32606**  
**Date Collected: 06/11/19 18:56**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-16**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/25/19 23:36	P1N	TAL SAC

**Client Sample ID: 32608**  
**Date Collected: 06/11/19 17:29**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-17**  
**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	303445	06/24/19 18:51	CGF	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			303736	06/26/19 00:13	P1N	TAL SAC

**Client Sample ID: 33065**  
**Date Collected: 06/13/19 12:12**  
**Date Received: 06/18/19 10:30**

**Lab Sample ID: 320-51422-18**  
**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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 12:09	P1N	TAL SAC

# Lab Chronicle

Client: Shannon & Wilson, Inc  
Project/Site: Yakutat PFAS

Job ID: 320-51422-1

**Client Sample ID: 93056**

**Lab Sample ID: 320-51422-19**

**Date Collected: 06/13/19 14:58**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 12:27	P1N	TAL SAC

**Client Sample ID: 33056**

**Lab Sample ID: 320-51422-20**

**Date Collected: 06/13/19 15:08**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 12:46	P1N	TAL SAC

**Client Sample ID: 33064**

**Lab Sample ID: 320-51422-21**

**Date Collected: 06/13/19 13:34**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 13:04	P1N	TAL SAC

**Client Sample ID: 33004**

**Lab Sample ID: 320-51422-22**

**Date Collected: 06/13/19 15:53**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 13:23	P1N	TAL SAC

**Client Sample ID: 32618**

**Lab Sample ID: 320-51422-23**

**Date Collected: 06/13/19 11:32**

**Matrix: Water**

**Date Received: 06/18/19 10:30**

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	303759	06/26/19 06:02	MTN	TAL SAC
Total/NA	Analysis	WS-LC-0025 At1		1			304589	06/29/19 13:41	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: Yakutat PFAS

Job ID: 320-51422-1

## 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: Yakutat PFAS

Job ID: 320-51422-1

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: Yakutat PFAS

Job ID: 320-51422-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-51422-1	32616	Water	06/12/19 13:41	06/18/19 10:30	
320-51422-2	33045	Water	06/12/19 17:12	06/18/19 10:30	
320-51422-3	32615	Water	06/12/19 12:22	06/18/19 10:30	
320-51422-4	33053	Water	06/12/19 11:40	06/18/19 10:30	
320-51422-5	33060	Water	06/12/19 15:43	06/18/19 10:30	
320-51422-6	33059	Water	06/12/19 16:15	06/18/19 10:30	
320-51422-7	93063	Water	06/12/19 13:20	06/18/19 10:30	
320-51422-8	33063	Water	06/12/19 13:30	06/18/19 10:30	
320-51422-9	33002	Water	06/12/19 16:50	06/18/19 10:30	
320-51422-10	33066	Water	06/12/19 12:56	06/18/19 10:30	
320-51422-11	33061	Water	06/13/19 09:46	06/18/19 10:30	
320-51422-12	32617	Water	06/13/19 10:47	06/18/19 10:30	
320-51422-13	33068	Water	06/13/19 14:08	06/18/19 10:30	
320-51422-14	33052	Water	06/13/19 15:41	06/18/19 10:30	
320-51422-15	32609	Water	06/11/19 18:10	06/18/19 10:30	
320-51422-16	32606	Water	06/11/19 18:56	06/18/19 10:30	
320-51422-17	32608	Water	06/11/19 17:29	06/18/19 10:30	
320-51422-18	33065	Water	06/13/19 12:12	06/18/19 10:30	
320-51422-19	93056	Water	06/13/19 14:58	06/18/19 10:30	
320-51422-20	33056	Water	06/13/19 15:08	06/18/19 10:30	
320-51422-21	33064	Water	06/13/19 13:34	06/18/19 10:30	
320-51422-22	33004	Water	06/13/19 15:53	06/18/19 10:30	
320-51422-23	32618	Water	06/13/19 11:32	06/18/19 10:30	



# CHAIN-OF-CUSTODY RECORD

Analytical Methods (include preservative if used)

Quote No: WPL

J-Flags:  Yes  No

Turn Around Time:  
 Normal  Rush

Please Specify

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
32616		1341	6/12/19	X	groundwaters
33045		1712	6/12/19	X	
32615		1222	6/12/19	X	
33053		1140	6/12/19	X	
33060		1543	6/12/19	X	
33059		1615	6/12/19	X	
33063		1320	6/12/19	X	
33002		1650	6/12/19	X	
33066		1256	6/12/19	X	



**Project Information**

Number: 102896

Name: YAKUTAT PFAS

Contact: MXJ

Ongoing Project? Yes  No

Sampler: ADAMS, JMH

**Sample Receipt**

Total No. of Containers: 46

COC Seals/Intact? 0/N/A

Received Good Cond./Cold

Temp: 1.0°C

Delivery Method: Gold Strak

**Notes:**

Standard turnaround time

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>Michael Jaramila</u> Printed Name: <u>Michael Jaramila</u> Company: <u>Shannon + Wilson, Inc</u>	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: <u>1400</u> Date: <u>6/12/19</u>	Time: _____ Date: _____	Time: _____ Date: _____
Received By: 1. Signature: <u>[Signature]</u> Printed Name: <u>Jennifer Darlington</u> Company: <u>ETA W SAC</u>	Received By: 2. Signature: _____ Printed Name: _____ Company: _____	Received By: 3. Signature: _____ Printed Name: _____ Company: _____
Time: <u>1630</u> Date: <u>6/12/19</u>	Time: _____ Date: _____	Time: _____ Date: _____

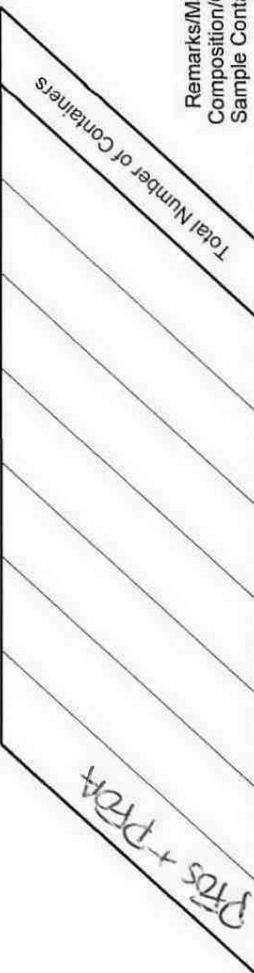
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report  
 Yellow - w/shipment - for consignee files  
 Pink - Shannon & Wilson - job file



# CHAIN-OF-CUSTODY RECORD

Laboratory TEST ANAVICA Page 2 of 3  
 Attn: D. ALLICES

Analytical Methods (include preservative if used)



Quote No: U11K

J-Flags:  Yes  No

Turn Around Time:  
 Normal  Rush

Please Specify

Sample Identity	Lab No.	Time	Date Sampled	Remarks/Matrix Composition/Grab? Sample Containers
33061		0946	6/13/19	2 ground water
32617		1047	6/13/19	
33068		1408	6/13/19	
33053		1541	6/13/19	
32609		1810	6/11/19	
32606		1856	6/11/19	
32608		1729	6/11/19	
33065		1212	6/13/19	
43056		1458	6/13/19	
33056		1508	6/13/19	

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>[Signature]</u> Time: <u>1400</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Michael Javarillo</u>	Printed Name: _____	Printed Name: _____
Company: <u>Shannon &amp; Wilson</u>	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: <u>[Signature]</u> Time: <u>1030</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Jennifer Livingston</u>	Printed Name: _____	Printed Name: _____
Company: <u>ETA W Sec</u>	Company: _____	Company: _____

**Sample Receipt**

Total No. of Containers: \_\_\_\_\_

COC Seals/Intact? Y/N/A

Received Good Copied/Coil [initials]

Temp: 56 pay

Delivery Method: \_\_\_\_\_

**Project Information**

Number: 102896

Name: YALUAT PTAS

Contact: MKT

Ongoing Project? Yes  No

Sampler: APM, SMH

**Notes:**

Standard turnaround time

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

# CHAIN-OF-CUSTODY RECORD

Laboratory TEST America Page 3 of 3  
 Attn: D. Hiltner

Analytical Methods (include preservative if used)

Quote No: \_\_\_\_\_  
 J-Flags:  Yes  No

Turn Around Time:  
 Normal  Rush  
 Please Specify \_\_\_\_\_

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers		Remarks/Matrix Composition/Grab? Sample Containers
				PTAS + PFOA		
33064		1334	6/13/19	X	2	groundwater
33004		1553	6/13/19	X	2	
32618		1132	6/13/19	X	2	

**Project Information**

Number: 102296  
 Name: YAPUKAT PTAS  
 Contact: MXJ  
 Ongoing Project? Yes  No   
 Sampler: ARM SMIT

**Sample Receipt**

Total No. of Containers: \_\_\_\_\_  
 COC Seals/Intact? Y/N/NA  
 Received Good Cond./Cold \_\_\_\_\_  
 Temp: 20.0°C  
 Delivery Method: \_\_\_\_\_

**Notes:**

Standard forward time

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>[Signature]</u> Time: <u>1400</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Michael James Hs</u> Date: <u>6/13/19</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: _____	Company: _____	Company: _____
Received By: 1.	Received By: 2.	Received By: 3.
Signature: <u>[Signature]</u> Time: <u>1050</u>	Signature: _____ Time: _____	Signature: _____ Time: _____
Printed Name: <u>Jennifer Darlington</u> Date: <u>6/13/19</u>	Printed Name: _____ Date: _____	Printed Name: _____ Date: _____
Company: <u>ETA W5ac</u>	Company: _____	Company: _____

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

## Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-51422-1

**Login Number: 51422**

**List Source: Eurofins TestAmerica, Sacramento**

**List Number: 1**

**Creator: Oropeza, Salvador**

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	102896
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	

**Laboratory Data Review Checklist**

Completed By:

Brittany Blood

Title:

Environmental Professional I

Date:

12/11/19

CS Report Name:

ADOT&PF Yakutat Airport Sitewide PFAS

Report Date:

July 12, 2019 & December 3, 2019

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Eurofins/TestAmerica Laboratories, Inc.

Laboratory Report Number:

320-51422-1 Rev.1 & Rev.3

ADEC File Number:

1530.38.022

Hazard Identification Number:

27090

1. Laboratory

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

Yes  No

Comments:

Eurofins/TestAmerica of Sacramento, CA is certified by the ADEC CSP for the analysis of PFOS and PFOA in soil and water samples by EPA Method 537.

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:

Network laboratories were not used for this work order.

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 6.0° C.

The “I” qualifier was applied to one or more samples due to transition mass ratios not meeting ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, the laboratory analyst used professional judgement to positively identify the analyte. Due to this uncertainty, the PFOA result for sample 33059 and the PFBS result for sample 330604 have been flagged ‘J\*’

A deviation from the Standard Operating Procedure (SOP) occurred. Details are as follows: Due to analyst oversight 11 samples were analyzed between the Continuing Calibration Verification (CCV) standards. The bracketing CCVs were within control limits; therefore there is no impact on the data.

Insufficient sample volume was available to perform a matrix spike/ matrix spike duplicate (MS/MSD) for the project preparation batches associated with this work order.

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

Yes  No

Comments:

c. Were all corrective actions documented?

Yes  No

Comments:

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, see above.

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes  No

Comments:

b. All applicable holding times met?

Yes  No

Comments:

c. All soils reported on a dry weight basis?

Yes  No

Comments:

N/A; soil samples were not submitted with this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes  No

Comments:

The reporting limit (RL) is less than applicable ADEC action level for drinking water and ADEC groundwater cleanup levels for PFOS and PFOA.

e. Data quality or usability affected?

Yes  No

Comments:

The data quality and usability were not affected.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes  No

Comments:

ii. All method blank results less than limit of quantitation (LOQ)?

Yes  No

Comments:

iii. If above LOQ, what samples are affected?

Comments:

None; PFAS compounds were not detected in method blank samples.

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.





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 33063/93063 and 33056/93056 were submitted with this work order.

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

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

Where R<sub>1</sub> = Sample Concentration  
R<sub>2</sub> = 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

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:

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:

## ANALYTICAL REPORT

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

Laboratory Job ID: 320-57280-1  
Client Project/Site: Yakotat Quarterly

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

Attn: Ann Marie Johnson



---

Authorized for release by:  
12/31/2019 3:42:50 PM

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

### LINKS

Review your project  
results through  
**TotalAccess**

Have a Question?



Visit us at:  
[www.testamericainc.com](http://www.testamericainc.com)

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

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

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



# Table of Contents

Cover Page . . . . .	1
Table of Contents . . . . .	2
Definitions/Glossary . . . . .	3
Case Narrative . . . . .	4
Detection Summary . . . . .	5
Client Sample Results . . . . .	6
Isotope Dilution Summary . . . . .	11
QC Sample Results . . . . .	12
QC Association Summary . . . . .	15
Lab Chronicle . . . . .	16
Certification Summary . . . . .	17
Method Summary . . . . .	18
Sample Summary . . . . .	19
Chain of Custody . . . . .	20
Receipt Checklists . . . . .	21

# Definitions/Glossary

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

## Qualifiers

### LCMS

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

# Case Narrative

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

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## Job ID: 320-57280-1

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### Laboratory: Eurofins TestAmerica, Sacramento

#### Narrative

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#### Job Narrative 320-57280-1

#### Receipt

The samples were received on 12/20/2019 10:40 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 6.0° C.

#### LCMS

Method 537 (modified): The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batch 320-348475 and analytical batch 320-348611 recovered outside control limits for the following analytes: HFPO-DA. The recoveries for this analyte in both the LCS and LCSD were within limits.

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 judgment was used to positively identify the analyte.

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 320-348475.

Method 3535: The following samples were observed to contain trizma prior to extraction: 33061 (320-57280-1), 33064 (320-57280-2), 33060 (320-57280-3), 33068 (320-57280-4) and 43068 (320-57280-5)

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: Yakotat Quarterly

Job ID: 320-57280-1

## Client Sample ID: 33061

## Lab Sample ID: 320-57280-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.32	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA

## Client Sample ID: 33064

## Lab Sample ID: 320-57280-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.35	J	2.0	0.20	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	14	B	2.0	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.8		2.0	0.54	ng/L	1		537 (modified)	Total/NA

## Client Sample ID: 33060

## Lab Sample ID: 320-57280-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	41		1.9	0.56	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.0		1.9	0.24	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	4.1		1.9	0.82	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.86	J I	1.9	0.26	ng/L	1		537 (modified)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	1.8	J	1.9	0.19	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	10	B	1.9	0.16	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	11		1.9	0.52	ng/L	1		537 (modified)	Total/NA

## Client Sample ID: 33068

## Lab Sample ID: 320-57280-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.27	J B	1.9	0.16	ng/L	1		537 (modified)	Total/NA

## Client Sample ID: 43068

## Lab Sample ID: 320-57280-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.34	J B	2.0	0.17	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento



# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 33061**  
**Date Collected: 12/17/19 12:46**  
**Date Received: 12/20/19 10:40**

**Lab Sample ID: 320-57280-1**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.80	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.27	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		12/30/19 06:26	12/31/19 04:10	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.32</b>	<b>J B</b>	1.9	0.16	ng/L		12/30/19 06:26	12/31/19 04:10	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		12/30/19 06:26	12/31/19 04:10	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		12/30/19 06:26	12/31/19 04:10	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		12/30/19 06:26	12/31/19 04:10	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/30/19 06:26	12/31/19 04:10	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	*	3.8	1.4	ng/L		12/30/19 06:26	12/31/19 04:10	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		12/30/19 06:26	12/31/19 04:10	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		12/30/19 06:26	12/31/19 04:10	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	97		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C4 PFHpA	89		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C4 PFOA	93		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C5 PFNA	96		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C2 PFDA	90		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C2 PFUnA	82		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C2 PFDoA	90		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C2 PFTeDA	81		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C3 PFBS	115		25 - 150	12/30/19 06:26	12/31/19 04:10	1
18O2 PFHxS	117		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C4 PFOS	112		25 - 150	12/30/19 06:26	12/31/19 04:10	1
d3-NMeFOSAA	97		25 - 150	12/30/19 06:26	12/31/19 04:10	1
d5-NEtFOSAA	100		25 - 150	12/30/19 06:26	12/31/19 04:10	1
13C3 HFPO-DA	75		25 - 150	12/30/19 06:26	12/31/19 04:10	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 33064**  
**Date Collected: 12/17/19 13:53**  
**Date Received: 12/20/19 10:40**

**Lab Sample ID: 320-57280-2**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.84	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/30/19 06:26	12/31/19 04:18	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		12/30/19 06:26	12/31/19 04:18	1
<b>Perfluorobutanesulfonic acid (PFBS)</b>	<b>0.35</b>	<b>J</b>	2.0	0.20	ng/L		12/30/19 06:26	12/31/19 04:18	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>14</b>	<b>B</b>	2.0	0.17	ng/L		12/30/19 06:26	12/31/19 04:18	1
<b>Perfluorooctanesulfonic acid (PFOS)</b>	<b>5.8</b>		2.0	0.54	ng/L		12/30/19 06:26	12/31/19 04:18	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		12/30/19 06:26	12/31/19 04:18	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		12/30/19 06:26	12/31/19 04:18	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/30/19 06:26	12/31/19 04:18	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	*	4.0	1.5	ng/L		12/30/19 06:26	12/31/19 04:18	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		12/30/19 06:26	12/31/19 04:18	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		12/30/19 06:26	12/31/19 04:18	1
<i>Isotope Dilution</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>				<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
13C2 PFHxA	97		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C4 PFHpA	90		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C4 PFOA	92		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C5 PFNA	90		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C2 PFDA	85		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C2 PFUnA	85		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C2 PFDoA	87		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C2 PFTeDA	85		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C3 PFBS	121		25 - 150				12/30/19 06:26	12/31/19 04:18	1
18O2 PFHxS	121		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C4 PFOS	118		25 - 150				12/30/19 06:26	12/31/19 04:18	1
d3-NMeFOSAA	96		25 - 150				12/30/19 06:26	12/31/19 04:18	1
d5-NEtFOSAA	100		25 - 150				12/30/19 06:26	12/31/19 04:18	1
13C3 HFPO-DA	93		25 - 150				12/30/19 06:26	12/31/19 04:18	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 33060**  
**Date Collected: 12/17/19 12:21**  
**Date Received: 12/20/19 10:40**

**Lab Sample ID: 320-57280-3**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	41		1.9	0.56	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluoroheptanoic acid (PFHpA)	5.0		1.9	0.24	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorooctanoic acid (PFOA)	4.1		1.9	0.82	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorononanoic acid (PFNA)	0.86	J I	1.9	0.26	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorobutanesulfonic acid (PFBS)	1.8	J	1.9	0.19	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorohexanesulfonic acid (PFHxS)	10	B	1.9	0.16	ng/L		12/30/19 06:26	12/31/19 04:26	1
Perfluorooctanesulfonic acid (PFOS)	11		1.9	0.52	ng/L		12/30/19 06:26	12/31/19 04:26	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		12/30/19 06:26	12/31/19 04:26	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	3.0	ng/L		12/30/19 06:26	12/31/19 04:26	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/30/19 06:26	12/31/19 04:26	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	*	3.8	1.4	ng/L		12/30/19 06:26	12/31/19 04:26	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		12/30/19 06:26	12/31/19 04:26	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		12/30/19 06:26	12/31/19 04:26	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	89		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C4 PFHpA	87		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C4 PFOA	86		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C5 PFNA	85		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C2 PFDA	89		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C2 PFUnA	86		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C2 PFDoA	87		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C2 PFTeDA	73		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C3 PFBS	111		25 - 150	12/30/19 06:26	12/31/19 04:26	1
18O2 PFHxS	113		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C4 PFOS	111		25 - 150	12/30/19 06:26	12/31/19 04:26	1
d3-NMeFOSAA	94		25 - 150	12/30/19 06:26	12/31/19 04:26	1
d5-NEtFOSAA	97		25 - 150	12/30/19 06:26	12/31/19 04:26	1
13C3 HFPO-DA	64		25 - 150	12/30/19 06:26	12/31/19 04:26	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 33068**  
**Date Collected: 12/17/19 16:29**  
**Date Received: 12/20/19 10:40**

**Lab Sample ID: 320-57280-4**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.28	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		12/30/19 06:26	12/31/19 04:34	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.27</b>	<b>J B</b>	1.9	0.16	ng/L		12/30/19 06:26	12/31/19 04:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.51	ng/L		12/30/19 06:26	12/31/19 04:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		19	1.8	ng/L		12/30/19 06:26	12/31/19 04:34	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		19	2.9	ng/L		12/30/19 06:26	12/31/19 04:34	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/30/19 06:26	12/31/19 04:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	*	3.8	1.4	ng/L		12/30/19 06:26	12/31/19 04:34	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		12/30/19 06:26	12/31/19 04:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.17	ng/L		12/30/19 06:26	12/31/19 04:34	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C4 PFHpA	85		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C4 PFOA	86		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C5 PFNA	83		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C2 PFDA	78		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C2 PFUnA	81		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C2 PFDoA	85		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C2 PFTeDA	75		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C3 PFBS	104		25 - 150	12/30/19 06:26	12/31/19 04:34	1
18O2 PFHxS	103		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C4 PFOS	101		25 - 150	12/30/19 06:26	12/31/19 04:34	1
d3-NMeFOSAA	84		25 - 150	12/30/19 06:26	12/31/19 04:34	1
d5-NEtFOSAA	90		25 - 150	12/30/19 06:26	12/31/19 04:34	1
13C3 HFPO-DA	80		25 - 150	12/30/19 06:26	12/31/19 04:34	1

# Client Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 43068**  
**Date Collected: 12/17/19 16:19**  
**Date Received: 12/20/19 10:40**

**Lab Sample ID: 320-57280-5**  
**Matrix: Water**

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.57	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.84	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/30/19 06:26	12/31/19 04:42	1
<b>Perfluorohexanesulfonic acid (PFHxS)</b>	<b>0.34</b>	<b>J B</b>	2.0	0.17	ng/L		12/30/19 06:26	12/31/19 04:42	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.53	ng/L		12/30/19 06:26	12/31/19 04:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		12/30/19 06:26	12/31/19 04:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		12/30/19 06:26	12/31/19 04:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/30/19 06:26	12/31/19 04:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND	*	3.9	1.5	ng/L		12/30/19 06:26	12/31/19 04:42	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		12/30/19 06:26	12/31/19 04:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		12/30/19 06:26	12/31/19 04:42	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	92		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C4 PFHpA	85		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C4 PFOA	94		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C5 PFNA	85		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C2 PFDA	81		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C2 PFUnA	84		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C2 PFDoA	86		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C2 PFTeDA	84		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C3 PFBS	111		25 - 150	12/30/19 06:26	12/31/19 04:42	1
18O2 PFHxS	111		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C4 PFOS	108		25 - 150	12/30/19 06:26	12/31/19 04:42	1
d3-NMeFOSAA	92		25 - 150	12/30/19 06:26	12/31/19 04:42	1
d5-NEtFOSAA	93		25 - 150	12/30/19 06:26	12/31/19 04:42	1
13C3 HFPO-DA	67		25 - 150	12/30/19 06:26	12/31/19 04:42	1

# Isotope Dilution Summary

Client: Shannon & Wilson, Inc  
 Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

## 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)	PFDaA (25-150)	PFTDA (25-150)
320-57280-1	33061	97	89	93	96	90	82	90	81
320-57280-2	33064	97	90	92	90	85	85	87	85
320-57280-3	33060	89	87	86	85	89	86	87	73
320-57280-4	33068	90	85	86	83	78	81	85	75
320-57280-5	43068	92	85	94	85	81	84	86	84
LCS 320-348475/2-A	Lab Control Sample	92	86	92	87	83	85	99	89
LCSD 320-348475/3-A	Lab Control Sample Dup	96	93	96	92	89	97	93	90
MB 320-348475/1-A	Method Blank	102	99	100	96	98	94	97	84

### Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	3C3-PFBs (25-150)	PFHxS (25-150)	PFOS (25-150)	-NMeFOS (25-150)	-NEtFOS (25-150)	HFPODA (25-150)
320-57280-1	33061	115	117	112	97	100	75
320-57280-2	33064	121	121	118	96	100	93
320-57280-3	33060	111	113	111	94	97	64
320-57280-4	33068	104	103	101	84	90	80
320-57280-5	43068	111	111	108	92	93	67
LCS 320-348475/2-A	Lab Control Sample	115	121	117	98	101	68
LCSD 320-348475/3-A	Lab Control Sample Dup	120	121	123	101	104	101
MB 320-348475/1-A	Method Blank	121	126	124	103	110	81

#### Surrogate Legend

- PFHxA = 13C2 PFHxA
- PFHpA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- 13C3-PFBs = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3-NMeFOSAA = d3-NMeFOSAA
- d5-NEtFOSAA = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

# QC Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

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

**Lab Sample ID: MB 320-348475/1-A**  
**Matrix: Water**  
**Analysis Batch: 348611**

**Client Sample ID: Method Blank**  
**Prep Type: Total/NA**  
**Prep Batch: 348475**

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.29	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorohexanesulfonic acid (PFHxS)	0.309	J	2.0	0.17	ng/L		12/30/19 06:26	12/31/19 03:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		12/30/19 06:26	12/31/19 03:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		20	1.9	ng/L		12/30/19 06:26	12/31/19 03:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		20	3.1	ng/L		12/30/19 06:26	12/31/19 03:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/30/19 06:26	12/31/19 03:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		12/30/19 06:26	12/31/19 03:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		12/30/19 06:26	12/31/19 03:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.18	ng/L		12/30/19 06:26	12/31/19 03:46	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	102		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C4 PFHpA	99		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C4 PFOA	100		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C5 PFNA	96		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C2 PFDA	98		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C2 PFUnA	94		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C2 PFDoA	97		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C2 PFTeDA	84		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C3 PFBS	121		25 - 150	12/30/19 06:26	12/31/19 03:46	1
18O2 PFHxS	126		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C4 PFOS	124		25 - 150	12/30/19 06:26	12/31/19 03:46	1
d3-NMeFOSAA	103		25 - 150	12/30/19 06:26	12/31/19 03:46	1
d5-NEtFOSAA	110		25 - 150	12/30/19 06:26	12/31/19 03:46	1
13C3 HFPO-DA	81		25 - 150	12/30/19 06:26	12/31/19 03:46	1

**Lab Sample ID: LCS 320-348475/2-A**  
**Matrix: Water**  
**Analysis Batch: 348611**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 348475**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	40.0	47.5		ng/L		119	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	44.8		ng/L		112	70 - 130
Perfluorononanoic acid (PFNA)	40.0	45.7		ng/L		114	75 - 135

Eurofins TestAmerica, Sacramento



# QC Sample Results

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

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

**Lab Sample ID: LCS 320-348475/2-A**  
**Matrix: Water**  
**Analysis Batch: 348611**

**Client Sample ID: Lab Control Sample**  
**Prep Type: Total/NA**  
**Prep Batch: 348475**

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorodecanoic acid (PFDA)	40.0	43.5		ng/L		109	76 - 136
Perfluoroundecanoic acid (PFUnA)	40.0	39.3		ng/L		98	68 - 128
Perfluorododecanoic acid (PFDoA)	40.0	39.7		ng/L		99	71 - 131
Perfluorotridecanoic acid (PFTriA)	40.0	40.2		ng/L		100	71 - 131
Perfluorotetradecanoic acid (PFTeA)	40.0	44.0		ng/L		110	70 - 130
Perfluorobutanesulfonic acid (PFBS)	35.4	38.9		ng/L		110	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.2		ng/L		99	59 - 119
Perfluorooctanesulfonic acid (PFOS)	37.1	41.3		ng/L		111	70 - 130
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid	37.3	39.7		ng/L		106	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	60.3		ng/L		151	51 - 173
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	40.2		ng/L		107	54 - 114
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	37.4		ng/L		99	79 - 139

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFHxA	92		25 - 150
13C4 PFHpA	86		25 - 150
13C4 PFOA	92		25 - 150
13C5 PFNA	87		25 - 150
13C2 PFDA	83		25 - 150
13C2 PFUnA	85		25 - 150
13C2 PFDoA	99		25 - 150
13C2 PFTeDA	89		25 - 150
13C3 PFBS	115		25 - 150
18O2 PFHxS	121		25 - 150
13C4 PFOS	117		25 - 150
d3-NMeFOSAA	98		25 - 150
d5-NEtFOSAA	101		25 - 150
13C3 HFPO-DA	68		25 - 150

**Lab Sample ID: LCSD 320-348475/3-A**  
**Matrix: Water**  
**Analysis Batch: 348611**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 348475**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	42.2		ng/L		106	73 - 133	10	30
Perfluoroheptanoic acid (PFHpA)	40.0	44.0		ng/L		110	72 - 132	8	30
Perfluorooctanoic acid (PFOA)	40.0	40.9		ng/L		102	70 - 130	9	30
Perfluorononanoic acid (PFNA)	40.0	43.8		ng/L		109	75 - 135	4	30
Perfluorodecanoic acid (PFDA)	40.0	45.4		ng/L		114	76 - 136	4	30
Perfluoroundecanoic acid (PFUnA)	40.0	34.8		ng/L		87	68 - 128	12	30

Eurofins TestAmerica, Sacramento



# QC Sample Results

Client: Shannon & Wilson, Inc  
 Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

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

**Lab Sample ID: LCSD 320-348475/3-A**  
**Matrix: Water**  
**Analysis Batch: 348611**

**Client Sample ID: Lab Control Sample Dup**  
**Prep Type: Total/NA**  
**Prep Batch: 348475**

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorododecanoic acid (PFDoA)	40.0	39.8		ng/L		99	71 - 131	0	30
Perfluorotridecanoic acid (PFTriA)	40.0	42.5		ng/L		106	71 - 131	6	30
Perfluorotetradecanoic acid (PFTeA)	40.0	42.0		ng/L		105	70 - 130	5	30
Perfluorobutanesulfonic acid (PFBS)	35.4	38.1		ng/L		108	67 - 127	2	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.0		ng/L		99	59 - 119	0	30
Perfluorooctanesulfonic acid (PFOS)	37.1	39.3		ng/L		106	70 - 130	5	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.3	37.3		ng/L		100	75 - 135	6	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	35.1	*	ng/L		88	51 - 173	53	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.7	38.0		ng/L		101	54 - 114	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.7	35.6		ng/L		94	79 - 139	5	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	96		25 - 150
13C4 PFHpA	93		25 - 150
13C4 PFOA	96		25 - 150
13C5 PFNA	92		25 - 150
13C2 PFDA	89		25 - 150
13C2 PFUnA	97		25 - 150
13C2 PFDoA	93		25 - 150
13C2 PFTeDA	90		25 - 150
13C3 PFBS	120		25 - 150
18O2 PFHxS	121		25 - 150
13C4 PFOS	123		25 - 150
d3-NMeFOSAA	101		25 - 150
d5-NEtFOSAA	104		25 - 150
13C3 HFPO-DA	101		25 - 150

# QC Association Summary

Client: Shannon & Wilson, Inc  
 Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

## LCMS

### Prep Batch: 348475

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-57280-1	33061	Total/NA	Water	3535	
320-57280-2	33064	Total/NA	Water	3535	
320-57280-3	33060	Total/NA	Water	3535	
320-57280-4	33068	Total/NA	Water	3535	
320-57280-5	43068	Total/NA	Water	3535	
MB 320-348475/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-348475/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-348475/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

### Analysis Batch: 348611

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-57280-1	33061	Total/NA	Water	537 (modified)	348475
320-57280-2	33064	Total/NA	Water	537 (modified)	348475
320-57280-3	33060	Total/NA	Water	537 (modified)	348475
320-57280-4	33068	Total/NA	Water	537 (modified)	348475
320-57280-5	43068	Total/NA	Water	537 (modified)	348475
MB 320-348475/1-A	Method Blank	Total/NA	Water	537 (modified)	348475
LCS 320-348475/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	348475
LCSD 320-348475/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	348475

# Lab Chronicle

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

**Client Sample ID: 33061**

**Lab Sample ID: 320-57280-1**

Date Collected: 12/17/19 12:46

Matrix: Water

Date Received: 12/20/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			264 mL	10 mL	348475	12/30/19 06:26	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			348611	12/31/19 04:10	MNV	TAL SAC

**Client Sample ID: 33064**

**Lab Sample ID: 320-57280-2**

Date Collected: 12/17/19 13:53

Matrix: Water

Date Received: 12/20/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			251.8 mL	10 mL	348475	12/30/19 06:26	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			348611	12/31/19 04:18	MNV	TAL SAC

**Client Sample ID: 33060**

**Lab Sample ID: 320-57280-3**

Date Collected: 12/17/19 12:21

Matrix: Water

Date Received: 12/20/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.1 mL	10 mL	348475	12/30/19 06:26	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			348611	12/31/19 04:26	MNV	TAL SAC

**Client Sample ID: 33068**

**Lab Sample ID: 320-57280-4**

Date Collected: 12/17/19 16:29

Matrix: Water

Date Received: 12/20/19 10:40

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			263.6 mL	10 mL	348475	12/30/19 06:26	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			348611	12/31/19 04:34	MNV	TAL SAC

**Client Sample ID: 43068**

**Lab Sample ID: 320-57280-5**

Date Collected: 12/17/19 16:19

Matrix: Water

Date Received: 12/20/19 10:40

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 mL	10 mL	348475	12/30/19 06:26	AF	TAL SAC
Total/NA	Analysis	537 (modified)		1			348611	12/31/19 04:42	MNV	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: Yakotat Quarterly

Job ID: 320-57280-1

## Laboratory: Eurofins TestAmerica, Sacramento

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

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	01-20-21
ANAB	Dept. of Defense ELAP	L2468	01-20-21
ANAB	Dept. of Energy	L2468.01	01-20-21
ANAB	ISO/IEC 17025	L2468	01-20-21
Arizona	State	AZ0708	08-11-20
Arkansas DEQ	State	19-042-0	06-17-20
California	State	2897	01-31-20
Colorado	State	CA0004	08-31-20
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-20
Georgia	State	4040	01-29-20
Hawaii	State	<cert No.>	01-29-20
Illinois	NELAP	200060	03-17-20
Kansas	NELAP	E-10375	10-31-20 *
Louisiana	NELAP	01944	06-30-20
Maine	State	2018009	04-14-20
Michigan	State	9947	01-29-20
Michigan	State Program	9947	01-31-20
Nevada	State	CA000442020-1	07-31-20
New Hampshire	NELAP	2997	04-18-20
New Jersey	NELAP	CA005	06-30-20
New York	NELAP	11666	04-01-20
Oregon	NELAP	4040	01-29-20
Pennsylvania	NELAP	68-01272	03-31-20
Texas	NELAP	T104704399-19-13	05-31-20
US Fish & Wildlife	US Federal Programs	58448	07-31-20
USDA	US Federal Programs	P330-18-00239	07-31-21
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: Yakotat Quarterly

Job ID: 320-57280-1

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

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- 15

# Sample Summary

Client: Shannon & Wilson, Inc  
Project/Site: Yakotat Quarterly

Job ID: 320-57280-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-57280-1	33061	Water	12/17/19 12:46	12/20/19 10:40	
320-57280-2	33064	Water	12/17/19 13:53	12/20/19 10:40	
320-57280-3	33060	Water	12/17/19 12:21	12/20/19 10:40	
320-57280-4	33068	Water	12/17/19 16:29	12/20/19 10:40	
320-57280-5	43068	Water	12/17/19 16:19	12/20/19 10:40	

1

2

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15

# CHAIN-OF-CUSTODY RECORD

Page 1 of 1  
 Laboratory Test America  
 Attn: D. Alltucker

Analytical Methods (include preservative if used)

Turn Around Time:  
 Normal  Rush  
 Please Specify

Quote No: \_\_\_\_\_

J-Flags:  Yes  No

Sample Identity	Lab No.	Time	Date Sampled	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
33061		1246	12/17/19	2	groundwater
33064		1353	12/17/19	2	
33060		1221	12/17/19	2	
33068		1629	12/17/19	2	
43068		1619	12/17/19	2	



Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: <u>102816</u> Name: <u>Yakutat Water</u> Contact: <u>AMS</u> Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Sampler: <u>ALM</u>	Total No. of Containers: COC Seals/Intact? Y/N/NA Received Good Cond./Cold Temp: Delivery Method:	Signature: _____ Printed Name: <u>Amber Masters</u> Company: <u>Shannon + Wilson, Inc.</u> Time: <u>1100</u> Date: <u>12/19/19</u>	Signature: _____ Printed Name: _____ Company: _____ Time: _____ Date: _____	Signature: _____ Printed Name: _____ Company: _____ Time: _____ Date: _____
Notes:		Received By: 1. Signature: _____ Printed Name: <u>A. Masters</u> Company: <u>Shannon + Wilson, Inc.</u> Time: <u>12/19/19</u> Date: <u>1630</u>	Received By: 2. Signature: _____ Printed Name: <u>Solomon Orapaka</u> Company: <u>ETA-Sol</u> Time: <u>1070</u> Date: <u>12/20/19</u>	Received By: 3. Signature: _____ Printed Name: _____ Company: _____ Time: _____ Date: _____

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

NOT Relinquished

6.0

No. 35985





## Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-57280-1

**Login Number: 57280**

**List Source: Eurofins TestAmerica, Sacramento**

**List Number: 1**

**Creator: Oropeza, Salvador**

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	



**Laboratory Data Review Checklist**

Completed By:

Ashley Jaramillo

Title:

Chemist

Date:

January 7, 2020

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

Eurofins/Test America Laboratories, Inc.

Laboratory Report Number:

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

ADEC File Number:

1530.38.022

Hazard Identification Number:

27090

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat 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:

Eurofins/TestAmerica of Sacramento, CA performed the analyses and is certified by the ADEC CSP for the analysis of PFOS and PFOA in soil and water samples by EPA Method 537.

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:

No samples were 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:

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

Yes  No  N/A  Comments:

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

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

Yes  No  N/A  Comments:

The sample receipt form indicates that the samples arrived in good condition and properly preserved.

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 at sample login.

e. Data quality or usability affected?

Comments:

Data quality or usability was 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:

The relative precision demonstrated between the HFPO-DA results of the laboratory control sample (LCS) and laboratory control sample duplicate (LCS-D) associated with preparation batch 320-348475 and analytical batch 320-348611 did not meet acceptance criteria. See section 6b for discussion.

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 judgment was used to positively identify the analyte.

Insufficient sample volume was available to perform a matrix spike (MS) and matrix spike duplicate (MSD) associated with preparation batch 320-348475.

The following samples were observed to contain trizma prior to extraction: 33061, 33064, 33060, 33068, and 43068.

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

c. Were all corrective actions documented?

Yes  No  N/A  Comments:

No corrective actions were reported in the case narrative.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The case narrative does not specify an effect on data quality/usability.

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:

No soil samples were included in this work order.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes  No  N/A  Comments:

e. Data quality or usability affected?

Data quality and/or usability were not affected; see above.

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

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:

No analytes were detected above the LOQ in the method blank; however, PFHxS was detected at an estimated concentration in the method blank sample associated with preparatory batch 320-348475.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

PFHxS was detected in samples 33061, 33068, and 43068 at concentrations within five times the concentration detected in the method blank sample.

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

Yes  No  N/A  Comments:

The PFHxS results of the samples 33061, 33068, and 43068 may be affected by laboratory contamination. These results are considered false positives and have been qualified 'B\*' at their respective LOQs.

v. Data quality or usability affected?

Comments:

The data quality/usability was 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:

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

No metal/inorganic analyses were requested for this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes  No  N/A  Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes  No  N/A  Comments:

The relative precision demonstrated between the HFPO-DA results of the LCS/LCSD associated with preparation batch 320-348475 exceeded the RPD limit.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

All field samples reported in this work order are included in preparatory batch 320-348475.

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

Yes  No  N/A  Comments:

The HPFO-DA results of samples 33061, 33064, 33060, 33068, and 43068 are considered estimated and have been qualified 'J\*' to identify the imprecision.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability was affected; see above.

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

**Note: Leave blank if not required for project**

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

Insufficient sample volume was available to perform a MS/MSD associated with preparatory batch 320-348475. Although potential matrix interference cannot be evaluated, batch accuracy and precision were confirmed through analysis of the LCS/LCSD.

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes  No  N/A  Comments:

No metal/inorganic analyses were requested for 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:

MS/MSD samples were not evaluated with this work order. See LCS/LCSD discussion for evaluation of analytical accuracy and precision.

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:

MS/MSD samples were not evaluated with this work order. See LCS/LCSD discussion for evaluation of analytical accuracy and precision.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Not applicable, no MS/MSD analysis was performed.

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

Yes  No  N/A  Comments:

See above.

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

No, see above.

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:

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:

There were no IDA recovery failures associated with this work order.

iv. Data quality or usability affected?

Comments:

The data quality/usability was not affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes  No  N/A  Comments:

Trip blanks are not required for PFAS analysis.

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.



320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

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.

v. Data quality or usability affected?

Comments:

The data quality/usability was not affected; see above.

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:

Sample 43068 is a field duplicate of sample 33068.

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:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality/usability was not affected; see above.

320-57280-1

Laboratory Report Date:

December 31, 2019

CS Site Name:

ADOT&PF Yakutat Airport Sitewide PFAS

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes  No  N/A  Comments:

Samples were not collected using reusable equipment.

i. All results less than LOQ and project specified objectives?

Yes  No  N/A  Comments:

An equipment blank was not required for this project.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

Not applicable, see above.

iii. Data quality or usability affected?

Comments:

The data quality/usability was not affected; see above.

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

a. Defined and appropriate?

Yes  No  N/A  Comments:

The transition mass ratio was outside of the established ratio limits for PFNA in sample 33060. PFNA was identified by the analyst, but there is some uncertainty in how it was quantified. Due to this uncertainty, the PFNA result for sample 33060 is considered estimated and has been flagged 'J\*'

Appendix B  
Field Logs

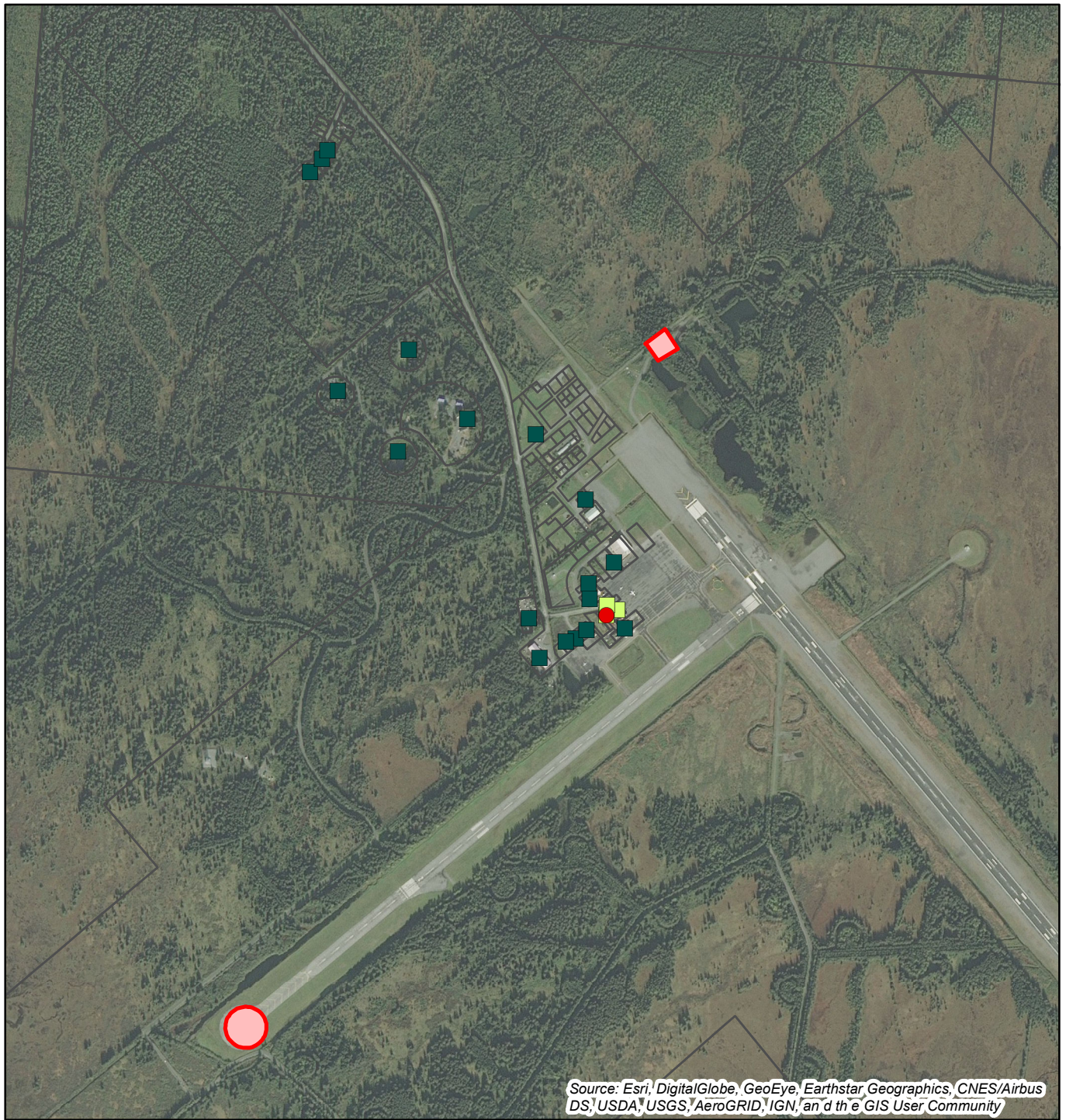
APPENDIX B: FIELD LOGS

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

Appendix C  
Public Information

APPENDIX C: PUBLIC INFORMATION





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

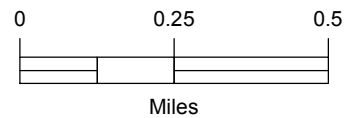
**LEGEND**

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

- ≤17 parts per trillion (ppt)
- 18 to 69 ppt
- ≥70 ppt (over former action level)

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

- ≤17 ppt
- 18 to 69 ppt
- ≥70 ppt (over EPA advisory)
- Aircraft Rescue and Firefighting (ARFF) Training Site



Yakutat Airport  
Yakutat, Alaska

**JUNE 2019  
ANALYTICAL RESULTS**

July 2019

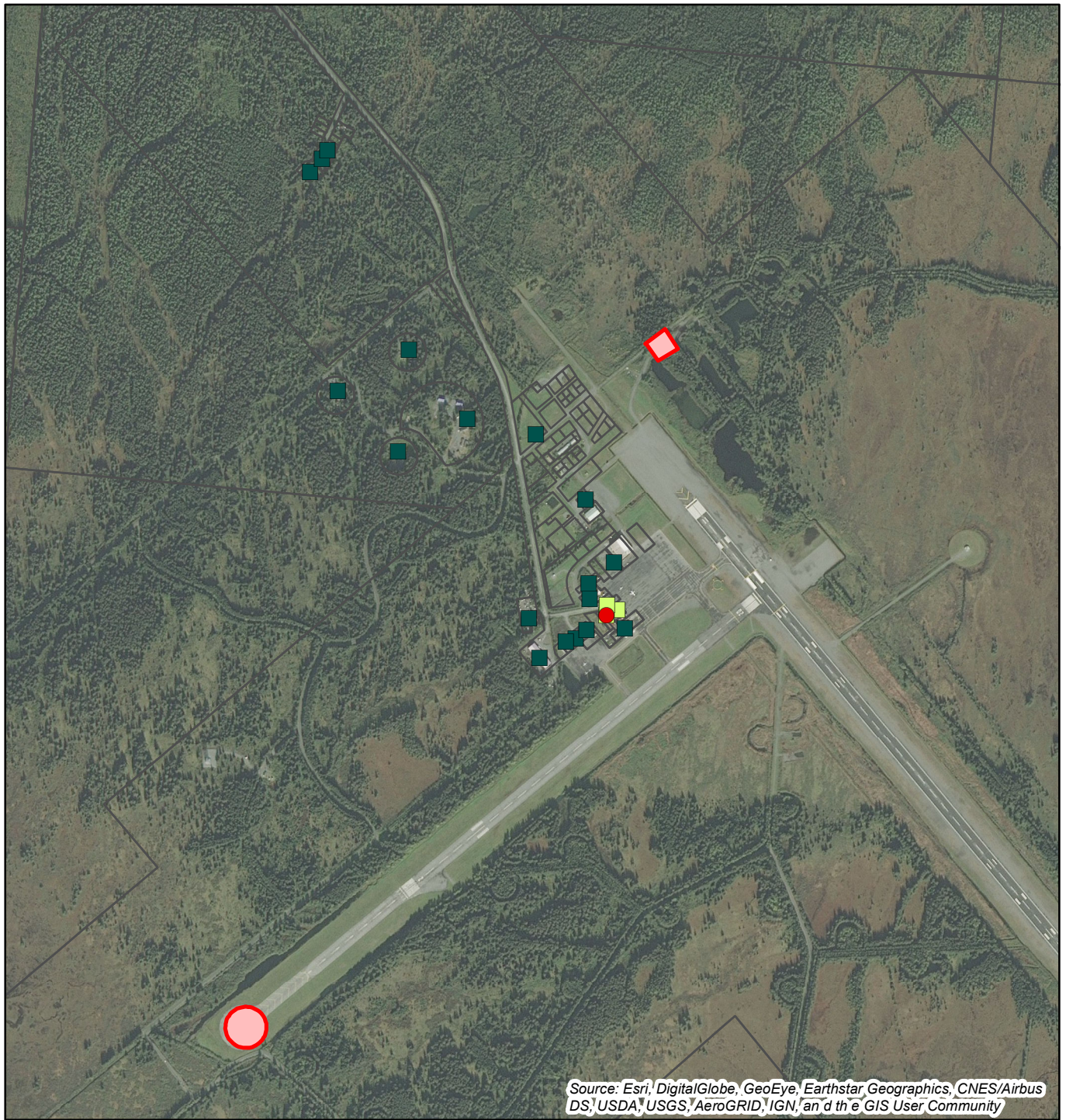
102896-003

**SHANNON & WILSON, INC.**  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

**Figure 1**

\*Sum of FPOS, PFOA, PFHxS, PFHpA, and PFNA





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

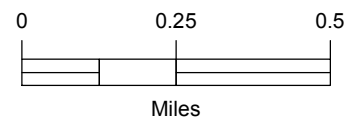
**LEGEND**

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

- ≤17 parts per trillion (ppt)
- 18 to 69 ppt
- ≥70 ppt (over former action level)

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

- ≤17 ppt
- 18 to 69 ppt
- ≥70 ppt (over EPA advisory)
- Aircraft Rescue and Firefighting (ARFF) Training Site



Yakutat Airport  
Yakutat, Alaska

**DECEMBER 2019  
ANALYTICAL RESULTS**

January 2020

102896-004

**SHANNON & WILSON, INC.**  
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

**Figure 1**

\*Sum of FPOS, PFOA, PFHxS, PFHpA, and PFNA

**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  Vegetable/grain Gardening  
 Cooking food preparation -Size of Garden \_\_\_\_\_ sq.feet/acres  
 Other \_\_\_\_\_ -Average watering frequency using well water? (daily, weekly, etc.) \_\_\_\_\_

- a) When was the well installed? \_\_\_\_\_  
 b) What is the well depth? \_\_\_\_\_  
 c) What is the well diameter? \_\_\_\_\_  
 d) What is the well type?  Dug Well  Driven  
 Drilled  Unknown  
 e) Do you have any treatment on your well (e.g. water softener)? Please describe. \_\_\_\_\_  
 \_\_\_\_\_

- 4) Sample Permission  
 Does the Shannon & Wilson, Inc. have permission to sample your private well?  Yes  No

\_\_\_\_\_  
 Signature Date





## PFAS Fact Sheet – Yakutat 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 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/](http://www.dot.alaska.gov/airportwater/)

### **For questions about well testing:**

Shannon & Wilson, Inc.  
Michael Jaramillo, Project Manager  
Phone: 907-458-3156  
Email: [mxj@shanwil.com](mailto:mxj@shanwil.com)

### **For regulatory questions:**

Dept. of Environmental Conservation  
Contaminated Sites Program  
Bill O'Connell  
Phone: 907-269-3057  
Email: [bill.oconnell@alaska.gov](mailto: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](mailto:kristin.bridges@alaska.gov)

### **To file an insurance claim:**

Dept. of Admin., Risk Management  
Sheri Gray, Risk Assessor  
Phone: (907) 465-5724  
[sheri.gray@alaska.gov](mailto:sheri.gray@alaska.gov)

### **For questions about fire training and other inquiries:**

Sammy Loud, DOT&PF Statewide Aviation  
Phone: 907-888-5671  
Email: [airportwater@alaska.gov](mailto:airportwater@alaska.gov)



## PFAS Fact Sheet – Yakutat Airport

December 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.

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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/](http://www.dot.alaska.gov/airportwater/)

### **For questions about well testing:**

Shannon & Wilson, Inc.  
Ashley Jaramillo, Project Manager  
Phone: 907-458-3118  
Email: [amj@shanwil.com](mailto:amj@shanwil.com)

### **For regulatory questions:**

Dept. of Environmental Conservation  
Contaminated Sites Program  
Bill O'Connell  
Phone: 907-269-3057  
Email: [bill.oconnell@alaska.gov](mailto:bill.oconnell@alaska.gov)

### **For questions about PFAS and health:**

Dept. of Health & Social Services  
Sarah Yoder, Public Health Scientist  
Phone: 907-269-8054  
Email: [sarah.yoder@alaska.gov](mailto:sarah.yoder@alaska.gov)

### **To file an insurance claim:**

Dept. of Admin., Risk Management  
Sheri Gray, Risk Assessor  
Phone: (907) 465-5724  
[sheri.gray@alaska.gov](mailto:sheri.gray@alaska.gov)

### **For questions about fire training and other inquiries:**

Sammy Cummings, DOT&PF Statewide Aviation  
Phone: 907-888-5671  
Email: [airportwater@alaska.gov](mailto:airportwater@alaska.gov)

# Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS)

## Frequently Asked Questions

### What are PFAS?

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

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



### How can I be exposed to PFAS?

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

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

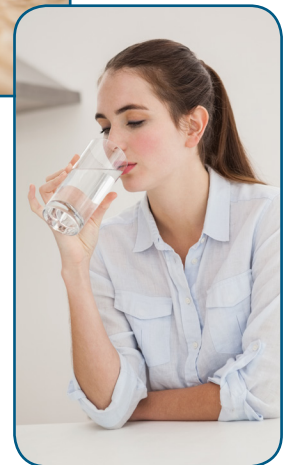
- Food packaging materials
- Nonstick cookware
- Stain resistant carpet treatments
- Water resistant clothing
- Cleaning products
- Paints, varnishes and sealants
- Firefighting foam
- Some cosmetics



### How can I reduce my exposure to PFAS?

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

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



## How can PFAS affect people's health?

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

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

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

## How can I learn more?

You can visit the following websites for more information:

- **CDC/ATSDR:**
  - » CDC Info: <https://www.cdc.gov/cdc-info/>, or **(800) 232-4636**.
  - » [www.atsdr.cdc.gov/pfc/index.html](http://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/newevents/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
<b>PFOS</b>	Perfluorooctane sulfonic acid
<b>PFOA (or C8)</b>	Perfluorooctanoic acid
<b>PFNA</b>	Perfluorononanoic acid
<b>PFDA</b>	Perfluorodecanoic acid
<b>PFOSA (or FOSA)</b>	Perfluorooctane sulfonamide
<b>MeFOSAA (aka Me-PFOSA-AcOH)</b>	2-(N-Methyl-perfluorooctane sulfonamido) acetic acid
<b>Et-FOSAA (aka Et-PFOSA-AcOH)</b>	2-(N-Ethyl-perfluorooctane sulfonamido) acetic acid
<b>PFHxS</b>	Perfluorohexane sulfonic acid

July 15, 2019

Full Name/s  
Mailing Address  
City, AK xxxxx

**RE: RESULTS OF JUNE 2019 PFAS PRIVATE WELL SAMPLING, YAKUTAT,  
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 Yakutat 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.

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/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.



Name/s  
Business Name  
Month X, 2019  
Page 2

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.

We sampled 21 private water-supply wells near the Yakutat 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-XXXXXX  
PFAS Fact Sheet - Yakutat Airport

July X, 2019

Full Name/s  
Mailing Address  
City, AK xxxxx

**RE: RESULTS OF JUNE 2019 PFAS PRIVATE WELL SAMPLING, YAKUTAT,  
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 Yakutat 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.

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 and PFOA were not detected 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.



Name/s  
Business Name  
Month X, 2019  
Page 2

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.

We sampled 21 private water-supply wells near the Yakutat 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 - Yakutat Airport

Month X, 2020

Full Name/s  
PO Box  
Yakutat, AK 99689

**RE: RESULTS OF MONTH 2019 PFAS PRIVATE WELL SAMPLING, YAKUTAT 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 Yakutat Airport. Shannon & Wilson, Inc. collected a water sample on December 17, 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). With the 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.

Name/s  
Business Name  
Month X, 2019  
Page 2

The Alaska Department of Transportation and Public Facilities (DOT&PF) is providing/will provide 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. Business Name is coordinating bottled water deliveries; they can be reached at (907) xxx-xxxx.

We sampled over XX private water-supply wells near the Name 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 - Yakutat Airport

Appendix D  
QA/QC Summary

APPENDIX D: QA/QC SUMMARY

## QA/QC SUMMARY

QA/QC procedures assist in producing data of acceptable quality and reliability. Shannon & Wilson staff reviewed the analytical results for laboratory QC samples and conducted a QA assessment for this project. COC records and laboratory-receipt forms were reviewed to check custody was not breached, sample holding-times were met, and the samples were properly handled from the point of collection through analysis by the laboratory. Shannon & Wilson's QA review procedures allowed us to document the accuracy and precision of the analytical data, as well as check the analyses were sufficiently sensitive to detect analytes at levels below regulatory standards.

Shannon & Wilson reviewed analytical sample results (TestAmerica WOs 320-47461-1, 320-51422-1, and 320-57280-1) for this project. The laboratory reports, including case narratives describing laboratory QA results, along with completed DEC data-review, are included in Appendix A. Details regarding our QA analysis are presented below.

## SAMPLE HANDLING

Coolers containing water samples were shipped via FedEx to perform analyses noted on the COC. The coolers with water samples contained a temperature blank to measure whether samples were kept appropriately cold. Laboratory personnel measured the temperature blank at the time the samples arrived at each of their facilities; the temperature blank was within the proper temperature range upon arrival at the laboratories.

Our review of COC records and laboratory sample-receipt documents did not reveal sample-handling anomalies that would affect the quality or usability of the data, and the samples were processed within the appropriate method holding times.

## ANALYTICAL SENSITIVITY

Groundwater-sample limits of detection (LODs) were compared to the DEC regulatory levels. For groundwater data, LODs were less than DEC-established action levels for PFAS, where applicable.

The laboratory runs a method blank with each sample batch to detect analyte carryover during analysis. In work order 320-57280-1, PFHxS was detected at an estimated concentration in the method blank sample associated with preparatory batch 320-348475. PFHxS was detected in samples 33061, 33068, and 43068 at concentrations within five times the concentration detected in the method blank sample. The PFHxS results of the samples 33061, 33068, and 43068 may be affected by laboratory contamination. These results are

considered false positives and have been qualified 'B\*' at their respective limits of quantitation (LOQs).

## ACCURACY

The laboratory assessed the accuracy of its analytical procedures by analyzing laboratory control samples (LCS), LCS duplicate samples (LCSD) matrix spike samples (MS), MS duplicate samples (MSD) and laboratory duplicate samples. LCS/LCSD analysis allows the laboratory to evaluate their ability to recover analytes added to clean aqueous matrices.

For the TestAmerica work orders LCS/LCSD samples were reported. Laboratory accuracy was also measured for each sample by assessing the recovery of analyte surrogates added to the individual project samples. For these work orders, the LCS/LCSD and surrogate recovery data were within laboratory control limits, indicating the sample results are accurate.

Insufficient sample volume was available to perform a MS/MSD. Although potential matrix interference cannot be evaluated, batch accuracy and precision were confirmed through analysis of the LCS/LCSD.

## PRECISION

Five field duplicate samples were submitted with the work orders. To evaluate data precision and reproducibility of our sampling techniques, the relative percent difference (RPD) between the sample and its duplicate was calculated. RPDs can only be evaluated if the results of the analysis for both the sample and its duplicate are greater than the LOQs for a given analyte. The field-duplicate RPDs for detected analytes were within the project-specified data quality objective of 30% for groundwater.

Laboratory analytical precision was evaluated using RPD calculations. The LCS/LCSDs provide information regarding the reproducibility of laboratory procedures and are therefore a measure of the laboratory's analytical precision. The RPD results for the LCS/LCSD were within acceptable laboratory QC limits.

## DATA QUALITY SUMMARY

By working in general accordance with the proposed scope of services, Shannon & Wilson considers the collected samples for this project to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures. In general, the quality of the analytical data for this project

does not appear to have been compromised by analytical irregularities and is adequate for the purposes of our assessment.

**APPENDIX D: QA/QC SUMMARY**



# Important Information

About Your Environmental Report

**IMPORTANT INFORMATION**

## CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

## THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

## SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

### MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining 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**