

SUBMITTED TO:
Alaska Department of
Transportation & Public
Facilities
PO Box 112506
Juneau, AK 99811-2506

BY:
Shannon & Wilson
2355 Hill Road
Fairbanks, AK 99709

(907) 479-0600
www.shannonwilson.com

FINAL

SUMMARY REPORT
July 2022 Through April 2024
Water Supply Well Monitoring
YAKUTAT, ALASKA

Submitted To: Alaska Department of Transportation & Public Facilities
PO Box 112506
Juneau, AK 99811-2506
Attn: Melanie Bray

Subject: FINAL SUMMARY REPORT, JULY 2022 THROUGH APRIL 2024
WATER SUPPLY WELL MONITORING, YAKUTAT, ALASKA

Shannon & Wilson, Inc. (S&W) has prepared this report to summarize the water supply well (WSW) monitoring efforts performed between July 2022 and April 2024 at the Yakutat Airport (YAK) in Yakutat, Alaska. These services were conducted on behalf of the Alaska Department of Transportation & Public Facilities (DOT&PF). S&W's scope of services was specified in proposals dated February 18, 2021 and June 27, 2022 and authorized on March 23, 2021 and August 26, 2022, 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 S&W's contract, relevant Alaska Department of Environmental Conservation (DEC) guidance documents, and Title 18 of the Alaska Administrative Code Chapter 75.335.

S&W 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

Ashley Jaramillo
Project Manager/Senior Chemist

EXECUTIVE SUMMARY

S&W has prepared this summary report to document WSW monitoring efforts at the Yakutat Airport (YAK) in Yakutat, Alaska between July 2022 and June 2023. S&W collected analytical samples for PFAS analysis from the sample locations noted below during the following monitoring events.

- September 2022: 33053, 33059, 33060, 33061, and 33068
- December 2022: 33059, 33060, 33061, and 33068
- March 2023: 33059, 33060, and 33068
- June 2023: 33053, 33056, 33059, 33060, and 33068

Between July 2022 and April 2024, sample results were less than the DEC's drinking water action level for PFAS. To date, sample locations 33063 (Yakutat Lodge), 33066 (Yakutat Lodge Restaurant), and 33065 (Yakutat Coastal Airlines) exceed DEC's drinking water action level for PFAS.

Based on the results of the WSW monitoring efforts at the YAK to date, S&W recommends continued quarterly and annual monitoring.

CONTENTS

1 Introduction 1

 1.1 Purpose and Objectives 1

 1.2 Scope of Services 1

 1.3 Site Location..... 2

 1.4 Geology and Hydrology 2

2 Background 2

 2.1 Site History..... 2

 2.2 AFFF Use at the Yakutat Airport 3

 2.3 PFAS Regulatory History..... 3

 2.4 Contaminants of Concern and Action Levels 4

 2.5 PFAS Discovery at the YAK 5

 2.6 June 2019 Initial Water Supply Well Search and Sampling Event 6

 2.6.1 Water Supply Well Categories 8

 2.6.2 Water Supply Well Monitoring Criteria and Schedule..... 9

 2.7 December 2019 through June 2020 Water Supply Well Monitoring..... 11

 2.7.1 Water Supply Well Monitoring Criteria Modification..... 11

 2.8 July 2020 Through June 2021 Water Supply Well Monitoring 11

 2.9 July 2021 Through June 2022 Water Supply Well Monitoring 12

 2.10 Alternative Water Sources 12

 2.11 Public Information 12

3 Field Activities..... 13

 3.1 Water Supply Well Sampling..... 13

 3.2 Sample Custody, Storage, and Transport 14

 3.3 Special Considerations for PFAS Sampling..... 14

 3.4 Notification of Results 14

 3.5 Deviations..... 15

4 Analytical Results 15

 4.1 Trend Analysis..... 15

5 Quality Assurance and Quality Control 17

6 Recommendations..... 17

7 References 18

Exhibits

Exhibit 2-1: PFAS Drinking Water Action Levels.....4

Exhibit 2-2: Applicable Regulatory Action Levels5

Exhibit 2-3: Reported PFAS Analytes.....5

Exhibit 2-4: DEC Limited PFAS Site Discovery Investigation.....6

Exhibit 2-5: Water Supply Wells Identified in the Well Search Area7

Exhibit 2-6: Water Supply Wells Identified in the Well Search Area9

Exhibit 2-7: June 2019 Water Supply Well Monitoring Criteria10

Exhibit 2-8: December 2019 Water Supply Well Monitoring Criteria11

Exhibit 4-1: MAROS Decision Matrix.....16

Exhibit 4-2: Trend Analysis Through June 202317

Tables

Table 1: September 2022 Water Supply Well Monitoring Analytical Results

Table 2: December 2022 Water Supply Well Monitoring Analytical Results

Table 3: March 2023 Water Supply Well Monitoring Analytical Results

Table 4: June 2023 Water Supply Well Monitoring Analytical Results

Table 5: Summary of Mann-Kendall Trend Analysis

Figures

Figure 1: Highest Reported Water Supply Well Results Through June 2023

Appendices

Appendix A: Field Forms

Appendix B: Laboratory Reports and LDRCs

Appendix C: Analytical Data QA/QC Summary

Important Information

ACRONYMS

AAC	Alaska Administrative Code
ADF&G	Alaska Department of Fish & Game
AFB	Yakutat Airforce Base
AFFF	aqueous film-forming foam
ARFF	aircraft rescue and firefighting
bgs	below ground surface
°C	degrees Celsius
CAA	Civil Aeronautics Administration
COV	coefficient of variation
DEC	Alaska Department of Environmental Conservation
DoD	Department of Defense
DOT&PF	Alaska Department of Transportation & Public Facilities
EPA	U.S. Environmental Protection Agency
Eurofins	Eurofins Environment Testing America
FAA	Federal Aviation Administration
HFPO-DA	hexafluoropropylene oxide dimer acid
LDRC	Laboratory Data Review Checklist
LHA	Lifetime Health Advisory
MAROS	Monitoring and Remediation Optimization System
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
ng/L	nanograms per liter
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
PFAS	per- and polyfluoroalkyl substances
PFBS	perfluorobutanesulfonic acid
PFHpA	perfluoroheptanoic acid
PFHxS	perfluorohexanesulfonic acid
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
QA	Quality Assurance
QC	Quality Control
QSM	Quality Systems Manual
S&W	Shannon & Wilson, Inc.
SREB	snow removal equipment building,
TSA	Transportation Security Administration,
USACE	U.S. Army Corps of Engineers

ACRONYMS

USFS	United States Forest Service.
USGS	U.S. Geological Survey
WSW	water supply well
WO	work order
YAK	Yakutat Airport

1 INTRODUCTION

Shannon & Wilson, Inc. (S&W) has prepared this summary report to document water supply well (WSW) monitoring efforts at the Yakutat Airport (YAK) in Yakutat, Alaska. This report describes the activities conducted by S&W between July 2022 and April 2024. The YAK is an active, Alaska Department of Environmental Conservation (DEC) listed contaminated site due to the presence of per- and polyfluoroalkyl substances (PFAS) in WSW samples (DEC File Number 1530.38.022, Hazard ID 27090).

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the potential for human exposure to PFAS-containing groundwater in WSWs at and near the YAK. S&W's objectives were to collect quarterly and annual analytical groundwater samples from previously sampled WSWs meeting the monitoring criteria discussed in Section 2.7.1. The scope of services implemented to achieve these objectives is defined in Section 1.2 below.

1.2 Scope of Services

S&W's scope of services summarized in this report include four WSW monitoring events and public-outreach support. This report includes data from the WSW sampling events conducted in September 2022, December 2022, March 2023, and June 2023. Sampling events were not conducted during the 2024 fiscal year (July 2023 to June 2024).

This report was prepared for the exclusive use of the Alaska Department of Transportation & Public Facilities (DOT&PF) and its representatives. This work presents S&W's professional judgment as to the conditions of the site. Information presented here is based on activities S&W performed. This report should not be used for other purposes without S&W'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, S&W should be retained to review the applicability of our recommendations. This report should not be used for other purposes without S&W's review. If a service is not specifically indicated in this report, do not assume it was performed.

1.3 Site Location

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. The geographic coordinates of the YAK terminal are latitude 59.5033° N, longitude -139.9928° W.

1.4 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.

2 BACKGROUND

This section provides background information regarding PFAS and the YAK.

2.1 Site History

A review of the Yakutat Airforce Base (AFB) site files and database actions indicates the Yakutat AFB was operated between 1940-1947 during WWII. In 1940, the Civil Aeronautics

Administration/Federal Aviation Administration (CAA/FAA) built a radio range and construction began on the Yakutat Landing Field which was completed in 1943. The airfield was re-designated Yakutat Army Air Base in 1944 and placed on caretaker status until the end of the war. The Yakutat Air Base was declared surplus by the Army in December 1945 and the CAA/FAA assumed responsibility for maintenance and operation of the Yakutat Airport, leading to the transfer of the air base and all associated facilities from the Army to CAA/FAA on April 4, 1947. In 1978, the DOT&PF acquired the airport from the FAA.

The YAK meets the requirements defined in Title 14, Code of Federal Regulations, Part 139, which requires specific certification through the FAA. This certification required, among other things, aircraft rescue and firefighting (ARFF) infrastructure and capabilities to ensure safety in air transportation. As part of this certification, Part 139 airports are required to conduct annual training for emergency response situations using aqueous film forming foam (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.

2.2 AFFF Use at the YAK

PFAS-containing AFFF has been known to be stored at the YAK and used for emergency and training purposes in at least one location on the YAK property (Figure 1). AFFF was first used on the YAK property by DOT&PF in the 1990s. Discussions with Robert Lekanof, a DOT&PF YAK foreman, during S&W'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.

2.3 PFAS Regulatory History

AFFF contains PFAS, a category of persistent organic compounds considered emerging environmental contaminants due to evidence that exposure can lead to adverse health effects. 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. Exhibit 2-1 below briefly outlines PFAS drinking water action levels since the start of the YAK WSW monitoring events.

Exhibit 2-1: PFAS Drinking Water Action Levels

Agency	Date	Analytes	Action Level
EPA	May 2016	PFOS + PFOA	70 ng/L ¹
DEC	August 2018	PFOS + PFOA + PFHxS + PFHpA + PFNA	70 ng/L ²
DEC	April 2019	PFOS + PFOA	70 ng/L ^{3,4}

Notes:

- 1 EPA LHA level
- 2 DEC submitted this action level 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.
- 3 DEC aligned their PFAS drinking water action level with the final EPA LHA for PFOS and PFOA.
- 4 Current DEC drinking water action level for PFAS.

DEC = Alaska Department of Environmental Conservation, EPA = U.S. Environmental Protection Agency, LHA = Lifetime Health Advisory, ng/L = nanograms per liter, PFHpA = perfluoroheptanoic acid, PFHxS = perfluorohexanesulfonic acid, PFNA = perfluorononanoic acid, PFOA = perfluorooctanoic acid, PFOS = perfluorooctanesulfonic acid

In June 2022 the Environmental Protection Agency (EPA) published Interim Lifetime Health Advisory (LHA) levels of 0.004 nanograms per liter (ng/L) for PFOA and 0.02 ng/L for PFOS, and Final LHA levels of 2,000 ng/L for perfluorobutanesulfonic acid (PFBS), and 10 ng/L for hexafluoropropylene oxide dimer and its ammonium salt (together referred to as “GenX chemicals”). In April 2024 the EPA finalized the regulatory limits for the six compounds, setting Maximum Contaminant Levels (MCLs) of 4.0 ng/L for PFOS and PFOA, 10.0 ng/L for perfluorohexanesulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA, also referred to as GenX), and 2,000 ng/L for PFBS. The DEC currently utilizes the 2016 EPA LHA as the PFAS drinking water action level for Alaska but is expected to align with the EPA MCLs following submittal through their regulatory process. DOT&PF has proactively compared historical results to the EPA MCL. Following DEC’s announcement of adopting the MCL, DOT&PF is prepared to respond to the new action level.

2.4 Contaminants of Concern and Action Levels

The primary contaminants of concern for the YAK are PFOS and PFOA. These two compounds are regulated with numeric action levels or cleanup levels, as summarized in Exhibit 2-2 below.

Exhibit 2-2: Applicable Regulatory Action Levels

Media	Analyte	Action Level
Drinking Water ¹	PFOS + PFOA	70 ng/L
Groundwater ²	PFOS	400 ng/L
	PFOA	400 ng/L
Soil ³	PFOS	3.0 µg/kg
	PFOA	1.7 µg/kg

Notes:

- 1 DEC's drinking water action level reported in DEC's October 2019 Technical Memorandum.
- 2 DEC's groundwater cleanup level reported in 18 AAC 75.345, Table C.
- 3 DEC's migration to groundwater soil cleanup levels reported in 18 AAC 75.341, Table B1.

AAC = Alaska Administrative Code, DEC = Alaska Department of Environmental Conservation, µg/kg = micrograms per kilogram, ng/L = nanograms per liter, PFOA = perfluorooctanoic acid, PFOS = perfluorooctanesulfonic acid

For the purposes of this project, samples were submitted for analysis of 18 PFAS analytes listed in Exhibit 2-3, below, via a modified EPA Method 537 compliant with the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories version 5.3 Table B-15.

Exhibit 2-3: Reported PFAS Analytes

EPA 537M PFAS Analytes	
perfluorooctanesulfonic acid (PFOS)	perfluorotetradecanoic acid (PFTeA)
perfluorooctanoic acid (PFOA)	perfluorotridecanoic acid (PFTriA)
perfluoroheptanoic acid (PFHpA)	perfluoroundecanoic acid (PFUnA)
perfluorononanoic acid (PFNA)	hexafluoropropylene oxide dimer acid (HFPO-DA)
perfluorohexanesulfonic acid (PFHxS)	N-ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)
perfluorobutanesulfonic acid (PFBS)	N-methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)
perfluorodecanoic acid (PFDA)	11-chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CL-PF3OUdS)
perfluorododecanoic acid (PFDoA)	9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CL-PF3ONS)
perfluorohexanoic acid (PFHxA)	4,8-Dioxa-3H-perfluorononanoic acid (ADONA)

2.5 PFAS Discovery at the YAK

In late 2018, as part of a Cooperative Agreement with the EPA, the DEC's Contaminated Sites Program conducted a limited PFAS Site Discovery Investigation. This included identifying potentially PFAS-impacted communities in Alaska, conducting a risk analysis of identified communities, collecting WSW samples for the analysis of PFAS, and reporting those results. The YAK was identified as a potentially PFAS affected site and DEC staff located and sampled 12 WSWs at and near the YAK in February of 2019 (Exhibit 2-4, below). Of the WSWs sampled, one well (YK-08, Yakutat Lodge) had PFAS concentrations

exceeding the then DEC PFAS action level for the sum of five PFAS (70 ng/L for PFOS + PFOA + PFHxS + PFHpA + PFNA).

Exhibit 2-4: Results of DEC Limited PFAS Site Discovery Investigation in February 2019

DEC Sample Name	Address/Location Description	Exceeds DEC Action Level ¹
YK-01	101 Airport Road – DOT&PF ARFF	No
YK-02	1015 Airport Access Road – DOT&PF SREB	No
YK-03	951 Airport Access Road - NOAA, TSA, and NPS Office	No
YK-04	NOAA Housing off Cannon Beach Road	No
YK-05	USFS Housing off Cannon Beach Road	No
YK-06	ADF&G Housing and Office off Colorado Road; NPS Housing	No
YK-07	808 Cannon Beach Road - NPS Housing	No
YK-08	1023/1033 Airport Access Road - Yakutat Lodge Employee and Guest Lodging	Yes
YK-09	989 Airport Way - Yakutat Lodge Restaurant	No
YK-10	935 Hangar Access Road - Alesek River Lodge	No
YK-11	960 Endicott Way - Italio River Lodge	No
YK-12	997 Airport Way - Alaska Airlines	No

Notes:

1 DEC drinking water action level for the sum of five PFAS (70 ng/L, PFOS + PFOA + PFHxS + PFHpA + PFNA) at 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, ng/L = nanograms per liter, PFAS = per- and polyfluoroalkyl substances, PFHpA = perfluoroheptanoic acid, PFHxS = perfluorohexanesulfonic acid, PFNA = perfluorononanoic acid, PFOA = perfluorooctanoic acid, and PFOS = perfluorooctanesulfonic acid, SREB = snow removal equipment building, TSA = Transportation Security Administration, USFS = United States Forest Service.

S&W reviewed the analytical data provided by DEC and performed a quality assurance/quality control (QA/QC) assessment of the analytical data and completed a DEC Laboratory Data Review Checklist (LDRC).

2.6 June 2019 Initial Water Supply Well Search and Sampling Event

In June 2019, S&W staff began the initial WSW search and survey at and near the YAK. Based on the information available and in coordination with the DOT&PF and DEC, a well search area was defined prior to the sampling event. Owners/users of the properties identified in the search area were contacted, where practicable, to determine the presence or absence of a WSW on the property and obtain pertinent information on the well. At that time, 21 properties with WSWs were identified as described in Exhibit 2-5 below.

Exhibit 2-5: Results of Water Supply Wells Identified in the Well Search Area in June 2019

Parcel/Sample ID Number ¹	DEC Sample ID	Address/Location Description
32606	—	#1 State Camp Road
32608	—	Second home from end (Left) of State Camp Road
32609	—	#7 State Camp Road
32615	YK-05	USFS Housing off Cannon Beach Road
32616	YK-04	NOAA Housing off Cannon Beach Road
32617	YK-07	808 Cannon Beach Road - NPS Housing
32618	—	ADF&G Housing off Cannon Beach Road
33002	YK-02	1015 Airport Access Road – DOT&PF SREB
33004	YK-06	ADF&G Housing and Office off Colorado Road; NPS Housing
33045	YK-10	935 Hangar Access Road - Alesek River Lodge
33052	—	963 Airport Road
33053	—	964 Hangar Access Road
33056	YK-11	960 Endicott Way - Italio River Lodge
33059	—	931 Airport Access Road - NPS Service Hangar
33060	YK-01	101 Airport Road – DOT&PF ARFF
33061	YK-03	951 Airport Access Road - NOAA, TSA, and Office
33063	YK-08	1023/1033 Airport Access Road - Yakutat Lodge Employee and Guest Lodging
33064	—	Delta Western Petroleum - Corner of Endicott and Airport Access
33065	—	1020 Airport Access Road - Yakutat Costal Airlines
33066	YK-09	989 Airport Way - Yakutat Lodge Restaurant
33068	YK-12	997 Airport Way - Alaska Airlines

Notes:

1 Parcel ID numbers were used to represent locations 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, S&W = Shannon & Wilson, Inc., SREB = snow removal equipment building, TSA = Transportation Security Administration, USFS = United States Forest Service.

During the June 2019 sampling event, an attempt was made to contact the owner and/or occupant of each identified property with a WSW 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. The 21 wells identified during the initial well search were sampled.

Sample YK-09 was collected after a carbon filter. The sample did not exceed the action level during the February 2019 event (sum of five PFAS above 70 ng/L, PFOS + PFOA + PFHxS +

PFHpA + PFNA). However, the presence of a carbon filter may have artificially biased the detected PFAS concentrations below the DEC action level. This was further verified with comparing the results in subsequent sampling events. Therefore, DOT&PF treated location YK-09/33066 (Yakutat Lodge Restaurant) as an exceedance.

2.6.1 Water Supply Well Categories

WSWs identified during the well search (June 2019) were categorized by use as follows based on information provided by the WSW owner/user.

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

WSWs are categorized in this manner to facilitate sorting of wells by use and provide levels of priority. Wells in Categories 1 and 2 are given a higher priority with respect to alternative water and additional monitoring. Exhibit 2-5 below includes the categories assigned to the 21 wells identified.

Exhibit 2-6: Water Supply Wells Identified in the Well Search Area

Parcel/Sample ID Number ¹	DEC Sample ID	Address/Location Description	Water Supply Well Category ²
32606	—	#1 State Camp Road	1
32608	—	Second home from end (Left) of State Camp Road	1
32609	—	#7 State Camp Road	1
32615	YK-05	USFS Housing off Cannon Beach Road	1
32616	YK-04	NOAA Housing off Cannon Beach Road	1
32617	YK-07	808 Cannon Beach Road - NPS Housing	1
32618	—	ADF&G Housing off Cannon Beach Road	1
33002	YK-02	1015 Airport Access Road – DOT&PF SREB	2
33004	YK-06	ADF&G Housing and Office off Colorado Road; NPS Housing	1
33045	YK-10	935 Hangar Access Road - Alesek River Lodge	1
33052	—	963 Airport Road	2
33053	—	964 Hangar Access Road	4
33056	YK-11	960 Endicott Way - Italio River Lodge	1
33059	—	931 Airport Access Road - NPS Service Hangar	1
33060	YK-01	101 Airport Road – DOT&PF ARFF	2
33061	YK-03	951 Airport Access Road - NOAA, TSA, and Office	1
33063	YK-08	1023/1033 Airport Access Road - Yakutat Lodge Employee and Guest Lodging	2
33064	—	Delta Western Petroleum - Corner of Endicott and Airport Access	2
33065	—	1020 Airport Access Road - Yakutat Costal Airlines	1
33066	YK-09	989 Airport Way - Yakutat Lodge Restaurant	1
33068	YK-12	997 Airport Way - Alaska Airlines	1

Notes:

1 Parcel ID numbers were used to represent locations 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, S&W = Shannon & Wilson, Inc., SREB = snow removal equipment building, TSA = Transportation Security Administration, USFS = United States Forest Service.

2.6.2 Water Supply Well Monitoring Criteria and Schedule

In coordination with the DOT&PF and DEC, S&W established the following quarterly and annual WSW monitoring criteria after the June 2019 sampling event.

- Quarterly Monitoring Criteria

- Active category 1 and 2 WSWs with a maximum combined PFOS and PFOA concentration greater than or equal to 35 ng/L during a previous sampling event, per DEC guidance; and
- Active category 1 and 2 WSWs within 500 lateral feet of WSWs with a combined PFOS and PFOA concentration greater than or equal to 35 ng/L during a previous sampling event.
- Annual Monitoring Criteria
 - Active category 1 and 2 WSWs with a maximum combined PFOS and PFOA concentration greater than or equal to 17.5 ng/L during a previous sampling event, per DEC guidance; and
 - Active category 1 and 2 WSWs within 500 lateral feet of WSWs with a combined PFOS and PFOA concentration greater than or equal to 17.5 ng/L during a previous sampling event.

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

Samples have generally been collected on a quarterly basis since the initial sampling event, with the exception of the 2024 fiscal year. The WSW monitoring criteria established for the YAK after the June 2019 event is shown in Exhibit 2-6 below.

Exhibit 2-7: June 2019 Water Supply Well Monitoring Criteria

Parcel/Sample ID Number ¹	Monitoring Criteria
33053	Q/A
33056	A
33059	Q/A
33060	Q/A
33061	Q/A
33063	Q/A
33064	Q/A
33065	Q/A
33066	Q/A
33068	Q/A

Notes:

1 Parcel ID numbers were used to represent locations during the water supply well search.
 A = annual, Q = quarterly

2.7 December 2019 through June 2020 Water Supply Well Monitoring

In December 2019, S&W conducted a quarterly event at the YAK, sampling wells 33060, 33061, 33064, and 33068. PFAS did not exceed DEC’s drinking water level of 70 ng/L for the sum of PFOS and PFOA. Additional quarterly and annual monitoring events were planned for March 2020 and June 2020, respectively; however, these events were postponed due to the COVID-19 pandemic.

2.7.1 Water Supply Well Monitoring Criteria Modification

Yakutat WSW monitoring criteria were modified after the December 2019 quarterly monitoring event. Wells which previously exceeded the PFAS action level would no longer be sampled. The WSW monitoring criteria established for the YAK after the December 2019 event is shown in Exhibit 2-6 below.

Exhibit 2-8: December 2019 Water Supply Well Monitoring Criteria

Parcel/Sample ID Number ¹	Monitoring Criteria
33053	Q/A
33056	A
33059	Q/A
33060	Q/A
33061	Q/A
33064	Q/A
33065	Q/A
33068	Q/A

Notes:

1 Parcel ID numbers were used to represent locations during the water supply well search.

A = annual, Q = quarterly

2.8 July 2020 Through June 2021 Water Supply Well Monitoring

S&W collected analytical samples for PFAS analysis from the sample locations noted below during the following monitoring events.

- August 2020: 33053, 33060, 33061, 33065, 33066, and 33068
- December 2020: 33059, 33060, 33061, 33064, and 33068
- March 2021: 33059, 33060, 33061, 33064, and 33068
- May 2021: 33053, 33056, 33059, 33060, 33061, 33064, and 33068

Between July 2020 and June 2021, sample results were less than the DEC's drinking water action level for PFAS, with the exception of sample location 33066 (Yakutat Lodge Restaurant) during the August 2020 event. This well was designated an exceedance during the June 2019 event under the former PFAS action level (sum of five PFAS above 70 ng/L, PFOS + PFOA + PFHxS + PFHpA + PFNA). During the August 2020 event the well exceeded the PFAS action level of 70 ng/L for the sum of PFOS and PFOA. To date, sample locations 33063 (Yakutat Lodge), 33066 (Yakutat Lodge Restaurant), and 33065 (Yakutat Coastal Airlines) exceed DEC's drinking water action level for PFAS.

2.9 July 2021 Through June 2022 Water Supply Well Monitoring

S&W collected analytical samples for PFAS analysis from the sample locations noted below during the following monitoring events.

- July 2021: 33053, 33059, 33060, 33061, 33064, 33065, and 33068
- October 2021: 33059, 33060, 33061, 33064, 33065, and 33068
- March 2022: 33059, 33060, 33061, 33064, and 33068
- June 2022: 33053, 33056, 33059, 33060, 33061, 33065, and 33068

Between July 2021 and June 2022, sample results were less than the DEC's drinking water action level for PFAS, with the exception of sample location 33065 (Yakutat Coastal Airlines) during the June 2022 event. To date, sample locations 33063 (Yakutat Lodge), 33066 (Yakutat Lodge Restaurant), and 33065 (Yakutat Coastal Airlines) exceed DEC's drinking water action level for PFAS.

2.10 Alternative Water Sources

Interim alternative bottled water has been supplied to well owners/users whose PFAS concentration exceeded the 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.

2.11 Public Information

The DOT&PF hosts a webpage (Alaska PFAS Information, Transportation & Public Facilities, State of Alaska; <https://dot.alaska.gov/airportwater/>) describing the PFAS water-testing project. The webpage includes simplified regional results maps, a project summary, list of contacts, and links to additional resources.

3 FIELD ACTIVITIES

This section summarizes activities performed between July 2022 and April 2024.

3.1 Water Supply Well Sampling

S&W conducted four WSW sampling events during the reporting period in September 2022, December 2022, March 2023, and June 2023. The following S&W personnel collected analytical water samples for this project. These individuals are State of Alaska Qualified Samplers as defined in 18 Alaska Administrative Code (AAC) 75.333[b] and 18 AAC 78.088[b].

- Kailyn Davis, Environmental Scientist
- Michael Jaramillo, Environmental Chemist
- Rachel Willis, Environmental Scientist

S&W collected WSW samples during the reporting period as noted below.

- September 2022: 33053, 33059, 33060, 33061, and 33068
- December 2022: 33059, 33060, 33061, and 33068
- March 2023: 33059, 33060, and 33068
- June 2023: 33053, 33056, 33059, 33060, and 33068

During the March 2023 event it was noted that the building associated with sample location 33061 had been condemned since the last sampling event in December 2022.

S&W collected WSW samples from a location in the structure's plumbing upstream of water-treatment systems or water softeners, where possible. For the purposes of this project S&W does not consider small (i.e., less than 18 inches in height) particulate filters to be PFAS treatment systems.

S&W purged the WSW systems prior to sampling by allowing the water to run until water parameters stabilized and the water appeared clear. During purging, parameters were collected using a multiprobe water quality meter. The parameters pH, temperature, and conductivity were recorded approximately once every three minutes until sample collection. The following values were used to indicate stability for a minimum of three consecutive readings: ± 0.1 pH, ± 0.5 degrees Celsius ($^{\circ}\text{C}$) temperature, and ± 3 percent conductivity (microsiemens per centimeter).

S&W discharged purge water to an indoor sink or to the ground surface. Following parameter stabilization, S&W collected PFAS water samples using laboratory-supplied containers. Copies of the WSW Sampling Logs are included in Appendix A, Field Forms.

3.2 Sample Custody, Storage, and Transport

Immediately after collection, the sample bottles for each WSW were placed in Ziploc bags and stored in a designated sample cooler maintained between 0 °C and 6 °C with ice substitute separated from the sample bottles by a liner bag. S&W maintained custody of the samples until submitting them to the laboratory for analysis. Analytical samples and chain-of-custody forms were packaged for shipping in a hard-plastic cooler with an adequate quantity of frozen-ice substitute and packing material to maintain the proper temperature and prevent bottle breakage. S&W 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 Eurofins Environment Testing America (Eurofins) in West Sacramento, California for analysis of PFAS by EPA 537(Mod) compliant with DoD QSM Version 5.3, Table B-15.

3.3 Special Considerations for PFAS Sampling

S&W 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.

3.4 Notification of Results

Following review and validation of the analytical data, S&W prepared analytical data tables for the project team (DOT&PF, DEC, Department of Health).

S&W 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 current action levels;
- description of the project; and
- pages of the Eurofins laboratory report that apply to the owner or occupant's WSW sample, including other PFAS results.

Where requested, S&W emailed results letters to owners and/or occupants.

3.5 Deviations

In general, S&W conducted the work in accordance with the sampling procedures noted above and based on ongoing discussion with DEC and DOT&PF. Samples were collected from wells accessible and functional during the time of sampling.

Quarterly and/or annual sampling was not conducted in the 2024 fiscal year.

4 ANALYTICAL RESULTS

Quarterly and annual samples were submitted for the analysis of the 18 PFAS listed in Exhibit 2-3 above by EPA 537(Mod) compliant with DoD QSM Version 5.3 Table B-15. Although all PFAS analytes for the analytical method are reported, PFAS concentrations are only compared to the DEC Drinking Water action level for PFOS and PFOA (70 ng/L).

Tables 1 through 4 summarize the PFAS concentrations for samples collected from WSWs during the September 2022, December 2022, March 2023, and June 2023 events. The Eurofins work orders (WOs) are included in chronological order followed by their LDRC in Appendix B. The highest reported WSW PFAS analytical results through April 2024 for all wells sampled associated with this project are shown on Figure 1.

4.1 Trend Analysis

An evaluation of concentration trends for PFOS, PFOA and their sum in groundwater was completed using a Mann-Kendall statistical analysis of groundwater analytical data and visual inspection of the concentration graphs. Monitoring and Remediation Optimization System (MAROS) software by the Air Force Center for Engineering and the Environment was developed to evaluate concentration trends by evaluating the Mann-Kendall statistical outputs and the coefficient of variation (COV). The COV is defined as the ratio of a dataset's standard deviation to its mean. S&W uses the ProUCL version 5.1 EPA Software capable of performing the Mann-Kendall test and calculating each dataset's COV for collected data. The information obtained from the ProUCL software is then used to further evaluate temporal trends using the MAROS decision matrix developed.

The MAROS decision matrix of concentration trend depends on the result of a Mann-Kendall trend analysis, coupled with information about the COV. A statistically significant increasing or decreasing trend is identified by the Mann-Kendall analysis if the probability of a false-negative assessment is less than 5 percent (i.e., $p < 0.05$); MAROS refers to this

condition as a “confidence in trend” above 95 percent. MAROS also discriminates between “no trend” and a “stable” contaminant concentration by evaluating the COV of a given well’s dataset. COV values less than or near one indicate that data form a relatively close group around the mean value; values larger than one indicate data exhibit a greater degree of scatter around the mean. The MAROS decision matrix is presented in Exhibit 4-1 below:

Exhibit 4-1: MAROS Decision Matrix

Mann-Kendall Statistic (S)	Confidence in Trend	Concentration in Trend
S > 0	> 95 percent	Increasing
	90 – 95 percent	Probably Increasing
	< 90 percent	No Trend
S ≤ 0	<90 percent and COV ≥ 1	No Trend
	<90 percent and COV < 1	Stable
S < 0	90 – 95 percent	Probably decreasing
	> 95 percent	Decreasing

COV = coefficient of variance

Data from DEC’s February 2019 samples were omitted from this analysis. Data collected by S&W through April 2024 was included in this analysis. Sample locations were evaluated for trends if:

- A minimum of four sample results are reported for the given location
- At least 50% detected results for a given analyte

Sample locations that did not meet the above criteria were excluded from the trend analysis. With the current data set, we conducted the trend analysis for sample locations 33053, 33056, 33060, 33064, and 33065. A summary of the trend analysis is provided in Table 5.

Our Mann-Kendall nonparametric trend analysis identified the following trends (Exhibit 4-2) for PFOS, PFOA, and the sum of PFOS+PFOA (for comparison to the DEC’s drinking water action level).

The data compared to the DEC drinking water action level was calculated as follows:

- If both PFOS and PFOA were detected = PFOS + PFOA
- If one is not detected and one detected = detected result
- If both PFOS and PFOA are not detected = sum of the minimum reporting limits

Exhibit 4-2: Trend Analysis Through June 2023

Parcel/Sample ID Number ¹	PFOS	PFOA	DEC Drinking Water Action Level
33053	Decreasing	Stable	Decreasing
33056	Stable	Stable	Stable
33060	No Trend	Stable	No Trend
33064	Stable	Insufficient Detections	Stable
33065	Increasing	Stable	Increasing

Notes:

- 1 Parcel ID numbers were used to represent locations during the water supply well search.
- "Insufficient detections" indicates that the percent non-detect was greater than 50 percent.
- PFOA = perfluorooctanoic acid, PFOS = perfluorooctanesulfonic acid

5 QUALITY ASSURANCE AND QUALITY CONTROL

QA/QC procedures assist in producing data of acceptable quality and reliability. S&W reviewed the analytical results provided by Eurofins for laboratory QC samples and conducted our own QA assessment for this project in accordance with the June 2020 DEC approved Data-Validation Program Plan included as a part of our DOT&PF Statewide General Work Plan. S&W completed LDRCs for the PFAS WOs. These LDRCs are included in Appendix B after the corresponding analytical report.

By working in accordance with the proposed scope of services, S&W 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 C for a QA/QC summary of the analytical data.

6 RECOMMENDATIONS

Based on the previously completed work, S&W recommends the DOT&PF continue:

- annual monitoring.
- working with the DEC and the Alaska Department of Health to continue educating the public regarding the potential health effects of exposure to PFAS-containing water, as new information becomes available; and
- limiting 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.

Based on the previously completed work, S&W recommends the DOT&PF consider:

- conducting additional quarterly sampling for the purposes of assessing analytical trends.
- resampling locations that have not been sampled during the quarterly and/or annual sampling events for comparison to upcoming regulatory changes.

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 S&W. 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), 2019a, 18 AAC 75, Oil and other hazardous substances pollution control: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, January available: <http://dec.alaska.gov/commish/regulations/>.

Alaska Department of Environmental Conservation (DEC), 2019b, 18 AAC 75.341, Soil cleanup levels: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, Section 341, January, available: <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>.

Alaska Department of Environmental Conservation (DEC), 2019d, Field sampling guidance for contaminated sites and leaking underground storage tanks: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, October, available: 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.
- Shannon & Wilson, Inc., 2022, DOT&PF Statewide PFAS Data-Validation Program Plan, Various Sites, Alaska: Prepared July.
- U.S. Army Corps of Engineers (USACE), 2008. Military Munitions Response Program Preliminary Assessment for Yakutat Air Base, Yakutat, Alaska, Property Number F10AK0606. July.
- U.S. Army Corps of Engineers (USACE), 2016. Environmental Assessment for Yakutat Air Base, Yakutat, Alaska, Property Number F10AK0606. April.
- U.S. Environmental Protection Agency (EPA), 2016, Drinking water health advisory for perfluorooctanoic acid (PFOA): Washington, D.C., U.S. EPA Office of Water, Health and Ecological Criteria Division, EPA 822-R-16-005, May, available: 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 — September 2022 Water Supply Well Monitoring Analytical Results

				Sample ID	33053	33059	33060	33160	33061	33068
				Sample Date	9/23/2022	9/23/2022	9/23/2022		9/23/2022	9/23/2022
Analytical Method	Analyte	Action Level	Units	Project Sample	Project Sample	Field Duplicate Pair		Project Sample	Project Sample	
EPA 537(Mod)	Perfluorooctanesulfonic acid (PFOS)	70‡	ng/L	6.3	< 1.8	7.9	8.4	< 1.8 J*	< 1.8	
	Perfluorooctanoic acid (PFOA)	70‡	ng/L	1.7 J	< 1.8	4.6	4.7	< 1.9	< 1.8	
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	10†	ng/L	< 3.6	< 3.6	< 3.7	< 3.7	< 3.7	< 3.7	
	Perfluorobutanesulfonic acid (PFBS)	2000†	ng/L	0.72 J	< 1.8	0.43 J	0.54 J	< 1.9	< 1.8	
	Perfluorodecanoic acid (PFDA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.9	< 1.8	
	Perfluorododecanoic acid (PFDoA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.9 J*	< 1.8	
	Perfluoroheptanoic acid (PFHpA)	N/A	ng/L	1.0 J	< 1.8	3.6	3.2	< 1.9	< 1.8	
	Perfluorohexanesulfonic acid (PFHxS)	N/A	ng/L	9.8	< 1.8	8.2	8.0	< 1.9 J*	< 1.8	
	Perfluorohexanoic acid (PFHxA)	N/A	ng/L	1.6 J	< 1.8	18	17	< 1.9	< 1.8	
	Perfluorononanoic acid (PFNA)	N/A	ng/L	0.52 J	< 1.8	0.63 J	0.65 J	< 1.9	< 1.8	
	Perfluorotetradecanoic acid (PFTeA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8 J*	< 1.8	
	Perfluorotridecanoic acid (PFTrDA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.9	< 1.8	
	Perfluoroundecanoic acid (PFUnA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.9 J*	< 1.8	
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8 J*	< 1.8	
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8 J*	< 1.8	
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8 J*	< 1.8	
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	ng/L	< 4.5	< 4.5	< 4.7	< 4.6	< 4.6 J*	< 4.6		
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	ng/L	< 4.5	< 4.5	< 4.7	< 4.6	< 4.6 J*	< 4.6		

- Notes: Results reported from Eurofins Environment Testing in West Sacramento, California work order 320-92599-1.
- † Final EPA PFAS LHAs (HFPO-DA/PFBS)
 - ‡ DEC Drinking Water Action Level = 70 ng/L for sum of PFOS and PFOA
 - < Analyte not detected; listed as less than the RL unless otherwise flagged due to quality-control failures.
 - J Estimated concentration, detected greater than the DL and less than the reporting limit RL. Flag applied by the laboratory.
 - J* Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc.
 - DEC Alaska Department of Environmental Conservation
 - DL Detection Limit
 - EPA United States Environmental Protection Agency
 - LHA Lifetime Health Advisory
 - ng/L nanograms per liter
 - N/A No applicable regulatory limit exists for the associated analyte.
 - RL Reporting Limit

Table 2 — December 2022 Water Supply Well Monitoring Analytical Results

				Sample ID	33059	33060	33160	33061	33068
				Sample Date	12/16/2022	12/15/2022		12/16/2022	12/16/2022
Analytical Method	Analyte	Action Level	Units	Project Sample	Field Duplicate Pair		Project Sample	Project Sample	Project Sample
EPA 537(Mod)	Perfluorooctanesulfonic acid (PFOS)	70‡	ng/L	< 2.0	8.9	9.2	< 1.9	< 1.9	
	Perfluorooctanoic acid (PFOA)	70‡	ng/L	< 2.0	2.4	2.4	< 1.9	< 1.9	
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	10†	ng/L	< 3.9	< 4.2	< 3.8	< 3.8	< 3.8	
	Perfluorobutanesulfonic acid (PFBS)	2000†	ng/L	< 2.0	0.79 J	0.73 J	< 1.9	< 1.9	
	Perfluorodecanoic acid (PFDA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	Perfluorododecanoic acid (PFDoA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	Perfluoroheptanoic acid (PFHpA)	N/A	ng/L	0.33 J	2.5	2.3	< 1.9	< 1.9	
	Perfluorohexanesulfonic acid (PFHxS)	N/A	ng/L	< 2.0	7.0	7.4	< 1.9	< 1.9	
	Perfluorohexanoic acid (PFHxA)	N/A	ng/L	< 2.0	6.1	6.3	< 1.9	< 1.9	
	Perfluorononanoic acid (PFNA)	N/A	ng/L	< 2.0	0.51 J	0.48 J	< 1.9	< 1.9	
	Perfluorotetradecanoic acid (PFTeA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	Perfluorotridecanoic acid (PFTrDA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	Perfluoroundecanoic acid (PFUnA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	ng/L	< 2.0	< 2.1	< 1.9	< 1.9	< 1.9	
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	ng/L	< 4.9	< 5.2	< 4.7	< 4.8	< 4.8		
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	ng/L	< 4.9	< 5.2	< 4.7	< 4.8	< 4.8		

Notes: Results reported from Eurofins Environment Testing in West Sacramento, California work order 320-95510-1.
† Final EPA PFAS LHAs (HFPO-DA/PFBS)
‡ DEC Drinking Water Action Level = 70 ng/L for sum of PFOS and PFOA
< Analyte not detected; listed as less than the RL unless otherwise flagged due to quality-control failures.
J Estimated concentration, detected greater than the DL and less than the reporting limit RL. Flag applied by the laboratory.
DEC Alaska Department of Environmental Conservation
DL Detection Limit
EPA United States Environmental Protection Agency
LHA Lifetime Health Advisory
ng/L nanograms per liter
N/A No applicable regulatory limit exists for the associated analyte.
RL Reporting Limit

Table 3 — March 2023 Water Supply Well Monitoring Analytical Results

				Sample ID	33059	33060	33160	33068
				Sample Date	3/8/2023	3/8/2023		3/8/2023
Analytical Method	Analyte	Action Level	Units	Project Sample	Field Duplicate Pair		Project Sample	
EPA 537(Mod)	Perfluorooctanesulfonic acid (PFOS)	70‡	ng/L	< 1.8	8.5	9.4	< 1.8	
	Perfluorooctanoic acid (PFOA)	70‡	ng/L	< 1.8	1.5 J	1.6 J	< 1.8	
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	10†	ng/L	< 3.7	< 3.6	< 3.6	< 3.7	
	Perfluorobutanesulfonic acid (PFBS)	2000†	ng/L	< 1.8	0.43 J	0.53 J	< 1.8	
	Perfluorodecanoic acid (PFDA)	N/A	ng/L	< 1.8	< 1.8	0.35 J	< 1.8	
	Perfluorododecanoic acid (PFDoA)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	Perfluoroheptanoic acid (PFHpA)	N/A	ng/L	< 1.8	1.1 J	1.0 J	< 1.8	
	Perfluorohexanesulfonic acid (PFHxS)	N/A	ng/L	< 1.8	5.5	5.9	< 1.8	
	Perfluorohexanoic acid (PFHxA)	N/A	ng/L	< 1.8	1.7 J	1.7 J	< 1.8	
	Perfluorononanoic acid (PFNA)	N/A	ng/L	< 1.8	0.59 J	0.69 J	< 1.8	
	Perfluorotetradecanoic acid (PFTeA)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	Perfluorotridecanoic acid (PFTrDA)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	Perfluoroundecanoic acid (PFUnA)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	ng/L	< 1.8	< 1.8	< 1.8	< 1.8	
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	ng/L	< 4.6	< 4.6	< 4.5	< 4.6		
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	ng/L	< 4.6	< 4.6	< 4.5	< 4.6		

Notes: Results reported from Eurofins Environment Testing America in West Sacramento, California work order 320-97690-1

- † Final EPA PFAS LHAs (HFPO-DA/PFBS)
- ‡ DEC Drinking Water Action Level = 70 ng/L for sum of PFOS and PFOA
- < Analyte not detected; listed as less than the RL unless otherwise flagged due to quality-control failures.
- J Estimated concentration, detected greater than the DL and less than the reporting limit RL. Flag applied by the laboratory.

DEC Alaska Department of Environmental Conservation
DL Detection Limit
EPA United States Environmental Protection Agency
LHA Lifetime Health Advisory
ng/L nanograms per liter
N/A No applicable regulatory limit exists for the associated analyte.
RL Reporting Limit

Table 4 — June 2023 Water Supply Well Monitoring Analytical Results

				Sample ID	33053	33056	33059	33060	93060	33068
				Sample Date	6/6/2023	6/6/2023	6/6/2023	6/6/2023		6/6/2023
Analytical Method	Analyte	Action Level	Units	Project Sample	Project Sample	Project Sample	Field Duplicate Pair		Project Sample	
EPA 537(Mod)	Perfluorooctanesulfonic acid (PFOS)	70‡	ng/L	4.0	9.5	0.54 J	12	12	< 1.7	
	Perfluorooctanoic acid (PFOA)	70‡	ng/L	0.84 J	2.7	< 1.9	2.3	2.4	< 1.7	
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	10†	ng/L	< 3.6	< 3.5	< 3.8	< 3.6	< 3.6	< 3.5	
	Perfluorobutanesulfonic acid (PFBS)	2000†	ng/L	0.34 J	0.79 J	< 1.9	0.31 J	0.30 J	< 1.7	
	Perfluorodecanoic acid (PFDA)	N/A	ng/L	< 1.8	0.33 J	< 1.9	0.33 J	0.33 J	< 1.7	
	Perfluorododecanoic acid (PFDoA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	Perfluoroheptanoic acid (PFHpA)	N/A	ng/L	0.65 J	1.5 J	< 1.9	2.0	2.3	< 1.7	
	Perfluorohexanesulfonic acid (PFHxS)	N/A	ng/L	6.9	8.9	< 1.9	3.6	3.7	< 1.7	
	Perfluorohexanoic acid (PFHxA)	N/A	ng/L	1.2 J	1.7 J	< 1.9	3.9	4.3	< 1.7	
	Perfluorononanoic acid (PFNA)	N/A	ng/L	0.35 J	1.2 J	< 1.9	0.63 J	0.68 J	< 1.7	
	Perfluorotetradecanoic acid (PFTeA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	Perfluorotridecanoic acid (PFTrDA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	Perfluoroundecanoic acid (PFUnA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	ng/L	< 1.8	< 1.8	< 1.9	< 1.8	< 1.8	< 1.7	
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	ng/L	< 4.5	< 4.4	< 4.8	< 4.5	< 4.5	< 4.4		
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	ng/L	< 4.5	< 4.4	< 4.8	< 4.5	< 4.5	< 4.4		

Notes: Results reported from Eurofins Environment Testing in West Sacramento, California work order 320-101394-1.

- † Final EPA PFAS LHAs (HFPO-DA/PFBS)
- ‡ DEC Drinking Water Action Level = 70 ng/L for sum of PFOS and PFOA
- < Analyte not detected; listed as less than the RL unless otherwise flagged due to quality-control failures.
- J Estimated concentration, detected greater than the DL and less than the reporting limit RL. Flag applied by the laboratory.

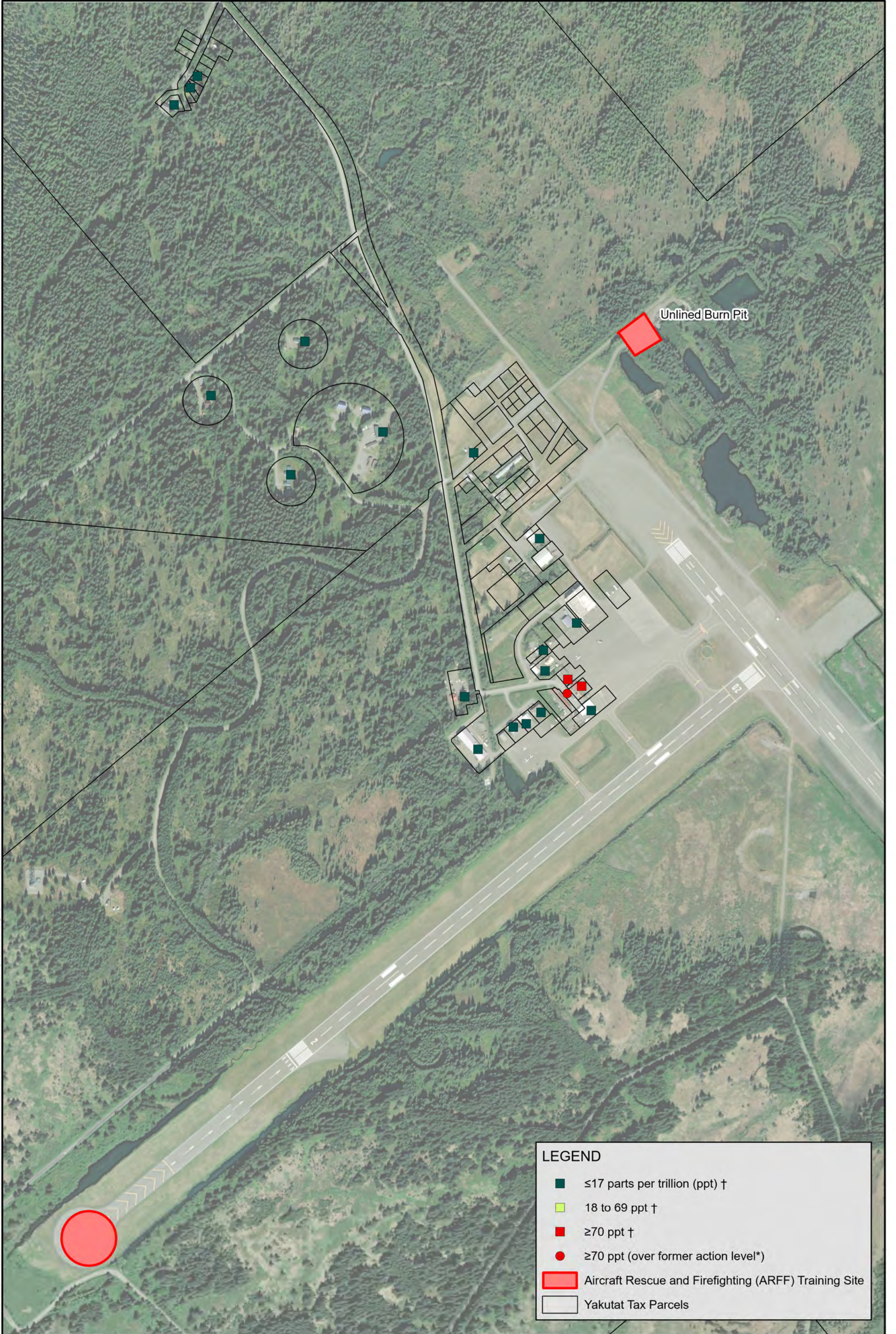
DEC Alaska Department of Environmental Conservation
DL Detection Limit
EPA United States Environmental Protection Agency
LHA Lifetime Health Advisory
ng/L nanograms per liter
N/A No applicable regulatory limit exists for the associated analyte.
RL Reporting Limit

Table 5 - Summary of Mann-Kendall Trend Analysis

Location	Analyte	N	%ND	S	p-value	Confidence	COV	Trend
33053	PFOS	7	0.00%	-13	0.035	96.5%	0.363	Decreasing trend
	PFOA	7	0.00%	-5	0.281	71.9%	0.220	Stable
	LHA	7	0.00%	-13	0.035	96.5%	0.322	Decreasing trend
33056	PFOS	5	0.00%	-4	0.242	75.8%	0.092	Stable
	PFOA	5	0.00%	0	0.592	40.8%	0.178	Stable
	LHA	5	0.00%	-4	0.242	75.8%	0.099	Stable
33060	PFOS	15	0.00%	2	0.461	53.9%	0.204	No trend
	PFOA	15	6.67%	-14	0.248	75.2%	0.511	Stable
	LHA	15	0.00%	15	0.248	75.2%	0.203	No trend
33064	PFOS	8	0.00%	-4	0.360	64.0%	0.467	Stable
	PFOA	8	62.50%	-	-	-	-	Insufficient detections for a meaningful trend analysis
	LHA	8	0.00%	-4	0.360	64.0%	0.511	Stable
33065	PFOS	5	0.00%	10	0.008	99.2%	0.659	Increasing trend
	PFOA	5	0.00%	-4	0.242	75.8%	0.195	Stable
	LHA	5	0.00%	8	0.042	95.8%	0.555	Increasing trend

Notes: COV = coefficient of variation; DEC = Alaska Department of Environmental Conservation;
 LHA = Lifetime Health Advisory Level/DECs PFAS Drinking Water Action Level; N = number of observations;
 PFAS = per- and polyfluoroalkyl substance; PFOA = perfluorooctanoic acid; PFOS = perfluorooctanesulfonic acid;
 S = Mann-Kendall Statistic

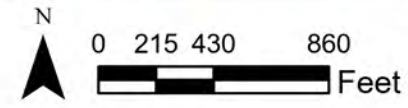
102896-007



Unlined Burn Pit

LEGEND

- ≤17 parts per trillion (ppt) †
- 18 to 69 ppt †
- ≥70 ppt †
- ≥70 ppt (over former action level*)
- Aircraft Rescue and Firefighting (ARFF) Training Site
- Yakutat Tax Parcels



NOTES:
 1. The highest concentration for each well is presented on this map. This figure depicts a compilation of data collected throughout the life of the project. Some data depicted in this figure was not recently collected and may not represent the current condition.
 † Sum of PFOS and PFOA; *Sum of PFOS, PFOA, PFHxS, PFHpA, and PFNA

HIGHEST REPORTED WATER SUPPLY WELL RESULTS THROUGH JUNE 2023
Figure 1

Path: T:\GIS_Projects\Statewide PFAS\Yakutat\Yakutat_DOT&PF\Yakutat_DOT&PF.aprx User: TXG Date: 5/7/2024
 Imagery provided by Maxar Products. Dynamic Mosaic © 2020 Maxar Technologies Inc., Alaska Geospatial Office, USGS; available: https://geoportal.alaska.gov/portal/home/item.html?id=66ccdaa872a6458095e95d6fa7231f68, accessed April, 2024.

Appendix A
Field Forms

APPENDIX A: FIELD FORMS

FIELD ACTIVITIES DAILY LOG

Date 9/23/22

Sheet 1 of 1

Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - Sept 2022

Field activity subject: Water well sampling

Description of daily activities and events:

0740 - Calibrate YSI B. pack for sampling

0900 - Arrive at 33060. Purge and sample from utility sink in garage bay

1000 - Arrive at 33059. Purge from bathroom sink while talking to Skip. Sample from PT in boiler room

1100 - Arrive at 33053. Purge from pump on top of well using owner's hose. Sample directly from spigot

1200 - Arrive at 33061. Purge through hose already connected to PT. Sample directly from PT. Nobody present during sample.

1255 - Arrive at 33068. Talk to gate agents who page Adam (airport manager). Purge from utility sink + sample directly from PT. Adam intermittently present during purging.

1:30 - Return to cabin, unpack samples

Visitors on site: —

Changes from plans/specifications and other special orders and important decisions: —

Weather conditions: Cloudy / rainy

Important telephone calls: —

Personnel on site: KND
Signature: KND MA

Date: 9/23/22

(initials)

Fri 9am

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 101 Airport Road
Owner/Occupant Bobby Lekanof
Mailing address See DB
Telephone (907) 784-3476

Project Number 102896-009
Project Name FY23 Water Supply Well Sampling - Sept 2022
Date 9/23/22
Time 0900
Sampling Personnel KND

Sample Location Purge AND sample from utility/handwashing sink in shop

Sample Number 33060
Duplicate 33160

Time 0927
Time 0917

Analysis PFAS

Lab Eurofins

0.5gal/min

Purge Volume ~11.5gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
0901	20.9	336.2	5.95	clear
0904	19.5	317.8	6.68	clear
0907	17.4	306.3	7.12	clear
0910	16.7	301.9	7.28	clear
0912	16.6	301.0	7.35	clear
0915	16.5	300.7	7.40	clear
0918	16.5	300.6	7.43	clear
0921	16.5	300.6	7.44	clear
0924	16.5	300.8	7.45	clear
Sampled @ 0927				

23min

Notes: Notify Bobby of results still

@

Fri 10am

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 931 Airport Access Rd
 Owner/Occupant Skip Johnson
 Mailing address See DB
 Telephone (907) 784-3337

Project Number 102896-009
 Project Name FY23 Water Supply Well Sampling - Sept 2022
 Date 9/23/22
 Time 1000
 Sampling Personnel KND

Sample Location Purge from ^{bathroom} ~~breakroom~~ sink w/ Skip present
Sample from PT in boiler room (1st door on left)

Sample Number 33059
 Duplicate —

Time 1033
 Time —

Analysis PFAS

Lab Eurofins

Purge Volume 0.6 gal/min ~ 18 gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1000	14.3	261.8	7.07	very slightly cloudy ↓
1003	12.6	228.5	7.64	
1006	11.6	212.9	8.01	
1009	11.0	211.5	8.27	
1012	10.6	216.0	8.42	
1015	10.4	223.7	8.50	
1018	10.3	229.3	8.47	
1021	10.2	234.2	8.45	
1024	10.1	238.2	8.45	
1027	10.2	240.7	8.46	
1030	10.2	242.1	8.47	
Sampled @ 1033				

30min

Notes: Sand results to Julia Bevans PO Box 31
Homer, AK 99603

On the Edge of Nowhere - Huntington
 North Wind Blows Softly



Fri any time
except 12-1 (lunch)

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 964 Hangar Access Road Suite B Project Number 102896-009
 Owner/Occupant Leo Tejada Project Name FY23 Water Supply Well Sampling - Sept 2022
 Mailing address See DB Date 9/23/22
 Telephone (907) 784-3910 Time 1100
 Sampling Personnel KND
 Sample Location Purged from pump on top of well using owner's hose
sampled through spigot

Sample Number 33053 Time 1147
 Duplicate - Time -
 Analysis PFAS Lab Eurofins

1 @ gal/min
 Purge Volume ~39 gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1105	9.7	188.6	6.34	clear
1108	9.8	189.0	6.94	clear
1111	9.8	188.8	7.17	clear
1114	9.8	188.6	7.32	clear
1117	9.8	188.2	7.47	clear
1120	9.8	188.0	7.59	clear
1123	9.8	187.6	7.68	clear
1126	9.7	187.4	7.76	clear
1129	9.8	187.3	7.83	clear
1132	9.8	187.2	7.90	clear
1135	9.7	187.0	7.97	clear
1138	9.7	186.9	8.02	clear
1141	9.8	186.8	8.05	clear
1144	9.8	186.9	8.06	clear
Sampled @ 1147				

39 min

Notes:

(a)

Fri any time

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 951 Airport Access Road
Owner/Occupant Kevin Brown
Mailing address See DB
Telephone (907) 227-9167

Project Number 102896-009
Project Name FY23 Water Supply Well Sampling - Sept 2022
Date 9/23/22
Time 1200
Sampling Personnel KND

Sample Location Purge/sample from PT (purged through hose already in place)
Ground floor maintenance room, access is rear L side corner of bldg
Door propped closed w/ 2 wooden boards

Sample Number 33061
Duplicate -

Time 1238
Time -

Analysis PFAS

Lab Eurofins

Purge Volume 2 gal/min
~66 gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1202	9.2	247.4	5.95	Slightly cloudy
1205	7.9	243.4	7.33	Slightly cloudy
1208	7.3	230.7	7.90	clear
1211	7.2	232.5	8.19	clear
1214	8.2	239.3	8.18	clear
1217	8.0	237.6	8.32	clear
1220	7.9	236.0	8.43	clear
1223	7.7	234.9	8.52	clear
1225	7.7	234.3	8.59	clear
1229	7.6	233.6	8.70	clear
1232	7.6	232.8	8.74	clear
1235	7.6	233.0	8.75	clear
Sampled @ 1238				

33min

Notes:

ⓐ

Fri between 12-2

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 997 Airport Way
Owner/Occupant Adam (manager)
Mailing address See DB
Telephone (360) 355-2406

Project Number 102896-009
Project Name FY23 Water Supply Well Sampling - Sept 2022
Date 9/23/22
Time 1255
Sampling Personnel KND

Sample Location Purge from utility sink + PT spigot sample
PT spigot rear L side of baggage area, requires escort
Adam present off and on during sampling. Said AK Air building new cargo location in town

Sample Number 33068
Duplicate -

Time 1319
Time -

Analysis PFAS

Lab Eurofins

3 gal/min
Purge Volume ~63 gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1255	17.3	313.8	6.39	clear
1258	16.2	305.0	7.15	clear
1301	16.1	303.7	7.46	clear
1304	16.0	302.5	7.65	clear
1307	15.9	300.5	7.77	clear
1310	15.8	299.8	7.80	clear
1313	15.8	298.4	7.85	clear
1316	15.6	296.6	7.89	clear
sampled @ 1319				

21min

Notes: _____

FIELD ACTIVITIES DAILY LOG

Date 12/15/2022

Sheet 1 of 1

December 2022 Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - ~~Sept 2022~~

Field Activity Subject: Water Supply Well Sampling

Calibration: 0530 AM Calibrate YSI F

Description of daily activities and events:

0530 Calibrate YSI and pack for field work.

0600 Drive to airport and check-in

0600-1604 Travel from Fairbanks → YAKUTAT

1604 Arrive in YAK and pick up luggage. Pick up rental vehicle

1634 Arrive at DOT&PF ARFF building. Collect sample and duplicate

	Sample ID	Sample Time.	
	33060	→ 1704	primary
	33160	→ 1706	duplicate

1708 Clean up work area and leave site. Check in on Leo's Vehicle Rental (33053). Business looks inactive. No vehicles on-site and no foot traffic to office.

Check in on Halio River Lodge (33056). Tire trucks to building. Check back in for AM

1731 Arrive at B&B and organize gear.

Visitors on site: None

Changes from plans/specifications and other special orders and important decisions:

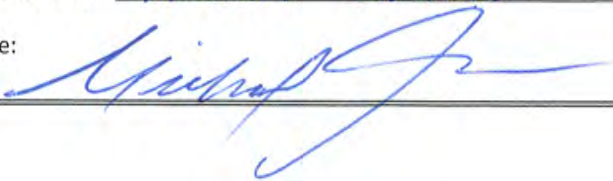
None

Weather conditions: Fairbanks 10°F snowing
Yakutat 30°F raining

Important telephone calls: see contact list

Personnel on site: Michael Jaramillo

Signature:



Date: 12/15/2022

am

FIELD ACTIVITIES DAILY LOG

Date 12/14/2022

Sheet 1 of 2

December 2022 Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - Sept 2022

Field Activity Subject: Water Supply Well Sampling

Calibration: Calibration check @ 6:30

Description of daily activities and events:

0630 Check calibration for YSI F. Conductivity out of calibration. Attempts to recalibrate and confirm calibration were unsuccessful. Continue with prep. Conductivity biased low but only used for stabilization criteria.

Pack for field work and departure.

0730 Arrive at Alaska Airlines terminal and purge from utility sink. Sample beneath pressure tank pre-treatment.

Sample ID 33068 collected @ 0813

0824 Clean up work area and await next appointment. Confirm no traffic for Leo's Auto. Some snow tracks at Italo's but no answer to phone call or knocking.

0845 Meet w Michael Mow of TSP. Utility room outside behind building. Door propped up w 2x4.

Purge and sample from spigot below pressure tank. Sample ID 33061 @ 0907. pre-treatment.

0915 Cleanup work area and await next appointment. Call Skip Johnson to see if he was able to come early. Get gas for rental.

Visitors on site: None

Changes from plans/specifications and other special orders and important decisions:

None

Weather conditions: Partly cloudy 25-30 °F

Important telephone calls: See contact list

Personnel on site: Michael Jaramillo (MJS)

Signature:

Michael Jaramillo

Date: 12/14/2022



FIELD ACTIVITIES DAILY LOG

Date 12/16/2022

Sheet 2 of 2

Project No. 102896-009

Project Name: Yakutat DOT & PF PFAS - FY23 Water Supply Well Sampling.

Field Activity Subject: Water Supply Well Sampling December 2022

Calibration: Calibration check @ 630 - see page 1 for notes.

Description of daily activities and events:

1001 Met with Skip Johnson to access National Parks Service Hangar. Purge from NPS breakroom and sample from spigot beneath pressure tank.
Sample ID 33059 @ 1031

1042 Cleanup work area and pack for departure.
Drop off luggage at Alaska Airlines.

1100 - 2145 Travel from Yakutat to Fairbanks.

2145 - 2230 Pick up luggage and drive to office place
Samples in refrigerator and unpack.

* NOTE: TSA inspected cooler. Sample custody not considered compromised.

Visitors on site: None

Changes from plans/specifications and other special orders and important decisions:

None

Weather conditions: Partly cloudy 25-30°F in Yakutat
-30°F in Fairbanks

Important telephone calls: See contact list

Personnel on site: Michael Jaramillo (PXX)

Signature:



Date: 12/16/2022



WATER SUPPLY WELL SAMPLING LOG

Address 101 Airport Road Project Number 102896-009
 Owner/Occupant DET & PF ARFF Project Name FY23 Water Supply Well Sampling - Dec 2022
 Mailing address Po Box 186 Date 12/15/2022
YAKUTAT, AK 99689 Time 1634
 Telephone (907) 784-3476 Sampling Personnel MXJ

Sample Location Utility Sink in ARFF building - No treatment.
purge @ ~ 0.5 gallons per minute

Sample Number 33060 Time 1704
 Duplicate 33160 Time 1706

Analysis PFAS x 18 Lab Eurofins - Sacramento, CA

Purge Volume ~ 13.5 gallons

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1637	Started	purging		
1640	18.9	355.1	6.74	Clear
1643	15.7	355.7	7.00	" "
1646	14.3	282.3	7.05	" "
1649	14.0	286.9	7.14	" "
1652	13.5	284.1	7.17	" "
1655	12.8	285.5	7.21	" "
1658	12.1	268.4	7.26	" "
1701	12.3	269.1	7.28	" "
1704	12.5	269.7	7.31	" "
1705	collect	samples		

Notes: None.



WATER SUPPLY WELL SAMPLING LOG

Address 931 Airport Access Road Project Number 102896-009
 Owner/Occupant Park Service Project Name FY23 Water Supply Well Sampling - Dec 2022
 Mailing address PO Box 31 Date 12/16/2022
Homier, AK 99603 Time 1001
 Telephone (907) 784-3337 Sampling Personnel MXJ

Sample Location Spigot beneath pressure tank

Sample Number 33059 Time 1031
 Duplicate _____ Time _____

Analysis PFAS x 18 Lab Eurofins - Sacramento, CA

Purge Volume ~27 gallons

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1003	Started	purging		
1006	14.4	233.7	7.34	Clear
1009	9.1	205.9	7.60	" "
1012	7.4	187.4	7.72	" "
1015	6.9	143.6	7.75	" "
1018	6.1	112.3	7.74	" "
1021	5.7	84.1	7.72	" "
1024	5.4	66.9	7.72	" "
1027	5.5	65.7	7.70	" "
1030	5.5	65.2	7.69	" "
1031	Collected	Sample		

Notes: Purge from NPS breakroom sink.
Purge rate ~1 gallon/minute

WATER SUPPLY WELL SAMPLING LOG

Address 997 Airport Way Project Number 102896-009
 Owner/Occupant Alaska Airlines Project Name FY23 Water Supply Well Sampling - Dec 2022
 Mailing address PO Box 290 Date 12/16/2022
YAKUTAT, AK 99689 Time 730
 Telephone (907) 784-3367 Sampling Personnel MXJ

Sample Location Spigot beneath pressure tank

Sample Number 33068 Time 0813
 Duplicate / Time /

Analysis PFAS x 18 Lab Eurofins - Sacramento, CA

Purge Volume ~180 gallons

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
0734	Started purging			
0739	17.1	296.1	6.75	Clear
0742	16.9	294.5	6.87	" "
0745	16.5	289.4	6.93	" "
0748	16.0	284.7	6.97	" "
0751	15.5	278.3	7.01	" "
0754	15.1	274.7	7.04	" "
0757	14.6	267.6	7.07	" "
0800	14.0	261.8	7.09	" "
0803	13.5	254.3	7.12	" "
0806	13.1	249.2	7.13	" "
0809	12.7	247.3	7.16	" "
0812	12.6	244.6	7.17	" "
0813	Collect	Sample		

Notes: Purge from utility sink near washing machine.
purge @ ~5 gallons/minute



WATER SUPPLY WELL SAMPLING LOG

Address 957 Airport Access Road Project Number 102896-009
 Owner/Occupant TSA Project Name FY23 Water Supply Well Sampling - Dec 2022
 Mailing address PO Box 427 Date 12/16/2022
YAKUTAT, AK 99689 Time 8:45
 Telephone (907) 784-3453 Sampling Personnel MXJ

Sample Location beneath pressure tank.

Sample Number 33061 Time 0907
 Duplicate / Time /

Analysis PFAS x18 Lab Eurofins - Sacramento, CA

Purge Volume ~30 gallons

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
851	Started purging			
854	7.0	193.5	7.55	Clear
857	6.9	193.4	7.75	" "
900	6.8	190.3	7.79	" "
903	6.8	191.3	7.76	" "
904	6.7	192.2	7.74	
907	collected sample			

Notes: Purge to outside of the utility closet.
Hose plumbed to outside but buried in
snow/ice. Used cover hole to purge.
Purge rate ~ 2 gallons per minute
Some sediment observed in sample container.

©

FIELD ACTIVITIES DAILY LOG

Date 3/8/23

Sheet 1 of 1

Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - March 2023

Field Activity Subject: March 2023 water supply well sampling

Calibration: yes - YSI-F

Description of daily activities and events:

0820 Calibrate YSI-F, pack for field day

0930 Load car, drive into town

1000 sample NPS hangar ^{sample} (33059)

1115 Drive around to other sample locations that didn't answer phone
Confirm currently unoccupied (sample #s 33053, 33056, 33061)

1200 Wait at AK Air terminal for flight to take off + get escort to
sample behind baggage area (sample # 33068)

1400 Meet Bobby @ Fire hall + sample + dup (sample #s
33060 and 33160)

1500 End of work day

33053 and 33056 were buried in snow, no evidence
of occupation

33061 - building has been condemned in
approx. February 2023

Visitors on site: —

Changes from plans/specifications and other special orders and important decisions: —

Weather conditions: sunny 40s

Important telephone calls: —

Personnel on site: KND

Signature: KND

Date: 3/8/23



Wed
10am

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 931 Airport Access Rd
Owner/Occupant Julie Bevins
Mailing address see DB

Project Number 102896-009
Project Name FY23 Water Supply Well Sampling - March 2023

Telephone (907) 350-4178 (Skip cell)
*DB = data base

Date 3/8/23
Time 1000
Sampling Personnel KND

Sample Location Purge from kitchen sink
Sample from PT

Sample Number 33059
Duplicate -

Time 1025
Time -

Analysis PFAS

Lab Eurofins

Purge Volume 1gal/min ⇒ 18gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1004	16.8	299.5	6.06	clear ↓
1007	15.0	283.2	6.65	
1010	13.8	276.6	6.89	
1013	12.3	266.5	7.03	
1016	11.3	261.3	7.03	
1019	11.1	261.2	7.08	
1022	10.9	260.1	7.10	
sampled @ 1025				

18min

Notes: _____

WATER SUPPLY WELL SAMPLING LOG

Address 997 Airport Way
 Owner/Occupant Alaska Airlines
 Mailing address See DB
 Telephone See DB

Project Number 102896-009
 Project Name FY23 Water Supply Well Sampling - March 2023
 Date 3/8/23
 Time 1215
 Sampling Personnel KND

*DB = database

Sample Location purge @ utility sink + sample from PT

Sample Number 33068
 Duplicate -

Time 1235
 Time -

Analysis PFAS

Lab Eurofins

Purge Volume 2 gal/min ⇒ 30 gal

PARAMETERS [stabilization criteria]

15 min

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1217	17.6	354.6	6.26	clear ↓
1220	16.1	337.0	7.01	
1223	14.9	326.3	7.16	
1226	14.9	326.3	7.23	
1229	14.9	326.1	7.25	
1232	15.0	327.3	7.27	
sampled @ 1235				

Notes: _____



Wed
2pm

SHANNON & WILSON, INC.

WATER SUPPLY WELL SAMPLING LOG

Address 101 Airport Rd
Owner/Occupant Bobby Lekanof
Mailing address see DB
Telephone (907) 410-7359 (Bobby cell)

Project Number 102896-009
Project Name FY23 Water Supply Well Sampling - March 2023
Date 3/8/23
Time 1400
Sampling Personnel KND

Sample Location purge/sample from utility sink

Sample Number 33060
Duplicate 33160

Time 1422
Time 1412

Analysis PFAS

Lab Eurofins

Purge Volume 1gal/min ⇒ 16gal

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1403	23.1	283.0	6.09	clear
1406	21.1	261.7	6.78	↓
1407	17.6	242.1	6.83	
1410	15.8	232.1	6.91	
1413	15.7	230.7	6.96	
1416	15.7	229.9	6.99	
1419	15.8	232.5	7.04	
Sampled @ 1422				

16min

Notes: _____

FIELD ACTIVITIES DAILY LOG

Date 6/15/23

Sheet 1 of 1

Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - June 2023

Field Activity Subject: WSW Sampling

Calibration: None

Safety: Travel safety

Description of daily activities and events:

0800 Arrive @ S+W office. Prepare equipment

0850 Arrive @ FAI to depart to YAK

0900 RLW arrives in YAK.

1620 Make phone calls to schedule sampling appointments

1700 Done with day

Visitors on site: /

Changes from plans/specifications and other special orders and important decisions: /

Weather conditions: 50°F overcast

Important telephone calls: schedule appointments

Personnel on site: RLW

QC: (Signature)

Signature: (Signature)

Date: 6/15/23

FIELD ACTIVITIES DAILY LOG

Date 6/6/23

Sheet 1 of 1

Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - June 2023

Field Activity Subject: WSW Sampling

Calibration: YSI F

Safety: residential sampling

Description of daily activities and events:

0700 Calibrate YSI F. Prepare paperwork

0815 Depart lodging

0820 RLW sample DOT+PF ARFF Bldg. Personnel inquired about why the state doesn't do any blood testing on employees who touched ARFF.

0900 RLW arrived @ AK Air terminal

1000 RLW @ sampled Italo River Lodge Hangar. Sampled Leo's Rental vehicle well & Hangar w/ Parks Service

1630 Done w/ day

Visitors on site: /

Changes from plans/specifications and other special orders and important decisions: /

Weather conditions: 50°F Overcast

Important telephone calls: /

Personnel on site: RLW

QC: (signature)

Signature: (signature)

Date: 6/6/23

FIELD ACTIVITIES DAILY LOG

Date 6/7/23

Sheet 1 of 1

Project No. 102896-009

Project Name: Yakutat DOT&PF PFAS - FY23 Water Supply Well Sampling - June 2023

Field Activity Subject: WSW Sampling

Calibration: None

Safety: Travel Safety

Description of daily activities and events:

0800 Pack equipment
RLW depart Yakutat

1700 RLW arrive in Fairbanks

1730 Unpack. Done for day

Visitors on site: /

Changes from plans/specifications and other special orders and important decisions: /

Weather conditions: 50-70°F

Important telephone calls: /

Personnel on site: RLW

QC: W

Signature: RLW

Date: 6/7/23

WATER SUPPLY WELL SAMPLING LOG

Address 101 Airport Rd / 941 Airport Access Rd Project Number 102896-009
 Owner/Occupant DOT+PF ARFF Project Name FY23 Water Supply Well Sampling - June 2023
 Mailing address PO Box 186 Date 6/6/23
Yakutat WA 99689 Time 0820
 Telephone 907-784-3476 Sampling Personnel RLW

Sample Location Purge from shop sink, sample from shop sink

Sample Number 33060 Time 0854
 Duplicate 93060 Time 0844

Analysis PFAS Lab Eurofins

Purge Volume 2 gal/min

0827 Purge start **PARAMETERS** [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
0833	9.3	252.7	7.00	clear
0836	9.7	235.3	7.19	clear
0839	9.6	243.1	7.36	clear
0842	6.0	218.1	7.46	clear
0845	6.3	219.4	7.56	clear
0848	6.0	217.6	7.61	clear
0851	6.1	216.2	7.63	clear
0854	Sample			

Notes: Bathroom Sink running simultaneously
Temp cycling w/ pressure tank refilling

WATER SUPPLY WELL SAMPLING LOG

Address 997 Airport Way / 1044 Airport Access Project Number 102896-009
 Owner/Occupant Alaska Airlines / TSA Project Name FY23 Water Supply Well Sampling - June 2023
 Mailing address PO Box 290 / PO Box 427 Date 6/6/23
Yakutat Yakutat 99689 Time 0905
 Telephone - Sampling Personnel RLW

Sample Location Purge from utility mop sink. Sample from pressure tank

Sample Number 33 068 Time 0934
 Duplicate - Time -

Analysis PFAS Lab Eurofins

Purge Volume 3 gall/min

0910 Purge Start **PARAMETERS** [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
0916	16.7	344.9	7.49	clear
0919	16.6	345.4	7.73	clear
0922	16.0	345.6	7.80	clear
0925	16.7	348.1	7.87	clear
0928	16.7	349.5	7.87	clear
0931	16.8	349.6	7.89	clear
0934	Sample			

Notes: Temp not decreasing



WATER SUPPLY WELL SAMPLING LOG

Address 960 Endicott Way Project Number 102896-009
 Owner/Occupant Italo River Lodge Hangar Project Name FY23 Water Supply Well Sampling - June 2023
 Mailing address Po Box 283 Date 6/6/23
Yakutat, AK 99689 Time 1000
 Telephone 907-784-3280 Sampling Personnel RLW

Sample Location Purge from sink (utility/kitchen prep)
Sample from

Sample Number 33056 Time 1025
 Duplicate - Time -

Analysis PFAS Lab Eurofins

Purge Volume 3 gal/min

1000 Purge start

PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1004	7.7	236.3	7.20	clear
1007	7.5	234.1	7.51	clear
1010	7.5	232.4	7.63	clear
1013	7.5	231.4	7.78	clear
1016	7.4	230.7	7.84	clear
1019	7.4	230.2	7.89	clear
1022	7.4	229.6	7.91	clear
1025	Sample			

Notes: _____

(Handwritten signature/initials)

WATER SUPPLY WELL SAMPLING LOG

Address 931 Airport Access Rd Project Number 102896-009
 Owner/Occupant Julia Bevins Project Name FY23 Water Supply Well Sampling - June 2023
 Mailing address PO Box 31 Date 6/6/23
Homer AK 99603 Time 1300
 Telephone 907-677-2602 (Julia) Sampling Personnel RLW

Sample Location From pressure tank Purged from breakroom sink

Sample Number 33059 Time 1334
 Duplicate - Time -

Analysis PFAS Lab Eurofins

Purge Volume 2 gal/min

1304 Purge start **PARAMETERS** [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1307	16.7	320.5	7.49	clear
1310	14.2	301.4	7.73	clear
1313	13.6	295.3	7.86	clear
1316	12.1	283.8	7.97	clear
1319	11.1	274.4	8.05	clear
1322	10.5	264.1	8.09	clear
1325	10.1	260.0	8.14	clear
1328	10.1	259.8	8.16	clear
1331	9.9	259.6	8.17	clear
1334				

Notes: _____

aw

WATER SUPPLY WELL SAMPLING LOG

Address 964 Hangar Access Rd St B
 Owner/Occupant LEO'S car rental
 Mailing address PO Box 283
Yakutat AK 99689
 Telephone 907-292-0600

Project Number 102896-009
 Project Name FY23 Water Supply Well Sampling - June 2023
 Date 1410
 Time 016123
 Sampling Personnel RLW

Sample Location from pump spigot

Sample Number 33053
 Duplicate -

Time 1436
 Time -

Analysis PFAS

Lab Eurofins

Purge Volume 3 gal/min

1412 Purge start **PARAMETERS** [stabilization criteria]

Time	Temp. (°C) [± 0.5]	Conductivity (µS/cm) [± 3%]	pH (std. units) [± 0.1]	Water Clarity (visual)
1415	6.7	155.9	7.05	clear
1418	6.4	153.1	7.27	clear
1421	6.0	150.1	7.62	clear
1424	6.0	149.4	7.74	clear
1427	5.7	147.9	7.96	clear
1430	5.6	147.1	8.03	clear
1433	5.7	146.9	8.04	clear
1436	Sample			

Notes: _____

Appendix B

Laboratory Reports and LDRCs

APPENDIX B: LABORATORY REPORTS AND LDRCS



ANALYTICAL REPORT

PREPARED FOR

Attn: Ashley Jaramillo
Shannon & Wilson, Inc
2355 Hill Rd.

Fairbanks, Alaska 99709-5244

Generated 11/28/2022 8:14:52 AM Revision 1

JOB DESCRIPTION

FY23 Well Sampling (YAK)

JOB NUMBER

320-92599-1

Eurofins Sacramento

Job Notes

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender and destroy this report immediately. This report shall not be reproduced except in full, without prior express written approval by the laboratory.

The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
11/28/2022 8:14:52 AM
Revision 1

Authorized for release by
David Alltucker, Project Manager I
David.Alltucker@et.eurofinsus.com
(916)374-4383



Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	7
Isotope Dilution Summary	14
QC Sample Results	15
QC Association Summary	19
Lab Chronicle	20
Certification Summary	21
Method Summary	22
Sample Summary	23
Chain of Custody	24
Receipt Checklists	25

Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Job ID: 320-92599-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-92599-1

Revision 11-28-2022: This report has been revised to report missing batch QC and correct batch number reference in narrative.

Receipt

The samples were received on 9/29/2022 12:46 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.0° C.

LCMS

Method EPA 537(Mod): Results for sample 33061 (320-92599-5) were reported from the analysis of a diluted extract due to sample matrix in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

Method EPA 537(Mod): Isotope Dilution Analyte (IDA) recoveries associated with the following sample are below the method recommended limit: 33061 (320-92599-5). The sample was re-extracted outside of the holding time with IDA recoveries within control limits. Both sets of data are reported. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample.

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 320-621650.

Method 3535: The following samples in preparation batch 320-621650 were observed to have floating particulates present in the sample bottle. 33059 (320-92599-3) and 33061 (320-92599-5)

Method 3535: The following samples in preparation batch 320-621650 were dark brown in color prior to extraction. 33059 (320-92599-3) and 33061 (320-92599-5)

Method 3535: During the solid phase extraction process, the following samples contained non-settable particulates which clogged the solid phase extraction column: 33059 (320-92599-3).320-621650

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-632337.

Method 3535: The following sample was re-prepared outside of preparation holding time due to a low IDA% recovery of 13C4 PFOS and 13C2 PFTeDA: 33061 (320-92599-5).
preparation batch 320-632337

Method 3535: The following sample in preparation batch 320-632337 was observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction. 33061 (320-92599-5)

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: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33160

Lab Sample ID: 320-92599-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	17		1.8	0.53	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.2		1.8	0.23	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.7		1.8	0.78	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.65	J	1.8	0.25	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.54	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.0		1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.4		1.8	0.50	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33060

Lab Sample ID: 320-92599-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	3.6		1.9	0.23	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	4.6		1.9	0.79	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.63	J	1.9	0.25	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.43	J	1.9	0.19	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.2		1.9	0.53	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.9		1.9	0.50	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33059

Lab Sample ID: 320-92599-3

No Detections.

Client Sample ID: 33053

Lab Sample ID: 320-92599-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.6	J	1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	J	1.8	0.22	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.7	J	1.8	0.76	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.52	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.72	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.8		1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.3		1.8	0.48	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33061

Lab Sample ID: 320-92599-5

No Detections.

Client Sample ID: 33068

Lab Sample ID: 320-92599-6

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33160

Lab Sample ID: 320-92599-1

Date Collected: 09/23/22 09:17

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	17		1.8	0.53	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluoroheptanoic acid (PFHpA)	3.2		1.8	0.23	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorooctanoic acid (PFOA)	4.7		1.8	0.78	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorononanoic acid (PFNA)	0.65	J	1.8	0.25	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.67	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorobutanesulfonic acid (PFBS)	0.54	J	1.8	0.18	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorohexanesulfonic acid (PFHxS)	8.0		1.8	0.52	ng/L		10/01/22 10:49	10/12/22 05:39	1
Perfluorooctanesulfonic acid (PFOS)	8.4		1.8	0.50	ng/L		10/01/22 10:49	10/12/22 05:39	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		10/01/22 10:49	10/12/22 05:39	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		10/01/22 10:49	10/12/22 05:39	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/01/22 10:49	10/12/22 05:39	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/01/22 10:49	10/12/22 05:39	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/01/22 10:49	10/12/22 05:39	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.37	ng/L		10/01/22 10:49	10/12/22 05:39	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C4 PFHpA	101		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C4 PFOA	100		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C5 PFNA	95		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C2 PFDA	95		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C2 PFUnA	93		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C2 PFDoA	84		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C2 PFTeDA	85		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C3 PFBS	97		50 - 150	10/01/22 10:49	10/12/22 05:39	1
18O2 PFHxS	94		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C4 PFOS	86		50 - 150	10/01/22 10:49	10/12/22 05:39	1
d3-NMeFOSAA	105		50 - 150	10/01/22 10:49	10/12/22 05:39	1
d5-NEtFOSAA	101		50 - 150	10/01/22 10:49	10/12/22 05:39	1
13C3 HFPO-DA	95		50 - 150	10/01/22 10:49	10/12/22 05:39	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33060

Lab Sample ID: 320-92599-2

Date Collected: 09/23/22 09:27

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	18		1.9	0.54	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluoroheptanoic acid (PFHpA)	3.6		1.9	0.23	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorooctanoic acid (PFOA)	4.6		1.9	0.79	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorononanoic acid (PFNA)	0.63	J	1.9	0.25	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.68	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorobutanesulfonic acid (PFBS)	0.43	J	1.9	0.19	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorohexanesulfonic acid (PFHxS)	8.2		1.9	0.53	ng/L		10/01/22 10:49	10/12/22 05:49	1
Perfluorooctanesulfonic acid (PFOS)	7.9		1.9	0.50	ng/L		10/01/22 10:49	10/12/22 05:49	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.7	1.1	ng/L		10/01/22 10:49	10/12/22 05:49	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.7	1.2	ng/L		10/01/22 10:49	10/12/22 05:49	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/01/22 10:49	10/12/22 05:49	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/01/22 10:49	10/12/22 05:49	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/01/22 10:49	10/12/22 05:49	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.37	ng/L		10/01/22 10:49	10/12/22 05:49	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	97		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C4 PFHpA	99		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C4 PFOA	96		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C5 PFNA	94		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C2 PFDA	94		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C2 PFUnA	93		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C2 PFDoA	88		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C2 PFTeDA	83		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C3 PFBS	94		50 - 150				10/01/22 10:49	10/12/22 05:49	1
18O2 PFHxS	96		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C4 PFOS	90		50 - 150				10/01/22 10:49	10/12/22 05:49	1
d3-NMeFOSAA	104		50 - 150				10/01/22 10:49	10/12/22 05:49	1
d5-NEtFOSAA	98		50 - 150				10/01/22 10:49	10/12/22 05:49	1
13C3 HFPO-DA	92		50 - 150				10/01/22 10:49	10/12/22 05:49	1

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33059

Lab Sample ID: 320-92599-3

Date Collected: 09/23/22 10:33

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.52	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.22	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.76	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.98	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.65	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.51	ng/L		10/01/22 10:49	10/12/22 05:59	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.48	ng/L		10/01/22 10:49	10/12/22 05:59	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		10/01/22 10:49	10/12/22 05:59	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		10/01/22 10:49	10/12/22 05:59	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.21	ng/L		10/01/22 10:49	10/12/22 05:59	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.3	ng/L		10/01/22 10:49	10/12/22 05:59	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/01/22 10:49	10/12/22 05:59	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		10/01/22 10:49	10/12/22 05:59	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	90		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C4 PFHpA	88		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C4 PFOA	85		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C5 PFNA	81		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C2 PFDA	78		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C2 PFUnA	66		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C2 PFDoA	59		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C2 PFTeDA	66		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C3 PFBS	85		50 - 150	10/01/22 10:49	10/12/22 05:59	1
18O2 PFHxS	85		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C4 PFOS	76		50 - 150	10/01/22 10:49	10/12/22 05:59	1
d3-NMeFOSAA	78		50 - 150	10/01/22 10:49	10/12/22 05:59	1
d5-NEtFOSAA	73		50 - 150	10/01/22 10:49	10/12/22 05:59	1
13C3 HFPO-DA	80		50 - 150	10/01/22 10:49	10/12/22 05:59	1

Eurofins Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33053

Lab Sample ID: 320-92599-4

Date Collected: 09/23/22 11:47

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.6	J	1.8	0.52	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluoroheptanoic acid (PFHpA)	1.0	J	1.8	0.22	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorooctanoic acid (PFOA)	1.7	J	1.8	0.76	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorononanoic acid (PFNA)	0.52	J	1.8	0.24	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.98	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.65	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorobutanesulfonic acid (PFBS)	0.72	J	1.8	0.18	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorohexanesulfonic acid (PFHxS)	9.8		1.8	0.51	ng/L		10/01/22 10:49	10/12/22 06:19	1
Perfluorooctanesulfonic acid (PFOS)	6.3		1.8	0.48	ng/L		10/01/22 10:49	10/12/22 06:19	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		10/01/22 10:49	10/12/22 06:19	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		10/01/22 10:49	10/12/22 06:19	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.21	ng/L		10/01/22 10:49	10/12/22 06:19	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.3	ng/L		10/01/22 10:49	10/12/22 06:19	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/01/22 10:49	10/12/22 06:19	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		10/01/22 10:49	10/12/22 06:19	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C4 PFHpA	102		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C4 PFOA	101		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C5 PFNA	103		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C2 PFDA	104		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C2 PFUnA	105		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C2 PFDoA	104		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C2 PFTeDA	112		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C3 PFBS	107		50 - 150				10/01/22 10:49	10/12/22 06:19	1
18O2 PFHxS	104		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C4 PFOS	102		50 - 150				10/01/22 10:49	10/12/22 06:19	1
d3-NMeFOSAA	117		50 - 150				10/01/22 10:49	10/12/22 06:19	1
d5-NEtFOSAA	120		50 - 150				10/01/22 10:49	10/12/22 06:19	1
13C3 HFPO-DA	97		50 - 150				10/01/22 10:49	10/12/22 06:19	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33061

Lab Sample ID: 320-92599-5

Date Collected: 09/23/22 12:38

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.54	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.23	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.79	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.25	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.51	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.68	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.53	ng/L		10/01/22 10:49	10/10/22 09:52	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.50	ng/L		10/01/22 10:49	10/10/22 09:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		10/01/22 10:49	10/10/22 09:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		10/01/22 10:49	10/10/22 09:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.22	ng/L		10/01/22 10:49	10/10/22 09:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/01/22 10:49	10/10/22 09:52	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		10/01/22 10:49	10/10/22 09:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.37	ng/L		10/01/22 10:49	10/10/22 09:52	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C4 PFHpA	87		50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C4 PFOA	81		50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C5 PFNA	68		50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C2 PFDA	56		50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C2 PFUnA	33	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C2 PFDoA	19	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C2 PFTeDA	5	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C3 PFBS	54		50 - 150	10/01/22 10:49	10/10/22 09:52	1
18O2 PFHxS	21	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C4 PFOS	5	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
d3-NMeFOSAA	35	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
d5-NEtFOSAA	23	*5-	50 - 150	10/01/22 10:49	10/10/22 09:52	1
13C3 HFPO-DA	96		50 - 150	10/01/22 10:49	10/10/22 09:52	1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorotetradecanoic acid (PFTeA)	ND	H	1.8	0.66	ng/L		11/11/22 13:03	11/13/22 04:43	1
Perfluorooctanesulfonic acid (PFOS)	ND	H	1.8	0.49	ng/L		11/11/22 13:03	11/13/22 04:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND	H	1.8	0.22	ng/L		11/11/22 13:03	11/13/22 04:43	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND	H	1.8	0.29	ng/L		11/11/22 13:03	11/13/22 04:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	H	1.8	0.36	ng/L		11/11/22 13:03	11/13/22 04:43	1

Eurofins Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33061

Date Collected: 09/23/22 12:38

Date Received: 09/29/22 12:46

Lab Sample ID: 320-92599-5

Matrix: Water

<u>Isotope Dilution</u>	<u>%Recovery</u>	<u>Qualifier</u>	<u>Limits</u>	<u>Prepared</u>	<u>Analyzed</u>	<u>Dil Fac</u>
13C2 PFTeDA	68		50 - 150	11/11/22 13:03	11/13/22 04:43	1
13C4 PFOS	90		50 - 150	11/11/22 13:03	11/13/22 04:43	1

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Client Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33068

Lab Sample ID: 320-92599-6

Date Collected: 09/23/22 13:19

Matrix: Water

Date Received: 09/29/22 12:46

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.67	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.52	ng/L		10/01/22 10:49	10/12/22 06:29	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.49	ng/L		10/01/22 10:49	10/12/22 06:29	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		10/01/22 10:49	10/12/22 06:29	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		10/01/22 10:49	10/12/22 06:29	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		10/01/22 10:49	10/12/22 06:29	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		10/01/22 10:49	10/12/22 06:29	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		10/01/22 10:49	10/12/22 06:29	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.37	ng/L		10/01/22 10:49	10/12/22 06:29	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C4 PFHpA	101		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C4 PFOA	99		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C5 PFNA	98		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C2 PFDA	98		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C2 PFUnA	97		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C2 PFDoA	97		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C2 PFTeDA	99		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C3 PFBS	95		50 - 150	10/01/22 10:49	10/12/22 06:29	1
18O2 PFHxS	99		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C4 PFOS	88		50 - 150	10/01/22 10:49	10/12/22 06:29	1
d3-NMeFOSAA	116		50 - 150	10/01/22 10:49	10/12/22 06:29	1
d5-NEtFOSAA	113		50 - 150	10/01/22 10:49	10/12/22 06:29	1
13C3 HFPO-DA	94		50 - 150	10/01/22 10:49	10/12/22 06:29	1

Eurofins Sacramento

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDoA (50-150)	PFTDA (50-150)
320-92599-1	33160	99	101	100	95	95	93	84	85
320-92599-2	33060	97	99	96	94	94	93	88	83
320-92599-3	33059	90	88	85	81	78	66	59	66
320-92599-4	33053	100	102	101	103	104	105	104	112
320-92599-5	33061	85	87	81	68	56	33 *5-	19 *5-	5 *5-
320-92599-5 - RE	33061								68
320-92599-6	33068	100	101	99	98	98	97	97	99
LCS 320-621650/2-A	Lab Control Sample	104	102	103	102	99	101	101	112
LCS 320-632337/2-A	Lab Control Sample								95
LCSD 320-621650/3-A	Lab Control Sample Dup	102	100	99	98	97	98	95	100
LCSD 320-632337/3-A	Lab Control Sample Dup								88
MB 320-621650/1-A	Method Blank	103	99	100	99	103	102	101	105
MB 320-632337/1-A	Method Blank								93

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-92599-1	33160	97	94	86	105	101	95
320-92599-2	33060	94	96	90	104	98	92
320-92599-3	33059	85	85	76	78	73	80
320-92599-4	33053	107	104	102	117	120	97
320-92599-5	33061	54	21 *5-	5 *5-	35 *5-	23 *5-	96
320-92599-5 - RE	33061			90			
320-92599-6	33068	95	99	88	116	113	94
LCS 320-621650/2-A	Lab Control Sample	104	103	99	115	113	100
LCS 320-632337/2-A	Lab Control Sample			97			
LCSD 320-621650/3-A	Lab Control Sample Dup	98	92	89	116	108	97
LCSD 320-632337/3-A	Lab Control Sample Dup			93			
MB 320-621650/1-A	Method Blank	103	99	97	114	110	94
MB 320-632337/1-A	Method Blank			97			

Surrogate Legend

- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDoA = 13C2 PFDoA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Lab Sample ID: MB 320-621650/1-A
Matrix: Water
Analysis Batch: 624111

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 621650

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		10/01/22 10:49	10/12/22 04:28	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		10/01/22 10:49	10/12/22 04:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		10/01/22 10:49	10/12/22 04:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		10/01/22 10:49	10/12/22 04:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		10/01/22 10:49	10/12/22 04:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		10/01/22 10:49	10/12/22 04:28	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		10/01/22 10:49	10/12/22 04:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		10/01/22 10:49	10/12/22 04:28	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	103		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C4 PFHpA	99		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C4 PFOA	100		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C5 PFNA	99		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C2 PFDA	103		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C2 PFUnA	102		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C2 PFDoA	101		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C2 PFTeDA	105		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C3 PFBS	103		50 - 150	10/01/22 10:49	10/12/22 04:28	1
18O2 PFHxS	99		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C4 PFOS	97		50 - 150	10/01/22 10:49	10/12/22 04:28	1
d3-NMeFOSAA	114		50 - 150	10/01/22 10:49	10/12/22 04:28	1
d5-NEtFOSAA	110		50 - 150	10/01/22 10:49	10/12/22 04:28	1
13C3 HFPO-DA	94		50 - 150	10/01/22 10:49	10/12/22 04:28	1

Lab Sample ID: LCS 320-621650/2-A
Matrix: Water
Analysis Batch: 624111

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 621650

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	40.0	42.8		ng/L		107	72 - 130
Perfluorooctanoic acid (PFOA)	40.0	44.0		ng/L		110	71 - 133
Perfluorononanoic acid (PFNA)	40.0	41.6		ng/L		104	69 - 130

Eurofins Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCS 320-621650/2-A
Matrix: Water
Analysis Batch: 624111

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 621650

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	40.0	44.8		ng/L		112	71 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	44.4		ng/L		111	69 - 133
Perfluorododecanoic acid (PFDoA)	40.0	42.4		ng/L		106	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	44.3		ng/L		111	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	42.3		ng/L		106	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	37.8		ng/L		106	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	37.4		ng/L		103	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	39.7		ng/L		107	65 - 140
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	40.0	39.5		ng/L		99	65 - 136
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	40.0	42.6		ng/L		107	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	40.4		ng/L		108	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	44.8		ng/L		112	72 - 132
11-Chloroeicosadecafluoro-3-oxadecane-1-sulfonic acid	37.8	41.1		ng/L		109	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	44.0		ng/L		117	81 - 141

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C2 PFHxA	104		50 - 150
13C4 PFHpA	102		50 - 150
13C4 PFOA	103		50 - 150
13C5 PFNA	102		50 - 150
13C2 PFDA	99		50 - 150
13C2 PFUnA	101		50 - 150
13C2 PFDoA	101		50 - 150
13C2 PFTeDA	112		50 - 150
13C3 PFBS	104		50 - 150
18O2 PFHxS	103		50 - 150
13C4 PFOS	99		50 - 150
d3-NMeFOSAA	115		50 - 150
d5-NEtFOSAA	113		50 - 150
13C3 HFPO-DA	100		50 - 150

Lab Sample ID: LCSD 320-621650/3-A
Matrix: Water
Analysis Batch: 624111

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 621650

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec	
							Limits	RPD
Perfluorohexanoic acid (PFHxA)	40.0	40.3		ng/L		101	72 - 129	3
Perfluoroheptanoic acid (PFHpA)	40.0	43.3		ng/L		108	72 - 130	1
Perfluorooctanoic acid (PFOA)	40.0	44.2		ng/L		110	71 - 133	0

Eurofins Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCSD 320-621650/3-A
Matrix: Water
Analysis Batch: 624111

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 621650

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorononanoic acid (PFNA)	40.0	42.8		ng/L		107	69 - 130	3	30
Perfluorodecanoic acid (PFDA)	40.0	45.2		ng/L		113	71 - 129	1	30
Perfluoroundecanoic acid (PFUnA)	40.0	44.7		ng/L		112	69 - 133	1	30
Perfluorododecanoic acid (PFDoA)	40.0	44.1		ng/L		110	72 - 134	4	30
Perfluorotridecanoic acid (PFTriA)	40.0	43.7		ng/L		109	65 - 144	1	30
Perfluorotetradecanoic acid (PFTeA)	40.0	41.0		ng/L		103	71 - 132	3	30
Perfluorobutanesulfonic acid (PFBS)	35.5	38.1		ng/L		107	72 - 130	1	30
Perfluorohexanesulfonic acid (PFHxS)	36.5	38.1		ng/L		104	68 - 131	2	30
Perfluorooctanesulfonic acid (PFOS)	37.2	42.3		ng/L		114	65 - 140	6	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	39.1		ng/L		98	65 - 136	1	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	45.6		ng/L		114	61 - 135	7	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	41.3		ng/L		111	77 - 137	2	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	44.5		ng/L		111	72 - 132	1	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.8	40.6		ng/L		107	76 - 136	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	49.3		ng/L		131	81 - 141	11	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	102		50 - 150
13C4 PFHpA	100		50 - 150
13C4 PFOA	99		50 - 150
13C5 PFNA	98		50 - 150
13C2 PFDA	97		50 - 150
13C2 PFUnA	98		50 - 150
13C2 PFDoA	95		50 - 150
13C2 PFTeDA	100		50 - 150
13C3 PFBS	98		50 - 150
18O2 PFHxS	92		50 - 150
13C4 PFOS	89		50 - 150
d3-NMeFOSAA	116		50 - 150
d5-NEtFOSAA	108		50 - 150
13C3 HFPO-DA	97		50 - 150

Lab Sample ID: MB 320-632337/1-A
Matrix: Water
Analysis Batch: 632509

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632337

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		11/11/22 13:03	11/13/22 04:12	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		11/11/22 13:03	11/13/22 04:12	1

Eurofins Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: MB 320-632337/1-A
Matrix: Water
Analysis Batch: 632509

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 632337

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		11/11/22 13:03	11/13/22 04:12	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		11/11/22 13:03	11/13/22 04:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		11/11/22 13:03	11/13/22 04:12	1
Isotope Dilution	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFTeDA	93		50 - 150				11/11/22 13:03	11/13/22 04:12	1
13C4 PFOS	97		50 - 150				11/11/22 13:03	11/13/22 04:12	1

Lab Sample ID: LCS 320-632337/2-A
Matrix: Water
Analysis Batch: 632509

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 632337

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluorotetradecanoic acid (PFTeA)	40.0	38.9		ng/L		97	71 - 132
Perfluorooctanesulfonic acid (PFOS)	37.2	38.9		ng/L		104	65 - 140
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	38.8		ng/L		104	77 - 137
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.8	39.4		ng/L		104	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	41.4		ng/L		110	81 - 141
Isotope Dilution	%Recovery	LCS Qualifier	Limits				
13C2 PFTeDA	95		50 - 150				
13C4 PFOS	97		50 - 150				

Lab Sample ID: LCSD 320-632337/3-A
Matrix: Water
Analysis Batch: 632509

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 632337

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorotetradecanoic acid (PFTeA)	40.0	36.1		ng/L		90	71 - 132	8	30
Perfluorooctanesulfonic acid (PFOS)	37.2	37.5		ng/L		101	65 - 140	4	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	36.8		ng/L		99	77 - 137	5	30
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.8	38.3		ng/L		101	76 - 136	3	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	41.0		ng/L		108	81 - 141	1	30
Isotope Dilution	%Recovery	LCSD Qualifier	Limits						
13C2 PFTeDA	88		50 - 150						
13C4 PFOS	93		50 - 150						

Eurofins Sacramento

QC Association Summary

Client: Shannon & Wilson, Inc
 Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

LCMS

Prep Batch: 621650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92599-1	33160	Total/NA	Water	3535	
320-92599-2	33060	Total/NA	Water	3535	
320-92599-3	33059	Total/NA	Water	3535	
320-92599-4	33053	Total/NA	Water	3535	
320-92599-5	33061	Total/NA	Water	3535	
320-92599-6	33068	Total/NA	Water	3535	
MB 320-621650/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-621650/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-621650/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 623410

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92599-5	33061	Total/NA	Water	EPA 537(Mod)	621650

Analysis Batch: 624111

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92599-1	33160	Total/NA	Water	EPA 537(Mod)	621650
320-92599-2	33060	Total/NA	Water	EPA 537(Mod)	621650
320-92599-3	33059	Total/NA	Water	EPA 537(Mod)	621650
320-92599-4	33053	Total/NA	Water	EPA 537(Mod)	621650
320-92599-6	33068	Total/NA	Water	EPA 537(Mod)	621650
MB 320-621650/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	621650
LCS 320-621650/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	621650
LCSD 320-621650/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	621650

Prep Batch: 632337

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92599-5 - RE	33061	Total/NA	Water	3535	
MB 320-632337/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-632337/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-632337/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 632509

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-92599-5 - RE	33061	Total/NA	Water	EPA 537(Mod)	632337
MB 320-632337/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	632337
LCS 320-632337/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	632337
LCSD 320-632337/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	632337

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Client Sample ID: 33160

Lab Sample ID: 320-92599-1

Date Collected: 09/23/22 09:17

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			272.2 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	624111	10/12/22 05:39	D1R	EET SAC

Client Sample ID: 33060

Lab Sample ID: 320-92599-2

Date Collected: 09/23/22 09:27

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			268.3 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	624111	10/12/22 05:49	D1R	EET SAC

Client Sample ID: 33059

Lab Sample ID: 320-92599-3

Date Collected: 09/23/22 10:33

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			280 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	624111	10/12/22 05:59	D1R	EET SAC

Client Sample ID: 33053

Lab Sample ID: 320-92599-4

Date Collected: 09/23/22 11:47

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.4 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	624111	10/12/22 06:19	D1R	EET SAC

Client Sample ID: 33061

Lab Sample ID: 320-92599-5

Date Collected: 09/23/22 12:38

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			269.6 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	623410	10/10/22 09:52	RS1	EET SAC
Total/NA	Prep	3535	RE		277.4 mL	10.0 mL	632337	11/11/22 13:03	RAC	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	632509	11/13/22 04:43	S1M	EET SAC

Client Sample ID: 33068

Lab Sample ID: 320-92599-6

Date Collected: 09/23/22 13:19

Matrix: Water

Date Received: 09/29/22 12:46

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			273.1 mL	10.0 mL	621650	10/01/22 10:49	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	624111	10/12/22 06:29	D1R	EET SAC

Laboratory References:

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

Eurofins Sacramento

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

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

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod) 3535	PFAS for QSM 5.3, Table B-15 Solid-Phase Extraction (SPE)	EPA SW846	EET SAC EET 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:

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



Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: FY23 Well Sampling (YAK)

Job ID: 320-92599-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-92599-1	33160	Water	09/23/22 09:17	09/29/22 12:46
320-92599-2	33060	Water	09/23/22 09:27	09/29/22 12:46
320-92599-3	33059	Water	09/23/22 10:33	09/29/22 12:46
320-92599-4	33053	Water	09/23/22 11:47	09/29/22 12:46
320-92599-5	33061	Water	09/23/22 12:38	09/29/22 12:46
320-92599-6	33068	Water	09/23/22 13:19	09/29/22 12:46

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15



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

CHAIN-OF-CUSTODY RECORD

Laboratory Eurofins Page 1 of 1
Attn: David Altucker

Analytical Methods (include preservative if used)

Turn Around Time:
 Normal Rush
 Please Specify _____

Quote No: _____

J-Flags: Yes No

Sample Identity	Lab No.	Time	Date Sampled	PFAS DO, GSM, S, B Tide Bts	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
33160		0917	9/23/22	X	2	Groundwater
33060		0927		X	2	
33059		1033		X	2	
33053		1147		X	2	
33061		1238		X	2	
33068		1319		X	2	



Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: <u>102896-009</u>	Total No. of Containers: <u>12</u>	Signature: <u>Kyle Dr</u>	Signature: _____	Signature: _____
Name: <u>FY23 Well Sampling (YAK)</u>	COC Seals/Intact? <u>Y/N/A</u>	Time: <u>1340</u>	Time: _____	Time: _____
Contact: <u>osley.jacimilco@shannonwilson.com</u>	Received Good Cond./Cold	Date: <u>9/26/22</u>	Date: _____	Date: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temp: <u>4.0</u>	Printed Name: <u>Kailyn Davis</u>	Printed Name: _____	Printed Name: _____
Sampler: <u>KND</u>	Delivery Method: _____	Company: <u>Shannon & Wilson</u>	Company: _____	Company: _____
Notes: _____	Received By: <u>1. Dr</u>	Received By: <u>2. Dr</u>	Received By: <u>3. Dr</u>	Received By: _____
	Signature: <u>[Signature]</u>	Signature: <u>[Signature]</u>	Signature: _____	Signature: _____
	Time: <u>1246</u>	Time: _____	Time: _____	Time: _____
	Date: <u>9/26/22</u>	Date: _____	Date: _____	Date: _____
	Printed Name: <u>David H</u>	Printed Name: _____	Printed Name: _____	Printed Name: _____
	Company: <u>[Signature]</u>	Company: _____	Company: _____	Company: _____

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



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-92599-1

Login Number: 92599

List Source: Eurofins Sacramento

List Number: 1

Creator: Her, David A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	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?	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	

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By: Date:	Ashley Jaramillo	CS Site Name:	ADOT&PF Yakutat Airport Sitewide PFAS	Lab Name:	Eurofins Environment Testing America
Title:	Senior Chemist	ADEC File No.:	1530.38.022	Lab Report No.:	320-92599-1 Revision 1
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID No.:	27090	Lab Report Date:	November 28, 2022

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

- a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?

Yes No N/A

Comments: The DEC certified Eurofins Environment Testing America in West Sacramento, California for the analysis of PFAS on February 11, 2021 by LCMSMS compliant with QSM Version 5.3 Table B-15. The reported analytes were included in the DEC's Contaminated Sites Laboratory Approval 17-020.

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

Yes No N/A

Comments: Project samples were not transferred to another "network" laboratory or sub-contracted to an alternate laboratory.

2. Chain of Custody (CoC)

- a. Is the CoC information completed, signed, and dated (including released/received by)?

Yes No N/A

Comments: Click or tap here to enter text.

- b. Were the correct analyses requested?

Yes No N/A

Analyses requested: EPA 537(Mod) PFAS compliant with QSM 5.3, Table B-15

Comments: Click or tap here to enter text.

3. Laboratory Sample Receipt Documentation

- a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
Yes No N/A
Cooler temperature(s): Cooler temperature was not reported by the laboratory.
Sample temperature(s): Sample temperatures were not noted by the laboratory.
Comments: A temperature blank was included with the samples in the cooler and is used to access temperature preservation. The temperature blank was within the acceptable temperature range of 0°C to 6°C.
- b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes No N/A
Comments: PFAS analysis does not require preservation outside of temperature preservation.
- c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes No N/A
Comments: The laboratory noted samples arrived in good condition and properly preserved on ice.
- 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, canister not holding a vacuum, etc.?
Yes No N/A
Comments: No sample discrepancies were identified by the laboratory at sample login.
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

4. Case Narrative

- a. Is the case narrative present and understandable?
Yes No N/A
Comments:

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

Lab Report No.: 320-92599-1 Revision 1

b. Are there discrepancies, errors, or QC failures identified by the lab?

Yes No N/A

Comments:

- Revision 11-28-2022: The laboratory report was revised to report missing batch QC and correct batch number references in the narrative.
- Results for sample 33061 were reported from the analysis of a diluted extract due to sample matrix in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits. Data quality and/or usability not affected.
- IDA recoveries associated with the following sample is below the method recommended limit: 33061. The sample was re-extracted outside of the holding time with IDA recoveries within control limits. Both sets of data are reported. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample. See Section 6.d. for details regarding data quality and/or usability impacts, if any.
- Insufficient sample volume was available to perform a MS/MSD associated with preparation batch 320-621650. See Section 6.c. for details regarding data quality and/or usability impacts, if any.
- The following samples in preparation batch 320-621650 were observed to have floating particulates present in the sample bottle. 33059 and 33061. Data quality and/or usability not affected.
- The following samples in preparation batch 320-621650 were dark brown in color prior to extraction. 33059 and 33061. Data quality and/or usability not affected.
- During the solid phase extraction process, the following samples contained non-settable particulates which clogged the solid phase extraction column: 33059. Data quality and/or usability not affected.
- Insufficient sample volume was available to perform a MS/MSD associated with preparation batch 320-632337. See Section 6.c. for details regarding data quality and/or usability impacts, if any.
- The following sample was re-prepared outside of preparation holding time due to a low IDA% recovery of 13C4 PFOS and 13C2 PFTeDA: 33061. See Section 5.b for details regarding impact to data quality and/or usability.
- The following sample in preparation batch 320-632337 was observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction: 33061. Data quality and/or usability not affected.

c. Were all the corrective actions documented?

Yes No N/A

Comments: Where required.

- d. What is the effect on data quality/usability according to the case narrative?
Comments: The case narrative does not discuss effect on data quality, it only discusses discrepancies and what was done considering them, as applicable. Any notable data quality issues mentioned in the case narrative are discussed above in Section 4.b. or elsewhere within this DEC checklist.

5. Sample Results

- a. Are the correct analyses performed/reported as requested on CoC?
Yes No N/A
Comments:
- b. Are all applicable holding times met?
Yes No N/A
Comments: Sample 33061 was re-prepared outside of preparation holding time due to gross low IDA recoveries for 13C2 PFTeDA and 13C4 PFOS. In hold and out of hold data is reported for the analytes associated with the gross IDA recovery failures in the laboratory report, but only the out of hold data is reported in the analytical tables. The reported non-results for the associated analytes PFOS, PFTeA, ADONA, 9Cl-PF3ONS, and 11Cl-PF3-OUdS are considered estimated and are flagged 'J*' in the analytical summary tables.
- c. Are all soils reported on a dry weight basis?
Yes No N/A
Comments: Soil samples were not included with this work order.
- d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?
Yes No N/A
Comments:
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

6. QC Samples

- a. Method Blank
- i. Was one method blank reported per matrix, analysis, and 20 samples?
Yes No N/A
Comments:
- ii. Are all method blank results less than LOQ (or RL)?
Yes No N/A

Comments:

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- v. Data quality or usability affected?

Yes No N/A

Comments: See above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – Are 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:

- A LCS and LCSD was reported for preparatory batches 320-621650 and 320-632337.

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

Yes No N/A

Comments: Metals/inorganics analyses were not requested with this work order.

- iii. Accuracy – Are 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 – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the RPD reported from LCS/LCSD, and or sample/sample duplicate? (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No N/A

Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- vii. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

- i. Organics – Are one MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: MS and MSD samples were not reported with this work order. Sample precision and accuracy were evaluated using the LCS/LCSD. Data quality and/or usability not affected.

- ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: Metals/inorganic analyses were not requested as a part of this work order.

- iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A

Comments: See above.

- iv. Precision – Are 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.

Yes No N/A

Comments: See above.

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

vii. Is the data quality or usability affected?

Yes No N/A

Comments: 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 – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A

Comments: The IDA recoveries for 13C2 PUnA, 13C2 PDoA, 18O2 PFHxS, d3-NMeFOSAA, and d5-NEtFOSAA were recovered low in sample 33061. The associated analytes PUnA, PDoA, PFHxS, NMeFOSAA, and NEtFOSAA results were not detected in sample 33061. These results are considered estimates and have been flagged 'J*' in the analytical tables.

The IDA recoveries for 13C2 PFTeA and 13C4 PFOS had gross low recovery failures for sample 33061. The sample was re-extracted outside of hold time and used for reporting purposes. The re-extracted results are not affected by the gross low IDA recovery failures. Refer to Section 5.b for applied qualifiers for out of hold data.

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: See above.

iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

e. Trip Blanks

i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes No N/A

Comments: Volatile samples were not included with this work order.

ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

f. Field Duplicate

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

Yes No N/A

Comments: 33160 is the sample duplicate for sample 33060.

ii. Was the duplicate submitted blind to lab?

Yes No N/A

Comments:

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

$$RPD (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No N/A

Comments: Where calculable.

iv. Is the data quality or usability affected? (Explain)

Yes No N/A

Comments: See above.

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?

Yes No N/A

Comments: reusable equipment was not used during sample collection.

ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS
Lab Report No.: 320-92599-1 Revision 1

iii. If above LoQ or RL, specify what samples are affected.
Comments: Not applicable, see above.

iv. Are data quality or usability affected?
Yes No N/A
Comments: See above.

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

a. Are they defined and appropriate?
Yes No N/A
Comments: Other data flags and/or qualifiers not required.

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Ashley Jaramillo
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Generated 1/17/2023 4:45:45 PM

JOB DESCRIPTION

Yakutat PFAS

JOB NUMBER

320-95510-1

Job Notes

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender and destroy this report immediately. This report shall not be reproduced except in full, without prior express written approval by the laboratory.

The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
1/17/2023 4:45:45 PM

Authorized for release by
David Alltucker, Project Manager I
David.Alltucker@et.eurofinsus.com
(916)374-4383



Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	7
Isotope Dilution Summary	12
QC Sample Results	13
QC Association Summary	18
Lab Chronicle	19
Certification Summary	20
Method Summary	21
Sample Summary	22
Chain of Custody	23
Receipt Checklists	24

Definitions/Glossary

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

Job ID: 320-95510-1

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
F1	MS and/or MSD recovery exceeds control limits.
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
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

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

Job ID: 320-95510-1

Job ID: 320-95510-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-95510-1

Receipt

The samples were received on 12/21/2022 10:52 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 4.8° C.

LCMS

Method EPA 537(Mod): The Isotope Dilution Analyte (IDA) recovery associated with the following samples is below the method recommended limit: (320-95519-A-4-A), (320-95519-A-4-B MS) and (320-95519-A-4-C MSD). Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the sample(s).

Method EPA 537(Mod): The matrix spike duplicate (MSD) recoveries for preparation batch 320-643176 and analytical batch 320-645374 was outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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

Organic Prep

Method 3535: The following samples in preparation batch 320-643176 were observed to have floating particulates present in the sample bottle 33061 (320-95510-3).

Method 3535: The following samples in preparation batch 320-643176 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction. 33060 (320-95510-1) and 33160 (320-95510-2)

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-643176.

Method 3535: During the solid phase extraction process, the following samples contain non-settable particulates which clogged the solid phase extraction column: 33061 (320-95510-3).preparation batch 320-643176

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: 320-95510-1

Client Sample ID: 33060

Lab Sample ID: 320-95510-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	6.1		2.1	0.61	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.5		2.1	0.26	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		2.1	0.89	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.51	J	2.1	0.28	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.79	J	2.1	0.21	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.0		2.1	0.60	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.9		2.1	0.56	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33160

Lab Sample ID: 320-95510-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	6.3		1.9	0.55	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		1.9	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		1.9	0.80	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.48	J	1.9	0.25	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.73	J	1.9	0.19	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	7.4		1.9	0.54	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.2		1.9	0.51	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33061

Lab Sample ID: 320-95510-3

No Detections.

Client Sample ID: 33059

Lab Sample ID: 320-95510-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.33	J	2.0	0.24	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33068

Lab Sample ID: 320-95510-5

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

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

Job ID: 320-95510-1

Client Sample ID: 33060
Date Collected: 12/15/22 17:04
Date Received: 12/21/22 10:52

Lab Sample ID: 320-95510-1
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	6.1		2.1	0.61	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluoroheptanoic acid (PFHpA)	2.5		2.1	0.26	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorooctanoic acid (PFOA)	2.4		2.1	0.89	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorononanoic acid (PFNA)	0.51	J	2.1	0.28	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorodecanoic acid (PFDA)	ND		2.1	0.32	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1	1.2	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.58	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorotridecanoic acid (PFTriA)	ND		2.1	1.4	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.76	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorobutanesulfonic acid (PFBS)	0.79	J	2.1	0.21	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorohexanesulfonic acid (PFHxS)	7.0		2.1	0.60	ng/L		12/29/22 05:14	01/07/23 18:37	1
Perfluorooctanesulfonic acid (PFOS)	8.9		2.1	0.56	ng/L		12/29/22 05:14	01/07/23 18:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.2	1.3	ng/L		12/29/22 05:14	01/07/23 18:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.2	1.4	ng/L		12/29/22 05:14	01/07/23 18:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.1	0.25	ng/L		12/29/22 05:14	01/07/23 18:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.2	1.6	ng/L		12/29/22 05:14	01/07/23 18:37	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		2.1	0.33	ng/L		12/29/22 05:14	01/07/23 18:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.1	0.42	ng/L		12/29/22 05:14	01/07/23 18:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C4 PFHpA	95		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C4 PFOA	98		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C5 PFNA	100		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C2 PFDA	98		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C2 PFUnA	103		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C2 PFDoA	86		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C2 PFTeDA	93		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C3 PFBS	91		50 - 150				12/29/22 05:14	01/07/23 18:37	1
18O2 PFHxS	99		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C4 PFOS	91		50 - 150				12/29/22 05:14	01/07/23 18:37	1
d3-NMeFOSAA	93		50 - 150				12/29/22 05:14	01/07/23 18:37	1
d5-NEtFOSAA	111		50 - 150				12/29/22 05:14	01/07/23 18:37	1
13C3 HFPO-DA	84		50 - 150				12/29/22 05:14	01/07/23 18:37	1

Client Sample Results

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

Job ID: 320-95510-1

Client Sample ID: 33160
Date Collected: 12/15/22 17:06
Date Received: 12/21/22 10:52

Lab Sample ID: 320-95510-2
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	6.3		1.9	0.55	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluoroheptanoic acid (PFHpA)	2.3		1.9	0.24	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorooctanoic acid (PFOA)	2.4		1.9	0.80	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorononanoic acid (PFNA)	0.48	J	1.9	0.25	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.29	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.0	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.52	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.69	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorobutanesulfonic acid (PFBS)	0.73	J	1.9	0.19	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorohexanesulfonic acid (PFHxS)	7.4		1.9	0.54	ng/L		12/29/22 05:14	01/07/23 18:47	1
Perfluorooctanesulfonic acid (PFOS)	9.2		1.9	0.51	ng/L		12/29/22 05:14	01/07/23 18:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.7	1.1	ng/L		12/29/22 05:14	01/07/23 18:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.7	1.2	ng/L		12/29/22 05:14	01/07/23 18:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/29/22 05:14	01/07/23 18:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		12/29/22 05:14	01/07/23 18:47	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.30	ng/L		12/29/22 05:14	01/07/23 18:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.38	ng/L		12/29/22 05:14	01/07/23 18:47	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C4 PFHpA	99		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C4 PFOA	96		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C5 PFNA	101		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C2 PFDA	100		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C2 PFUnA	110		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C2 PFDoA	92		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C2 PFTeDA	89		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C3 PFBS	89		50 - 150				12/29/22 05:14	01/07/23 18:47	1
18O2 PFHxS	95		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C4 PFOS	93		50 - 150				12/29/22 05:14	01/07/23 18:47	1
d3-NMeFOSAA	108		50 - 150				12/29/22 05:14	01/07/23 18:47	1
d5-NEtFOSAA	115		50 - 150				12/29/22 05:14	01/07/23 18:47	1
13C3 HFPO-DA	89		50 - 150				12/29/22 05:14	01/07/23 18:47	1

Client Sample Results

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

Job ID: 320-95510-1

Client Sample ID: 33061
Date Collected: 12/16/22 09:07
Date Received: 12/21/22 10:52

Lab Sample ID: 320-95510-3
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.55	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.70	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.55	ng/L		12/29/22 05:14	01/07/23 18:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		12/29/22 05:14	01/07/23 18:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.8	1.1	ng/L		12/29/22 05:14	01/07/23 18:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.8	1.2	ng/L		12/29/22 05:14	01/07/23 18:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/29/22 05:14	01/07/23 18:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		12/29/22 05:14	01/07/23 18:57	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		12/29/22 05:14	01/07/23 18:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.38	ng/L		12/29/22 05:14	01/07/23 18:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	94		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C4 PFHpA	96		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C4 PFOA	95		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C5 PFNA	94		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C2 PFDA	89		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C2 PFUnA	76		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C2 PFDoA	54		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C2 PFTeDA	64		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C3 PFBS	94		50 - 150	12/29/22 05:14	01/07/23 18:57	1
18O2 PFHxS	97		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C4 PFOS	86		50 - 150	12/29/22 05:14	01/07/23 18:57	1
d3-NMeFOSAA	77		50 - 150	12/29/22 05:14	01/07/23 18:57	1
d5-NEtFOSAA	77		50 - 150	12/29/22 05:14	01/07/23 18:57	1
13C3 HFPO-DA	79		50 - 150	12/29/22 05:14	01/07/23 18:57	1

Client Sample Results

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

Job ID: 320-95510-1

Client Sample ID: 33059

Lab Sample ID: 320-95510-4

Date Collected: 12/16/22 10:31

Matrix: Water

Date Received: 12/21/22 10:52

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.57	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluoroheptanoic acid (PFHpA)	0.33	J	2.0	0.24	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.83	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.26	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.30	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.71	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.56	ng/L		12/29/22 05:14	01/07/23 19:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.53	ng/L		12/29/22 05:14	01/07/23 19:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.9	1.2	ng/L		12/29/22 05:14	01/07/23 19:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.9	1.3	ng/L		12/29/22 05:14	01/07/23 19:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.23	ng/L		12/29/22 05:14	01/07/23 19:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		12/29/22 05:14	01/07/23 19:07	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		12/29/22 05:14	01/07/23 19:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.39	ng/L		12/29/22 05:14	01/07/23 19:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	106		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C4 PFHpA	104		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C4 PFOA	102		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C5 PFNA	104		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C2 PFDA	101		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C2 PFUnA	109		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C2 PFDoA	92		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C2 PFTeDA	99		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C3 PFBS	99		50 - 150	12/29/22 05:14	01/07/23 19:07	1
18O2 PFHxS	112		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C4 PFOS	99		50 - 150	12/29/22 05:14	01/07/23 19:07	1
d3-NMeFOSAA	114		50 - 150	12/29/22 05:14	01/07/23 19:07	1
d5-NEtFOSAA	121		50 - 150	12/29/22 05:14	01/07/23 19:07	1
13C3 HFPO-DA	80		50 - 150	12/29/22 05:14	01/07/23 19:07	1

Client Sample Results

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

Job ID: 320-95510-1

Client Sample ID: 33068

Lab Sample ID: 320-95510-5

Date Collected: 12/16/22 08:31

Matrix: Water

Date Received: 12/21/22 10:52

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.81	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.70	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.55	ng/L		12/29/22 05:14	01/07/23 19:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.9	0.52	ng/L		12/29/22 05:14	01/07/23 19:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.8	1.1	ng/L		12/29/22 05:14	01/07/23 19:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.8	1.2	ng/L		12/29/22 05:14	01/07/23 19:17	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		12/29/22 05:14	01/07/23 19:17	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		12/29/22 05:14	01/07/23 19:17	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		12/29/22 05:14	01/07/23 19:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.38	ng/L		12/29/22 05:14	01/07/23 19:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	95		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C4 PFHpA	95		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C4 PFOA	97		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C5 PFNA	98		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C2 PFDA	99		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C2 PFUnA	103		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C2 PFDoA	102		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C2 PFTeDA	97		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C3 PFBS	88		50 - 150	12/29/22 05:14	01/07/23 19:17	1
18O2 PFHxS	100		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C4 PFOS	97		50 - 150	12/29/22 05:14	01/07/23 19:17	1
d3-NMeFOSAA	104		50 - 150	12/29/22 05:14	01/07/23 19:17	1
d5-NEtFOSAA	119		50 - 150	12/29/22 05:14	01/07/23 19:17	1
13C3 HFPO-DA	79		50 - 150	12/29/22 05:14	01/07/23 19:17	1

Isotope Dilution Summary

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDaA (50-150)	PFTDA (50-150)
320-95510-1	33060	95	95	98	100	98	103	86	93
320-95510-2	33160	100	99	96	101	100	110	92	89
320-95510-3	33061	94	96	95	94	89	76	54	64
320-95510-4	33059	106	104	102	104	101	109	92	99
320-95510-5	33068	95	95	97	98	99	103	102	97
320-95519-A-4-B MS	Matrix Spike	85	89	88	87	73	61	49 *5-	50
320-95519-A-4-C MSD	Matrix Spike Duplicate	93	101	100	92	87	77	52	49 *5-
LCS 320-643176/2-A	Lab Control Sample	95	99	97	97	105	113	98	98
LCSD 320-643176/3-A	Lab Control Sample Dup	97	102	98	104	107	111	94	102
MB 320-643176/1-A	Method Blank	95	97	98	99	97	104	99	104

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-95510-1	33060	91	99	91	93	111	84
320-95510-2	33160	89	95	93	108	115	89
320-95510-3	33061	94	97	86	77	77	79
320-95510-4	33059	99	112	99	114	121	80
320-95510-5	33068	88	100	97	104	119	79
320-95519-A-4-B MS	Matrix Spike	78	89	70	58	55	81
320-95519-A-4-C MSD	Matrix Spike Duplicate	91	100	85	58	68	88
LCS 320-643176/2-A	Lab Control Sample	94	105	96	107	117	86
LCSD 320-643176/3-A	Lab Control Sample Dup	95	105	94	112	113	86
MB 320-643176/1-A	Method Blank	96	102	94	101	114	96

Surrogate Legend

- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

QC Sample Results

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Lab Sample ID: MB 320-643176/1-A
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 643176

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		12/29/22 05:14	01/07/23 18:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		12/29/22 05:14	01/07/23 18:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		12/29/22 05:14	01/07/23 18:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		12/29/22 05:14	01/07/23 18:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/29/22 05:14	01/07/23 18:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		12/29/22 05:14	01/07/23 18:07	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		12/29/22 05:14	01/07/23 18:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		12/29/22 05:14	01/07/23 18:07	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	95		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C4 PFHpA	97		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C4 PFOA	98		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C5 PFNA	99		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C2 PFDA	97		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C2 PFUnA	104		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C2 PFDoA	99		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C2 PFTeDA	104		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C3 PFBS	96		50 - 150	12/29/22 05:14	01/07/23 18:07	1
18O2 PFHxS	102		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C4 PFOS	94		50 - 150	12/29/22 05:14	01/07/23 18:07	1
d3-NMeFOSAA	101		50 - 150	12/29/22 05:14	01/07/23 18:07	1
d5-NEtFOSAA	114		50 - 150	12/29/22 05:14	01/07/23 18:07	1
13C3 HFPO-DA	96		50 - 150	12/29/22 05:14	01/07/23 18:07	1

Lab Sample ID: LCS 320-643176/2-A
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	40.0	40.1		ng/L		100	72 - 130
Perfluorooctanoic acid (PFOA)	40.0	41.2		ng/L		103	71 - 133
Perfluorononanoic acid (PFNA)	40.0	43.5		ng/L		109	69 - 130

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCS 320-643176/2-A
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	40.0	40.9		ng/L		102	71 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	39.4		ng/L		99	69 - 133
Perfluorododecanoic acid (PFDoA)	40.0	46.5		ng/L		116	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	47.3		ng/L		118	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	42.9		ng/L		107	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	37.7		ng/L		106	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	36.0		ng/L		99	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	40.6		ng/L		109	65 - 140
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	40.0	41.0		ng/L		102	65 - 136
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	40.0	39.9		ng/L		100	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	40.9		ng/L		110	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	43.7		ng/L		109	72 - 132
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	37.8	41.8		ng/L		111	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	42.2		ng/L		112	81 - 141

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C2 PFHxA	95		50 - 150
13C4 PFHpA	99		50 - 150
13C4 PFOA	97		50 - 150
13C5 PFNA	97		50 - 150
13C2 PFDA	105		50 - 150
13C2 PFUnA	113		50 - 150
13C2 PFDoA	98		50 - 150
13C2 PFTeDA	98		50 - 150
13C3 PFBS	94		50 - 150
18O2 PFHxS	105		50 - 150
13C4 PFOS	96		50 - 150
d3-NMeFOSAA	107		50 - 150
d5-NEtFOSAA	117		50 - 150
13C3 HFPO-DA	86		50 - 150

Lab Sample ID: LCSD 320-643176/3-A
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec RPD	
							Limits	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	40.6		ng/L		102	72 - 129	2 30
Perfluoroheptanoic acid (PFHpA)	40.0	44.4		ng/L		111	72 - 130	10 30
Perfluorooctanoic acid (PFOA)	40.0	41.8		ng/L		104	71 - 133	1 30

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCSD 320-643176/3-A
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorononanoic acid (PFNA)	40.0	41.3		ng/L		103	69 - 130	5	30
Perfluorodecanoic acid (PFDA)	40.0	39.9		ng/L		100	71 - 129	3	30
Perfluoroundecanoic acid (PFUnA)	40.0	40.5		ng/L		101	69 - 133	3	30
Perfluorododecanoic acid (PFDoA)	40.0	48.8		ng/L		122	72 - 134	5	30
Perfluorotridecanoic acid (PFTriA)	40.0	46.9		ng/L		117	65 - 144	1	30
Perfluorotetradecanoic acid (PFTeA)	40.0	46.1		ng/L		115	71 - 132	7	30
Perfluorobutanesulfonic acid (PFBS)	35.5	37.0		ng/L		104	72 - 130	2	30
Perfluorohexanesulfonic acid (PFHxS)	36.5	35.6		ng/L		98	68 - 131	1	30
Perfluorooctanesulfonic acid (PFOS)	37.2	42.5		ng/L		114	65 - 140	4	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	40.8		ng/L		102	65 - 136	1	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	40.7		ng/L		102	61 - 135	2	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	42.2		ng/L		113	77 - 137	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	44.1		ng/L		110	72 - 132	1	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.8	45.1		ng/L		119	76 - 136	8	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	42.7		ng/L		113	81 - 141	1	30

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	97		50 - 150
13C4 PFHpA	102		50 - 150
13C4 PFOA	98		50 - 150
13C5 PFNA	104		50 - 150
13C2 PFDA	107		50 - 150
13C2 PFUnA	111		50 - 150
13C2 PFDoA	94		50 - 150
13C2 PFTeDA	102		50 - 150
13C3 PFBS	95		50 - 150
18O2 PFHxS	105		50 - 150
13C4 PFOS	94		50 - 150
d3-NMeFOSAA	112		50 - 150
d5-NEtFOSAA	113		50 - 150
13C3 HFPO-DA	86		50 - 150

Lab Sample ID: 320-95519-A-4-B MS
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanoic acid (PFHxA)	14		37.5	50.8		ng/L		99	72 - 129
Perfluoroheptanoic acid (PFHpA)	6.9		37.5	46.4		ng/L		105	72 - 130

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: 320-95519-A-4-B MS
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Matrix Spike
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Sample	Sample	Spike	MS	MS	Unit	D	%Rec	%Rec Limits
	Result	Qualifier	Added	Result	Qualifier				
Perfluorooctanoic acid (PFOA)	8.4		37.5	48.8		ng/L		108	71 - 133
Perfluorononanoic acid (PFNA)	5.8		37.5	44.4		ng/L		103	69 - 130
Perfluorodecanoic acid (PFDA)	1.0	J	37.5	44.9		ng/L		117	71 - 129
Perfluoroundecanoic acid (PFUnA)	ND		37.5	41.4		ng/L		110	69 - 133
Perfluorododecanoic acid (PFDoA)	ND		37.5	37.6		ng/L		100	72 - 134
Perfluorotridecanoic acid (PFTriA)	ND		37.5	33.5		ng/L		89	65 - 144
Perfluorotetradecanoic acid (PFTeA)	ND		37.5	40.9		ng/L		109	71 - 132
Perfluorobutanesulfonic acid (PFBS)	ND		33.3	60.7		ng/L		105	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	14		34.2	51.6		ng/L		111	68 - 131
Perfluorooctanesulfonic acid (PFOS)	31		34.9	73.9		ng/L		122	65 - 140
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		37.5	38.9		ng/L		104	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		37.5	39.1		ng/L		104	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		35.0	40.7		ng/L		116	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		37.5	36.3		ng/L		97	72 - 132
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND	F1	35.4	26.8		ng/L		76	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		35.4	45.9		ng/L		130	81 - 141

Isotope Dilution	MS	MS	Limits
	%Recovery	Qualifier	
13C2 PFHxA	85		50 - 150
13C4 PFHpA	89		50 - 150
13C4 PFOA	88		50 - 150
13C5 PFNA	87		50 - 150
13C2 PFDA	73		50 - 150
13C2 PFUnA	61		50 - 150
13C2 PFDoA	49	*5-	50 - 150
13C2 PFTeDA	50		50 - 150
13C3 PFBS	78		50 - 150
18O2 PFHxS	89		50 - 150
13C4 PFOS	70		50 - 150
d3-NMeFOSAA	58		50 - 150
d5-NEtFOSAA	55		50 - 150
13C3 HFPO-DA	81		50 - 150

Lab Sample ID: 320-95519-A-4-C MSD
Matrix: Water
Analysis Batch: 645374

Client Sample ID: Matrix Spike Duplicate
Prep Type: Total/NA
Prep Batch: 643176

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
	Result	Qualifier	Added	Result	Qualifier						
Perfluorohexanoic acid (PFHxA)	14		37.7	52.2		ng/L		102	72 - 129	3	30

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-95510-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: 320-95519-A-4-C MSD

Matrix: Water

Analysis Batch: 645374

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 643176

Analyte	Sample	Sample	Spike	MSD	MSD	Unit	D	%Rec	%Rec	RPD	RPD
	Result	Qualifier	Added	Result	Qualifier				Limits		
Perfluoroheptanoic acid (PFHpA)	6.9		37.7	47.5		ng/L		108	72 - 130	2	30
Perfluorooctanoic acid (PFOA)	8.4		37.7	46.4		ng/L		101	71 - 133	5	30
Perfluorononanoic acid (PFNA)	5.8		37.7	46.1		ng/L		107	69 - 130	4	30
Perfluorodecanoic acid (PFDA)	1.0	J	37.7	43.5		ng/L		113	71 - 129	3	30
Perfluoroundecanoic acid (PFUnA)	ND		37.7	41.4		ng/L		110	69 - 133	0	30
Perfluorododecanoic acid (PFDoA)	ND		37.7	36.1		ng/L		96	72 - 134	4	30
Perfluorotridecanoic acid (PFTriA)	ND		37.7	36.0		ng/L		95	65 - 144	7	30
Perfluorotetradecanoic acid (PFTeA)	ND		37.7	35.2		ng/L		94	71 - 132	15	30
Perfluorobutanesulfonic acid (PFBS)	ND		33.5	64.8		ng/L		116	72 - 130	6	30
Perfluorohexanesulfonic acid (PFHxS)	14		34.4	49.3		ng/L		103	68 - 131	5	30
Perfluorooctanesulfonic acid (PFOS)	31		35.1	69.7		ng/L		110	65 - 140	6	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		37.7	41.2		ng/L		109	65 - 136	6	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		37.7	39.7		ng/L		105	61 - 135	1	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		35.2	38.5		ng/L		109	77 - 137	5	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		37.7	41.8		ng/L		111	72 - 132	14	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND	F1	35.6	25.5	F1	ng/L		72	76 - 136	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		35.6	40.9		ng/L		115	81 - 141	12	30

Isotope Dilution	MSD	MSD	Limits
	%Recovery	Qualifier	
13C2 PFHxA	93		50 - 150
13C4 PFHpA	101		50 - 150
13C4 PFOA	100		50 - 150
13C5 PFNA	92		50 - 150
13C2 PFDA	87		50 - 150
13C2 PFUnA	77		50 - 150
13C2 PFDoA	52		50 - 150
13C2 PFTeDA	49	*5-	50 - 150
13C3 PFBS	91		50 - 150
18O2 PFHxS	100		50 - 150
13C4 PFOS	85		50 - 150
d3-NMeFOSAA	58		50 - 150
d5-NEtFOSAA	68		50 - 150
13C3 HFPO-DA	88		50 - 150

QC Association Summary

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

Job ID: 320-95510-1

LCMS

Prep Batch: 643176

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95510-1	33060	Total/NA	Water	3535	
320-95510-2	33160	Total/NA	Water	3535	
320-95510-3	33061	Total/NA	Water	3535	
320-95510-4	33059	Total/NA	Water	3535	
320-95510-5	33068	Total/NA	Water	3535	
MB 320-643176/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-643176/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-643176/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
320-95519-A-4-B MS	Matrix Spike	Total/NA	Water	3535	
320-95519-A-4-C MSD	Matrix Spike Duplicate	Total/NA	Water	3535	

Analysis Batch: 645374

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-95510-1	33060	Total/NA	Water	EPA 537(Mod)	643176
320-95510-2	33160	Total/NA	Water	EPA 537(Mod)	643176
320-95510-3	33061	Total/NA	Water	EPA 537(Mod)	643176
320-95510-4	33059	Total/NA	Water	EPA 537(Mod)	643176
320-95510-5	33068	Total/NA	Water	EPA 537(Mod)	643176
MB 320-643176/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	643176
LCS 320-643176/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	643176
LCSD 320-643176/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	643176
320-95519-A-4-B MS	Matrix Spike	Total/NA	Water	EPA 537(Mod)	643176
320-95519-A-4-C MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 537(Mod)	643176

Lab Chronicle

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

Job ID: 320-95510-1

Client Sample ID: 33060

Lab Sample ID: 320-95510-1

Date Collected: 12/15/22 17:04

Matrix: Water

Date Received: 12/21/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			239 mL	10.0 mL	643176	12/29/22 05:14	RLT	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645374	01/07/23 18:37	D1R	EET SAC

Client Sample ID: 33160

Lab Sample ID: 320-95510-2

Date Collected: 12/15/22 17:06

Matrix: Water

Date Received: 12/21/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			265.5 mL	10.0 mL	643176	12/29/22 05:14	RLT	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645374	01/07/23 18:47	D1R	EET SAC

Client Sample ID: 33061

Lab Sample ID: 320-95510-3

Date Collected: 12/16/22 09:07

Matrix: Water

Date Received: 12/21/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.3 mL	10.0 mL	643176	12/29/22 05:14	RLT	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645374	01/07/23 18:57	D1R	EET SAC

Client Sample ID: 33059

Lab Sample ID: 320-95510-4

Date Collected: 12/16/22 10:31

Matrix: Water

Date Received: 12/21/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			256 mL	10.0 mL	643176	12/29/22 05:14	RLT	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645374	01/07/23 19:07	D1R	EET SAC

Client Sample ID: 33068

Lab Sample ID: 320-95510-5

Date Collected: 12/16/22 08:31

Matrix: Water

Date Received: 12/21/22 10:52

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			261.1 mL	10.0 mL	643176	12/29/22 05:14	RLT	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645374	01/07/23 19:17	D1R	EET SAC

Laboratory References:

EET SAC = Eurofins 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: 320-95510-1

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Method Summary

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

Job ID: 320-95510-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod) 3535	PFAS for QSM 5.3, Table B-15 Solid-Phase Extraction (SPE)	EPA SW846	EET SAC EET 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:

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

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

Sample Summary

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

Job ID: 320-95510-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-95510-1	33060	Water	12/15/22 17:04	12/21/22 10:52
320-95510-2	33160	Water	12/15/22 17:06	12/21/22 10:52
320-95510-3	33061	Water	12/16/22 09:07	12/21/22 10:52
320-95510-4	33059	Water	12/16/22 10:31	12/21/22 10:52
320-95510-5	33068	Water	12/16/22 08:31	12/21/22 10:52

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15



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

CHAIN-OF-CUSTODY RECORD

Page 1 of 1
Laboratory EVOPFINS
Attn: DAVID ALBUCKER

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
33060	1304	12/5/22	X	2	Groundwater ↓
33160	1700	↓	X	2	
33061	0907	12/16/22	X	2	
33059	1031	↓	X	2	
33068	0813	↓	X	2	



Project Information
Number: 102896-00A
Name: Yakutat PFAS
Contact: Ashley Jaramillo
Ongoing Project? Yes No
Sampler: MXJ

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

Notes:
N.B.

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: <u>A. Jaramillo</u> Printed Name: <u>Ashley Jaramillo</u> Company: <u>Shannon & Wilson, Inc.</u>	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: <u>1305</u> Date: <u>12/19/22</u>	Time: _____ Date: _____	Time: _____ Date: _____
Received By: 1. Signature: <u>[Signature]</u> Printed Name: <u>Juan Gutierrez</u> Company: <u>EETSA</u>	Received By: 2. Signature: _____ Printed Name: _____ Company: _____	Received By: 3. Signature: _____ Printed Name: _____ Company: _____
Time: <u>1030</u> Date: <u>12/21/22</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



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-95510-1

Login Number: 95510

List Source: Eurofins Sacramento

List Number: 1

Creator: Alltucker, David R

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	N/A	
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?	N/A	
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 <math><6\text{mm}</math> (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Ashley Jaramillo	CS Site	ADOT&PF	Lab	Eurofins
Date:	01/18/2023	Name:	Yakutat Airport Sitewide PFAS	Name:	Environment Testing
Title:	Senior Chemist	ADEC File	1530.38.022	Lab	320-95510-1
		No.:		Report	
				No.:	
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID	27090	Lab	01/17/2023
		No.:		Report	
				Date:	

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

- a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?

Yes No N/A

Comments: The DEC certified Eurofins Environment Testing in West Sacramento, California for the analysis of PFAS on February 11, 2021 by LCMSMS compliant with QSM Version 5.3 Table B-15. The reported analytes were included in the DEC's Contaminated Sites Laboratory Approval 17-020.

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

Yes No N/A

Comments: Project samples were not transferred to another "network" laboratory or sub-contracted to an alternate laboratory.

2. Chain of Custody (CoC)

- a. Is the CoC information completed, signed, and dated (including released/received by)?

Yes No N/A

Comments:

- b. Were the correct analyses requested?

Yes No N/A

Analyses requested: PFAS by EPA 537 modified method compliant with QSM 5.3 Table B-15.

Comments: Analyses performed as requested.

3. Laboratory Sample Receipt Documentation

- a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
Yes No N/A
Cooler temperature(s): Cooler temperature was 4.8°C at sample login.
Sample temperature(s): Sample temperature was not reported by the laboratory.
Comments: Cooler temperature is within the acceptable range of 0°C to 6°C.
- b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes No N/A
Comments: PFAS analysis does not require preservation outside of temperature preservation.
- c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes No N/A
Comments: The samples arrived in good condition, and where required, properly preserved and on ice.
- 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, canister not holding a vacuum, etc.?
Yes No N/A
Comments: No discrepancies were identified by the laboratory.
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

4. Case Narrative

- a. Is the case narrative present and understandable?
Yes No N/A
Comments:
- b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes No N/A
Comments:
 - The IDA recovery associated with the following samples is below the method recommended limit: 320-95519-A-4-A, 320-95519-A-4-B MS and 320-95519-A-4-C MSD. Generally, data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples. These samples are not associated with the

project samples submitted with this work order. Data quality and/or usability not affected.

- MS and/or MSD recoveries for preparation batch 320-643176 and analytical batch 320-645374 were outside control limits. Sample matrix interference is suspected because the associated LCS recovery was within acceptance limits. The MS/MSD samples are not associated with project samples submitted with this work order. Data quality and/or usability not affected.
- The following sample in preparation batch 320-643176 was observed to have floating particulates present in the sample bottle: 33061. Data quality and/or usability not affected.
- The following samples in preparation batch 320-643176 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction: 33060 and 33160. Data quality and/or usability not affected.
- Insufficient sample volume was available to perform MS/MSD samples associated with preparation batch 320-643176. See Section 6.c. for details regarding affect to data quality and/or usability, if any.
- During the solid phase extraction process, the following sample contain non-settable particulates which clogged the solid phase extraction column: 33061 in preparation batch 320-643176. Data quality and/or usability not affected.

c. Were all the corrective actions documented?

Yes No N/A

Comments: Corrective actions were not required.

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

Comments: The case narrative does not discuss effect on data quality, it discusses discrepancies and what was done considering them, as applicable. Any notable data quality issues mentioned in the case narrative are discussed above in Section 4.b. or elsewhere within this DEC checklist.

5. Sample Results

a. Are the correct analyses performed/reported as requested on CoC?

Yes No N/A

Comments:

b. Are all applicable holding times met?

Yes No N/A

Comments:

c. Are all soils reported on a dry weight basis?

Yes No N/A

Comments: Soil samples were not submitted with this work order.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

Lab Report No.: 320-95510-1

- d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?

Yes No N/A

Comments:

- e. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

6. QC Samples

- a. Method Blank

- i. Was one method blank reported per matrix, analysis, and 20 samples?

Yes No N/A

Comments:

- ii. Are all method blank results less than LOQ (or RL)?

Yes No N/A

Comments:

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- v. Data quality or usability affected?

Yes No N/A

Comments: See above.

- b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – Are one LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No N/A

Comments:

- ii. Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples?
Yes No N/A
Comments: Metal/inorganic analyses were not requested as a part of this work order.
- iii. Accuracy – Are 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 – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the RPD reported from LCS/LCSD, and or sample/sample duplicate? (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)
Yes No N/A
Comments:
- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Not applicable, see above.
- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes No N/A
Comments: See above.
- vii. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

- i. Organics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes No N/A
Comments: Insufficient project sample volume was available to perform a MS/MSD associated with preparation batch 320-643176. An MS/MSD was included in preparation batch 320-643176, but the MS/MSD samples were not associated with the project samples included in this work order. Batch accuracy and precision was evaluated using LCS/LCSD samples, see Section 6.b. Data quality and/or usability not affected.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

Lab Report No.: 320-95510-1

- ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A

Comments: Metal/inorganic analyses were not requested as a part of this work order.

- iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes No N/A

Comments: The MSD recoveries for 11-chloroicosafuoro-3-oxaundecane-1-sulfonic acid was below control limits. The MS/MSD samples are not associated with the project samples submitted with this work order. Data quality and/or usability not affected.

- iv. Precision – Are 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.

Yes No N/A

Comments:

- v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- vii. Is the data quality or usability affected?

Yes No N/A

Comments: 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 – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes No N/A

Comments: MS and/or MSD samples had IDA recoveries outside of laboratory limits for 13C2 PFTeDA and 13C2 PFD_oA. The MS/MSD samples are not associated with project samples submitted with this work order. Data quality and/or usability not affected.

- 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: See above.

- iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

e. Trip Blanks

- i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples?

Yes No N/A

Comments: No volatile samples were included with this work order.

- ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

- iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

f. Field Duplicate

- i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?

Yes No N/A

Comments:

- ii. Was the duplicate submitted blind to lab?
Yes No N/A
Comments: Sample 33160 is the field duplicate sample for 33060.
- iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water or air, 50% soil)

$$RPD (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

- Yes No N/A
Comments: Where calculable.

- iv. Is the data quality or usability affected? (Explain)
Yes No N/A
Comments: See above.

g. Decontamination or Equipment Blanks

- i. Were decontamination or equipment blanks collected?
Yes No N/A
Comments: Reusable equipment was not used to collect project samples.
- ii. Are all results less than LoQ or RL?
Yes No N/A
Comments: See above.
- iii. If above LoQ or RL, specify what samples are affected.
Comments: Not applicable, see above.
- iv. Are data quality or usability affected?
Yes No N/A
Comments: See above.

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

- a. Are they defined and appropriate?
Yes No N/A
Comments: No other data flags and/or qualifiers required.



ANALYTICAL REPORT

PREPARED FOR

Attn: Ashley Jaramillo
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Generated 3/30/2023 2:47:00 PM

JOB DESCRIPTION

YAK

JOB NUMBER

320-97690-1

Eurofins Sacramento

Job Notes

This report is issued solely for the use of the person or company to whom it is addressed. Any use, copying or disclosure other than by the intended recipient is unauthorized. If you have received this report in error, please notify the sender and destroy this report immediately. This report shall not be reproduced except in full, without prior express written approval by the laboratory.

The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
3/30/2023 2:47:00 PM

Authorized for release by
David Alltucker, Project Manager I
David.Alltucker@et.eurofinsus.com
(916)374-4383



Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	7
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: YAK

Job ID: 320-97690-1

Qualifiers

LCMS

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

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

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

Job ID: 320-97690-1

Job ID: 320-97690-1

Laboratory: Eurofins Sacramento

Narrative

**Job Narrative
320-97690-1**

Receipt

The samples were received on 3/14/2023 2:47 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.1° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-661239.

Method 3535: The following samples in preparation batch 320-661239 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction. 33059 (320-97690-1) and 33068 (320-97690-2)

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: YAK

Job ID: 320-97690-1

Client Sample ID: 33059

Lab Sample ID: 320-97690-1

No Detections.

Client Sample ID: 33068

Lab Sample ID: 320-97690-2

No Detections.

Client Sample ID: 33160

Lab Sample ID: 320-97690-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.0	J	1.8	0.22	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.6	J	1.8	0.76	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.69	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.35	J	1.8	0.28	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.53	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.9		1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.4		1.8	0.48	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33060

Lab Sample ID: 320-97690-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.53	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.8	0.23	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	1.5	J	1.8	0.77	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.59	J	1.8	0.25	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.43	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	5.5		1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.5		1.8	0.49	ng/L	1		EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

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

Job ID: 320-97690-1

Client Sample ID: 33059
Date Collected: 03/08/23 10:25
Date Received: 03/14/23 16:26

Lab Sample ID: 320-97690-1
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.67	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.52	ng/L		03/16/23 05:40	03/18/23 04:57	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.49	ng/L		03/16/23 05:40	03/18/23 04:57	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		03/16/23 05:40	03/18/23 04:57	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		03/16/23 05:40	03/18/23 04:57	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		03/16/23 05:40	03/18/23 04:57	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		03/16/23 05:40	03/18/23 04:57	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		03/16/23 05:40	03/18/23 04:57	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.37	ng/L		03/16/23 05:40	03/18/23 04:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	111		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C4 PFHpA	110		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C4 PFOA	107		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C5 PFNA	113		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C2 PFDA	113		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C2 PFUnA	114		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C2 PFDoA	107		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C2 PFTeDA	104		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C3 PFBS	106		50 - 150	03/16/23 05:40	03/18/23 04:57	1
18O2 PFHxS	104		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C4 PFOS	104		50 - 150	03/16/23 05:40	03/18/23 04:57	1
d3-NMeFOSAA	105		50 - 150	03/16/23 05:40	03/18/23 04:57	1
d5-NEtFOSAA	111		50 - 150	03/16/23 05:40	03/18/23 04:57	1
13C3 HFPO-DA	107		50 - 150	03/16/23 05:40	03/18/23 04:57	1

Client Sample Results

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

Job ID: 320-97690-1

Client Sample ID: 33068

Lab Sample ID: 320-97690-2

Date Collected: 03/08/23 12:35

Matrix: Water

Date Received: 03/14/23 16:26

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.8	0.53	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.23	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.78	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.29	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.51	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.67	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.52	ng/L		03/16/23 05:40	03/18/23 05:07	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.50	ng/L		03/16/23 05:40	03/18/23 05:07	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		03/16/23 05:40	03/18/23 05:07	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		03/16/23 05:40	03/18/23 05:07	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		03/16/23 05:40	03/18/23 05:07	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.7	1.4	ng/L		03/16/23 05:40	03/18/23 05:07	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		03/16/23 05:40	03/18/23 05:07	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.37	ng/L		03/16/23 05:40	03/18/23 05:07	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	113		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C4 PFHpA	110		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C4 PFOA	107		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C5 PFNA	111		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C2 PFDA	115		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C2 PFUnA	112		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C2 PFDoA	113		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C2 PFTeDA	107		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C3 PFBS	109		50 - 150	03/16/23 05:40	03/18/23 05:07	1
18O2 PFHxS	110		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C4 PFOS	111		50 - 150	03/16/23 05:40	03/18/23 05:07	1
d3-NMeFOSAA	110		50 - 150	03/16/23 05:40	03/18/23 05:07	1
d5-NEtFOSAA	111		50 - 150	03/16/23 05:40	03/18/23 05:07	1
13C3 HFPO-DA	110		50 - 150	03/16/23 05:40	03/18/23 05:07	1

Client Sample Results

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

Job ID: 320-97690-1

Client Sample ID: 33160

Lab Sample ID: 320-97690-3

Date Collected: 03/08/23 14:12

Matrix: Water

Date Received: 03/14/23 16:26

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.52	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluoroheptanoic acid (PFHpA)	1.0	J	1.8	0.22	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorooctanoic acid (PFOA)	1.6	J	1.8	0.76	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorononanoic acid (PFNA)	0.69	J	1.8	0.24	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorodecanoic acid (PFDA)	0.35	J	1.8	0.28	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.98	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.65	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorobutanesulfonic acid (PFBS)	0.53	J	1.8	0.18	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorohexanesulfonic acid (PFHxS)	5.9		1.8	0.51	ng/L		03/16/23 05:40	03/18/23 05:17	1
Perfluorooctanesulfonic acid (PFOS)	9.4		1.8	0.48	ng/L		03/16/23 05:40	03/18/23 05:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		03/16/23 05:40	03/18/23 05:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		03/16/23 05:40	03/18/23 05:17	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.21	ng/L		03/16/23 05:40	03/18/23 05:17	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.3	ng/L		03/16/23 05:40	03/18/23 05:17	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		03/16/23 05:40	03/18/23 05:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		03/16/23 05:40	03/18/23 05:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	116		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C4 PFHpA	109		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C4 PFOA	107		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C5 PFNA	111		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C2 PFDA	108		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C2 PFUnA	104		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C2 PFDoA	107		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C2 PFTeDA	102		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C3 PFBS	112		50 - 150	03/16/23 05:40	03/18/23 05:17	1
18O2 PFHxS	108		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C4 PFOS	110		50 - 150	03/16/23 05:40	03/18/23 05:17	1
d3-NMeFOSAA	102		50 - 150	03/16/23 05:40	03/18/23 05:17	1
d5-NEtFOSAA	108		50 - 150	03/16/23 05:40	03/18/23 05:17	1
13C3 HFPO-DA	107		50 - 150	03/16/23 05:40	03/18/23 05:17	1

Client Sample Results

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

Job ID: 320-97690-1

Client Sample ID: 33060

Lab Sample ID: 320-97690-4

Date Collected: 03/08/23 14:22

Matrix: Water

Date Received: 03/14/23 16:26

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.53	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluoroheptanoic acid (PFHpA)	1.1	J	1.8	0.23	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorooctanoic acid (PFOA)	1.5	J	1.8	0.77	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorononanoic acid (PFNA)	0.59	J	1.8	0.25	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	1.0	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.67	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorobutanesulfonic acid (PFBS)	0.43	J	1.8	0.18	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorohexanesulfonic acid (PFHxS)	5.5		1.8	0.52	ng/L		03/16/23 05:40	03/18/23 05:28	1
Perfluorooctanesulfonic acid (PFOS)	8.5		1.8	0.49	ng/L		03/16/23 05:40	03/18/23 05:28	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.6	1.1	ng/L		03/16/23 05:40	03/18/23 05:28	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.6	1.2	ng/L		03/16/23 05:40	03/18/23 05:28	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		03/16/23 05:40	03/18/23 05:28	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.4	ng/L		03/16/23 05:40	03/18/23 05:28	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		03/16/23 05:40	03/18/23 05:28	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		03/16/23 05:40	03/18/23 05:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	112		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C4 PFHpA	106		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C4 PFOA	110		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C5 PFNA	109		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C2 PFDA	109		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C2 PFUnA	110		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C2 PFDoA	104		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C2 PFTeDA	102		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C3 PFBS	110		50 - 150				03/16/23 05:40	03/18/23 05:28	1
18O2 PFHxS	106		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C4 PFOS	109		50 - 150				03/16/23 05:40	03/18/23 05:28	1
d3-NMeFOSAA	102		50 - 150				03/16/23 05:40	03/18/23 05:28	1
d5-NEtFOSAA	105		50 - 150				03/16/23 05:40	03/18/23 05:28	1
13C3 HFPO-DA	104		50 - 150				03/16/23 05:40	03/18/23 05:28	1

Isotope Dilution Summary

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

Job ID: 320-97690-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDaA (50-150)	PFTDA (50-150)
320-97690-1	33059	111	110	107	113	113	114	107	104
320-97690-2	33068	113	110	107	111	115	112	113	107
320-97690-3	33160	116	109	107	111	108	104	107	102
320-97690-4	33060	112	106	110	109	109	110	104	102
LCS 320-661239/2-A	Lab Control Sample	112	107	105	105	107	111	107	101
LCSD 320-661239/3-A	Lab Control Sample Dup	109	109	108	107	109	109	114	107
MB 320-661239/1-A	Method Blank	113	112	109	111	113	115	118	108

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-97690-1	33059	106	104	104	105	111	107
320-97690-2	33068	109	110	111	110	111	110
320-97690-3	33160	112	108	110	102	108	107
320-97690-4	33060	110	106	109	102	105	104
LCS 320-661239/2-A	Lab Control Sample	107	107	107	103	102	104
LCSD 320-661239/3-A	Lab Control Sample Dup	109	107	107	102	107	99
MB 320-661239/1-A	Method Blank	110	110	113	114	111	109

Surrogate Legend

- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

QC Sample Results

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

Job ID: 320-97690-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Lab Sample ID: MB 320-661239/1-A
Matrix: Water
Analysis Batch: 661801

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 661239

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		03/16/23 05:40	03/18/23 04:27	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		03/16/23 05:40	03/18/23 04:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		03/16/23 05:40	03/18/23 04:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		03/16/23 05:40	03/18/23 04:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		03/16/23 05:40	03/18/23 04:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		03/16/23 05:40	03/18/23 04:27	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		03/16/23 05:40	03/18/23 04:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		03/16/23 05:40	03/18/23 04:27	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	113		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C4 PFHpA	112		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C4 PFOA	109		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C5 PFNA	111		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C2 PFDA	113		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C2 PFUnA	115		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C2 PFDoA	118		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C2 PFTeDA	108		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C3 PFBS	110		50 - 150	03/16/23 05:40	03/18/23 04:27	1
18O2 PFHxS	110		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C4 PFOS	113		50 - 150	03/16/23 05:40	03/18/23 04:27	1
d3-NMeFOSAA	114		50 - 150	03/16/23 05:40	03/18/23 04:27	1
d5-NEtFOSAA	111		50 - 150	03/16/23 05:40	03/18/23 04:27	1
13C3 HFPO-DA	109		50 - 150	03/16/23 05:40	03/18/23 04:27	1

Lab Sample ID: LCS 320-661239/2-A
Matrix: Water
Analysis Batch: 661801

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 661239

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	40.0	43.3		ng/L		108	72 - 130
Perfluorooctanoic acid (PFOA)	40.0	41.9		ng/L		105	71 - 133
Perfluorononanoic acid (PFNA)	40.0	43.9		ng/L		110	69 - 130

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-97690-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCS 320-661239/2-A
Matrix: Water
Analysis Batch: 661801

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 661239

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	40.0	44.5		ng/L		111	71 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	43.4		ng/L		109	69 - 133
Perfluorododecanoic acid (PFDoA)	40.0	43.2		ng/L		108	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	40.4		ng/L		101	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	39.8		ng/L		100	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	40.3		ng/L		114	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	40.1		ng/L		110	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	38.9		ng/L		105	65 - 140
N-methylperfluorooctanesulfonamide acetic acid (NMeFOSAA)	40.0	41.4		ng/L		103	65 - 136
N-ethylperfluorooctanesulfonamide acetic acid (NEtFOSAA)	40.0	40.7		ng/L		102	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	41.2		ng/L		110	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	40.7		ng/L		102	72 - 132
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.8	41.4		ng/L		110	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	40.0		ng/L		106	81 - 141

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C2 PFHxA	112		50 - 150
13C4 PFHpA	107		50 - 150
13C4 PFOA	105		50 - 150
13C5 PFNA	105		50 - 150
13C2 PFDA	107		50 - 150
13C2 PFUnA	111		50 - 150
13C2 PFDoA	107		50 - 150
13C2 PFTeDA	101		50 - 150
13C3 PFBS	107		50 - 150
18O2 PFHxS	107		50 - 150
13C4 PFOS	107		50 - 150
d3-NMeFOSAA	103		50 - 150
d5-NEtFOSAA	102		50 - 150
13C3 HFPO-DA	104		50 - 150

Lab Sample ID: LCSD 320-661239/3-A
Matrix: Water
Analysis Batch: 661801

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 661239

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec	
							Limits	RPD
Perfluorohexanoic acid (PFHxA)	40.0	37.9		ng/L		95	72 - 129	1 30
Perfluoroheptanoic acid (PFHpA)	40.0	42.3		ng/L		106	72 - 130	2 30
Perfluorooctanoic acid (PFOA)	40.0	40.3		ng/L		101	71 - 133	4 30

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-97690-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCSD 320-661239/3-A
Matrix: Water
Analysis Batch: 661801

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 661239

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorononanoic acid (PFNA)	40.0	42.8		ng/L		107	69 - 130	3	30
Perfluorodecanoic acid (PFDA)	40.0	43.3		ng/L		108	71 - 129	3	30
Perfluoroundecanoic acid (PFUnA)	40.0	45.2		ng/L		113	69 - 133	4	30
Perfluorododecanoic acid (PFDoA)	40.0	42.6		ng/L		106	72 - 134	1	30
Perfluorotridecanoic acid (PFTriA)	40.0	41.1		ng/L		103	65 - 144	2	30
Perfluorotetradecanoic acid (PFTeA)	40.0	39.7		ng/L		99	71 - 132	0	30
Perfluorobutanesulfonic acid (PFBS)	35.5	39.4		ng/L		111	72 - 130	2	30
Perfluorohexanesulfonic acid (PFHxS)	36.5	38.2		ng/L		105	68 - 131	5	30
Perfluorooctanesulfonic acid (PFOS)	37.2	37.8		ng/L		102	65 - 140	3	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	41.1		ng/L		103	65 - 136	1	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	41.6		ng/L		104	61 - 135	2	30
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	40.0		ng/L		107	77 - 137	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	43.6		ng/L		109	72 - 132	7	30
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.8	40.6		ng/L		107	76 - 136	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	41.7		ng/L		110	81 - 141	4	30

Isotope Dilution	LCSD %Recovery	LCSD Qualifier	Limits
13C2 PFHxA	109		50 - 150
13C4 PFHpA	109		50 - 150
13C4 PFOA	108		50 - 150
13C5 PFNA	107		50 - 150
13C2 PFDA	109		50 - 150
13C2 PFUnA	109		50 - 150
13C2 PFDoA	114		50 - 150
13C2 PFTeDA	107		50 - 150
13C3 PFBS	109		50 - 150
18O2 PFHxS	107		50 - 150
13C4 PFOS	107		50 - 150
d3-NMeFOSAA	102		50 - 150
d5-NEtFOSAA	107		50 - 150
13C3 HFPO-DA	99		50 - 150

QC Association Summary

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

Job ID: 320-97690-1

LCMS

Prep Batch: 661239

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-97690-1	33059	Total/NA	Water	3535	
320-97690-2	33068	Total/NA	Water	3535	
320-97690-3	33160	Total/NA	Water	3535	
320-97690-4	33060	Total/NA	Water	3535	
MB 320-661239/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-661239/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-661239/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 661801

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-97690-1	33059	Total/NA	Water	EPA 537(Mod)	661239
320-97690-2	33068	Total/NA	Water	EPA 537(Mod)	661239
320-97690-3	33160	Total/NA	Water	EPA 537(Mod)	661239
320-97690-4	33060	Total/NA	Water	EPA 537(Mod)	661239
MB 320-661239/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	661239
LCS 320-661239/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	661239
LCSD 320-661239/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	661239

Lab Chronicle

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

Job ID: 320-97690-1

Client Sample ID: 33059

Lab Sample ID: 320-97690-1

Date Collected: 03/08/23 10:25

Matrix: Water

Date Received: 03/14/23 16:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			273.4 mL	10.0 mL	661239	03/16/23 05:40	HK	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	661801	03/18/23 04:57	K1S	EET SAC

Client Sample ID: 33068

Lab Sample ID: 320-97690-2

Date Collected: 03/08/23 12:35

Matrix: Water

Date Received: 03/14/23 16:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.9 mL	10.0 mL	661239	03/16/23 05:40	HK	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	661801	03/18/23 05:07	K1S	EET SAC

Client Sample ID: 33160

Lab Sample ID: 320-97690-3

Date Collected: 03/08/23 14:12

Matrix: Water

Date Received: 03/14/23 16:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.8 mL	10.0 mL	661239	03/16/23 05:40	HK	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	661801	03/18/23 05:17	K1S	EET SAC

Client Sample ID: 33060

Lab Sample ID: 320-97690-4

Date Collected: 03/08/23 14:22

Matrix: Water

Date Received: 03/14/23 16:26

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			274.2 mL	10.0 mL	661239	03/16/23 05:40	HK	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	661801	03/18/23 05:28	K1S	EET SAC

Laboratory References:

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

Accreditation/Certification Summary

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

Job ID: 320-97690-1

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

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

Method Summary

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

Job ID: 320-97690-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod) 3535	PFAS for QSM 5.3, Table B-15 Solid-Phase Extraction (SPE)	EPA SW846	EET SAC EET 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:

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

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

Sample Summary

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

Job ID: 320-97690-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-97690-1	33059	Water	03/08/23 10:25	03/14/23 16:26
320-97690-2	33068	Water	03/08/23 12:35	03/14/23 16:26
320-97690-3	33160	Water	03/08/23 14:12	03/14/23 16:26
320-97690-4	33060	Water	03/08/23 14:22	03/14/23 16:26

1

2

3

4

5

6

7

8

9

10

11

12

13

14


15

CHAIN-OF-CUSTODY RECORD

Analytical Methods (include preservative if used)

Turn Around Time:
 Normal Rush
 Please Specify



Quote No:
 J-Flags: Yes No

Sample Identity	Lab No.	Time	Date Sampled	PFAS x 18	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
33059		1025	3/8/23	X	2	Groundwater  320-97690 Chain of Custody
33068		1235		X	2	
33160		1412		X	2	
33060		1422		X	2	

Project Information
 Number: 102896 - 009
 Name: YAK
 Contact: ashley.jaramillo@shannonwilson.com
 Ongoing Project? Yes No
 Sampler: KND

Sample Receipt
 Total No. of Containers: 8
 COC Seals/Intact? Y/N/NA
 Received Good Cond./Cold
 Temp:
 Delivery Method: Goldstreak

Notes:
 PFAS method is DoD QSM v5.5 Table B.1

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature:  Printed Name: Kaitlyn Davis Company: Shannon & Wilson Inc.	Signature: _____ Printed Name: _____ Company: _____	Signature: _____ Printed Name: _____ Company: _____
Time: 1630 Date: 3/13/23	Time: _____ Date: _____	Time: _____ Date: _____
Received By: 1. Signature:  Printed Name: SANDY Company: BETCS	Received By: 2. Signature: _____ Printed Name: _____ Company: _____	Received By: 3. Signature: _____ Printed Name: _____ Company: _____
Time: 1447 Date: 3-14-23	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



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-97690-1

Login Number: 97690

List Source: Eurofins Sacramento

List Number: 1

Creator: Pratali, Sandra A

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	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?	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	

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By: Date:	Ashley Jaramillo 3/31/2023	CS Site Name:	ADOT&PF Yakutat Airport Sitewide PFAS	Lab Name:	Eurofins Environment Testing
Title:	Senior Chemist	ADEC File No.:	1530.38.022	Lab Report No.:	320-97690-1
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID No.:	27090	Lab Report Date:	3/30/2023

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

- a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
Yes No N/A
Comments: Project samples were sent to Eurofins Environment Testing in West Sacramento, California for the analysis of PFAS by LCMSMS compliant with DoD QSM Version 5.3 Table B-15, under DEC approval 17-020 dated 2/11/21.
- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses CS-LAP approved?
Yes No N/A
Comments: Samples were not transferred to another “network” laboratory or sub-contracted to an alternate laboratory.

2. Chain of Custody (CoC)

- a. Is the CoC information completed, signed, and dated (including released/received by)?
Yes No N/A
Comments:
- b. Were the correct analyses requested?
Yes No N/A
Analyses requested: Analysis of PFAS was incorrectly requested by LCMSMS compliant with DoD QSM Version 5.5 Table B-1, rather than DoD QSM Version 5.3 Table B-15, the correct method.
Comments: PFAS was correctly analyzed by LCMSMS compliant with DoD QSM Version 5.3 Table B-15. Data quality and/or usability not affected.

3. Laboratory Sample Receipt Documentation

- a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
Yes No N/A
Cooler temperature(s): The temperature of the cooler at receipt was 0.1° C.
Sample temperature(s): Sample temperatures were not noted by the laboratory.
Comments: The cooler temperature was within the acceptable range.
- b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes No N/A
Comments: PFAS analysis does not require preservation outside of temperature preservation.
- c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes No N/A
Comments: The laboratory noted the samples arrived in good condition, and where required, properly preserved and on ice.
- 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, canister not holding a vacuum, etc.?
Yes No N/A
Comments: No sample discrepancies were noted by the laboratory.
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

4. Case Narrative

- a. Is the case narrative present and understandable?
Yes No N/A
Comments:
- b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes No N/A
Comments: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-661239. See section 6.c. for details regarding impacts to data quality and/or usability, as applicable.
The following samples in preparation batch 320-661239 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction: 33059 and 33068. Data quality and/or usability not affected.

- c. Were all the corrective actions documented?
Yes No N/A
Comments: Corrective actions not required.
- d. What is the effect on data quality/usability according to the case narrative?
Comments: The case narrative does not discuss effect of identified discrepancies on data quality. Any notable data quality issues mentioned in the case narrative are discussed above in Section 4.b. or elsewhere within this DEC checklist.

5. Sample Results

- a. Are the correct analyses performed/reported as requested on CoC?
Yes No N/A
Comments: Analysis of PFAS was incorrectly requested by LCMSMS compliant with DoD QSM Version 5.5 Table B-1, rather than DoD QSM Version 5.3 Table B-15, the correct method. PFAS was correctly analyzed by LCMSMS compliant with DoD QSM Version 5.3 Table B-15. Data quality and/or usability not affected.
- b. Are all applicable holding times met?
Yes No N/A
Comments:
- c. Are all soils reported on a dry weight basis?
Yes No N/A
Comments: Soil samples were not included with this work order.
- d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?
Yes No N/A
Comments:
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

6. QC Samples

- a. Method Blank
- i. Was one method blank reported per matrix, analysis, and 20 samples?
Yes No N/A
Comments:

- ii. Are all method blank results less than LOQ (or RL)?

Yes No N/A

Comments:

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- v. Data quality or usability affected?

Yes No N/A

Comments: See above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – Are one LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No N/A

Comments:

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

Yes No N/A

Comments: Metal/inorganic analyses were not requested for samples included in this work order.

- iii. Accuracy – Are 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 – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the 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:

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

Lab Report No.: 320-97690-1

- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Not applicable, see above.
- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes No N/A
Comments: See above.
- vii. Is the data quality or usability affected?
Yes No N/A
Comments: See above.
- c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)
- i. Organics – Are 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 preparation batch 320-661239. Batch accuracy and precision is evaluated using the LCS/LCSD samples. See section 6.b, above.
- ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes No N/A
Comments: Metal/inorganic analyses were not requested for samples included in this work order.
- iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?
Yes No N/A
Comments: See above.
- iv. Precision – Are 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.
Yes No N/A
Comments: See above.
- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Not applicable, see above.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS

Lab Report No.: 320-97690-1

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

Yes No N/A

Comments: See above.

vii. Is the data quality or usability affected?

Yes No N/A

Comments: 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 – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; 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: See above.

iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

e. Trip Blanks

i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes No N/A

Comments: Volatile samples were not included with this work order.

ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

f. Field Duplicate

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

Yes No N/A

Comments: Sample 33160 is the field duplicate of project sample 33060.

ii. Was the duplicate submitted blind to lab?

Yes No N/A

Comments:

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

$$RPD (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No N/A

Comments:

iv. Is the data quality or usability affected? (Explain)

Yes No N/A

Comments: See above.

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?

Yes No N/A

Comments: Samples were not collected with reusable equipment.

ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

iii. If above LoQ or RL, specify what samples are affected.

Comments: Not applicable, see above.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS
Lab Report No.: 320-97690-1

- iv. Are data quality or usability affected?
Yes No N/A
Comments: See above.

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

- a. Are they defined and appropriate?
Yes No N/A
Comments: No other data flags/qualifiers required.

 **ANALYTICAL REPORT****PREPARED FOR**

Attn: Ashley Jaramillo
Shannon & Wilson, Inc
2355 Hill Rd.
Fairbanks, Alaska 99709-5244

Generated 6/23/2023 9:16:59 AM

JOB DESCRIPTION

YAKUTAT

JOB NUMBER

320-101394-1

Eurofins Sacramento

Job Notes

This report may not be reproduced except in full, and with written approval from the laboratory. The results relate only to the samples tested. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northern California, LLC Project Manager.

Authorization



Generated
6/23/2023 9:16:59 AM

Authorized for release by
Linda C. Laver, Senior Project Manager
Linda.Laver@et.eurofinsus.com
Designee for
David Alltucker, Project Manager I
David.Alltucker@et.eurofinsus.com
(916)374-4383



Table of Contents

Cover Page	1
Table of Contents	3
Definitions/Glossary	4
Case Narrative	5
Detection Summary	6
Client Sample Results	7
Isotope Dilution Summary	13
QC Sample Results	14
QC Association Summary	17
Lab Chronicle	18
Certification Summary	19
Method Summary	20
Sample Summary	21
Chain of Custody	22
Receipt Checklists	23

Definitions/Glossary

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

Job ID: 320-101394-1

Qualifiers

LCMS

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

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
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)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
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)
TNTC	Too Numerous To Count

Case Narrative

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

Job ID: 320-101394-1

Job ID: 320-101394-1

Laboratory: Eurofins Sacramento

Narrative

**Job Narrative
320-101394-1**

Receipt

The samples were received on 6/10/2023 11:05 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.3° C.

LCMS

No analytical or quality issues were noted, other than those described 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 320-684092.

Method 3535: The following samples were yellow in color and contained floating particulates prior to extraction: 33068 (320-101394-1), 33060 (320-101394-2), 93060 (320-101394-3), 33059 (320-101394-4), 33056 (320-101394-5) and 33053 (320-101394-6). preparation batch 320-684092

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

Job ID: 320-101394-1

Client Sample ID: 33068

Lab Sample ID: 320-101394-1

No Detections.

Client Sample ID: 33060

Lab Sample ID: 320-101394-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	3.9		1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.0		1.8	0.23	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.3		1.8	0.77	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.63	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.28	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.31	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.6		1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12		1.8	0.49	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 93060

Lab Sample ID: 320-101394-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	4.3		1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	2.3		1.8	0.22	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.4		1.8	0.76	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.68	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.28	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.30	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.7		1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	12		1.8	0.48	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33059

Lab Sample ID: 320-101394-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	0.54	J	1.9	0.52	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33056

Lab Sample ID: 320-101394-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.5	J	1.8	0.22	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		1.8	0.75	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.2	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.27	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.79	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	8.9		1.8	0.50	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	9.5		1.8	0.47	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: 33053

Lab Sample ID: 320-101394-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.2	J	1.8	0.52	ng/L	1		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.65	J	1.8	0.23	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.84	J	1.8	0.77	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.35	J	1.8	0.24	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.34	J	1.8	0.18	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	6.9		1.8	0.51	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	4.0		1.8	0.49	ng/L	1		EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 33068
Date Collected: 06/06/23 09:34
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-1
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.7	0.51	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluoroheptanoic acid (PFHpA)	ND		1.7	0.22	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorooctanoic acid (PFOA)	ND		1.7	0.74	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorononanoic acid (PFNA)	ND		1.7	0.24	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorodecanoic acid (PFDA)	ND		1.7	0.27	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluoroundecanoic acid (PFUnA)	ND		1.7	0.96	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorododecanoic acid (PFDoA)	ND		1.7	0.48	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorotridecanoic acid (PFTriA)	ND		1.7	1.1	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.7	0.64	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.7	0.17	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.7	0.50	ng/L		06/19/23 05:13	06/21/23 09:17	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.7	0.47	ng/L		06/19/23 05:13	06/21/23 09:17	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.4	1.0	ng/L		06/19/23 05:13	06/21/23 09:17	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.4	1.1	ng/L		06/19/23 05:13	06/21/23 09:17	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.7	0.21	ng/L		06/19/23 05:13	06/21/23 09:17	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.5	1.3	ng/L		06/19/23 05:13	06/21/23 09:17	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.7	0.28	ng/L		06/19/23 05:13	06/21/23 09:17	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.7	0.35	ng/L		06/19/23 05:13	06/21/23 09:17	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	99		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C4 PFHpA	99		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C4 PFOA	96		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C5 PFNA	100		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C2 PFDA	97		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C2 PFUnA	98		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C2 PFDoA	92		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C2 PFTeDA	88		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C3 PFBS	93		50 - 150	06/19/23 05:13	06/21/23 09:17	1
18O2 PFHxS	95		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C4 PFOS	96		50 - 150	06/19/23 05:13	06/21/23 09:17	1
d3-NMeFOSAA	108		50 - 150	06/19/23 05:13	06/21/23 09:17	1
d5-NEtFOSAA	100		50 - 150	06/19/23 05:13	06/21/23 09:17	1
13C3 HFPO-DA	96		50 - 150	06/19/23 05:13	06/21/23 09:17	1

Eurofins Sacramento

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 33060
Date Collected: 06/06/23 08:54
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-2
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	3.9		1.8	0.52	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluoroheptanoic acid (PFHpA)	2.0		1.8	0.23	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorooctanoic acid (PFOA)	2.3		1.8	0.77	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorononanoic acid (PFNA)	0.63	J	1.8	0.24	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.28	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.99	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.66	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorobutanesulfonic acid (PFBS)	0.31	J	1.8	0.18	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorohexanesulfonic acid (PFHxS)	3.6		1.8	0.51	ng/L		06/19/23 05:13	06/21/23 09:27	1
Perfluorooctanesulfonic acid (PFOS)	12		1.8	0.49	ng/L		06/19/23 05:13	06/21/23 09:27	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		06/19/23 05:13	06/21/23 09:27	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		06/19/23 05:13	06/21/23 09:27	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		06/19/23 05:13	06/21/23 09:27	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.4	ng/L		06/19/23 05:13	06/21/23 09:27	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		06/19/23 05:13	06/21/23 09:27	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		06/19/23 05:13	06/21/23 09:27	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	100		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C4 PFHpA	100		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C4 PFOA	94		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C5 PFNA	97		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C2 PFDA	95		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C2 PFUnA	95		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C2 PFDoA	86		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C2 PFTeDA	80		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C3 PFBS	87		50 - 150				06/19/23 05:13	06/21/23 09:27	1
18O2 PFHxS	96		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C4 PFOS	91		50 - 150				06/19/23 05:13	06/21/23 09:27	1
d3-NMeFOSAA	104		50 - 150				06/19/23 05:13	06/21/23 09:27	1
d5-NEtFOSAA	97		50 - 150				06/19/23 05:13	06/21/23 09:27	1
13C3 HFPO-DA	100		50 - 150				06/19/23 05:13	06/21/23 09:27	1

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 93060
Date Collected: 06/06/23 08:44
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-3
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	4.3		1.8	0.52	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluoroheptanoic acid (PFHpA)	2.3		1.8	0.22	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorooctanoic acid (PFOA)	2.4		1.8	0.76	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorononanoic acid (PFNA)	0.68	J	1.8	0.24	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.28	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.98	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.49	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.65	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorobutanesulfonic acid (PFBS)	0.30	J	1.8	0.18	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorohexanesulfonic acid (PFHxS)	3.7		1.8	0.51	ng/L		06/19/23 05:13	06/21/23 09:37	1
Perfluorooctanesulfonic acid (PFOS)	12		1.8	0.48	ng/L		06/19/23 05:13	06/21/23 09:37	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		06/19/23 05:13	06/21/23 09:37	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		06/19/23 05:13	06/21/23 09:37	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.21	ng/L		06/19/23 05:13	06/21/23 09:37	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.3	ng/L		06/19/23 05:13	06/21/23 09:37	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		06/19/23 05:13	06/21/23 09:37	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		06/19/23 05:13	06/21/23 09:37	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C4 PFHpA	97		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C4 PFOA	96		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C5 PFNA	94		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C2 PFDA	91		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C2 PFUnA	92		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C2 PFDoA	87		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C2 PFTeDA	87		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C3 PFBS	91		50 - 150				06/19/23 05:13	06/21/23 09:37	1
18O2 PFHxS	93		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C4 PFOS	95		50 - 150				06/19/23 05:13	06/21/23 09:37	1
d3-NMeFOSAA	99		50 - 150				06/19/23 05:13	06/21/23 09:37	1
d5-NEtFOSAA	102		50 - 150				06/19/23 05:13	06/21/23 09:37	1
13C3 HFPO-DA	95		50 - 150				06/19/23 05:13	06/21/23 09:37	1

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 33059

Lab Sample ID: 320-101394-4

Date Collected: 06/06/23 13:34

Matrix: Water

Date Received: 06/10/23 11:05

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		1.9	0.56	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluoroheptanoic acid (PFHpA)	ND		1.9	0.24	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorooctanoic acid (PFOA)	ND		1.9	0.82	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorononanoic acid (PFNA)	ND		1.9	0.26	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorodecanoic acid (PFDA)	ND		1.9	0.30	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluoroundecanoic acid (PFUnA)	ND		1.9	1.1	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorododecanoic acid (PFDoA)	ND		1.9	0.53	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorotridecanoic acid (PFTriA)	ND		1.9	1.2	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.9	0.70	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorobutanesulfonic acid (PFBS)	ND		1.9	0.19	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.9	0.55	ng/L		06/19/23 05:13	06/21/23 09:47	1
Perfluorooctanesulfonic acid (PFOS)	0.54	J	1.9	0.52	ng/L		06/19/23 05:13	06/21/23 09:47	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.8	1.2	ng/L		06/19/23 05:13	06/21/23 09:47	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.8	1.2	ng/L		06/19/23 05:13	06/21/23 09:47	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.9	0.23	ng/L		06/19/23 05:13	06/21/23 09:47	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.8	1.4	ng/L		06/19/23 05:13	06/21/23 09:47	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.9	0.31	ng/L		06/19/23 05:13	06/21/23 09:47	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.9	0.38	ng/L		06/19/23 05:13	06/21/23 09:47	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C4 PFHpA	95		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C4 PFOA	93		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C5 PFNA	95		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C2 PFDA	93		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C2 PFUnA	91		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C2 PFDoA	86		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C2 PFTeDA	82		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C3 PFBS	88		50 - 150	06/19/23 05:13	06/21/23 09:47	1
18O2 PFHxS	92		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C4 PFOS	95		50 - 150	06/19/23 05:13	06/21/23 09:47	1
d3-NMeFOSAA	99		50 - 150	06/19/23 05:13	06/21/23 09:47	1
d5-NEtFOSAA	96		50 - 150	06/19/23 05:13	06/21/23 09:47	1
13C3 HFPO-DA	94		50 - 150	06/19/23 05:13	06/21/23 09:47	1

Eurofins Sacramento

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 33056
Date Collected: 06/06/23 10:25
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-5
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.7	J	1.8	0.51	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluoroheptanoic acid (PFHpA)	1.5	J	1.8	0.22	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorooctanoic acid (PFOA)	2.7		1.8	0.75	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorononanoic acid (PFNA)	1.2	J	1.8	0.24	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorodecanoic acid (PFDA)	0.33	J	1.8	0.27	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.96	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.48	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.1	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.64	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorobutanesulfonic acid (PFBS)	0.79	J	1.8	0.18	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorohexanesulfonic acid (PFHxS)	8.9		1.8	0.50	ng/L		06/19/23 05:13	06/21/23 09:58	1
Perfluorooctanesulfonic acid (PFOS)	9.5		1.8	0.47	ng/L		06/19/23 05:13	06/21/23 09:58	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.4	1.1	ng/L		06/19/23 05:13	06/21/23 09:58	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.4	1.1	ng/L		06/19/23 05:13	06/21/23 09:58	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.21	ng/L		06/19/23 05:13	06/21/23 09:58	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.5	1.3	ng/L		06/19/23 05:13	06/21/23 09:58	1
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.28	ng/L		06/19/23 05:13	06/21/23 09:58	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.35	ng/L		06/19/23 05:13	06/21/23 09:58	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	91		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C4 PFHpA	93		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C4 PFOA	90		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C5 PFNA	96		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C2 PFDA	89		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C2 PFUnA	85		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C2 PFDoA	71		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C2 PFTeDA	63		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C3 PFBS	91		50 - 150				06/19/23 05:13	06/21/23 09:58	1
18O2 PFHxS	94		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C4 PFOS	92		50 - 150				06/19/23 05:13	06/21/23 09:58	1
d3-NMeFOSAA	90		50 - 150				06/19/23 05:13	06/21/23 09:58	1
d5-NEtFOSAA	82		50 - 150				06/19/23 05:13	06/21/23 09:58	1
13C3 HFPO-DA	95		50 - 150				06/19/23 05:13	06/21/23 09:58	1

Client Sample Results

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

Job ID: 320-101394-1

Client Sample ID: 33053
Date Collected: 06/06/23 14:36
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-6
Matrix: Water

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	1.2	J	1.8	0.52	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluoroheptanoic acid (PFHpA)	0.65	J	1.8	0.23	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorooctanoic acid (PFOA)	0.84	J	1.8	0.77	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorononanoic acid (PFNA)	0.35	J	1.8	0.24	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorodecanoic acid (PFDA)	ND		1.8	0.28	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluoroundecanoic acid (PFUnA)	ND		1.8	0.99	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorododecanoic acid (PFDoA)	ND		1.8	0.50	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorotridecanoic acid (PFTriA)	ND		1.8	1.2	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorotetradecanoic acid (PFTeA)	ND		1.8	0.66	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorobutanesulfonic acid (PFBS)	0.34	J	1.8	0.18	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorohexanesulfonic acid (PFHxS)	6.9		1.8	0.51	ng/L		06/19/23 05:13	06/21/23 10:08	1
Perfluorooctanesulfonic acid (PFOS)	4.0		1.8	0.49	ng/L		06/19/23 05:13	06/21/23 10:08	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.5	1.1	ng/L		06/19/23 05:13	06/21/23 10:08	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.5	1.2	ng/L		06/19/23 05:13	06/21/23 10:08	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		1.8	0.22	ng/L		06/19/23 05:13	06/21/23 10:08	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.6	1.4	ng/L		06/19/23 05:13	06/21/23 10:08	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		1.8	0.29	ng/L		06/19/23 05:13	06/21/23 10:08	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.8	0.36	ng/L		06/19/23 05:13	06/21/23 10:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C4 PFHpA	95		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C4 PFOA	95		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C5 PFNA	97		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C2 PFDA	96		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C2 PFUnA	94		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C2 PFDoA	87		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C2 PFTeDA	85		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C3 PFBS	86		50 - 150				06/19/23 05:13	06/21/23 10:08	1
18O2 PFHxS	90		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C4 PFOS	93		50 - 150				06/19/23 05:13	06/21/23 10:08	1
d3-NMeFOSAA	98		50 - 150				06/19/23 05:13	06/21/23 10:08	1
d5-NEtFOSAA	101		50 - 150				06/19/23 05:13	06/21/23 10:08	1
13C3 HFPO-DA	100		50 - 150				06/19/23 05:13	06/21/23 10:08	1

Isotope Dilution Summary

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

Job ID: 320-101394-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Matrix: Water

Prep Type: Total/NA

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDaA (50-150)	PFTDA (50-150)
320-101394-1	33068	99	99	96	100	97	98	92	88
320-101394-2	33060	100	100	94	97	95	95	86	80
320-101394-3	93060	96	97	96	94	91	92	87	87
320-101394-4	33059	91	95	93	95	93	91	86	82
320-101394-5	33056	91	93	90	96	89	85	71	63
320-101394-6	33053	96	95	95	97	96	94	87	85
LCS 320-684092/2-A	Lab Control Sample	96	97	96	98	97	95	95	87
LCSD 320-684092/3-A	Lab Control Sample Dup	94	95	96	97	95	97	95	92
MB 320-684092/1-A	Method Blank	98	96	96	98	96	93	85	88

Percent Isotope Dilution Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-101394-1	33068	93	95	96	108	100	96
320-101394-2	33060	87	96	91	104	97	100
320-101394-3	93060	91	93	95	99	102	95
320-101394-4	33059	88	92	95	99	96	94
320-101394-5	33056	91	94	92	90	82	95
320-101394-6	33053	86	90	93	98	101	100
LCS 320-684092/2-A	Lab Control Sample	93	101	97	104	100	97
LCSD 320-684092/3-A	Lab Control Sample Dup	93	102	103	100	107	96
MB 320-684092/1-A	Method Blank	87	93	94	99	94	98

Surrogate Legend

- PFHxA = 13C2 PFHxA
- C4PFHA = 13C4 PFHpA
- PFOA = 13C4 PFOA
- PFNA = 13C5 PFNA
- PFDA = 13C2 PFDA
- PFUnA = 13C2 PFUnA
- PFDaA = 13C2 PFDaA
- PFTDA = 13C2 PFTeDA
- C3PFBS = 13C3 PFBS
- PFHxS = 18O2 PFHxS
- PFOS = 13C4 PFOS
- d3NMFOS = d3-NMeFOSAA
- d5NEFOS = d5-NEtFOSAA
- HFPODA = 13C3 HFPO-DA

QC Sample Results

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

Job ID: 320-101394-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15

Lab Sample ID: MB 320-684092/1-A
Matrix: Water
Analysis Batch: 684603

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 684092

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.58	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		06/19/23 05:13	06/21/23 08:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		06/19/23 05:13	06/21/23 08:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		06/19/23 05:13	06/21/23 08:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		06/19/23 05:13	06/21/23 08:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		06/19/23 05:13	06/21/23 08:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		06/19/23 05:13	06/21/23 08:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		06/19/23 05:13	06/21/23 08:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		06/19/23 05:13	06/21/23 08:46	1

Isotope Dilution	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
13C2 PFHxA	98		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C4 PFHpA	96		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C4 PFOA	96		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C5 PFNA	98		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C2 PFDA	96		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C2 PFUnA	93		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C2 PFDoA	85		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C2 PFTeDA	88		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C3 PFBS	87		50 - 150	06/19/23 05:13	06/21/23 08:46	1
18O2 PFHxS	93		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C4 PFOS	94		50 - 150	06/19/23 05:13	06/21/23 08:46	1
d3-NMeFOSAA	99		50 - 150	06/19/23 05:13	06/21/23 08:46	1
d5-NEtFOSAA	94		50 - 150	06/19/23 05:13	06/21/23 08:46	1
13C3 HFPO-DA	98		50 - 150	06/19/23 05:13	06/21/23 08:46	1

Lab Sample ID: LCS 320-684092/2-A
Matrix: Water
Analysis Batch: 684603

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 684092

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Perfluoroheptanoic acid (PFHpA)	40.0	46.9		ng/L		117	72 - 130
Perfluorooctanoic acid (PFOA)	40.0	44.0		ng/L		110	71 - 133
Perfluorononanoic acid (PFNA)	40.0	43.5		ng/L		109	69 - 130

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-101394-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCS 320-684092/2-A
Matrix: Water
Analysis Batch: 684603

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 684092

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	40.0	43.8		ng/L		109	71 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	41.7		ng/L		104	69 - 133
Perfluorododecanoic acid (PFDoA)	40.0	44.3		ng/L		111	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	41.7		ng/L		104	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	42.6		ng/L		106	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	39.6		ng/L		111	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	36.2		ng/L		99	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	40.5		ng/L		109	65 - 140
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	43.4		ng/L		108	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	46.7		ng/L		117	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	41.1		ng/L		110	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	44.5		ng/L		111	72 - 132
11-Chloroeicosadecafluoro-3-oxaundecane-1-sulfonic acid	37.8	41.8		ng/L		111	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	46.4		ng/L		123	81 - 141

Isotope Dilution	LCS LCS		Limits
	%Recovery	Qualifier	
13C2 PFHxA	96		50 - 150
13C4 PFHpA	97		50 - 150
13C4 PFOA	96		50 - 150
13C5 PFNA	98		50 - 150
13C2 PFDA	97		50 - 150
13C2 PFUnA	95		50 - 150
13C2 PFDoA	95		50 - 150
13C2 PFTeDA	87		50 - 150
13C3 PFBS	93		50 - 150
18O2 PFHxS	101		50 - 150
13C4 PFOS	97		50 - 150
d3-NMeFOSAA	104		50 - 150
d5-NEtFOSAA	100		50 - 150
13C3 HFPO-DA	97		50 - 150

Lab Sample ID: LCSD 320-684092/3-A
Matrix: Water
Analysis Batch: 684603

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 684092

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD
							Limits	RPD	
Perfluorohexanoic acid (PFHxA)	40.0	46.4		ng/L		116	72 - 129	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	45.8		ng/L		115	72 - 130	2	30
Perfluorooctanoic acid (PFOA)	40.0	44.9		ng/L		112	71 - 133	2	30

Eurofins Sacramento

QC Sample Results

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

Job ID: 320-101394-1

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 (Continued)

Lab Sample ID: LCSD 320-684092/3-A
Matrix: Water
Analysis Batch: 684603

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 684092

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec		RPD	RPD Limit
							Limits	RPD		
Perfluorononanoic acid (PFNA)	40.0	45.0		ng/L		113	69 - 130	3	30	
Perfluorodecanoic acid (PFDA)	40.0	43.1		ng/L		108	71 - 129	2	30	
Perfluoroundecanoic acid (PFUnA)	40.0	42.6		ng/L		106	69 - 133	2	30	
Perfluorododecanoic acid (PFDoA)	40.0	47.3		ng/L		118	72 - 134	7	30	
Perfluorotridecanoic acid (PFTriA)	40.0	43.6		ng/L		109	65 - 144	4	30	
Perfluorotetradecanoic acid (PFTeA)	40.0	42.8		ng/L		107	71 - 132	0	30	
Perfluorobutanesulfonic acid (PFBS)	35.5	41.3		ng/L		116	72 - 130	4	30	
Perfluorohexanesulfonic acid (PFHxS)	36.5	36.6		ng/L		100	68 - 131	1	30	
Perfluorooctanesulfonic acid (PFOS)	37.2	40.2		ng/L		108	65 - 140	1	30	
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	46.9		ng/L		117	65 - 136	8	30	
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	45.3		ng/L		113	61 - 135	3	30	
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	40.4		ng/L		108	77 - 137	2	30	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	45.5		ng/L		114	72 - 132	2	30	
11-Chloroeicosafuoro-3-oxaundecane-1-sulfonic acid	37.8	42.5		ng/L		112	76 - 136	2	30	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	43.1		ng/L		114	81 - 141	7	30	

Isotope Dilution	LCSD		Limits
	%Recovery	Qualifier	
13C2 PFHxA	94		50 - 150
13C4 PFHpA	95		50 - 150
13C4 PFOA	96		50 - 150
13C5 PFNA	97		50 - 150
13C2 PFDA	95		50 - 150
13C2 PFUnA	97		50 - 150
13C2 PFDoA	95		50 - 150
13C2 PFTeDA	92		50 - 150
13C3 PFBS	93		50 - 150
18O2 PFHxS	102		50 - 150
13C4 PFOS	103		50 - 150
d3-NMeFOSAA	100		50 - 150
d5-NEtFOSAA	107		50 - 150
13C3 HFPO-DA	96		50 - 150

QC Association Summary

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

Job ID: 320-101394-1

LCMS

Prep Batch: 684092

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-101394-1	33068	Total/NA	Water	3535	
320-101394-2	33060	Total/NA	Water	3535	
320-101394-3	93060	Total/NA	Water	3535	
320-101394-4	33059	Total/NA	Water	3535	
320-101394-5	33056	Total/NA	Water	3535	
320-101394-6	33053	Total/NA	Water	3535	
MB 320-684092/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-684092/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-684092/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 684603

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-101394-1	33068	Total/NA	Water	EPA 537(Mod)	684092
320-101394-2	33060	Total/NA	Water	EPA 537(Mod)	684092
320-101394-3	93060	Total/NA	Water	EPA 537(Mod)	684092
320-101394-4	33059	Total/NA	Water	EPA 537(Mod)	684092
320-101394-5	33056	Total/NA	Water	EPA 537(Mod)	684092
320-101394-6	33053	Total/NA	Water	EPA 537(Mod)	684092
MB 320-684092/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	684092
LCS 320-684092/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	684092
LCSD 320-684092/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	684092

Lab Chronicle

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

Job ID: 320-101394-1

Client Sample ID: 33068
Date Collected: 06/06/23 09:34
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			286.2 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 09:17	C1P	EET SAC

Client Sample ID: 33060
Date Collected: 06/06/23 08:54
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 09:27	C1P	EET SAC

Client Sample ID: 93060
Date Collected: 06/06/23 08:44
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.6 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 09:37	C1P	EET SAC

Client Sample ID: 33059
Date Collected: 06/06/23 13:34
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			260.1 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 09:47	C1P	EET SAC

Client Sample ID: 33056
Date Collected: 06/06/23 10:25
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			285.1 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 09:58	C1P	EET SAC

Client Sample ID: 33053
Date Collected: 06/06/23 14:36
Date Received: 06/10/23 11:05

Lab Sample ID: 320-101394-6
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			277.5 mL	10.00 mL	684092	06/19/23 05:13	HJA	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	684603	06/21/23 10:08	C1P	EET SAC

Laboratory References:

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

Eurofins Sacramento

Accreditation/Certification Summary

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

Job ID: 320-101394-1

Laboratory: Eurofins Sacramento

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

Method Summary

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

Job ID: 320-101394-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod) 3535	PFAS for QSM 5.3, Table B-15 Solid-Phase Extraction (SPE)	EPA SW846	EET SAC EET 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:

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



Sample Summary

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

Job ID: 320-101394-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-101394-1	33068	Water	06/06/23 09:34	06/10/23 11:05
320-101394-2	33060	Water	06/06/23 08:54	06/10/23 11:05
320-101394-3	93060	Water	06/06/23 08:44	06/10/23 11:05
320-101394-4	33059	Water	06/06/23 13:34	06/10/23 11:05
320-101394-5	33056	Water	06/06/23 10:25	06/10/23 11:05
320-101394-6	33053	Water	06/06/23 14:36	06/10/23 11:05

1

2

3

4

5

6

7

8

9

10

11

12

13

14

15

CHAIN-OF-CUSTODY RECORD

Analytical Methods (include preservative if used)

Quote No: _____
 MSA Number: _____
 J-Flags: Yes No

Turn Around Time:
 Normal Rush
 Please Specify _____

Total Number of Containers

Remarks/Matrix Composition/Grab? Sample Containers

Sample Identity	Lab No.	Time	Date Sampled
33068		0934	6/6/23
33060		0854	
93060		0844	
33059		1334	
33056		1025	
33053		1436	



Project Information	Sample Receipt	Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Number: <u>102896-009</u>	Total No. of Containers: <u>10</u>	Signature: <u>[Signature]</u>	Signature: _____	Signature: _____
Name: <u>YAKUTAT</u>	COC Seals/Intact? <u>Y/N/A</u>	Printed Name: <u>Silvia Kralis</u>	Printed Name: _____	Printed Name: _____
Contact: <u>amy@shannonwilson.com</u>	Received Good Cond./Cold	Company: <u>Shannon & Wilson</u>	Company: _____	Company: _____
Ongoing Project? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Temp: <u>1.3°C</u>	Time: <u>1500</u>	Time: _____	Time: _____
Sampler: <u>RLW</u>	Delivery Method: _____	Date: <u>6/6/23</u>	Date: _____	Date: _____
Notes: <u>DOD QSM v53 Table B-15</u>		Received By: 1. Signature: <u>[Signature]</u>	Received By: 2. Signature: _____	Received By: 3. Signature: _____
Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report Yellow - Shannon & Wilson - job file		Printed Name: <u>Juan Gutierrez</u>	Printed Name: _____	Printed Name: _____
		Company: <u>ECTA</u>	Company: _____	Company: _____



Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-101394-1

Login Number: 101394

List Source: Eurofins Sacramento

List Number: 1

Creator: Cahill, Nicholas P

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	1504531/1504530
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	

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By: Date:	Ashley Jaramillo 6/26/2023	CS Site Name:	ADOT&PF Yakutat Airport Sitewide PFAS	Lab Name:	Eurofins Environment Testing
Title:	Senior Chemist	ADEC File No.:	1530.38.022	Lab Report No.:	320-101394-1
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID No.:	27090	Lab Report Date:	6/23/23

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

- a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
Yes No N/A
Comments: Project samples were sent to Eurofins Environment Testing (Eurofins) in Sacramento, California. Eurofins analyzed project samples for PFAS by 537(Mod), compliant with the DoD QSM Version 5.3 Table B-15, under DEC approval 17-020 dated 4/13/23.
- b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses CS-LAP approved?
Yes No N/A
Comments: Project samples were not transferred to another “network” laboratory or sub-contracted to an alternate laboratory.

2. Chain of Custody (CoC)

- a. Is the CoC information completed, signed, and dated (including released/received by)?
Yes No N/A
Comments: None
- b. Were the correct analyses requested?
Yes No N/A
Analyses requested: PFAS compliant with the DoD QSM Version 5.3 Table B-15.
Comments: Eurofins performed analysis as requested.

3. Laboratory Sample Receipt Documentation

- a. Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
Yes No N/A
Cooler temperature(s): 1.3° C at receipt.
Sample temperature(s): Sample temperature not included.
Comments: Cooler temperature was within acceptable range.
- b. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)?
Yes No N/A
Comments: Outside of ice, sample preservation is not required for PFAS analysis.
- c. Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.?
Yes No N/A
Comments: Eurofins noted upon receipt that project samples arrived in good condition, and where required, properly preserved and on ice.
- 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, canister not holding a vacuum, etc.?
Yes No N/A
Comments: No discrepancies were identified by the lab, no documentation required.
- e. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

4. Case Narrative

- a. Is the case narrative present and understandable?
Yes No N/A
Comments: None
- b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes No N/A
Comments:
Insufficient sample volume was available to perform a MS/MSD associated with preparation batch 320-684092. See section 6.b. for impacts to data quality and/or usability, as applicable.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS
Lab Report No.: 320-101394-1

The following samples were yellow in color and contained floating particulates prior to extraction: 33068, 33060, 93060, 33059, 33056 and 33053, in preparation batch 320-684092. Data quality and/or usability not affected.

- c. Were all the corrective actions documented?

Yes No N/A

Comments: Corrective actions were not required; no documentation required.

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

Comments: Effects to data quality and/or usability due to discrepancies noted in the case narrative are either discussed above in Section 4.b. or elsewhere within this checklist, as applicable.

5. Sample Results

- a. Are the correct analyses performed/reported as requested on CoC?

Yes No N/A

Comments: None.

- b. Are all applicable holding times met?

Yes No N/A

Comments: None.

- c. Are all soils reported on a dry weight basis?

Yes No N/A

Comments: Soil samples were not included in this work order.

- d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?

Yes No N/A

Comments:

Analytical sensitivity was evaluated to verify that RLs met applicable DEC groundwater cleanup levels for non-detect results, as appropriate. RLs met applicable regulatory levels.

- e. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

6. QC Samples

a. Method Blank

- i. Was one method blank reported per matrix, analysis, and 20 samples?

Yes No N/A

Comments: None

- ii. Are all method blank results less than LOQ (or RL)?

Yes No N/A

Comments: No target analytes were detected in the method blank sample associated with batch 320-684092.

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

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

Yes No N/A

Comments: See above.

- v. Data quality or usability affected?

Yes No N/A

Comments: See above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

- i. Organics – Are 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: A LCS/LCSD was reported for PFAS batch 320-684092.

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

Yes No N/A

Comments: Metals/inorganics analyses were not requested for samples included in the work order.

- iii. Accuracy – Are 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: None

- iv. Precision – Are all relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? Was the 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: None
- v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Not applicable, see above.
- vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes No N/A
Comments: See above.
- vii. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

- i. Organics – Are 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 batch 320-684092. Batch accuracy and precision is evaluated using the LCS/LCSD samples. See section 6.b, above. Data quality and/or usability not affected.
- ii. Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes No N/A
Comments: Metals/inorganics analyses were not requested for samples included in the work order.
- iii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?
Yes No N/A
Comments: See above.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS
Lab Report No.: 320-101394-1

- iv. Precision – Are 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.
Yes No N/A
Comments: See above.
 - v. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: Not applicable, see above.
 - vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes No N/A
Comments: None
 - vii. Is the data quality or usability affected?
Yes No N/A
Comments: 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: None.
 - ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)
Yes No N/A
Comments: None.
 - 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: See above.
 - iv. Is the data quality or usability affected?
Yes No N/A
Comments: See above.

e. Trip Blanks

- i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples?

Yes No N/A

Comments: Volatile samples were not included with this work order, trip blank not required.

- ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

- iii. If above LoQ or RL, what samples are affected?

Comments: Not applicable, see above.

- iv. Is the data quality or usability affected?

Yes No N/A

Comments: See above.

f. Field Duplicate

- i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?

Yes No N/A

Comments: Sample 93060 is the field duplicate of project sample 33060.

- ii. Was the duplicate submitted blind to lab?

Yes No N/A

Comments: None.

- iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water or air, 50% soil)

$$RPD (\%) = \left| \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right| \times 100$$

Where R_1 = Sample Concentration

R_2 = Field Duplicate Concentration

Yes No N/A

Comments: Where calculable, analytical results met the comparison criterion ($\leq 30\%$ for water) for the field duplicate pair.

- iv. Is the data quality or usability affected? (Explain)

Yes No N/A

Comments: See above.

CS Site Name: ADOT&PF Yakutat Airport Sitewide PFAS
Lab Report No.: 320-101394-1

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?

Yes No N/A

Comments: Samples were not collected using reusable equipment, equipment blank not required.

ii. Are all results less than LoQ or RL?

Yes No N/A

Comments: See above.

iii. If above LoQ or RL, specify what samples are affected.

Comments: Not applicable, see above.

iv. Are data quality or usability affected?

Yes No N/A

Comments: See above.

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

a. Are they defined and appropriate?

Yes No N/A

Comments: Other data flags/qualifiers not required.

Appendix C

Analytical Data QA/QC Summary

APPENDIX C: ANALYTICAL DATA QA/QC SUMMARY

Appendix C QA/QC Summary

CONTENTS

- C.1 Introduction 1
 - C.1.1 Analytical Methods and Data Quality Objectives 1
 - C.1.2 Summary of Groundwater Samples 2
- C.2 Water Supply Well Data Quality Review 3
 - C.2.1 Sample Collection..... 3
 - C.2.2 Sample Handling..... 3
 - C.2.3 Method Blanks..... 4
 - C.2.4 Laboratory Control Samples..... 4
 - C.2.5 Matrix Spike Sample and Sample Duplicates 4
 - C.2.6 Isotope Dilution Analytes 4
 - C.2.7 Field Duplicates..... 4
 - C.2.8 Analytical Sensitivity 4
 - C.2.9 Summary of Qualified Results 5
 - C.2.10 Completeness..... 5

APPENDIX C: QA/QC SUMMARY

APPENDIX C: QA/QC SUMMARY

°C	degrees Celsius
DEC	Alaska Department of Environmental Conservation
DQO	data quality objective
Eurofins	Eurofins Environment Testing
GWP	General Work Plan
IDA	isotope dilution analyte
LCS	laboratory control samples
LCSD	LCS duplicate
LDRC	Laboratory Data Review Checklist
MS	matrix spike
MSD	MS duplicate
PFAS	per- and polyfluoroalkyl substances
QA	quality assurance
QC	quality control
RPD	relative percent difference
WO	work order
YAK	Yakutat Airport

C.1 INTRODUCTION

This quality assurance (QA)/quality control (QC) summary outlines the technical review of analytical results generated in support of water supply well sample collection at the Yakutat Airport (YAK) from July 2022 through April 2024.

Shannon & Wilson, Inc. reviewed project sample and QC analytical data to assess whether the data met the designated quality objectives (DQOs) and were acceptable for project use. The project data were reviewed for deviations to the requirements presented in *Revision 1 - DOT&PF Statewide PFAS General Work Plan (GWP)*, approved by the Alaska Department of Environmental Conservation (DEC) in August 2020. As appropriate, the review includes evaluation of sample collection and handling, holding times, blanks, project sample and laboratory quality control sample duplicates, laboratory control samples (LCSs) and sample isotope dilution analyte (IDA) recoveries, and matrix spike sample (MS) recoveries. Calibration curves and continuing calibration verification recoveries were not reviewed unless a QC discrepancy was noted by the laboratory in a case narrative. QC deviations that do not impact data quality are not discussed in this summary. Full data quality descriptions are reported in the DEC Laboratory Data Review Checklists (LDRC) prepared for each laboratory report. LDRCs and laboratory reports are included in Appendix B.

Water supply well data quality is discussed in the following sections. Data which did not meet acceptance criteria have been described and the associated samples and data quality implications or qualifications are summarized.

C.1.1 Analytical Methods and Data Quality Objectives

The analytical methods and associated DQOs used for this review were established in the GWP. The DQOs represent the minimum acceptable QC limits and goals for analytical measurements and are used as comparison criteria during data quality review to determine both the quality and usability of the analytical data.

The six DQOs used for this review were accuracy, precision, representativeness, comparability, sensitivity, and completeness.

- Accuracy measures the correctness, or the closeness, between the true value and the quantity detected. It is measured by calculating the percent recovery of known concentrations of spiked compounds that were introduced into the appropriate sample matrix. IDA, LCS, and MS sample recoveries are used to measure accuracy.

- Precision measures the reproducibility of repetitive measurements. It is measured by calculating the relative percent difference (RPD) between duplicate samples. Laboratory duplicate samples, field duplicate samples, MS and matrix spike duplicate sample (MSD) sample pairs, and LCS and laboratory control sample duplicate (LCSD) pairs are used to measure precision.
- Representativeness describes the degree to which data accurately and precisely represents site characteristics. This is addressed in more detail in the following section(s).
- Comparability describes whether two data sets can be considered equivalent with respect to the project goal. This is addressed in more detail in the following section(s).
- Sensitivity describes the lowest concentration that the analytical method can reliably quantitate and is evaluated by verifying that the detected results and/or limits of detection meet the project-specific cleanup levels and/or screening levels.
- Completeness describes the amount of valid data obtained from the sampling event(s). It is calculated as the percentage of valid measurements compared to the total number of measurements. The completeness goal for this project was set at 90 percent.

In addition to these criteria for the six DQOs described above, sample collection and handling procedures and blank samples were reviewed to ensure overall data quality. Sample collection forms were reviewed to verify that representative samples were collected. Sample handling was reviewed to assess parameters such as chain-of-custody documentation, the use of appropriate sample containers and preservatives, shipment cooler temperature, and method-specified sample holding times. Each of these parameters contributes to the general representativeness and comparability of the project data. The combination of evaluations of the above-mentioned items leads to a determination of the overall project data completeness.

C.1.2 Summary of Groundwater Samples

A total of 17 groundwater samples were collected from water supply wells at the YAK between June 2022 and April 2024 (including 4 field duplicate samples).

Project samples were sent to Eurofins Environment Testing (Eurofins) in Sacramento, California. Groundwater samples were shipped via Alaska Airlines Goldstreak service from Fairbanks to Eurofins. Eurofins analyzed project samples for per- and polyfluoroalkyl substances (PFAS) by 537(Mod), compliant with the U.S. Department of Defense Quality Systems Manual Version 5.3 Table B-15, under DEC approval 17-020 dated February 21, 2024.

The laboratory reports were assigned the following work order (WO) numbers:

- WO 320-92599-1 September 2022 samples
- WO 320-95510-1 December 2022 samples
- WO 320-97690-1 March 2023 samples
- WO 320-101394-1 June 2023 samples

The laboratory reports and associated DEC LDRCs are included in Appendix B.

C.2 WATER SUPPLY WELL DATA QUALITY REVIEW

This section presents the findings of the data quality review and the resulting data qualifications for water supply well samples. See the associated LDRCs in Appendix B for more elaborate data quality descriptions.

C.2.1 Sample Collection

Water supply well sample collection forms (Appendix A) were reviewed to ensure samples were collected as identified in the GWP. No sample collection discrepancies were noted.

C.2.2 Sample Handling

The evaluation of proper sample handling procedures includes verification of the following: correct chain-of-custody documentation, appropriate sample containers and preservatives, cooler temperatures maintained within the DEC-recommended temperature range (0 to 6 degrees Celsius [°C]), and sample analyses performed within method-specified holding times. No sample handling discrepancies were noted upon receipt at the laboratory with the one exception noted below:

- WO 320-92599-1
 - Sample 33061 was re-prepared outside of preparation holding time due to gross low IDA recoveries for 13C2 PFTeDA and 13C4 PFOS. In hold and out of hold data was reported for the analytes associated with the gross IDA recovery failures in the laboratory report, but only the out of hold data is reported in the analytical tables. The reported results for the associated analytes PFOS, PFTeA, ADONA, 9Cl-PF3ONS, and 11Cl-PF3-OUdS are considered estimated and are flagged 'J*' in the analytical summary tables.

C.2.3 Method Blanks

Method blanks were utilized to detect potential laboratory cross-contamination of project samples. Samples are considered affected if they are detected within ten times the concentration of the detection in the method blank. Blank samples were analyzed in every batch, as required. No analytes were detected in method blank samples.

C.2.4 Laboratory Control Samples

The LCS/LCSD samples were prepared by adding spike compounds to blank samples to assess laboratory extraction and instrumentation performance. An LCS/LCSD pair was reported in each WO. LCS/LCSD recoveries and/or RPDs were within laboratory and project limits and did not result in qualification of the data.

C.2.5 Matrix Spike Sample and Sample Duplicates

MS/MSD samples were not performed in any WO due to insufficient sample volumes. Sample precision and accuracy were evaluated using the LCS/LCSDs.

C.2.6 Isotope Dilution Analytes

IDA compounds were added to project samples by the laboratory prior to analysis, in accordance with method requirements. IDA recoveries were then calculated as percentages and reported by the laboratory as a measure of analytical extraction efficiency. The following IDA discrepancies were identified:

- WO 320-92599-1
 - The IDA recoveries for 13C2 PUnA, 13C2 PFD_oA, 18O2 PFH_xS, d3-NMeFOSAA, and d5-NEtFOSAA were recovered below limits in sample 33061. The associated analytes PUnA, PFD_oA, PFH_xS, NMeFOSAA, and NEtFOSAA results were not detected in sample 33061. These results are considered estimates and have been flagged 'J*' in the analytical tables.

C.2.7 Field Duplicates

Four field duplicate samples were collected as a part of this project. Where calculable, analytical results met the comparison criterion ($\leq 30\%$ for water) for the field duplicate pairs.

C.2.8 Analytical Sensitivity

Analytical sensitivity was evaluated to verify that the reporting limits met the applicable regulatory levels for non-detect results. Analytes met the minimum required detection level.

C.2.9 Summary of Qualified Results

The following table summarizes the applied flags.

Exhibit C-1: Summary of Qualified Results

WO	Sample	Analyte	Flag	Explanation
320-92599-1	33061	PFOS, PFTeA, ADONA, 9CI-PF3ONS, and 11CI-PF3-OUdS	J*	Hold time exceedance
		PFUnA, PFDoA, PFHxS, NMeFOSAA, and NEtFOSAA	J*	IDA recovery failure

C.2.10 Completeness

Overall, the data validation process deemed the groundwater data acceptable for use. No data were rejected pursuant to the data quality review, and all data may be used as applicable for the purposes of the July 2022 to April 2024 Water Supply Well Monitoring Summary Report.

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