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DOT&PF Statewide PFAS
Kotzebue Crosswind Runway 18/36
KOTZEBUE, ALASKA





Submitted To: Alaska Department of Transportation & Public Facilities

2301 Peger Road

Fairbanks, Alaska 99709

Attn: Sammy Cummings, Daniel Phillips, P.E., and Jonathan Hutchinson,

P.E.

Subject: FINAL SITE CHARACTERIZATION REPORT, DOT&PF STATEWIDE PFAS

KOTZEBUE CROSSWIND RUNWAY 18/36, KOTZEBUE, ALASKA

Shannon & Wilson has prepared this report and participated in this project as a consultant to the Alaska Department of Transportation and Public Facilities (DOT&PF). Our scope of services was specified in our proposal dated October 24, 2022, and authorized by DOT&PF on October 26, 2022, under Professional Services Agreement Number 25-19-013 *Per- and Polyfluorinated Substances (PFAS) Related Environmental & Engineering Services*.

This report presents a summary of Shannon & Wilson's per- and polyfluoroalkyl substances (PFAS) sampling effort associated with the Kotzebue Airport Runway 18/36 (crosswind runway), prior to planned runway improvements, and limited monitoring well sampling requested by the DOT&PF Statewide PFAS Coordinator.

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

Sincerely,

SHANNON & WILSON

Kristen Freiburger Associate, Statewide Project Manager

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Important Information

AAC Alaska Administrative Code
AFFF aqueous film-forming foam
ARFF Aircraft Rescue and Firefighting

bgs below ground surface

BTEX benzene, toluene, ethylbenzene, and xylenes

°C degrees Celsius

CFR Code of Federal Regulations

CMMP Contaminated Materials Management Plan

COC chain-of-custody

CSM conceptual site model

CSPP Construction Safety and Phasing Plan

DEC Alaska Department of Environmental Conservation

DRO diesel range organics

DOT&PF Alaska Department of Transportation & Public Facilities

EPA U.S. Environmental Protection Agency
Eurofins Eurofins Environment Testing America

FAA Federal Aviation Administration

GRO gasoline range organics

GWP DOT&PF Statewide PFAS General Work Plan – Revision 1

GWP Addendum DOT&PF Statewide PFAS Addendum 17-OTZ-02 Kotzebue Crosswind

Runway 18/36 Generic Work Plan Addendum

IDA isotope dilution analysis LCS laboratory control sample

LCSD laboratory control sample duplicate LDRC laboratory data review checklist

LOQ limit of quantitation mg/kg milligrams per kilogram

MS matrix spike

MSD matrix spike duplicate ng/L nanograms per liter OTZ Kotzebue Airport

PAH polycyclic aromatic hydrocarbon PFAS per- and polyfluoroalkyl substances

PFBS perfluorobutanesulfonic acid

PFDA perfluorodecanoic acid PFHpA perfluoroheptanoic acid PFHxA perfluorohexanoic acid

PFHxS perfluorohexanesulfonic acid

PFNA perfluorononanoic acid PFOA perfluorooctanoic acid

PFOS perfluorooctanesulfonic acid

POC point-of-contact
QA quality assurance
QC quality control

RPD relative percent difference
RRO residual range organics
Runway 18/36 crosswind runway
SGS SGS North America, Inc.
Shannon & Wilson Shannon & Wilson, Inc.

WO work order

μg/kg micrograms per kilogram

1 INTRODUCTION

This report documents our per- and polyfluoroalkyl substances (PFAS) surface soil and groundwater sampling activities at the Ralph Wien Memorial Airport (OTZ) associated with the upcoming Runway 18/36 (crosswind runway) improvement project, and the Statewide PFAS investigation. The OTZ is a state-owned airport managed by the Alaska Department of Transportation and Public Facilities (DOT&PF). DOT&PF intends to prepare bid documents for the planned work in 2023 and begin construction in 2024. The OTZ and vicinity are shown in Figure 1. Additional information regarding the OTZ is listed in Exhibit 1-1, below, and in Section 1.2.

Exhibit 1-1: Airport Information

Airport Name:	Ralph Wien Memorial Airport
Airport Code:	ОТZ
DEC File No. / Hazard ID:	No PFAS-related File Number or Hazard ID has been assigned
Airport Address:	100 Airport Access Road, Kotzebue, Alaska
DOT&PF Region:	Northern
DOT&PF Regional POC:	Daniel Phillips, P.E.
DOT&PF PFAS POC:	Sammy Cummings
Airport Type:	Current Part 139 Airport
Airport Coordinates (Lat/Long):	66.8907, -162.6024

POC = point-of-contact

Shannon & Wilson, Inc. (Shannon & Wilson) prepared this report on behalf of DOT&PF Northern Region in accordance with the terms and conditions of Shannon & Wilson's contract. The field effort described herein was conducted in general accordance with:

- DOT&PF Statewide PFAS General Work Plan Revision 1 (GWP), July 2020.
- DOT&PF Statewide PFAS Addendum 17-OTZ-02 Kotzebue Crosswind Runway 18/36 Generic Work Plan Addendum (GWP Addendum), approved by the Alaska Department of Environmental Conservation (DEC) via email on October 20, 2022.
- DOT&PF Statewide PFAS Addendum 015-OTZ-01 Kotzebue Water Supply Sampling GWP Addendum, approved by DEC via email on October 5, 2022 (monitoring well sampling only).
- Relevant regulatory guidance documents.
- 18 Alaska Administrative Code (AAC) 75.335.

1.1 Purpose and Objectives

The purpose of the services described in this report was to evaluate the presence of PFAS contamination along the crosswind runway and in monitoring wells discovered at the airport resulting from the historic use of aqueous film-forming foam (AFFF) by the DOT&PF at OTZ. Our sampling activities included:

- Collecting surface soil samples along the Runway 18/36 and adjacent areas, focusing on the proposed runway-lighting excavation areas.
- Sampling existing monitoring wells near the OTZ.

1.2 Background

General background information relating to sites covered under the GWP is included in Section 1.1 of the GWP. Background information specific to the OTZ was detailed previously in our October 2022 GWP Addendums; an abbreviated site background is presented below.

DOT&PF Aircraft Rescue and Firefighting (ARFF) services have used AFFF for training and systems testing for many years. Per the Federal Aviation Administration's (FAA) Federal Airport Certification regulation Title 14, Code of Federal Regulations (CFR) Part 139 (14 CFR 139) Airports are required to conduct annual AFFF systems testing to maintain their certification through the FAA. Prior to 2019, FAA inspections required the release of AFFF to the ground surface. One area of known use of AFFF at the OTZ is at the end of the crosswind runway, as shown on Figure 2.

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. Because of the potential for encountering PFAS contamination during construction activities, the DOT&PF decided to collect samples prior to construction to determine if a Contaminated Materials Management Plan (CMMP) would need to be included in the contractor bid documents.

The DEC Contaminated Sites Program published soil and groundwater cleanup levels for PFOS and PFOA in November 2016. Prior to the publication of these levels, there were no state-level cleanup levels established for PFAS. On October 2, 2019, DEC published a Technical Memorandum that added more PFAS analytes to the testing requirements, though regulatory levels have not yet been established for these additional compounds. A

summary of the changes to DEC regulatory requirements is also described in Section 1.1 of the GWP.

1.2.1 Previous Investigations

To our knowledge, no sampling for PFAS has been conducted at the OTZ, the Kotzebue Lagoon, or the airport vicinity prior to the sampling detailed in this report. Multiple crash reports for aircraft accidents at the OTZ are available in the National Transportation Safety Board Aviation Accident Database. It is unknown whether AFFF was used at these crash sites.

There are several former DEC contaminated sites located at or near the OTZ that may have the potential to impact the crosswind runway project area. These sites include:

- Kotzebue Municipal Dump located south of the crosswind runway, between the Kotzebue Lagoon and Kotzebue Sound. The dump is currently retired; however, the dump was used as an open dump for 30 years and the quantity and type of materials disposed of at the dump is unknown.
- DOT&PF Mark Air (Former Cargo Building) a cargo building at the OTZ burned and was demolished sometime between 1995 and 1997. It is unknown whether AFFF was used at this site.
- Kotzebue Airport Alaska Airlines Investigation of leaking underground storage tanks at the OTZ Alaska Airlines Terminal began in 1993 when an excavation at the OTZ showed heavy sheen on groundwater. According to a 2017 report by SLR Consulting Ltd. summarizing soil and water removal from this site, approximately 600 cubic yards of soil was excavated. The report estimated 115 cubic yards of contaminated soil was sent out of state for thermal remediation; the remaining soil with results less than the petroleum regulatory limit was used as fill or cover. It is unknown where the remaining soil was reused, or if PFAS contamination also existed in this area.
- Kotzebue Airport DOT&PF Maintenance Station a former passenger terminal and former DOT&PF Maintenance Station were demolished in 1996 for the ARFF & Snow Removal Equipment Building project. Approximately 5,000 cubic yards of soils from the site were excavated and analyzed for petroleum products. Soil with results less than the DEC regulatory limit was used as landfill cover at the current Kotzebue Landfill.

1.3 Contaminants of Concern and Action Levels

The primary contaminants of concern are the PFAS compounds PFOS and PFOA. The DEC Human Health – Arctic Zone soil cleanup level for PFOS or PFOA is 2,200 micrograms per kilogram (μ g/kg). The DEC groundwater cleanup level for PFOS or PFOA is 400 nanograms

per liter (ng/L). The soil and groundwater cleanup levels were promulgated in 18 AAC 75.345 in 2016. There are no DEC cleanup levels for other PFAS compounds.

DEC's 2022 Field Sampling Guidance also identifies petroleum hydrocarbons as contaminants of potential concern at AFFF training areas. As a result, the secondary contaminants of concern at this site include gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), and polycyclic aromatic hydrocarbons (PAHs).

The current regulatory levels for these contaminants are summarized in Exhibit 1-2. The water limits are reported in ng/L. The soil limits are reported in milligrams per kilogram (mg/kg).

Exhibit 1-2: Regulatory Levels

Method	Analyte	Soil Limit ^a (mg/kg)	Water Limit ^b (ng/L)
ourou	PFOS	2.2	400
EPA 537M —	PFOA	2.2	400
AK101	GRO	1,400	NS
AK102	DRO	12,500	NS
AK103	RRO	13,700	NS
	Benzene	16	NS
	Toluene	200	NS
EPA 8021 —	Ethylbenzene	72	NS
	Xylenes (total)	57	NS
EPA 8270D-SIM	PAH (analyte dependent)	2.0 to 31,000	NS

Notes:

1.4 Scope of Services

The scope of services summarized in this report includes surface soil sampling at Runway 18/36, groundwater sampling from existing monitoring wells near OTZ, data review and validation, and preparation of this summary report. Figure 2 presents an overview of the soil and groundwater sample locations.

a. 18 AAC 75 Table B2. Method Two – Arctic Zone Ingestion or Table B1. Method Two - Soil Cleanup Levels Table – Arctic Zone Human Health.

b. 18 AAC 75.345 Table C. Groundwater Human Health Cleanup Levels.

AK = Alaska Method; EPA = U.S. Environmental Protection Agency; mg/kg = milligrams per kilogram; NS = no sample collected for this analyte; ng/L = nanograms per liter

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

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

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

2 FIELD ACTIVITIES

This section summarizes field activities performed between November 28 to December 4, 2022, to implement the GWP Addendums. Analytical sample locations are presented in Figure 2, Site Map. Copies of our field forms are included in Appendix A.

Shannon & Wilson staff members Adam Wyborny and Justin Risley conducted the soil and groundwater sampling effort described in this report. These individuals are State of Alaska Qualified Environmental Professionals as defined in 18 AAC 75.333[b].

2.1 Preparation and Permitting

Shannon & Wilson prepared a Construction Safety and Phasing Plan (CSPP) related to sampling activities along the OTZ crosswind runway. The CSPP documents project phasing, access and vehicle route details, badging, work zone lighting, and other relevant details. A draft CSPP was submitted to the Regional Safety & Airport Security Officer, Airport Manager, and other DOT&PF personnel for review. The CSPP was revised in response to comments and the November 2022 version is considered final.

Collecting surface soil samples required an FAA 7460-1 airspace permit. Shannon & Wilson submitted the final CSPP and 7460 permit application to the FAA on October 18, 2022. We received the FAA 7460 determination letter on November 15, 2022 (Appendix B). Shannon & Wilson and the DOT&PF Airport Manager coordinated to schedule runway nighttime closure for three consecutive nights, the duration of our runway sampling event. The DOT&PF Airport Manager issued a Notice to Airmen for the closure during this time.

Both Shannon & Wilson staff members completed OTZ-specific airport familiarization training prior to sampling activities.

2.2 Soil Sampling

We collected 47 soil samples, including five field duplicate samples, from approximately 0.2 to 0.5 feet below ground surface (bgs) at regularly spaced intervals along the length of the crosswind runway. Soil samples were submitted for analysis of PFAS, and a subset of samples collected near the former AFFF training area were submitted for petroleum hydrocarbon analysis (see Section 1.3). Copies of our sample collection logs are included in Appendix A.



Photo 1: Collecting a field-screening sample from surface soil at the crosswind runway.

2.3 Monitoring Wells

DOT&PF staff informed us of two monitoring wells near the OTZ on November 29, 2022. We identified these wells as MW10-04 and MW10-09, installed by Shannon & Wilson in 2010 for a previous site characterization conducted by DEC (Figure 2). The wells had stickup

monuments. We attempted to locate additional wells that had been installed in 2010 but were unsuccessful.

We purged and sampled the two monitoring wells using a peristaltic pump. Both wells were shallow and exhibited poor recharge. Estimated recharge rate was approximately 10 milliliters per minute. Total well depth ranged from about 4.0 to 8.7 feet bgs and depth to water ranged from about 3.5 to 5.4



Photo 2: MW10-09 (right-hand side of photo, with carsonite marker), east from the DOT&PF Shop visible in the background.

feet bgs. Multiple well volumes were required to fill the analytical sample jars. Groundwater samples were submitted for analysis of PFAS only.

2.4 Investigation-Derived Waste Management

Excess soil displaced during sample collection was returned to the sample location from where it was obtained. Decontamination water and monitoring well purge water was filtered through granular activated carbon before being disposed of to the ground surface at the OTZ. Other investigation-derived waste consisted of single-use sampling equipment that was disposed of at the Kotzebue Landfill.

2.5 Sample Custody, Storage, and Shipping

Field staff collected, handled, and stored samples in a manner consistent with the GWP and DEC *Field Sampling Guidance*. Immediately after collection, the samples were placed in a designated sample cooler maintained between 0 degrees Celsius (°C) and 6 °C with ice-substitute. The PFAS samples were stored in individual Ziploc bags. Shannon & Wilson maintained custody of the analytical samples until submitting them to the laboratory for analysis.

When shipping the analytical samples, chain-of-custody forms were placed in the hard-sided cooler with an adequate quantity of frozen ice-substitute to maintain the proper temperature range. Petroleum samples were submitted to SGS North America, Inc. (SGS) by shipping to the Ted Stevens Anchorage International Airport using Alaska Air Cargo's Goldstreak service and delivered to the laboratory by courier. PFAS samples were submitted to the Eurofins Environment Testing America (Eurofins) Laboratory in Sacramento, CA by shipping to the Sacramento International Airport, where they were collected by a Eurofins employee.

2.6 Deviations from the Work Plan

In general, Shannon & Wilson conducted these services in accordance with the approved GWP Addendums. The following are the deviations from our agreed-upon scope of services. These modifications do not impact the overall data quality or project aims.

- We were unable to sample surface water from drainage ditches and waterbodies near the crosswind runway because surface water was frozen.
- The monitoring well sampling was not part of our original scope; however, the DOT&PF PFAS coordinator Sammy Cummings approved sampling the monitoring wells under the previously authorized Shannon & Wilson project number 102219 and associated

DEC-approved GWP Addendum. We opted to report the information together for efficiency and to provide contractors with the full set of information.

3 ANALYTICAL RESULTS

We submitted soil and groundwater samples for analysis of the 18 PFAS compounds listed in U.S. Environmental Protection Agency (EPA) Method 537.1 or 537M. The PFAS samples were analyzed by Eurofins in Sacramento, California using their DEC-approved 537-compliant method listed in the Department of Defense Quality Systems Manual Version 5.3, Table B-15. We also submitted a subset of the soil samples (collected near the former AFFF training area) for analysis of GRO, DRO, RRO, BTEX, and PAHs by Methods AK101, AK102, AK103, 8021B, and 8270D SIM, respectively. These samples were analyzed by SGS in Anchorage, Alaska.

Figure 2 shows an overview of the analytical sample locations. The analytical results are summarized in Tables 1 through 3. The laboratory reports and associated DEC Laboratory Data Review Checklists for each work order are included in Appendix C. Analytical sample quality assurance (QA) and quality control (QC) results are summarized in Appendix D.

3.1 Surface Soil

PFOS and PFOA detected in surface soil samples did not exceed the DEC Arctic Zone Human Health cleanup levels (Table 1, Figure 3). PFOA was detected in 21 project samples at concentrations up to 0.74 μ g/kg. PFOS was detected in 26 project samples at concentrations up to 82 μ g/kg. Several other PFAS analytes were detected in the project samples; soil regulatory levels are not yet established for these other PFAS analytes.

Petroleum contaminants of concern detected in the surface soil did not exceed the applicable DEC cleanup levels (Table 2, Figure 4). DRO and RRO were detected in samples 22OTZ-SS29, 22OTZ-SS32, and 22OTZ-SS33. RRO was detected below the laboratory's limit of quantitation (LOQ) at an estimated concentration in sample 22OTZ-SS28, and benzene and toluene were detected below the LOQ in sample 22OTZ-SS29 and its field duplicate 22OTZ-SS30.

3.2 Monitoring Wells

PFOS and PFOA were detected in both monitoring wells but did not exceed the DEC groundwater cleanup level (Figure 5). PFOS and PFOA were detected at 160 ng/L and 10 ng/L, respectively, in *MW10-04* and at 5.2 ng/L and 41 ng/L, respectively, in *MW10-09* (Table 3). Other PFAS analytes including perfluorobutanesulfonic acid (PFBS), perfluorodecanoic

acid (PFDA), perfluoroheptanoic acid (PFHpA), perfluorohexanesulfonic acid (PFHxS), perfluorohexanoic acid (PFHxA), and perfluorononanoic acid (PFNA) were detected in the samples from both wells; groundwater regulatory levels are not yet established for these analytes.

4 CONCEPTUAL SITE MODEL

A conceptual site model (CSM) describes potential pathways between a contaminant source and possible receptors (i.e., people, animals, and plants) and is used to determine who may be at risk of exposure to those contaminants. This section describes the suspected and identified contaminant sources, migration and exposure pathways, and potential receptors on the DEC Human Health Conceptual Site Model Scoping and Graphic Forms included in Appendix E. The contaminants of concern at and near the OTZ are PFOS and PFOA.

A draft CSM was included in the GWP Addendum for this project. The enclosed CSM has been updated based on observed site conditions and the analytical results discussed in Section 3. This CSM should be reevaluated if regulatory standards change.

4.1 Description of Potential Receptors

Potential receptors for this site include residents near the OTZ, commercial and construction workers, subsistence harvesters and consumers, site visitors, and trespassers.

4.2 Potential Exposure Pathways

Potential complete exposure pathways include direct contact with soil and sediment, dermal absorption of contaminants from soil and groundwater, ingestion of groundwater, ingestion of wild foods, and inhalation of fugitive dust. Ingestion of surface water is considered an incomplete pathway because surface water bodies near the OTZ are not a current or potential drinking water source due to salinity.

4.2.1 Direct Contact with Soil and Sediment

Direct contact with soil is a complete exposure pathway for construction workers, commercial workers, and visitors at the site. Because contaminant concentrations are less than the DEC cleanup levels applicable to this site, we consider exposure via direct contact to be insignificant. However, if soil is moved off-site this exposure pathway should be reevaluated, especially if migration to groundwater or surface water becomes a potential complete exposure pathway.

Sediment has not yet been sampled near the OTZ. Until more information is available, we consider this a potential complete exposure pathway for receptors at and near the site.

4.2.2 Dermal Absorption from Soil and Groundwater

Dermal absorption of contaminants from soil and groundwater is a complete exposure pathway for construction workers, commercial workers, and visitors at the site who might encounter contaminated soil and groundwater during construction activities. Contaminant levels in soil and groundwater are less than the applicable DEC cleanup levels for this site. These levels are assumed to be protective of human health. As a result, exposure via dermal absorption is considered insignificant.

4.2.3 Ingestion of Groundwater and Surface Water

Ingestion of groundwater is a potential complete exposure pathway for residents, commercial workers, construction workers, visitors, trespassers, and subsistence harvesters and consumers. PFAS have been detected in surface soil at the crosswind runway, which could leach to surface water or groundwater. We have not yet sampled surface water near the OTZ. We consider ingestion of surface water to be a potential incomplete exposure pathway because natural surface water bodies around the OTZ are likely too salty for use as drinking water.

It is unlikely residential drinking water wells exist near the OTZ; we consider it unlikely due to the presence of permafrost and Kotzebue's location on the coast. Additionally, drinking water for the area is supplied from a lake to the east and uphill from the City of Kotzebue. Shannon & Wilson mailed a survey to every mailbox in the Kotzebue zip code requesting information for any groundwater wells in the area. To date, we have only received information indicating the community uses the city water supply.

4.2.4 Inhalation of Fugitive Dust

Inhalation of fugitive dust is a potential complete exposure pathway for residents, commercial workers, construction workers, visitors, trespassers, and subsistence harvesters and consumers. Contaminants are present in near-surface soil; however, contaminant concentrations are less than the applicable DEC human health cleanup levels, and so exposure is considered insignificant.

5 DISCUSSION AND RECOMMENDATIONS

PFOS and PFOA were detected in surface soil samples throughout the length of the crosswind runway at concentrations less than DEC regulatory levels. The highest PFOS and PFOA results were found at the former AFFF release area at the south end of the crosswind runway. Other PFAS compounds were detected in surface soil samples; DEC has not yet promulgated regulatory levels for these compounds. For the purposes of construction activities planned for the OTZ crosswind runway, we recommend a CMMP to prevent the movement of PFAS-containing soil to areas without detectable PFAS. If soil is planned to be moved off-site, we recommend notifying DEC prior to beginning construction by approval of the CMMP.

Groundwater samples collected from two monitoring wells near the OTZ contained PFOS, PFOA, and other PFAS compounds. In monitoring well MW10-04, groundwater exceeded the DEC drinking water action level for PFOS and PFOA but did not exceed the DEC groundwater cleanup level. To our knowledge, the City of Kotzebue provides municipal water to residents which is supplied from a lake east and uphill from the City and OTZ. As part of another Statewide PFAS project, Shannon & Wilson is conducting a water supply well search. To date, no water supply wells have been discovered.

6 REFERENCES

- Alaska Department of Environmental Conservation, January 2022, Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tanks: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, available: https://dec.alaska.gov/spar/csp/guidance-forms/.
- Alaska Department of Environmental Conservation, November 2021, 18 AAC 75, Oil and Other Hazardous Substances Pollution Control: Juneau, Alaska, Alaska Administrative Code (AAC), Title 18, Chapter 75, available: http://dec.alaska.gov/commish/regulations/.
- Alaska Department of Environmental Conservation, January 2017, *Guidance on Developing Conceptual Site Models*: Juneau, Alaska, DEC Division of Spill Prevention and Response, Contaminated Sites Program, available: https://dec.alaska.gov/spar/csp/guidance-forms/.
- Alaska Department of Environmental Conservation Contaminated Sites Database, DEC Division of Spill Prevention and Response Contaminated Sites Program, available: https://dec.alaska.gov/spar/csp/.
- Shannon & Wilson, Inc., July 2020, DOT&PF Statewide PFAS General Work Plan Revision 1.
- Shannon & Wilson, Inc., October 2022, DOT&PF Statewide PFAS Addendum 17-OTZ-02 Kotzebue Crosswind Runway 18/36 Generic Work Plan Addendum.
- SLR Consulting Ltd., January 2018, 2017 Groundwater Monitoring and Soil Removal Report, Alaska Airlines Kotzebue Facility; Kotzebue, Alaska, SLR Ref:105.00104.17002.



Table 1. Surface Soil PFAS Analytical Results

Analytical		DEC Regulatory											
Method	Analyte	Limit	Units	220TZ-SS01	22OTZ-SS02	22OTZ-SS03	22OTZ-SS04	22OTZ-SS05	22OTZ-SS06	220TZ-SS07	22OTZ-SS08	22OTZ-SS09	220TZ-SS10
	Perfluorooctanesulfonic acid (PFOS)	2,200	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	1.3 J*	8.4	1.9 J*	3.3
	Perfluorooctanoic acid (PFOA)	2,200	μg/Kg	<0.21	<0.22	<0.21	0.080J	0.061J	0.075J	<0.21	0.79	<0.22	<0.22
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	μg/Kg	<0.21	< 0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	Perfluorobutanesulfonic acid (PFBS)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	Perfluorodecanoic acid (PFDA)	N/A	μg/Kg	0.053J	<0.22	0.064J	0.086J	<0.22	0.052J	0.070J	<0.20	0.062J	0.11J
	Perfluorododecanoic acid (PFDoA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	0.058J	<0.22	<0.22
	Perfluoroheptanoic acid (PFHpA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	0.067J	<0.22	<0.22
	Perfluorohexanesulfonic acid (PFHxS)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	1.5	<0.22	<0.22
EPA	Perfluorohexanoic acid (PFHxA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	0.040J	0.042J	<0.21	1.1	<0.22	0.051J
537(Mod)	Perfluorononanoic acid (PFNA)	N/A	μg/Kg	0.11J	0.14J	0.064J	0.17J	0.18J	0.12J	0.62	0.028J	0.11J	0.56
	Perfluorotetradecanoic acid (PFTeA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	Perfluorotridecanoic acid (PFTrDA)	N/A	μg/Kg	0.078J	0.043J	0.025J	0.063J	0.028J	<0.21	0.026J	0.048J	0.026J	0.024J
	Perfluoroundecanoic acid (PFUnA)	N/A	μg/Kg	0.35	0.16J	0.15J	0.32	0.13J	0.093J	0.056J	0.16J	0.12J	0.078J
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9CI-PF3ONS)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	<0.20	<0.22	<0.22
	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	μg/Kg	<0.21	<0.22	<0.21	<0.24	<0.22	<0.21	<0.21	0.034 J*	<0.22	<0.22



Table 1. Surface Soil PFAS Analytical Results

		DEC		22OT	Z-SS11								
Analytical		Regulatory											
Method	Analyte	Limit	Units	Primary	Duplicate	22OTZ-SS13	220TZ-SS14	22OTZ-SS15	22OTZ-SS16	220TZ-SS17	220TZ-SS18	220TZ-SS19	220TZ-SS20
	Perfluorooctanesulfonic acid (PFOS)	2,200	μg/Kg	0.90 J*	<0.22 J*	2.3	1.4 J*	0.27 J*	<0.20	2.7	1.1 J*	<0.25	6.8
	Perfluorooctanoic acid (PFOA)	2,200	μg/Kg	0.090J	0.074J	0.076J	0.20J	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	μg/Kg	<0.21	<0.22 J*	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	Perfluorobutanesulfonic acid (PFBS)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	Perfluorodecanoic acid (PFDA)	N/A	μg/Kg	0.21 J*	0.12 J*	0.27	0.089J	0.11J	0.049J	0.15J	0.19J	0.17J	0.20J
	Perfluorododecanoic acid (PFDoA)	N/A	μg/Kg	0.051J	0.064J	0.12J	<0.22	0.054J	0.040J	<0.23	0.044J	0.058J	<0.22
	Perfluoroheptanoic acid (PFHpA)	N/A	μg/Kg	0.060J	0.056J	0.047J	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	Perfluorohexanesulfonic acid (PFHxS)	N/A	μg/Kg	<0.21	<0.22	< 0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
EPA	Perfluorohexanoic acid (PFHxA)	N/A	μg/Kg	0.078J	0.048 J*	0.058 J*	0.086J	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
537(Mod)	Perfluorononanoic acid (PFNA)	N/A	μg/Kg	0.068J	0.040J	0.37	0.55	0.028J	<0.20	0.22J	<0.24	0.037J	0.39
	Perfluorotetradecanoic acid (PFTeA)	N/A	μg/Kg	<0.21	<0.22	0.043J	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	Perfluorotridecanoic acid (PFTrDA)	N/A	μg/Kg	0.058J	0.048J	0.16J	0.044J	0.11J	0.054J	0.081J	0.063J	0.11J	0.043J
	Perfluoroundecanoic acid (PFUnA)	N/A	μg/Kg	0.38	0.36	0.62	0.15J	0.33	0.35	0.26	0.25	0.50	0.24
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9CI-PF3ONS)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3OUdS)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22
	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	μg/Kg	<0.21	<0.22	<0.22	<0.22	<0.22	<0.20	<0.23	<0.24	<0.25	<0.22



Table 1. Surface Soil PFAS Analytical Results

Analytical		DEC		2201	Z-SS21							220T	Z-SS29
Analytical Method	Analyte	Regulatory Limit	Units	Primary	Duplicate	22OTZ-SS23	220TZ-SS24	22OTZ-SS25	22OTZ-SS26	220TZ-SS27	22OTZ-SS28	Primary	Duplicate
	Perfluorooctanesulfonic acid (PFOS)	2,200	μg/Kg	0.26 J*	0.39 J*	2.9	0.69 J*	<0.22	82	31	10	15	8.7
	Perfluorooctanoic acid (PFOA)	2,200	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	0.32	0.40	0.63	0.34
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23
	Perfluorobutanesulfonic acid (PFBS)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23
	Perfluorodecanoic acid (PFDA)	N/A	μg/Kg	0.055J	0.056J	0.11J	0.078J	<0.22	10	4.1	3.2	2.6	1.4
	Perfluorododecanoic acid (PFDoA)	N/A	μg/Kg	0.057J	0.060J	0.037J	<0.22	0.036J	7.2	0.87	0.36	0.62 J*	0.23 J*
	Perfluoroheptanoic acid (PFHpA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	0.20J	0.13J	0.21J	0.11J
	Perfluorohexanesulfonic acid (PFHxS)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	0.81J	0.11 J*	0.053 J*	< 0.23	<0.23
EPA	Perfluorohexanoic acid (PFHxA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	1.2J	0.21	0.13J	0.30 J*	0.15 J*
537(Mod)	Perfluorononanoic acid (PFNA)	N/A	μg/Kg	0.024J	<0.23	0.041J	0.047J	<0.22	2.7	0.50	0.71	1.4	0.78
	Perfluorotetradecanoic acid (PFTeA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	3.1	0.28	0.11J	0.21J	0.065J
	Perfluorotridecanoic acid (PFTrDA)	N/A	μg/Kg	0.12J	0.17J	0.080J	0.054J	0.12J	98	5.3	0.41	2.5 J*	0.76 J*
	Perfluoroundecanoic acid (PFUnA)	N/A	μg/Kg	0.41	0.44	0.30	0.21J	0.18J	240	26	1.7	9.3 J*	3.8 J*
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9CI-PF3ONS)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3OUdS)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23
	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	μg/Kg	<0.21	<0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	<0.23	<0.23
	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	μg/Kg	<0.21	< 0.23	<0.22	<0.22	<0.22	<2.2	<0.21	<0.21	< 0.23	<0.23



Table 1. Surface Soil PFAS Analytical Results

Analytical Method	Analyte	DEC Regulatory Limit	Units	220TZ-\$\$31	22OTZ-\$\$32	22OTZ-\$\$33	22OTZ-\$\$34	22OTZ-\$\$35	22OTZ-S\$36	220TZ-S\$37	22OTZ-SS38	22OTZ-SS39
	Perfluorooctanesulfonic acid (PFOS)	2,200	μg/Kg	30	8.9	1.4 J*	2.4	29	<0.89	0.21 J*	3.4	<0.23
	Perfluorooctanoic acid (PFOA)	2,200	μg/Kg	0.74	0.11J	0.087J	0.15J	0.29	<0.21	<0.20	<0.22	0.15J
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	Perfluorobutanesulfonic acid (PFBS)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	Perfluorodecanoic acid (PFDA)	N/A	μg/Kg	1.2	0.40	0.65	2.9	4.2	0.071J	<0.20	0.067J	<0.23
	Perfluorododecanoic acid (PFDoA)	N/A	μg/Kg	0.18J	0.065J	0.40	0.86	2.9	<0.21	0.035J	<0.22	<0.23
	Perfluoroheptanoic acid (PFHpA)	N/A	μg/Kg	0.44	0.077J	0.050J	0.066J	0.13J	<0.21	<0.20	<0.22	<0.23
	Perfluorohexanesulfonic acid (PFHxS)	N/A	μg/Kg	0.96	<0.22	<0.23	<0.22	0.16J	<0.21	<0.20	<0.22	<0.23
EPA	Perfluorohexanoic acid (PFHxA)	N/A	μg/Kg	0.58	0.090J	0.061J	0.073J	0.20J	<0.21	<0.20	<0.22	<0.23
537(Mod)	Perfluorononanoic acid (PFNA)	N/A	μg/Kg	12	0.64	0.26	0.14J	0.64	0.074J	<0.20	0.061J	0.073J
	Perfluorotetradecanoic acid (PFTeA)	N/A	μg/Kg	0.064J	<0.22	0.058J	0.21J	0.33	<0.21	<0.20	<0.22	<0.23
	Perfluorotridecanoic acid (PFTrDA)	N/A	μg/Kg	1.3	0.29	0.52	1.4	16	0.029J	0.042J	<0.22	<0.23
	Perfluoroundecanoic acid (PFUnA)	N/A	μg/Kg	4.6	1.1	3.4	6.3	93	0.14J	0.12J	0.081J	<0.23
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9Cl-PF3ONS)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	μg/Kg	<0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23
	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	μg/Kg	< 0.23	<0.22	<0.23	<0.22	<0.22	<0.21	<0.20	<0.22	<0.23



Table 1. Surface Soil PFAS Analytical Results

An abathari		DEC		220T	Z-SS40					22OT	Z-SS46
Analytical Method	Analyte	Regulatory Limit	Units	Primary	Duplicate	22OTZ-SS42	220TZ-SS43	220TZ-SS44	22OTZ-SS45	Primary	Duplicate
	Perfluorooctanesulfonic acid (PFOS)	2,200	μg/Kg	<0.22	< 0.23	<0.22	<0.24	<0.24	7.3 J*	<0.22	<0.34 B*
	Perfluorooctanoic acid (PFOA)	2,200	μg/Kg	0.11J	0.12J	0.17J	0.30	0.25	0.091J	<0.22	<0.21
	Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	< 0.23	<0.22	<0.21
	Perfluorobutanesulfonic acid (PFBS)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	<0.23	<0.22	<0.21
	Perfluorodecanoic acid (PFDA)	N/A	μg/Kg	<0.22	< 0.23	0.057J	<0.24	0.14J	0.059J	<0.22	<0.21
	Perfluorododecanoic acid (PFDoA)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	0.036J	<0.23	<0.22	<0.21
	Perfluoroheptanoic acid (PFHpA)	N/A	μg/Kg	<0.22	<0.23	0.042J	0.12J	0.062J	0.051J	<0.22	<0.21
	Perfluorohexanesulfonic acid (PFHxS)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	<0.23	<0.22	<0.21
EPA	Perfluorohexanoic acid (PFHxA)	N/A	μg/Kg	0.035J	< 0.23	<0.22	0.14J	0.062J	0.079J	<0.22	<0.21
537(Mod)	Perfluorononanoic acid (PFNA)	N/A	μg/Kg	0.091J	0.087J	0.15J	0.27	0.30	0.20J	<0.22	0.025J
	Perfluorotetradecanoic acid (PFTeA)	N/A	μg/Kg	< 0.22	<0.23	< 0.22	<0.24	<0.24	< 0.23	<0.22	<0.21
	Perfluorotridecanoic acid (PFTrDA)	N/A	μg/Kg	< 0.22	< 0.23	<0.22 B*	<0.24 B*	<0.24 B*	<0.23 B*	<0.22 B*	<0.21 B*
	Perfluoroundecanoic acid (PFUnA)	N/A	μg/Kg	<0.22	< 0.23	<0.27 B*	<0.24 B*	<0.39 B*	<0.23 B*	<0.22 B*	<0.29 B*
	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9CI-PF3ONS)	N/A	μg/Kg	< 0.22	<0.23	< 0.22	<0.24	<0.24	< 0.23	<0.22	<0.21
	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3OUdS)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	<0.23	<0.22	<0.21
	4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	<0.23	<0.22	<0.21
	N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	μg/Kg	<0.22	<0.23	<0.22	<0.24	<0.24	<0.23	<0.22	<0.21
	N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	μg/Kg	<0.22	< 0.23	<0.22	<0.24	<0.24	<0.23	< 0.22	<0.21

Notes: Results reported from Eurofins Environment Testing America work order 320-94972-1.

Regulatory limits from 18 AAC 75.341 Table B1 - Method 2 (Human Health - Arctic Zone).

DEC Alaska Department of Environmental Conservation

PFAS per- and poly-fluoroalkyl substances

ug/kg micrograms per kilogram

N/A No applicable regulatory limit exists for the associated analyte.

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

J Estimated concentration, detected greater than the method detection limit (MDL) and less than the RL. Flag applied by the laboratory.

B* Result is included in the same preparatory batch as a blank detection for the associated analyte. Flag applied by Shannon & Wilson, Inc. (*)

J* Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)



Table 2. Surface Soil Petroleum Hydrocarbon Analytical Results

Analytical							22OT.	Z-SS29			
Method	Analyte	Regulatory Limit	Units	22OTZ-SS26	220TZ-SS27	22OTZ-SS28	Primary	Duplicate	22OTZ-SS32	22OTZ-SS33	220TZ-SS34
AK101	Gasoline Range Organics	1,400	mg/kg	<6.76B*	<5.03B*	<6.22B*	<6.92B*	<6.27B*	<4.84B*	<6.32B*	<4.79B*
AK102	Diesel Range Organics	12,500	mg/kg	<23.3	<11.7	<11.7	60.8	90.3	66.4	152	<10.9
AK103	Residual Range Organics	13,700	mg/kg	<117	<58.5	50.2J	90.1J	121	213	314	<54.5
	Benzene	16	mg/kg	< 0.0169	<0.0126	<0.0156	0.0131J	0.0125J	<0.0121	<0.0158	<0.0120
	Ethylbenzene	72	mg/kg	<0.0338	< 0.0251	<0.0311	< 0.0346	< 0.0314	<0.0242	< 0.0316	< 0.0239
SW8021B	m,p-xylenes	57	mg/kg	< 0.0675	< 0.0505	<0.0620	< 0.0690	< 0.0625	<0.0484	< 0.0630	< 0.0479
(BTEX)	o-Xylene	57	mg/kg	<0.0338	<0.0251	<0.0311	< 0.0346	< 0.0314	<0.0242	<0.0316	< 0.0239
	Toluene	200	mg/kg	<0.0338	<0.0251	<0.0311	0.0270J	0.0257J	<0.0242	< 0.0316	< 0.0239
	Total Xylenes	57	mg/kg	<0.102	<0.0755	<0.0935	<0.104	<0.0940	< 0.0725	< 0.0950	< 0.0720
	1-Methylnaphthalene	68	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	2-Methylnaphthalene	420	mg/kg	<0.0144	< 0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	< 0.0140	< 0.0137
	Acenaphthene	6,300	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Acenaphthylene	3,100	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Anthracene	31,000	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Benzo(a)anthracene	20	mg/kg	<0.0144	< 0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Benzo(a)pyrene	2.0	mg/kg	<0.0144	<0.0145	<0.0144	< 0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Benzo(b)fluoranthene	20	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
8270D SIM	Benzo(g,h,i)perylene	3,100	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
(PAH)	Benzo(k)fluoranthene	200	mg/kg	<0.0144	< 0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Chrysene	2,000	mg/kg	<0.0144	<0.0145	<0.0144	< 0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Dibenzo(a,h)anthracene	2.0	mg/kg	< 0.0144	< 0.0145	<0.0144	< 0.0146	< 0.0143	< 0.0142	< 0.0140	< 0.0137
	Fluoranthene	4,200	mg/kg	<0.0144	< 0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
-	Fluorene	4,200	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	<0.0142	<0.0140	< 0.0137
	Indeno(1,2,3-cd)pyrene	20	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Naphthalene	42	mg/kg	<0.0115	<0.0116	<0.0115	< 0.0117	<0.0115	<0.0114	<0.0112	< 0.0110
	Phenanthrene	3,100	mg/kg	<0.0144	<0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	<0.0140	< 0.0137
	Pyrene	3,100	mg/kg	<0.0144	< 0.0145	<0.0144	<0.0146	< 0.0143	< 0.0142	< 0.0140	< 0.0137

Notes:

Results reported from SGS work order 1227130.

Regulatory limits from 18 AAC 75.341 Table B1 Method Two - Soil Cleanup Levels Table (Arctic Zone Human Health) and Table B2 Method Two - Petroleum Hydrocarbon Soil Cleanup Levels (Arctic Zone Ingestion).

Analyte not detected; listed as less than the limit of quantitation (LOQ) unless otherwise flagged due to quality-control failures.

J Estimated concentration, detected greater than the limit of detection (LOD) and less than the LOQ.

B* Estimated concentration due to a method blank detection. Flag applied by Shannon & Wilson, Inc. (*)

BTEX = benzene, toluene, ethylbenzene, and xylenes; DEC = Alaska Department of Environmental Conservation; mg/kg = milligrams per kilogram; PAH = polycyclic aromatic hydrocarbon



Table 3. December 2022 Groundwater Analytical Results

	San	nple Name	MW10-04	MW110-04	MW10-09
	Sa	mple Date	12/3/	2022	12/3/2022
Analyte	DEC Regulatory Limit	Units	Field Dupl	icate Pair	Project Sample
Perfluorooctanesulfonic acid (PFOS)	400	ng/L	160	150	5.2
Perfluorooctanoic acid (PFOA)	400	ng/L	9.7	10	41
Hexafluoropropylene oxide dimer acid (HFPO-DA)	N/A	ng/L	<4.2	<3.9	<4.4
Perfluorobutanesulfonic acid (PFBS)	N/A	ng/L	0.84 J	0.78 J	7.9
Perfluorodecanoic acid (PFDA)	N/A	ng/L	2.6	2.3	<2.2
Perfluorododecanoic acid (PFDoA)	N/A	ng/L	<2.1	<2.0	<2.2 J*
Perfluoroheptanoic acid (PFHpA)	N/A	ng/L	7.8	7.5	160
Perfluorohexanesulfonic acid (PFHxS)	N/A	ng/L	9.6	9.5	43
Perfluorohexanoic acid (PFHxA)	N/A	ng/L	14	15	280
Perfluorononanoic acid (PFNA)	N/A	ng/L	24	24	1.2J
Perfluorotetradecanoic acid (PFTeA)	N/A	ng/L	<2.1	<2.0	<2.2 J*
Perfluorotridecanoic acid (PFTrDA)	N/A	ng/L	<2.1	<2.0	<2.2 J*
Perfluoroundecanoic acid (PFUnA)	N/A	ng/L	<2.1	<2.0	<2.2
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid (9CI-PF3ONS)	N/A	ng/L	<2.1	<2.0	<2.2
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11CI-PF3OUdS)	N/A	ng/L	<2.1	<2.0	<2.2
4,8-Dioxa-3H-perfluorononanoic acid (DONA)	N/A	ng/L	<2.1	<2.0	<2.2
N-Ethyl perfluorooctane sulfonamidoacetic acid (N-EtFOSAA)	N/A	ng/L	<5.3	<4.9	<5.5 J*
N-Methyl perfluorooctane sulfonamidoacetic acid (N-MeFOSAA)	N/A	ng/L	<5.3	<4.9	<5.5 J*

Notes: Results reported from Eurofins Environmental Testing work order 320-94968-1.

Regulatory limits from 18 AAC 75.345 Table C - Groundwater Cleanup Levels.

DEC Alaska Department of Environmental Conservation

PFAS per- and poly-fluoroalkyl substances

ng/L nanograms per liter

N/A No applicable regulatory limit exists for the associated analyte.

- < Analyte not detected; listed as less than the reporting limit (RL) unless otherwise flagged due to quality-control failures.
- J Estimated concentration, detected greater than the detection limit (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. (*)



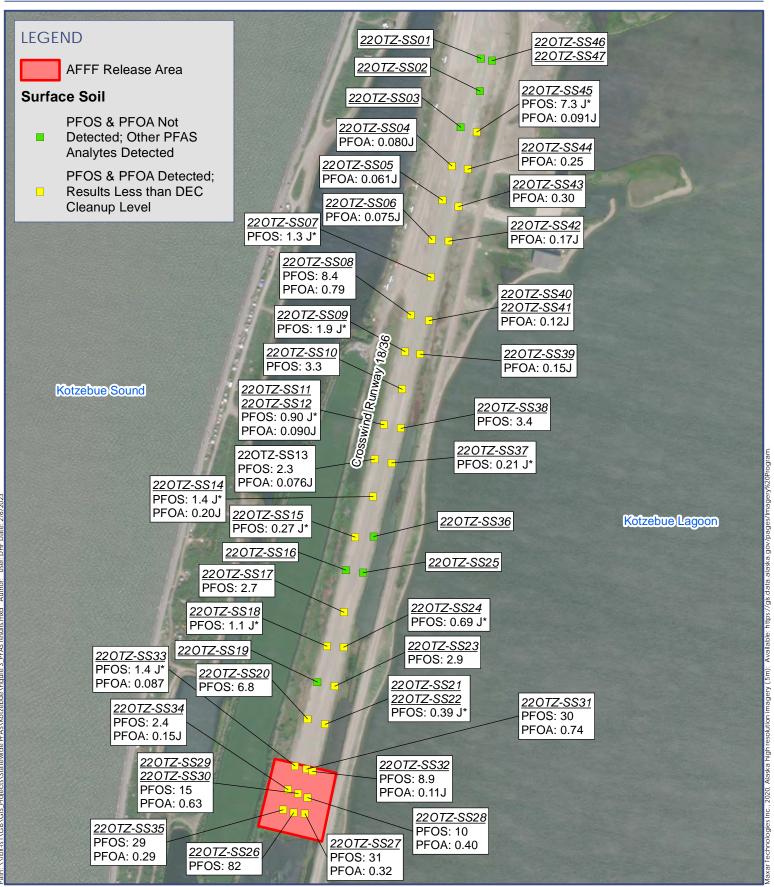


April 2023 VICINITY MAP Figure 1











Notes:

- 1. Sample name and sample result, in micrograms per kilogram (µg/kg).
- 2. Only the highest result for each analyte in the duplicate pair is reported.
- 3. See Table 1 for complete analytical results.

April 2023

SURFACE SOIL PFOS & PFOA RESULTS



200 Feet

Notes:

- 1. Sample name and sample result, in milligrams per kilogram (mg/kg).
- Only the highest result for each analyte in the duplicate pair is reported.
- 3. See Table 2 for complete analytical results.

April 2023

SURFACE SOIL PETROLEUM **HYDROCARBON RESULTS** Figure 4





Notes:

- 1. Sample name and sample result, in nanograms per liter (ng/L).
- 2. Only the highest result for each analyte in the duplicate pair is reported.
- See Table 3 for complete analytical results.

April 2023

MONITORING WELL PFOS & PFOA RESULTS Figure 5

Appendix A

Field Forms

CONTENTS

- Field Activities Daily Log
- Soil Sample Collection Log
- Monitoring Well Sampling Log

JOB NAME Kotzebus DOT APF JOB NO. 109531 SUBJECT Travel day DATE 11/28/22 SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

SUBJECT Travel

BY Atu __ CHK'D___ SHEET___ Adam Wyberny (APW) and Justin Risley (JKR) arrived at the 0400-Saw Fairbanks office and consolidated gear. APW and JKR got a cab to FAI 0600 -APW and JKR departed FAI on Alaska Airlines for ANC. APW and JKR arrived in ANC. The connecting flight to OTZ was 0650 delayed due to a maintenance issue. APW and JKR departed ANC For OTZ on Alaska Airlines. 1330 -1430 - APW and JKR arrived at OTZ. APW contacted DOT & PF to ask about the driver training. Alven the airport manager informed us that he and his office staff were out sick. The trains would need to wait until 11/29. APW and JKR collected personal bags and went to the hotel. APW and JKR went to the Alaska Air Cargo desk to pick up 1630 sampling gear. 1730 + End of Day -23°F wind ~ 10 mph wind chill factor 2 - 31°F

JOB NAME Kotzebue DOT+ PF JOB NO. 109531 SUBJECT Weather hold DATE 11/29/22 SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

BY APU

BY Adam Wyborny (APW) and Justin Risley (JKR) went to DOT-APF 1000 to meet Alvin Werneke. Alvin informed us that he had a pull-behind generator thaving in the shop that we could use to run the rotory hammer. Alvin also werned us that a winter storm warning was in effect until the evening of 11/30 and the crosswind runway access road may not remain usable. APW and JKR completed the Airport familiarization training. Alvin 1100 decided that the driver training was not necessary. Following the training Alvin drove us down the crosswind runway and into the AFFF training area. Snow drifts were already making the access road difficulty to travel. Alvin strongly advised against working overnight. Apul and JKR deported the site. APU decided that a weather 1230 hold was the most prudent choice. JKR contacted Alvin to ask about any known wells near the 1600 airport. Alvin said that he was aware of two test wells but that he was leaving the office soon. APU and JKR arrived at DOT & PF to meet Alvin but were 1620 informed he had already left. End of day. 1700 -Air temp: - 20F wind 28 mph with moderate snowfall Storm warning issued by the Notional weather service

JOB NO. 109531 JOB NAME KOTZELUE DOT & PF SUBJECT Crosswind Runway Sampling DATE 11/30/22 SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

BY APC SHEET_____ of _____ _ CHK'D_ Adam Wyborny (APW) and Justin Risley (JKR) went to DOTAPE to meet Alvin. After discussing the goal of finding monitoring wells, Alvin claimed to know of two. Other DOT staff implied that the wells were buried or sheared off duing plowing over the years. Alving took us to two stickup monitoring wells secured with 1100 -Masterlocks. The first well was damaged such that the 11d could be removed. A borologger was present in the monument and a datalogger was in the well casing. APW and JKR confirmed the presence of liquid water. All personnel returned to the DOT shop. The generator still 1130 wouldn't fire up so Alvin said he would have someone look at APW and JKR departed the site to report findings to the PM. 1200 + 1400 - After following up with DOTAPE the PM confirmed that sampling of the two manitoring wens was desired. The project team began organizing a shipment of water sampling gear. 1615 - Alvin called to inform us that the generator was not functional but that they had a smaller unit we could use. April and JKR returned to DOTEPF to pick up the generator APW and JKR returned to the hotel to await runway closure. 1700 -APW and JKR went to the crosswind runway to begin sample collection. APW and JKR storted at the north end of runway progressing south down the western side. 12/01/22 0300 - The generator ran out of fuel after sample 25 was collected. APW and JKR packed up for the night 0330 - APW and JKR returned to the hotel. End of day Air temp during sampling GOF wind Glomph

SHANNON & WILSON, INC.

Geotechnical and Environmental Consultants

By Apu CHKD

On 11/30 were identified as Mule-04 and Mule-09

installed in 2010 as port of an Saw Site characterization.

1400 - Adam wyborny (Apu) and Justin Risley (JKR) went to Alace air Cargo to pick up water sampling gear Apu and JKR

After corresponding with the project team, the well's located Adam wyborny (APW) and Justin Risley (JKR) went to Alaska air cargo to pick up water sompling gear. Arw and JKR then drove around to try and locate additional wells from the 2010 installation. None of the other wells were visible. APW and JKR went to refuel the car and the generator 1500 then stopped at the hordware store. April and JKR returned to the hotel to await runway closure. 1600 -Arm followed up with the PM about monitoring well sampling. APW and JKR went to the crosswind runway high winds and 2000 blowing snow made for low visibility. The runway lights were still on so JKR contacted Aivin. Alvin quickly responded by radioing in the runway closure. APW and JKR then went to the south end of the runway to sample the AFFF training area. Alvin continued us to continuously check the road because he expected it to drift in and cut off our exit. 2030 -The furthest row of sample locations to the south of the AFFF training area was not plowed and inaccessible. Apul and JKR proceeded to sample the 9 accessible locations within the AFFF training area. 2100 -The snowfall turned to freezing rain and began to coat everything in ice. The vehicle was used to the extent practicle to sheild the work area. 2300 -Sampling of the AFFF training area was completed. Apul and JKR went to check on the status of the runway access road. The road had begun to drift in and was quickly becoming closed Off APW and JKR attempted to traverse it and struggled to reach the DOTSPF shop. APW determined that it was not feasible to continuing working in the storm without getting the vehicle stranded. April and JKR returned to the note to complete paperwork 2330a shipping documentation. 2430 -End of day Air temperature: 18 of wind 25 mph with freezing rain and drifting snow. Storm worning issued by the National weather service.

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JOB NAME KOTZELINE DOTE PF JOB NO. 109531 SUBJECT Monitoring well Sampling DATE 12/03/22 SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

SUBJECT MARKET MARK SHEET____ CHK'D_ Adam Wyborny (APW) and Justin Risley (JKR) pack up the 0900samples and got JKR organized for his noon departure. JKR Learned that his flight had been delayed. 1030 -JKR Learned that the marning flight was concled. JKR was 1200 subsenquently rebooked on the evening Flight. APON and JKR learned that the cargo plane had arrived 1400 in the morning but reported unsafe runway conditions due to the ice cover. The evening passenger flight was also conceled. APW and JKR returned the generator borrowed from DOTIPE. APW 1430 spoke with Alvin about plowing the location of Mulo-01. Alvin claimed that he had never seen a well there and the the location was most likely buried during construction of the correct SREB/ ARFF building. Regardless, Alvin said that he did not have any space personnel to commit to the task. APUS and JKR went to the Alaska Air Cargo desk and picked 1500 up the much waylaid sample cooler. After setting JKR checked back into the hotel, APW and JKR went 1600 to sample mulio-on and mulio-og Both wells were shallow with very little water. They purged dry in less than three minutes with a low flow peristaltic pump. Recharge was roughly 50 ml to 100 ml every ten minutes. The samples were collected over several recharge Cy cles. 2000 -Dinner break APW and JKR QCid and packed all the samples and prepared 2100 the chain of custody records. 2200 -APW prepared the daily report. 2230 -End of day light snowfall. Air temp: 20°F wind 26 mph

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SAMPLE COLLECTION LOG

Date: 11/30/22 - 12/	0] / 22									
Sampler: APW / JKR		Comple	Donth	n Interval (ft)	Matrix	Sampling	Comple	PID		
Canada Niverbar	Location	Time	top	bottom	-					Analyses
Sample Number	Location	.3.33.33.5		35.334.114	Type SS			Reading	1	Analyses
22 OTZ - SS Ø I		2045	0.2	0.5	22	G	ES	AIA	PFAS	EPA 537M
22072-5502		2/10	1		-					
220TZ - SS 03		2/30	1.7							
220TZ-SS 04		2/45								
22 OTZ -SS 05		2200								
22 OTZ - SS 06		22.10								
22 OTZ - SS Ø7		2225								
220TZ -SS 08		2240								
220TZ-SS 09		2255					7.0			
220TZ -SS 10	-	2305								
11 22 - STO SE		2325					4			
22 OTZ -SS 12	Field duplicate of SS11	23/5		-			FD			
22 OTZ -SS 13		2340					ES			
22 072 - 270 25		2355								
22 OTZ - SS 15	J	0010								
22 OTZ -55 16		0025		-		4"				
22 OTZ - SS 17		0046				100				
22 OTZ-SSE		0055								
220TZ-SS 19		0105								-
22 OTZ -SS 20		0125								
22 OTZ - SS 21	×	0145					1			
22 OTZ - SS 22	Duplicate of sample 5521	0/35					FD			
22 OTZ -SS 23		0155					ES			
22 OTZ -SS 24	W	0216								
22 OTZ -SS 25		0225	1	•	v	4	4	1		4
<u> </u>				atrix Type		ng Method		ole Type		
	marked with EOS Arrow		AR GW PR	Groundwater Product	D G	Grab sampling	ER g FB	Environmenta Equipment ris Field blank	nsate	
in AreCollector			SE SG	Sludge	L P	Hand auger Tube liner Pump (liquid)		Field duplica Field measur Field replicat	rement le	
			SS		SS T V	Split spoon Shelby tube Vacuum (gas)	MD MS TB	Matrix spike of Matrix spike of Trip blank		

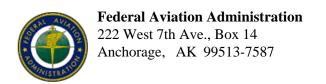
	SAI	MPLE CC	DLLE	CTION LO)G					
Project Number: (0953)	Location: Ralph Wien Memori	al Aire	ert -	Kotzeba	e, AK				Page	2 of 2
Date: 12/01/22 -	12/02/22									
Sampler: APW / JKR					_					
		Sample	Depti	h Interval (ft)	Matrix	Sampling				
Sample Number	Location	Time	top	bottom	Туре	Method	Туре	Reading	Analyses	
22 OTZ - SS 26		20 40	0.2	0.5	SS	G	ES	PE	AS EPASSOM	POL
22 OTZ - 55 27		2050			1					1
22 OTZ -SS 28		2/10								
22 OTZ -SS 29		2130					ES			
22 OTZ - SS 30	Field duplicate of SS29	2/20					FD			
220TZ-SS 31	×	2150					ES			
22OTZ -SS 32		2200								
220TZ - SS 33		2220								
220TZ - SS 34		2240								
22 OTZ - SS 35		2255								
22 OTZ - SS 36		2050								
22 OTZ - 55 37		2100								
22 OTZ - 55 38		2110								
22 OTZ -S\$ 39		2120								
22 OTZ - SS 40		2130								
22 OTZ - 55 41	Field duplicate of 5540	2120					FD			
220TZ - SS 42		2/45					FS		1	
220T2 -SS 43		2155		1			i			
220TZ - \$5 44		2205								
22 OTZ -SS 45		2215								
22072-5546		2230					i			
22012-5547	Field deplicate of SS4B	2220	1	V	V	1	Fb			
	_	+								
			Ma AR	atrix Type	Sampli	ng Method Bailer/Coliwas		ole Type Environmental sam	nnle	
			GW	Groundwater	D	Drill cuttings	ER	Equipment rinsate	Production of the control of the con	
			PR SB	Product Subsurf. soil	G H	Grab sampling Hand auger		Field blank Field duplicate		
			SE	Sediment	L	Tube liner	FM	Field measurement	t	
			SG SS	Sludge Surface soil	P SS	Pump (liquid) Split spoon	FR MD	Field replicate Matrix spike duplicate	ate	
			SW	Surface water	T	Shelby tube	MS	Matrix spike duplica		
			WR	Water	v w	Vacuum (gas) Wipe sampling	TB	Trip blank		

Appendix B

Permitting

CONTENTS

• FAA 7460-1 Permit



November 15, 2022

TO: Shannon & Wilson, Inc. Attn: Kristen Freiburger 2355 Hill Road Fairbanks, AK 99709 kristen.freiburger@shanwil.com CC:

Shannon & Wilson, Inc.
Attn: Kristen Freiburger
2355 Hill Road
Fairbanks, AK 99709
kristen.freiburger@shanwil.com

RE: (See attached Table 1 for referenced case(s))

FINAL DETERMINATION

Table 1 - Letter Referenced Case(s)

ASN	Prior ASN	Location	Latitude (NAD83)	Longitude (NAD83)	AGL (Feet)	AMSL (Feet)
2022-AAL-398-NRA		KOTZEBUE,AK	66-52-37.58N	162-36-51.41W	3	13
2022-AAL-425-NRA		KOTZEBUE,AK	66-52-37.58N	162-36-51.41W	3	13
2022-AAL-426-NRA		KOTZEBUE,AK	66-53-02.36N	162-36-34.79W	3	13
2022-AAL-427-NRA		KOTZEBUE,AK	66-53-04.38N	162-36-34.95W	3	13
2022-AAL-428-NRA		KOTZEBUE,AK	66-53-02.50N	162-36-37.68W	3	13
2022-AAL-429-NRA		KOTZEBUE,AK	66-52-29.89N	162-36-58.80W	3	13
2022-AAL-430-NRA		KOTZEBUE,AK	66-52-27.35N	162-36-58.56W	3	13
2022-AAL-431-NRA		KOTZEBUE,AK	66-52-26.30N	162-36-59.21W	3	13
2022-AAL-432-NRA		KOTZEBUE,AK	66-52-26.45N	162-37-01.62W	3	13
2022-AAL-433-NRA		KOTZEBUE,AK	66-52-29.37N	162-36-54.82W	3	13
2022-AAL-434-NRA		KOTZEBUE,AK	66-52-27.55N	162-37-00.91W	3	13
2022-AAL-435-NRA		KOTZEBUE,AK	66-52-26.14N	162-36-57.20W	3	13
2022-AAL-436-NRA		KOTZEBUE,AK	66-52-34.05N	162-36-55.52W	3	13
2022-AAL-437-NRA		KOTZEBUE,AK	66-52-32.18N	162-36-56.97W	3	13
2022-AAL-438-NRA		KOTZEBUE,AK	66-52-33.80N	162-36-52.81W	3	13
2022-AAL-439-NRA		KOTZEBUE,AK	66-52-35.76N	162-36-51.42W	3	13
2022-AAL-440-NRA		KOTZEBUE,AK	66-52-35.98N	162-36-54.37W	3	13
2022-AAL-441-NRA		KOTZEBUE,AK	66-52-41.45N	162-36-48.00W	3	13
2022-AAL-442-NRA		KOTZEBUE,AK	66-52-37.75N	162-36-51.75W	3	13
2022-AAL-443-NRA		KOTZEBUE,AK	66-52-43.52N	162-36-48.22W	3	13
2022-AAL-444-NRA		KOTZEBUE,AK	66-52-45.25N	162-36-45.48W	3	13
2022-AAL-445-NRA		KOTZEBUE,AK	66-52-45.48N	162-36-48.48W	3	13
2022-AAL-446-NRA		KOTZEBUE,AK	66-52-47.03N	162-36-44.39W	3	13
2022-AAL-447-NRA		KOTZEBUE,AK	66-52-47.29N	162-36-47.25W	3	13
2022-AAL-448-NRA		KOTZEBUE,AK	66-52-48.97N	162-36-44.53W	3	13
2022-AAL-449-NRA		KOTZEBUE,AK	66-52-50.86N	162-36-41.95W	3	13
2022-AAL-450-NRA		KOTZEBUE,AK	66-52-51.03N	162-36-44.47W	3	13
2022-AAL-451-NRA		KOTZEBUE,AK	66-52-53.04N	162-36-43.53W	3	13
2022-AAL-452-NRA		KOTZEBUE,AK	66-52-41.68N	162-36-50.96W	3	13
2022-AAL-453-NRA		KOTZEBUE,AK	66-52-58.58N	162-36-37.48W	3	13
2022-AAL-454-NRA		KOTZEBUE,AK	66-53-00.71N	162-36-38.73W	3	13
2022-AAL-455-NRA		KOTZEBUE,AK	66-52-58.82N	162-36-39.98W	3	13

2022-AAL-456-NRA	KOTZEBUE,AK	66-52-56.86N	162-36-41.10W	3	13
2022-AAL-457-NRA	KOTZEBUE,AK	66-52-54.88N	162-36-40.94W	3	13
2022-AAL-458-NRA	KOTZEBUE,AK	66-53-06.24N	162-36-35.20W	3	13
2022-AAL-459-NRA	KOTZEBUE,AK	66-52-39.61N	162-36-48.91W	3	13
2022-AAL-460-NRA	KOTZEBUE,AK	66-52-39.95N	162-36-51.84W	3	13
2022-AAL-461-NRA	KOTZEBUE,AK	66-52-27.22N	162-36-56.58W	3	13
2022-AAL-462-NRA	KOTZEBUE,AK	66-53-05.93N	162-36-32.39W	3	13
2022-AAL-463-NRA	KOTZEBUE,AK	66-52-56.70N	162-36-38.61W	3	13
2022-AAL-464-NRA	KOTZEBUE,AK	66-52-29.66N	162-36-56.84W	3	13
2022-AAL-465-NRA	KOTZEBUE,AK	66-52-28.54N	162-36-59.90W	3	13
2022-AAL-466-NRA	KOTZEBUE,AK	66-52-28.33N	162-36-57.93W	3	13
2022-AAL-467-NRA	KOTZEBUE,AK	66-52-28.16N	162-36-56.01W	3	13
2022-AAL-468-NRA	KOTZEBUE,AK	66-53-00.45N	162-36-36.16W	3	13
2022-AAL-469-NRA	KOTZEBUE,AK	66-52-52.68N	162-36-40.68W	3	13
2022-AAL-470-NRA	KOTZEBUE,AK	66-52-31.94N	162-36-53.81W	3	13
2022-AAL-471-NRA	KOTZEBUE,AK	66-52-30.48N	162-36-53.64W	3	13
2022-AAL-472-NRA	KOTZEBUE,AK	66-52-26.68N	162-36-55.80W	3	13
2022-AAL-473-NRA	KOTZEBUE,AK	66-52-42.58N	162-36-46.28W	3	13
2022-AAL-474-NRA	KOTZEBUE,AK	66-52-48.10N	162-36-42.52W	3	13
2022-AAL-475-NRA	KOTZEBUE,AK	66-52-52.81N	162-36-39.63W	3	13
2022-AAL-476-NRA	KOTZEBUE,AK	66-52-46.28N	162-36-49.50W	3	13
2022-AAL-477-NRA	KOTZEBUE,AK	66-52-25.52N	162-37-00.75W	3	13
2022-AAL-478-NRA	KOTZEBUE,AK	66-52-58.98N	162-36-30.68W	3	13
2022-AAL-479-NRA	KOTZEBUE,AK	66-52-55.39N	162-36-31.84W	3	13
2022-AAL-480-NRA	KOTZEBUE,AK	66-52-56.81N	162-36-31.14W	3	13

Description: For use of temporary construction equipment (no greater than 3ft AGL), points provided outlines the work area and proposed sample sites (57 points total). We are planning to collect surface soil samples from the crosswind gravel runway. These samples will be submitted for PFAS analysis. Due to frozen conditions, we will be using a rotohammer to collect the samples. Please see the attached map. We also plan to collect surface water samples. This work is being performed prior to upcoming construction activities in 2023/2024 by the DOT in order to determine if PFAS is present and material needs to be handled appropriately during construction. Schedule is dependent on the approval of funding through DOT; however, we are tentatively scheduled for mid-November.

We do not object with conditions to the construction described in this proposal provided:

You comply with the requirements set forth in FAA Advisory Circular 150/5370-2, "Operational Safety on Airports During Construction."

- -Contact Airport Manager before start of work
- -FAA understands the RWY 18/36 (Crosswind RWY) will be closed during sampling operations during the evenings to minimize impact to airport operations. Please ensure all NOTAMs are in place before the start of work. Due to the close proximity to FAA equipment especially the last 1000ft of RWY18 end additional coordination is needed see the following comments.
- -Recommends the runway be closed while the work is being conducted. If the runway is needed to allow for a Medivac aircraft that could not land or depart on the paved runway due to a circumstance such as high winds, FS recommends that all equipment and personnel be able to be removed from the worksite in no more than 30 minutes in order to allow for the aircraft to land or depart. Additionally, any open bore hole that could cause

a safety issue for the aircraft would have to be sufficiently covered or filled in order to mitigate any safety concern prior to the aircraft landing

-Weather ASOS: The Ralph Wien Memorial Airport (OTZ) proposal violates the criteria given in the siting standard, FCM-S4-2019, for the Automated Surface Observing System (ASOS) serving Ralph Wien Memorial Airport, Kotzebue, Alaska (AK). The proposal is expected to generate significant dust or smoke in the vicinity of the facility. Appropriate measures should be implemented that will prohibit significant dust or smoke from intruding upon the ASOS facility. If not possible, a Notice to Airmen (NOTAM) should be issued warning pilots of the potential for inaccurate or unreliable OTZ ASOS. In addition, the facility may require extra maintenance, calibration, and/or general cleaning with special attention being paid to the visibility sensors and the Motor Aspirated Radiation Shield (MARS) unit. Contact the Network Enterprise Management Center System Operations Center (NEMC SOC) prior to the start of the project in order to schedule any necessary service outages and/or maintenance. NEMC SOC: 855-FAA-NEMC (855-322-6362), Option #1 for an NEMC and then Option #3 for a Team Lead.

A separate notice to the FAA is required for any construction equipment, such as temporary cranes, whose working limits would exceed the height and lateral dimensions of your proposal.

This determination does not constitute FAA approval or disapproval of the physical development involved in the proposal. It is a determination with respect to the safe and efficient use of navigable airspace by aircraft and with respect to the safety of persons and property on the ground.

In making this determination, the FAA has considered matters such as the effects the proposal would have on existing or planned traffic patterns of neighboring airports, the effects it would have on the existing airspace structure and projected programs of the FAA, the effects it would have on the safety of persons and property on the ground, and the effects that existing or proposed manmade objects (on file with the FAA), and known natural objects within the affected area would have on the airport proposal.

This determination expires on 10/31/2025 unless:

- (a) extended, revised or terminated by the issuing office.
- (b) the construction is subject to the licensing authority of the Federal Communications Commission (FCC) and an application for a construction permit has been filed, as required by the FCC, within 6 months of the date of this determination. In such case, the determination expires on the date prescribed by the FCC for the completion of construction, or the date the FCC denies the application.

NOTE: Request for extension of the effective period of this determination must be obtained at least 15 days prior to expiration date specified in this letter.

If you have any questions concerning this determination contact Venus Larson (907) 271-3813 venus.larson@faa.gov. On any future correspondence concerning this matter, please refer to Aeronautical Study Number 2022-AAL-426-NRA.

Venus Larson Specialist

Signature Control No: 558974552-561435412

Appendix C

Laboratory Reports and Laboratory Data Review Checklists

CONTENTS

- SGS Work Order 1227130 and LDRC
- Eurofins Work Order 320-94968-1 and LDRC
- Eurofins Work Order 320-94972-1 and LDRC



Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks

2355 Hill Rd

Fairbanks, AK 99707 (907)479-0600

Report Number: 1227130

Client Project: 109531 OTZ PFAS

Dear Kristen Freiburger,

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

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

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

Sincerely,

SGS North America Inc.

Stephen C. Ede

Styrten C. Ede 2022.12.21

14:04:21 -09'00'

Jennifer Dawkins

Date

Project Manager

Jennifer.Dawkins@sgs.com

Print Date: 12/21/2022 1:17:55PM Results via Engage



Case Narrative

SGS Client: Shannon & Wilson-Fairbanks SGS Project: 1227130 Project Name/Site: 109531 OTZ PFAS Project Contact: Kristen Freiburger

Refer to sample receipt form for information on sample condition.

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

Print Date: 12/21/2022 1:17:56PM



Report of Manual Integrations

<u>Laboratory ID</u> <u>Client Sample ID</u> <u>Analytical Batch</u> <u>Analyte</u> <u>Reason</u>

8270D SIM (PAH)

1699027 1227130006MSD XMS13491 Benzo[k]fluoranthene RP

Manual Integration Reason Code Descriptions

Code Description

O Original Chromatogram
M Modified Chromatogram
SS Skimmed surrogate
BLG Closed baseline gap
RP Reassign peak name
PIR Pattern integration required

IT Included tail SP Split peak

RSP Removed split peak FPS Forced peak start/stop BLC Baseline correction

PNF Peak not found by software

All DRO/RRO analysis are integrated per SOP.

Print Date: 12/21/2022 1:17:57PM



Laboratory Qualifiers

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

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

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 DW Chemistry (Provisionally Certified as of 11/25/2022 for TTHM compounds by EPA 524.2) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

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

* The analyte has exceeded allowable regulatory or control limits.

! Surrogate out of control limits.

B Indicates the analyte is found in a blank associated with the sample.

CCV/CVA/CVB Continuing Calibration Verification
CCCV/CVCA/CVCB Closing Continuing Calibration Verification

CL Control Limit

DF Analytical Dilution Factor

DL Detection Limit (i.e., maximum method detection limit)
E The analyte result is above the calibrated range.

GT Greater Than
IB Instrument Blank

ICV Initial Calibration Verification
J The quantitation is an estimation.
LCS(D) Laboratory Control Spike (Duplicate)
LLQC/LLIQC Low Level Quantitation Check
LOD Limit of Detection (i.e., 1/2 of the LOQ)

LOQ Limit of Quantitation (i.e., reporting or practical quantitation limit)

LT Less Than MB Method Blank

MS(D) Matrix Spike (Duplicate)

ND Indicates the analyte is not detected.

RPD Relative Percent Difference
TNTC Too Numerous To Count

U Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.

All DRO/RRO analyses are integrated per SOP.

Print Date: 12/21/2022 1:17:58PM

SGS North America Inc.

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



Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	<u>Matrix</u>
22OTZ-SS26	1227130001	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS27	1227130002	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS28	1227130003	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS29	1227130004	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS30	1227130005	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS32	1227130006	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS33	1227130007	12/01/2022	12/06/2022	Soil/Solid (dry weight)
22OTZ-SS34	1227130008	12/01/2022	12/06/2022	Soil/Solid (dry weight)
Trip Blank	1227130009	12/01/2022	12/06/2022	Soil/Solid (dry weight)

Method Description

8270D SIM (PAH) 8270 PAH SIM Semi-Volatiles GC/MS

AK101 AK101/8021 Combo. (S) SW8021B AK101/8021 Combo. (S)

AK102 Diesel/Residual Range Organics
AK103 Diesel/Residual Range Organics

SM21 2540G Percent Solids SM2540G



Detectable	Results	Summary
------------	---------	---------

Client Sample ID: 220TZ-SS26			
Lab Sample ID: 1227130001	<u>Parameter</u>	Result	<u>Units</u>
Volatile Fuels	Gasoline Range Organics	3.59J	mg/kg
Client Sample ID: 220TZ-SS27			
Lab Sample ID: 1227130002	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	2.70J	mg/kg
Client Sample ID: 220TZ-SS28			
Lab Sample ID: 1227130003	Parameter	Popult	Units
!	<u>rarameter</u> Residual Range Organics	<u>Result</u> 50.2J	mg/kg
Semivolatile Organic Fuels Volatile Fuels	Gasoline Range Organics	3.32J	mg/kg
	Caseline Range Organics	0.020	mg/kg
Client Sample ID: 220TZ-SS29			
Lab Sample ID: 1227130004	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	60.8	mg/kg
	Residual Range Organics	90.1J	mg/kg
Volatile Fuels	Benzene	0.0131J	mg/kg
	Gasoline Range Organics	3.94J	mg/kg
	Toluene	0.0270J	mg/kg
Client Sample ID: 220TZ-SS30			
Lab Sample ID: 1227130005	<u>Parameter</u>	<u>Result</u>	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	90.3	mg/kg
	Residual Range Organics	121	mg/kg
Volatile Fuels	Benzene	0.0125J	mg/kg
	Gasoline Range Organics	3.76J	mg/kg
	Toluene	0.0257J	mg/kg
Client Sample ID: 220TZ-SS32			
Lab Sample ID: 1227130006	<u>Parameter</u>	Result	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	66.4	mg/kg
	Residual Range Organics	213	mg/kg
Volatile Fuels	Gasoline Range Organics	2.58J	mg/kg
Client Sample ID: 220TZ-SS33			
Lab Sample ID: 1227130007	<u>Parameter</u>	Result	<u>Units</u>
Semivolatile Organic Fuels	Diesel Range Organics	152	mg/kg
3	Residual Range Organics	314	mg/kg
Volatile Fuels	Gasoline Range Organics	3.49J	mg/kg
Client Sample ID: 220TZ-SS34			
Lab Sample ID: 1227130008	<u>Parameter</u>	Result	<u>Units</u>
Volatile Fuels	Gasoline Range Organics	2.59J	mg/kg
	Cassinia rango Organios	2.000	9/1/9
Client Sample ID: Trip Blank	_	_	
Lab Sample ID: 1227130009	<u>Parameter</u>	Result	<u>Units</u>
Volatile Fuels	Gasoline Range Organics	1.46J	mg/kg

Print Date: 12/21/2022 1:18:00PM

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



Client Sample ID: 220TZ-SS26 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130001 Lab Project ID: 1227130 Collection Date: 12/01/22 20:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.4 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
2-Methylnaphthalene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Acenaphthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Acenaphthylene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Benzo(a)Anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Benzo[a]pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Benzo[b]Fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Benzo[g,h,i]perylene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Benzo[k]fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Chrysene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Dibenzo[a,h]anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Fluorene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Indeno[1,2,3-c,d] pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Naphthalene	0.0115 U	0.0229	0.00574	mg/kg	1		12/14/22 21:13
Phenanthrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:13
Surrogates							
2-Methylnaphthalene-d10 (surr)	87.6	58-103		%	1		12/14/22 21:13
Fluoranthene-d10 (surr)	86.3	54-113		%	1		12/14/22 21:13

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 21:13 Container ID: 1227130001-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.964 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS26 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130001 Lab Project ID: 1227130 Collection Date: 12/01/22 20:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.4 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Diesel Range Organics	23.3 U	46.5	20.9	mg/kg	1	Limits	12/13/22 15:24
Surrogates 5a Androstane (surr)	87.9	50-150		%	4		12/13/22 15:24

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/13/22 15:24 Container ID: 1227130001-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 15.092 g Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	117 U	233	100	mg/kg	1		12/13/22 15:24
Surrogates							
n-Triacontane-d62 (surr)	78.6	50-150		%	1		12/13/22 15:24

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/13/22 15:24 Container ID: 1227130001-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 15.092 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS26 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130001 Lab Project ID: 1227130 Collection Date: 12/01/22 20:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.4 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	DF	<u>Allowable</u> Limits	Date Analyzed
Gasoline Range Organics	3.59 J	6.76	2.03	mg/kg	1		12/07/22 22:52
Surrogates							
4-Bromofluorobenzene (surr)	92.6	50-150		%	1		12/07/22 22:52

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/07/22 22:52 Container ID: 1227130001-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 20:40 Prep Initial Wt./Vol.: 24.802 g Prep Extract Vol: 28.6193 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0169 U	0.0338	0.0108	mg/kg	1		12/07/22 22:52
Ethylbenzene	0.0338 U	0.0676	0.0243	mg/kg	1		12/07/22 22:52
o-Xylene	0.0338 U	0.0676	0.0246	mg/kg	1		12/07/22 22:52
P & M -Xylene	0.0675 U	0.135	0.0405	mg/kg	1		12/07/22 22:52
Toluene	0.0338 U	0.0676	0.0211	mg/kg	1		12/07/22 22:52
Xylenes (total)	0.102 U	0.203	0.0676	mg/kg	1		12/07/22 22:52
Surrogates							
1,4-Difluorobenzene (surr)	89.7	72-119		%	1		12/07/22 22:52

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/07/22 22:52 Container ID: 1227130001-B Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 20:40 Prep Initial Wt./Vol.: 24.802 g Prep Extract Vol: 28.6193 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS27 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130002 Lab Project ID: 1227130 Collection Date: 12/01/22 20:50 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.6 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
2-Methylnaphthalene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Acenaphthene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Acenaphthylene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Anthracene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Benzo(a)Anthracene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Benzo[a]pyrene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Benzo[b]Fluoranthene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Benzo[g,h,i]perylene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Benzo[k]fluoranthene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Chrysene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Dibenzo[a,h]anthracene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Fluoranthene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Fluorene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Indeno[1,2,3-c,d] pyrene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Naphthalene	0.0116 U	0.0232	0.00580	mg/kg	1		12/14/22 21:29
Phenanthrene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Pyrene	0.0145 U	0.0290	0.00725	mg/kg	1		12/14/22 21:29
Surrogates							
2-Methylnaphthalene-d10 (surr)	88.2	58-103		%	1		12/14/22 21:29
Fluoranthene-d10 (surr)	87.8	54-113		%	1		12/14/22 21:29

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 21:29 Container ID: 1227130002-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.649 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS27 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130002 Lab Project ID: 1227130

Collection Date: 12/01/22 20:50 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.6 Location:

Results by Semivolatile Organic Fuels

Parameter Diesel Range Organics	<u>Result Qual</u> 11.7 U	LOQ/CL 23.3	<u>DL</u> 10.5	<u>Units</u> mg/kg	<u>DF</u> 1	Allowable Limits	<u>Date Analyzed</u> 12/13/22 15:34
Surrogates							
5a Androstane (surr)	85.2	50-150		%	1		12/13/22 15:34

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK102 Analyst: HMW

Analytical Date/Time: 12/13/22 15:34 Container ID: 1227130002-A

Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.062 g Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	58.5 U	117	50.1	mg/kg	1		12/13/22 15:34
Surrogates							
n-Triacontane-d62 (surr)	72.9	50-150		%	1		12/13/22 15:34

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/13/22 15:34 Container ID: 1227130002-A

Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.062 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS27 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130002 Lab Project ID: 1227130 Collection Date: 12/01/22 20:50 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.6 Location:

Results by Volatile Fuels

Parameter Gasoline Range Organics	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
	2.70 J	5.03	1.51	mg/kg	1	Limits	12/08/22 00:08
Surrogates 4-Bromofluorobenzene (surr)	102	50-150		%	1		12/08/22 00:08

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 00:08 Container ID: 1227130002-B Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 20:50
Prep Initial Wt./Vol.: 34.858 g
Prep Extract Vol: 30.024 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0126 U	0.0252	0.00805	mg/kg	1		12/08/22 00:08
Ethylbenzene	0.0251 U	0.0503	0.0181	mg/kg	1		12/08/22 00:08
o-Xylene	0.0251 U	0.0503	0.0183	mg/kg	1		12/08/22 00:08
P & M -Xylene	0.0505 U	0.101	0.0302	mg/kg	1		12/08/22 00:08
Toluene	0.0251 U	0.0503	0.0157	mg/kg	1		12/08/22 00:08
Xylenes (total)	0.0755 U	0.151	0.0503	mg/kg	1		12/08/22 00:08
Surrogates							
1,4-Difluorobenzene (surr)	89.6	72-119		%	1		12/08/22 00:08

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 00:08 Container ID: 1227130002-B Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 20:50 Prep Initial Wt./Vol.: 34.858 g Prep Extract Vol: 30.024 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS28 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130003 Lab Project ID: 1227130 Collection Date: 12/01/22 21:10 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.8 Location:

Results by Polynuclear Aromatics GC/MS

						Allowable	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
2-Methylnaphthalene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Acenaphthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Acenaphthylene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Benzo(a)Anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Benzo[a]pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Benzo[b]Fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Benzo[g,h,i]perylene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Benzo[k]fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Chrysene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Dibenzo[a,h]anthracene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Fluoranthene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Fluorene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Indeno[1,2,3-c,d] pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Naphthalene	0.0115 U	0.0230	0.00574	mg/kg	1		12/14/22 21:45
Phenanthrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Pyrene	0.0144 U	0.0287	0.00717	mg/kg	1		12/14/22 21:45
Surrogates							
2-Methylnaphthalene-d10 (surr)	94.3	58-103		%	1		12/14/22 21:45
Fluoranthene-d10 (surr)	94.4	54-113		%	1		12/14/22 21:45

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 21:45 Container ID: 1227130003-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.851 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS28 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130003 Lab Project ID: 1227130 Collection Date: 12/01/22 21:10 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.8 Location:

Results by Semivolatile Organic Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Diesel Range Organics	11.7 U	23.3	10.5	mg/kg	1		12/13/22 15:44
Surrogates							
5a Androstane (surr)	88.9	50-150		%	1		12/13/22 15:44

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/13/22 15:44 Container ID: 1227130003-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.008 g Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	50.2 J	117	50.1	mg/kg	1		12/13/22 15:44
Surrogates							
n-Triacontane-d62 (surr)	79.4	50-150		%	1		12/13/22 15:44

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/13/22 15:44 Container ID: 1227130003-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.008 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS28
Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130003 Lab Project ID: 1227130 Collection Date: 12/01/22 21:10 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):85.8 Location:

Results by Volatile Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Gasoline Range Organics	3.32 J	6.22	1.87	mg/kg	1		12/08/22 00:27
Surrogates							
4-Bromofluorobenzene (surr)	100	50-150		%	1		12/08/22 00:27

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 00:27 Container ID: 1227130003-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 21:10 Prep Initial Wt./Vol.: 27.033 g Prep Extract Vol: 28.8455 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0156 U	0.0311	0.00995	mg/kg	1		12/08/22 00:27
Ethylbenzene	0.0311 U	0.0622	0.0224	mg/kg	1		12/08/22 00:27
o-Xylene	0.0311 U	0.0622	0.0226	mg/kg	1		12/08/22 00:27
P & M -Xylene	0.0620 U	0.124	0.0373	mg/kg	1		12/08/22 00:27
Toluene	0.0311 U	0.0622	0.0194	mg/kg	1		12/08/22 00:27
Xylenes (total)	0.0935 U	0.187	0.0622	mg/kg	1		12/08/22 00:27
Surrogates							
1,4-Difluorobenzene (surr)	88.9	72-119		%	1		12/08/22 00:27

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 00:27 Container ID: 1227130003-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 21:10

Prep Initial Wt./Vol.: 27.033 g Prep Extract Vol: 28.8455 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS29
Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130004 Lab Project ID: 1227130 Collection Date: 12/01/22 21:30 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):84.9 Location:

Results by Polynuclear Aromatics GC/MS

D	D #0 1	1.00/01	DI		D.F.	Allowable	5.4.
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
2-Methylnaphthalene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Acenaphthene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Acenaphthylene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Anthracene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Benzo(a)Anthracene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Benzo[a]pyrene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Benzo[b]Fluoranthene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Benzo[g,h,i]perylene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Benzo[k]fluoranthene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Chrysene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Dibenzo[a,h]anthracene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Fluoranthene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Fluorene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Indeno[1,2,3-c,d] pyrene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Naphthalene	0.0117 U	0.0234	0.00584	mg/kg	1		12/14/22 22:01
Phenanthrene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Pyrene	0.0146 U	0.0292	0.00730	mg/kg	1		12/14/22 22:01
Surrogates							
2-Methylnaphthalene-d10 (surr)	87.8	58-103		%	1		12/14/22 22:01
Fluoranthene-d10 (surr)	85.8	54-113		%	1		12/14/22 22:01

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 22:01 Container ID: 1227130004-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.684 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS29 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130004 Lab Project ID: 1227130 Collection Date: 12/01/22 21:30 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):84.9 Location:

Results by Semivolatile Organic Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	Limits	Date Analyzed
Diesel Range Organics	60.8	23.4	10.5	mg/kg	1		12/13/22 15:55
Surrogates							
5a Androstane (surr)	83.7	50-150		%	1		12/13/22 15:55

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/13/22 15:55 Container ID: 1227130004-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.208 g Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	90.1 J	117	50.3	mg/kg	1		12/13/22 15:55
Surrogates							
n-Triacontane-d62 (surr)	72.1	50-150		%	1		12/13/22 15:55

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/13/22 15:55 Container ID: 1227130004-A Prep Batch: XXX47405 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:47 Prep Initial Wt./Vol.: 30.208 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS29
Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130004 Lab Project ID: 1227130 Collection Date: 12/01/22 21:30 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):84.9 Location:

Results by Volatile Fuels

<u>Parameter</u>	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Gasoline Range Organics	3.94 J	6.92	2.08	mg/kg	1	Limits	12/08/22 00:46
Surrogates 4-Bromofluorobenzene (surr)	92.6	50-150		%	1		12/08/22 00:46

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 00:46 Container ID: 1227130004-B Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 21:30
Prep Initial Wt./Vol.: 24.405 g
Prep Extract Vol: 28.6822 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0131 J	0.0346	0.0111	mg/kg	1		12/08/22 00:46
Ethylbenzene	0.0346 U	0.0692	0.0249	mg/kg	1		12/08/22 00:46
o-Xylene	0.0346 U	0.0692	0.0252	mg/kg	1		12/08/22 00:46
P & M -Xylene	0.0690 U	0.138	0.0415	mg/kg	1		12/08/22 00:46
Toluene	0.0270 J	0.0692	0.0216	mg/kg	1		12/08/22 00:46
Xylenes (total)	0.104 U	0.208	0.0692	mg/kg	1		12/08/22 00:46
Surrogates							
1,4-Difluorobenzene (surr)	88.1	72-119		%	1		12/08/22 00:46

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 00:46 Container ID: 1227130004-B Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 21:30 Prep Initial Wt./Vol.: 24.405 g Prep Extract Vol: 28.6822 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS30 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130005 Lab Project ID: 1227130 Collection Date: 12/01/22 21:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):86.5 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
2-Methylnaphthalene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Acenaphthene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Acenaphthylene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Anthracene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Benzo(a)Anthracene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Benzo[a]pyrene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Benzo[b]Fluoranthene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Benzo[g,h,i]perylene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Benzo[k]fluoranthene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Chrysene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Dibenzo[a,h]anthracene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Fluoranthene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Fluorene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Indeno[1,2,3-c,d] pyrene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Naphthalene	0.0115 U	0.0229	0.00572	mg/kg	1		12/14/22 22:17
Phenanthrene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Pyrene	0.0143 U	0.0286	0.00714	mg/kg	1		12/14/22 22:17
Surrogates							
2-Methylnaphthalene-d10 (surr)	86.4	58-103		%	1		12/14/22 22:17
Fluoranthene-d10 (surr)	82.9	54-113		%	1		12/14/22 22:17

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 22:17 Container ID: 1227130005-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.765 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS30
Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130005 Lab Project ID: 1227130 Collection Date: 12/01/22 21:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):86.5 Location:

Results by Semivolatile Organic Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	Limits	Date Analyzed
Diesel Range Organics	90.3	23.0	10.3	mg/kg	1		12/14/22 19:16
Surrogates							
5a Androstane (surr)	87.6	50-150		%	1		12/14/22 19:16

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/14/22 19:16 Container ID: 1227130005-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.232 g
Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	121	115	49.4	mg/kg	1		12/14/22 19:16
Surrogates							
n-Triacontane-d62 (surr)	75.9	50-150		%	1		12/14/22 19:16

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/14/22 19:16 Container ID: 1227130005-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.232 g
Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS30 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130005 Lab Project ID: 1227130 Collection Date: 12/01/22 21:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):86.5 Location:

Results by Volatile Fuels

Parameter	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Allowable</u> Limits	Date Analyzed
Gasoline Range Organics	3.76 J	6.27	1.88	mg/kg	1	<u> </u>	12/08/22 01:05
Surrogates							
4-Bromofluorobenzene (surr)	93.7	50-150		%	1		12/08/22 01:05

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 01:05 Container ID: 1227130005-B Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 21:20
Prep Initial Wt./Vol.: 26.364 g
Prep Extract Vol: 28.5707 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0125 J	0.0313	0.0100	mg/kg	1		12/08/22 01:05
Ethylbenzene	0.0314 U	0.0627	0.0226	mg/kg	1		12/08/22 01:05
o-Xylene	0.0314 U	0.0627	0.0228	mg/kg	1		12/08/22 01:05
P & M -Xylene	0.0625 U	0.125	0.0376	mg/kg	1		12/08/22 01:05
Toluene	0.0257 J	0.0627	0.0196	mg/kg	1		12/08/22 01:05
Xylenes (total)	0.0940 U	0.188	0.0627	mg/kg	1		12/08/22 01:05
Surrogates							
1,4-Difluorobenzene (surr)	87.4	72-119		%	1		12/08/22 01:05

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 01:05 Container ID: 1227130005-B Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 21:20 Prep Initial Wt./Vol.: 26.364 g Prep Extract Vol: 28.5707 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS32 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130006 Lab Project ID: 1227130 Collection Date: 12/01/22 22:00 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):87.2 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
2-Methylnaphthalene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Acenaphthene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Acenaphthylene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Anthracene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Benzo(a)Anthracene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Benzo[a]pyrene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Benzo[b]Fluoranthene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Benzo[g,h,i]perylene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Benzo[k]fluoranthene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Chrysene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Dibenzo[a,h]anthracene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Fluoranthene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Fluorene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Indeno[1,2,3-c,d] pyrene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Naphthalene	0.0114 U	0.0228	0.00569	mg/kg	1		12/14/22 22:32
Phenanthrene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Pyrene	0.0142 U	0.0284	0.00711	mg/kg	1		12/14/22 22:32
Surrogates							
2-Methylnaphthalene-d10 (surr)	94.2	58-103		%	1		12/14/22 22:32
Fluoranthene-d10 (surr)	93.3	54-113		%	1		12/14/22 22:32

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/14/22 22:32 Container ID: 1227130006-A Prep Batch: XXX47404 Prep Method: SW3550C Prep Date/Time: 12/09/22 16:44 Prep Initial Wt./Vol.: 22.683 g Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS32 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130006 Lab Project ID: 1227130 Collection Date: 12/01/22 22:00 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):87.2 Location:

Results by Semivolatile Organic Fuels

<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Diesel Range Organics	66.4	22.6	10.2	mg/kg	1	Limits	12/14/22 19:26
Surrogates 5a Androstane (surr)	93.2	50-150		%	1		12/14/22 19:26

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/14/22 19:26 Container ID: 1227130006-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.447 g
Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	213	113	48.6	mg/kg	1		12/14/22 19:26
Surrogates							
n-Triacontane-d62 (surr)	82.6	50-150		%	1		12/14/22 19:26

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/14/22 19:26 Container ID: 1227130006-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.447 g
Prep Extract Vol: 5 mL



Client Sample ID: 220TZ-SS32 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130006 Lab Project ID: 1227130 Collection Date: 12/01/22 22:00 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):87.2 Location:

Results by Volatile Fuels

<u>Parameter</u>	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Gasoline Range Organics	2.58 J	4.84	1.45	mg/kg	1	<u>Limits</u>	12/08/22 01:24
Surrogates 4-Bromofluorobenzene (surr)	95.2	50-150		%	1		12/08/22 01:24

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 01:24 Container ID: 1227130006-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 22:00 Prep Initial Wt./Vol.: 34.938 g Prep Extract Vol: 29.4764 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0121 U	0.0242	0.00774	mg/kg	1		12/08/22 01:24
Ethylbenzene	0.0242 U	0.0484	0.0174	mg/kg	1		12/08/22 01:24
o-Xylene	0.0242 U	0.0484	0.0176	mg/kg	1		12/08/22 01:24
P & M -Xylene	0.0484 U	0.0968	0.0290	mg/kg	1		12/08/22 01:24
Toluene	0.0242 U	0.0484	0.0151	mg/kg	1		12/08/22 01:24
Xylenes (total)	0.0725 U	0.145	0.0484	mg/kg	1		12/08/22 01:24
Surrogates							
1,4-Difluorobenzene (surr)	89.1	72-119		%	1		12/08/22 01:24

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 01:24 Container ID: 1227130006-B Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 22:00 Prep Initial Wt./Vol.: 34.938 g Prep Extract Vol: 29.4764 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS33 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130007 Lab Project ID: 1227130

Collection Date: 12/01/22 22:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):88.3 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
2-Methylnaphthalene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Acenaphthene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Acenaphthylene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Anthracene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Benzo(a)Anthracene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Benzo[a]pyrene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Benzo[b]Fluoranthene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Benzo[g,h,i]perylene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Benzo[k]fluoranthene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Chrysene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Dibenzo[a,h]anthracene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Fluoranthene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Fluorene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Indeno[1,2,3-c,d] pyrene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Naphthalene	0.0112 U	0.0224	0.00560	mg/kg	1		12/15/22 19:41
Phenanthrene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Pyrene	0.0140 U	0.0280	0.00701	mg/kg	1		12/15/22 19:41
Surrogates							
2-Methylnaphthalene-d10 (surr)	85.1	58-103		%	1		12/15/22 19:41
Fluoranthene-d10 (surr)	87.7	54-113		%	1		12/15/22 19:41

Batch Information

Analytical Batch: XMS13493 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/15/22 19:41 Container ID: 1227130007-A

Prep Batch: XXX47415 Prep Method: SW3550C Prep Date/Time: 12/15/22 14:02 Prep Initial Wt./Vol.: 22.721 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM



Client Sample ID: 220TZ-SS33 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130007 Lab Project ID: 1227130

Collection Date: 12/01/22 22:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):88.3 Location:

Results by Semivolatile Organic Fuels

Parameter Diesel Range Organics	Result Qual 152	LOQ/CL 22.5	<u>DL</u> 10.1	<u>Units</u> mg/kg	<u>DF</u> 1	Allowable Limits	Date Analyzed 12/14/22 19:36
Surrogates	02.0	E0 1E0		0/	1		10/14/00 10:26
5a Androstane (surr)	93.9	50-150		%	1		12/14/22 19:36

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/14/22 19:36 Container ID: 1227130007-A

Prep Batch: XXX47410 Prep Method: SW3550C Prep Date/Time: 12/14/22 12:42 Prep Initial Wt./Vol.: 30.2 g Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	314	112	48.4	mg/kg	1		12/14/22 19:36
Surrogates							
n-Triacontane-d62 (surr)	78.2	50-150		%	1		12/14/22 19:36

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/14/22 19:36 Container ID: 1227130007-A

Prep Batch: XXX47410 Prep Method: SW3550C Prep Date/Time: 12/14/22 12:42 Prep Initial Wt./Vol.: 30.2 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM J flagging is activated



Client Sample ID: 220TZ-SS33 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130007 Lab Project ID: 1227130 Collection Date: 12/01/22 22:20 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):88.3 Location:

Results by Volatile Fuels

<u>Parameter</u>	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Gasoline Range Organics	3.49 J	6.32	1.90	mg/kg	1	Limits	12/08/22 01:43
Surrogates 4-Bromofluorobenzene (surr)	91.3	50-150		%	1		12/08/22 01:43

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 01:43 Container ID: 1227130007-B Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 22:20
Prep Initial Wt./Vol.: 25 g
Prep Extract Vol: 27.9143 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0158 U	0.0316	0.0101	mg/kg	1		12/08/22 01:43
Ethylbenzene	0.0316 U	0.0632	0.0228	mg/kg	1		12/08/22 01:43
o-Xylene	0.0316 U	0.0632	0.0230	mg/kg	1		12/08/22 01:43
P & M -Xylene	0.0630 U	0.126	0.0379	mg/kg	1		12/08/22 01:43
Toluene	0.0316 U	0.0632	0.0197	mg/kg	1		12/08/22 01:43
Xylenes (total)	0.0950 U	0.190	0.0632	mg/kg	1		12/08/22 01:43
Surrogates							
1,4-Difluorobenzene (surr)	89.4	72-119		%	1		12/08/22 01:43

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 01:43 Container ID: 1227130007-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 22:20 Prep Initial Wt./Vol.: 25 g Prep Extract Vol: 27.9143 mL

Print Date: 12/21/2022 1:18:01PM

J flagging is activated



Client Sample ID: 220TZ-SS34 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130008 Lab Project ID: 1227130 Collection Date: 12/01/22 22:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):90.5 Location:

Results by Polynuclear Aromatics GC/MS

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
1-Methylnaphthalene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
2-Methylnaphthalene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Acenaphthene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Acenaphthylene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Anthracene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Benzo(a)Anthracene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Benzo[a]pyrene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Benzo[b]Fluoranthene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Benzo[g,h,i]perylene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Benzo[k]fluoranthene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Chrysene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Dibenzo[a,h]anthracene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Fluoranthene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Fluorene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Indeno[1,2,3-c,d] pyrene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Naphthalene	0.0110 U	0.0219	0.00548	mg/kg	1		12/15/22 20:02
Phenanthrene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Pyrene	0.0137 U	0.0274	0.00685	mg/kg	1		12/15/22 20:02
Surrogates							
2-Methylnaphthalene-d10 (surr)	84.5	58-103		%	1		12/15/22 20:02
Fluoranthene-d10 (surr)	87.1	54-113		%	1		12/15/22 20:02

Batch Information

Analytical Batch: XMS13493 Analytical Method: 8270D SIM (PAH)

Analyst: NGG

Analytical Date/Time: 12/15/22 20:02 Container ID: 1227130008-A

Prep Batch: XXX47415 Prep Method: SW3550C Prep Date/Time: 12/15/22 14:02 Prep Initial Wt./Vol.: 22.686 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM J flagging is activated



Client Sample ID: 220TZ-SS34 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130008 Lab Project ID: 1227130 Collection Date: 12/01/22 22:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):90.5 Location:

Results by Semivolatile Organic Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Diesel Range Organics	10.9 U	21.8	9.80	mg/kg	1		12/14/22 19:47
Surrogates							
5a Androstane (surr)	98.1	50-150		%	1		12/14/22 19:47

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK102

Analyst: HMW

Analytical Date/Time: 12/14/22 19:47 Container ID: 1227130008-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.447 g
Prep Extract Vol: 5 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Residual Range Organics	54.5 U	109	46.8	mg/kg	1		12/14/22 19:47
Surrogates							
n-Triacontane-d62 (surr)	87.7	50-150		%	1		12/14/22 19:47

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK103

Analyst: HMW

Analytical Date/Time: 12/14/22 19:47 Container ID: 1227130008-A Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/22 12:42
Prep Initial Wt./Vol.: 30.447 g
Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:01PM J flagging is activated



Client Sample ID: 220TZ-SS34 Client Project ID: 109531 OTZ PFAS

Lab Sample ID: 1227130008 Lab Project ID: 1227130 Collection Date: 12/01/22 22:40 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%):90.5 Location:

Results by Volatile Fuels

<u>Parameter</u>	Result Qual	<u>LOQ/CL</u>	<u>DL</u>	<u>Units</u>	<u>DF</u>	Allowable	<u>Date Analyzed</u>
Gasoline Range Organics	2.59 J	4.79	1.44	mg/kg	1	Limits	12/08/22 02:02
Surrogates 4-Bromofluorobenzene (surr)	93.5	50-150		%	1		12/08/22 02:02

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/08/22 02:02 Container ID: 1227130008-B Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 22:40
Prep Initial Wt./Vol.: 32.38 g
Prep Extract Vol: 28.0804 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.0120 U	0.0240	0.00767	mg/kg	1		12/08/22 02:02
Ethylbenzene	0.0239 U	0.0479	0.0173	mg/kg	1		12/08/22 02:02
o-Xylene	0.0239 U	0.0479	0.0174	mg/kg	1		12/08/22 02:02
P & M -Xylene	0.0479 U	0.0958	0.0288	mg/kg	1		12/08/22 02:02
Toluene	0.0239 U	0.0479	0.0150	mg/kg	1		12/08/22 02:02
Xylenes (total)	0.0720 U	0.144	0.0479	mg/kg	1		12/08/22 02:02
Surrogates							
1,4-Difluorobenzene (surr)	89.5	72-119		%	1		12/08/22 02:02

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/08/22 02:02 Container ID: 1227130008-B Prep Batch: VXX39524 Prep Method: SW5035A Prep Date/Time: 12/01/22 22:40

Prep Initial Wt./Vol.: 32.38 g Prep Extract Vol: 28.0804 mL

Print Date: 12/21/2022 1:18:01PM

J flagging is activated



Results of Trip Blank

Client Sample ID: **Trip Blank**Client Project ID: **109531 OTZ PFAS**

Lab Sample ID: 1227130009 Lab Project ID: 1227130 Collection Date: 12/01/22 20:00 Received Date: 12/06/22 09:00 Matrix: Soil/Solid (dry weight)

Solids (%): Location:

Results by Volatile Fuels

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Gasoline Range Organics	1.46 J	2.54	0.761	mg/kg	1		12/07/22 22:33
Surrogates							
4-Bromofluorobenzene (surr)	98.7	50-150		%	1		12/07/22 22:33

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101

Analyst: JY

Analytical Date/Time: 12/07/22 22:33 Container ID: 1227130009-A Prep Batch: VXX39524
Prep Method: SW5035A
Prep Date/Time: 12/01/22 20:00
Prep Initial Wt./Vol.: 49.297 g
Prep Extract Vol: 25 mL

						<u>Allowable</u>	
<u>Parameter</u>	Result Qual	LOQ/CL	<u>DL</u>	<u>Units</u>	<u>DF</u>	<u>Limits</u>	Date Analyzed
Benzene	0.00635 U	0.0127	0.00406	mg/kg	1		12/07/22 22:33
Ethylbenzene	0.0127 U	0.0254	0.00913	mg/kg	1		12/07/22 22:33
o-Xylene	0.0127 U	0.0254	0.00923	mg/kg	1		12/07/22 22:33
P & M -Xylene	0.0254 U	0.0507	0.0152	mg/kg	1		12/07/22 22:33
Toluene	0.0127 U	0.0254	0.00791	mg/kg	1		12/07/22 22:33
Xylenes (total)	0.0381 U	0.0761	0.0254	mg/kg	1		12/07/22 22:33
Surrogates							
1,4-Difluorobenzene (surr)	89.5	72-119		%	1		12/07/22 22:33

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B

Analyst: JY

Analytical Date/Time: 12/07/22 22:33 Container ID: 1227130009-A Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/01/22 20:00 Prep Initial Wt./Vol.: 49.297 g Prep Extract Vol: 25 mL

Print Date: 12/21/2022 1:18:01PM

J flagging is activated



Blank ID: MB for HBN 1849538 [SPT/11696]

Blank Lab ID: 1699071

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008, 1227130007, 1227130008, 1227130007, 1227130008, 122713008, 1227130008, 1227130008, 122713008, 1227130008, 122713008, 122713008, 122713008, 122713008,

Matrix: Soil/Solid (dry weight)

Results by SM21 2540G

 Parameter
 Results
 LOQ/CL
 DL
 Units

 Total Solids
 100
 %

Batch Information

Analytical Batch: SPT11696 Analytical Method: SM21 2540G

Instrument: Analyst: EBH

Analytical Date/Time: 12/9/2022 5:42:00PM

Print Date: 12/21/2022 1:18:04PM



Duplicate Sample Summary

Original Sample ID: 1227130001 Analysis Date: 12/09/2022 17:42
Duplicate Sample ID: 1699072 Matrix: Soil/Solid (dry weight)

QC for Samples:

 $1227130001,\,1227130002,\,1227130003,\,1227130004,\,1227130005,\,1227130006,\,1227130007,\,1227130008$

Results by SM21 2540G

NAME	<u>Original</u>	<u>Duplicate</u>	<u>Units</u>	RPD (%)	RPD CL
Total Solids	85.4	85.2	%	0.24	(< 15)

Batch Information

Analytical Batch: SPT11696 Analytical Method: SM21 2540G

Instrument: Analyst: EBH

Print Date: 12/21/2022 1:18:05PM



Blank ID: MB for HBN 1849544 [VXX/39524]

Blank Lab ID: 1699092

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008, 1227130009

Matrix: Soil/Solid (dry weight)

Results by AK101

 Parameter
 Results
 LOQ/CL
 DL
 Units

 Gasoline Range Organics
 1.74J
 2.50
 0.750
 mg/kg

Surrogates

4-Bromofluorobenzene (surr) 92.1 50-150 %

Batch Information

Analytical Batch: VFC16347 Prep Batch: VXX39524
Analytical Method: AK101 Prep Method: SW5035A

Instrument: Agilent 7890 PID/FID Prep Date/Time: 12/7/2022 6:00:00AM

Analyst: JY Prep Initial Wt./Vol.: 50 g Analytical Date/Time: 12/7/2022 2:33:00PM Prep Extract Vol: 25 mL

Print Date: 12/21/2022 1:18:09PM



Blank Spike ID: LCS for HBN 1227130 [VXX39524]

Blank Spike Lab ID: 1699095

Date Analyzed: 12/07/2022 13:55

Spike Duplicate ID: LCSD for HBN 1227130

[VXX39524]

Spike Duplicate Lab ID: 1699096

Matrix: Soil/Solid (dry weight)

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007,

1227130008, 1227130009

Results by AK101

	E	Blank Spike	(mg/kg)	S	pike Duplic	ate (mg/kg)			
<u>Parameter</u>	<u>Spike</u>	Result	Rec (%)	<u>Spike</u>	Result	Rec (%)	<u>CL</u>	RPD (%)	RPD CL
Gasoline Range Organics	12.5	14.2	114	12.5	13.7	110	(60-120)	3.80	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25		94	1.25		96	(50-150)	2.30	

Batch Information

Analytical Batch: VFC16347 Analytical Method: AK101 Instrument: Agilent 7890 PID/FID

Analyst: JY

Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/07/2022 06:00

Spike Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL Dupe Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL

Print Date: 12/21/2022 1:18:11PM



Blank ID: MB for HBN 1849544 [VXX/39524]

Blank Lab ID: 1699092

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008, 1227130009, 122710009, 1227100009, 1227100009, 1227100009, 1227100009, 1227100009, 1227100009, 1227100009, 12271

Results by SW8021B

Parameter	Results	LOQ/CL	<u>DL</u>	<u>Units</u>
Benzene	0.00625U	0.0125	0.00400	mg/kg
Ethylbenzene	0.0125U	0.0250	0.00900	mg/kg
o-Xylene	0.0125U	0.0250	0.00910	mg/kg
P & M -Xylene	0.0250U	0.0500	0.0150	mg/kg
Toluene	0.0125U	0.0250	0.00780	mg/kg
Xylenes (total)	0.0375U	0.0750	0.0250	mg/kg
Surrogates				
1,4-Difluorobenzene (surr)	89.5	72-119		%

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B Instrument: Agilent 7890 PID/FID

Analyst: JY

Analytical Date/Time: 12/7/2022 2:33:00PM

Prep Batch: VXX39524 Prep Method: SW5035A

Prep Date/Time: 12/7/2022 6:00:00AM

Matrix: Soil/Solid (dry weight)

Prep Initial Wt./Vol.: 50 g Prep Extract Vol: 25 mL

Print Date: 12/21/2022 1:18:13PM



Blank Spike ID: LCS for HBN 1227130 [VXX39524]

Blank Spike Lab ID: 1699093 Date Analyzed: 12/07/2022 13:18 Spike Duplicate ID: LCSD for HBN 1227130

[VXX39524]

Spike Duplicate Lab ID: 1699094 Matrix: Soil/Solid (dry weight)

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007,

1227130008, 1227130009

Results by SW8021B

	E	Blank Spike	(mg/kg)	s	pike Duplic	ate (mg/kg)			
<u>Parameter</u>	Spike	Result	Rec (%)	Spike	Result	Rec (%)	<u>CL</u>	RPD (%)	RPD CL
Benzene	1.25	1.38	110	1.25	1.29	103	(75-125)	7.00	(< 20)
Ethylbenzene	1.25	1.32	106	1.25	1.24	99	(75-125)	6.20	(< 20)
o-Xylene	1.25	1.29	104	1.25	1.22	98	(75-125)	5.90	(< 20)
P & M -Xylene	2.50	2.65	106	2.50	2.48	99	(80-125)	6.40	(< 20)
Toluene	1.25	1.33	107	1.25	1.25	100	(70-125)	6.80	(< 20)
Xylenes (total)	3.75	3.94	105	3.75	3.71	99	(78-124)	6.20	(< 20)
Surrogates									
1,4-Difluorobenzene (surr)	1.25		95	1.25		95	(72-119)	0.72	

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B Instrument: Agilent 7890 PID/FID

Analyst: JY

Prep Batch: VXX39524
Prep Method: SW5035A

Prep Date/Time: 12/07/2022 06:00

Spike Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL Dupe Init Wt./Vol.: 1.25 mg/kg Extract Vol: 25 mL

Print Date: 12/21/2022 1:18:15PM



Matrix Spike Summary

 Original Sample ID: 1699105
 Analysis Date: 12/07/2022 22:52

 MS Sample ID: 1699106 MS
 Analysis Date: 12/07/2022 23:11

 MSD Sample ID: 1699107 MSD
 Analysis Date: 12/07/2022 23:30

 Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007,

1227130008, 1227130009

Results by SW8021B

		Mat	rix Spike (r	mg/kg)	Spike	Duplicate	(mg/kg)			
<u>Parameter</u>	<u>Sample</u>	<u>Spike</u>	Result	Rec (%)	<u>Spike</u>	Result	Rec (%)	CL	RPD (%)	RPD CL
Benzene	0.0126U	2.52	2.88	114	2.52	2.74	109	75-125	5.20	(< 20)
Ethylbenzene	0.0252U	2.52	2.76	110	2.52	2.60	103	75-125	6.20	(< 20)
o-Xylene	0.0252U	2.52	2.74	109	2.52	2.56	102	75-125	6.50	(< 20)
P & M -Xylene	0.0505U	5.04	5.53	110	5.04	5.19	103	80-125	6.30	(< 20)
Toluene	0.0252U	2.52	2.77	110	2.52	2.63	104	70-125	5.30	(< 20)
Xylenes (total)	0.0755U	7.56	8.26	109	7.56	7.75	103	78-124	6.30	(< 20)
Surrogates										
1,4-Difluorobenzene (surr)		2.52	2.41	96	2.52	2.38	94	72-119	1.30	

Batch Information

Analytical Batch: VFC16347 Analytical Method: SW8021B Instrument: Agilent 7890 PID/FID

Analyst: JY

Analytical Date/Time: 12/7/2022 11:11:00PM

Prep Batch: VXX39524

Prep Method: AK101 Extraction (S)
Prep Date/Time: 12/7/2022 6:00:00AM

Prep Initial Wt./Vol.: 24.80g Prep Extract Vol: 25.00mL

Print Date: 12/21/2022 1:18:17PM



Blank ID: MB for HBN 1849509 [XXX/47404]

Blank Lab ID: 1699024

QC for Samples:

 $1227130001,\,1227130002,\,1227130003,\,1227130004,\,1227130005,\,1227130006$

Results by 8270D SIM (PAH)

<u>Parameter</u>	<u>Results</u>	LOQ/CL	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
2-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthylene	0.0125U	0.0250	0.00625	mg/kg
Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo(a)Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo[a]pyrene	0.0125U	0.0250	0.00625	mg/kg
Benzo[b]Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Benzo[g,h,i]perylene	0.0125U	0.0250	0.00625	mg/kg
Benzo[k]fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Chrysene	0.0125U	0.0250	0.00625	mg/kg
Dibenzo[a,h]anthracene	0.0125U	0.0250	0.00625	mg/kg
Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Fluorene	0.0125U	0.0250	0.00625	mg/kg
Indeno[1,2,3-c,d] pyrene	0.0125U	0.0250	0.00625	mg/kg
Naphthalene	0.0100U	0.0200	0.00500	mg/kg
Phenanthrene	0.0125U	0.0250	0.00625	mg/kg
Pyrene	0.0125U	0.0250	0.00625	mg/kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	91	58-103		%
Fluoranthene-d10 (surr)	98.4	54-113		%

Batch Information

Analytical Batch: XMS13491 Analytical Method: 8270D SIM (PAH)

Instrument: Agilent 8890 GC/MS US2210A024

Analyst: NGG

Analytical Date/Time: 12/14/2022 4:58:00PM

Prep Batch: XXX47404 Prep Method: SW3550C

Prep Date/Time: 12/9/2022 4:44:01PM

Matrix: Soil/Solid (dry weight)

Prep Initial Wt./Vol.: 22.5 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:18PM



Blank Spike ID: LCS for HBN 1227130 [XXX47404]

Blank Spike Lab ID: 1699025 Date Analyzed: 12/14/2022 17:14

Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006

Results by 8270D SIM (PAH)

research by 62765 Chill (1741)		21 1 2 1	(()	
		Blank Spike		
<u>Parameter</u>	Spike	Result	<u>Rec (%)</u>	<u>CL</u>
1-Methylnaphthalene	0.111	0.102	92	(43-111)
2-Methylnaphthalene	0.111	0.105	95	(39-114)
Acenaphthene	0.111	0.106	96	(44-111)
Acenaphthylene	0.111	0.103	93	(39-116)
Anthracene	0.111	0.103	92	(50-114)
Benzo(a)Anthracene	0.111	0.100	90	(54-122)
Benzo[a]pyrene	0.111	0.0969	87	(50-125)
Benzo[b]Fluoranthene	0.111	0.103	93	(53-128)
Benzo[g,h,i]perylene	0.111	0.0973	88	(49-127)
Benzo[k]fluoranthene	0.111	0.106	95	(56-123)
Chrysene	0.111	0.106	95	(57-118)
Dibenzo[a,h]anthracene	0.111	0.0977	88	(50-129)
Fluoranthene	0.111	0.107	97	(55-119)
Fluorene	0.111	0.104	94	(47-114)
Indeno[1,2,3-c,d] pyrene	0.111	0.0986	89	(49-130)
Naphthalene	0.111	0.104	94	(38-111)
Phenanthrene	0.111	0.102	92	(49-113)
Pyrene	0.111	0.105	95	(55-117)
Surrogates				
2-Methylnaphthalene-d10 (surr)	0.111		90	(58-103)
Fluoranthene-d10 (surr)	0.111		92	(54-113)

Batch Information

Analytical Batch: XMS13491
Analytical Method: 8270D SIM (PAH)

Instrument: Agilent 8890 GC/MS US2210A024

Analyst: NGG

Prep Batch: XXX47404
Prep Method: SW3550C

Prep Date/Time: 12/09/2022 16:44

Spike Init Wt./Vol.: 0.111 mg/kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 12/21/2022 1:18:20PM



Matrix Spike Summary

 Original Sample ID: 1227130006
 Analysis Date: 12/14/2022 22:32

 MS Sample ID: 1699026 MS
 Analysis Date: 12/14/2022 22:48

 MSD Sample ID: 1699027 MSD
 Analysis Date: 12/14/2022 23:04

 Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006

Results by 8270D SIM (PAH)

Tresuits by 02700 Silvi (I AII)										
		Mat	rix Spike (r	ng/kg)	Spike	Duplicate	(mg/kg)			
<u>Parameter</u>	<u>Sample</u>	Spike	Result	Rec (%)	<u>Spike</u>	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	0.0142U	0.126	0.116	92	0.127	0.119	94	43-111	3.10	(< 20)
2-Methylnaphthalene	0.0142U	0.126	0.119	94	0.127	0.124	97	39-114	4.10	(< 20)
Acenaphthene	0.0142U	0.126	0.118	94	0.127	0.124	98	44-111	4.70	(< 20)
Acenaphthylene	0.0142U	0.126	0.114	90	0.127	0.120	95	39-116	5.50	(< 20)
Anthracene	0.0142U	0.126	0.117	93	0.127	0.120	95	50-114	2.70	(< 20)
Benzo(a)Anthracene	0.0142U	0.126	0.112	88	0.127	0.115	91	54-122	3.00	(< 20)
Benzo[a]pyrene	0.0142U	0.126	0.112	89	0.127	0.116	91	50-125	3.00	(< 20)
Benzo[b]Fluoranthene	0.0142U	0.126	0.119	95	0.127	0.122	95	53-128	1.30	(< 20)
Benzo[g,h,i]perylene	0.0142U	0.126	0.102	81	0.127	0.106	84	49-127	4.00	(< 20)
Benzo[k]fluoranthene	0.0142U	0.126	0.112	89	0.127	0.117	92	56-123	3.70	(< 20)
Chrysene	0.0142U	0.126	0.117	93	0.127	0.122	95	57-118	3.40	(< 20)
Dibenzo[a,h]anthracene	0.0142U	0.126	0.107	85	0.127	0.113	89	50-129	4.70	(< 20)
Fluoranthene	0.0142U	0.126	0.115	91	0.127	0.117	92	55-119	2.10	(< 20)
Fluorene	0.0142U	0.126	0.113	89	0.127	0.119	94	47-114	5.70	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0142U	0.126	0.105	83	0.127	0.110	86	49-130	4.10	(< 20)
Naphthalene	0.0114U	0.126	0.114	91	0.127	0.119	94	38-111	4.60	(< 20)
Phenanthrene	0.0142U	0.126	0.116	92	0.127	0.122	96	49-113	5.00	(< 20)
Pyrene	0.0142U	0.126	0.115	91	0.127	0.118	93	55-117	2.60	(< 20)
Surrogates										
_		0.126	0.114	91	0.127	0.118	93	58-103	2.70	
2-Methylnaphthalene-d10 (surr) Fluoranthene-d10 (surr)		0.126	0.114	91 87	0.127	0.116	93 91	54-113	4.70	
i idoranti lene-d 10 (Sult)		0.120	0.110	01	0.127	0.110	91	J4-113	4.70	

Batch Information

Analytical Batch: XMS13491

Analytical Method: 8270D SIM (PAH)

Instrument: Agilent 8890 GC/MS US2210A024

Analyst: NGG

Analytical Date/Time: 12/14/2022 10:48:00PM

Prep Batch: XXX47404

Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml

Prep Date/Time: 12/9/2022 4:44:01PM

Prep Initial Wt./Vol.: 22.68g Prep Extract Vol: 5.00mL

Print Date: 12/21/2022 1:18:21PM



Blank ID: MB for HBN 1849510 [XXX/47405]

Blank Lab ID: 1699028

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004

Matrix: Soil/Solid (dry weight)

Results by AK102

ParameterResultsLOQ/CLDLUnitsDiesel Range Organics10.0U20.09.00mg/kg

Surrogates

5a Androstane (surr) 89.4 60-120 %

Batch Information

Analytical Batch: XFC16423 Prep Batch: XXX47405 Analytical Method: AK102 Prep Method: SW3550C

Instrument: Agilent 7890B R Prep Date/Time: 12/9/2022 4:47:47PM

Analyst: HMW Prep Initial Wt./Vol.: 30 g Analytical Date/Time: 12/13/2022 11:47:00AM Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:22PM



Blank Spike ID: LCS for HBN 1227130 [XXX47405]

Blank Spike Lab ID: 1699029 Date Analyzed: 12/13/2022 11:57 Spike Duplicate ID: LCSD for HBN 1227130

[XXX47405]

Spike Duplicate Lab ID: 1699030 Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130001, 1227130002, 1227130003, 1227130004

Results by AK102

	Е	Blank Spike	(mg/kg)	S	pike Duplic	ate (mg/kg)			
<u>Parameter</u>	Spike	Result	Rec (%)	Spike	Result	Rec (%)	<u>CL</u>	RPD (%)	RPD CL
Diesel Range Organics	667	541	81	667	597	90	(75-125)	9.80	(< 20)
Surrogates									
5a Androstane (surr)	16.7		92	16.7		97	(60-120)	6.00	

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK102 Instrument: Agilent 7890B R

Analyst: HMW

Prep Batch: XXX47405
Prep Method: SW3550C

Prep Date/Time: 12/09/2022 16:47

Spike Init Wt./Vol.: 16.7 mg/kg $\,$ Extract Vol: 5 mL $\,$ Dupe Init Wt./Vol.: 16.7 mg/kg $\,$ Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:24PM



Blank ID: MB for HBN 1849510 [XXX/47405]

Blank Lab ID: 1699028

QC for Samples:

1227130001, 1227130002, 1227130003, 1227130004

Matrix: Soil/Solid (dry weight)

Results by AK103

ParameterResultsLOQ/CLDLUnitsResidual Range Organics50.0U10043.0mg/kg

Surrogates

n-Triacontane-d62 (surr) 79.7 60-120 %

Batch Information

Analytical Batch: XFC16423 Prep Batch: XXX47405
Analytical Method: AK103 Prep Method: SW3550C

Instrument: Agilent 7890B R Prep Date/Time: 12/9/2022 4:47:47PM

Analyst: HMW Prep Initial Wt./Vol.: 30 g Analytical Date/Time: 12/13/2022 11:47:00AM Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:26PM



Blank Spike ID: LCS for HBN 1227130 [XXX47405]

Blank Spike Lab ID: 1699029 Date Analyzed: 12/13/2022 11:57 Spike Duplicate ID: LCSD for HBN 1227130

[XXX47405]

Spike Duplicate Lab ID: 1699030 Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130001, 1227130002, 1227130003, 1227130004

Results by AK103

	-			_							
		В	lank Spike ((mg/kg)	S	pike Duplic	ate (mg/kg)				
	<u>Parameter</u>	Spike	Result	Rec (%)	<u>Spike</u>	Result	Rec (%)	<u>CL</u>	RPD (%)	RPD CL	
	Residual Range Organics	667	516	77	667	531	80	(60-120)	2.90	(< 20)	
S	Surrogates										
	n-Triacontane-d62 (surr)	16.7		82	16.7		82	(60-120)	0.43		

Batch Information

Analytical Batch: XFC16423 Analytical Method: AK103 Instrument: Agilent 7890B R

Analyst: HMW

Prep Batch: XXX47405
Prep Method: SW3550C

Prep Date/Time: 12/09/2022 16:47

Spike Init Wt./Vol.: 16.7 mg/kg $\,$ Extract Vol: 5 mL $\,$ Dupe Init Wt./Vol.: 16.7 mg/kg $\,$ Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:29PM



Blank ID: MB for HBN 1849740 [XXX/47410]

Blank Lab ID: 1699316

QC for Samples:

1227130005, 1227130006, 1227130007, 1227130008

Matrix: Soil/Solid (dry weight)

Results by AK102

ParameterResultsLOQ/CLDLUnitsDiesel Range Organics10.0U20.09.00mg/kg

Surrogates

5a Androstane (surr) 97 60-120 %

Batch Information

Analytical Batch: XFC16424 Prep Batch: XXX47410
Analytical Method: AK102 Prep Method: SW3550C

Instrument: Agilent 7890B R Prep Date/Time: 12/14/2022 12:42:30PM

Analyst: HMW Prep Initial Wt./Vol.: 30 g Analytical Date/Time: 12/14/2022 6:46:00PM Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:30PM



Blank Spike ID: LCS for HBN 1227130 [XXX47410]

Blank Spike Lab ID: 1699317

Date Analyzed: 12/14/2022 18:56

Spike Duplicate ID: LCSD for HBN 1227130

[XXX47410]

Spike Duplicate Lab ID: 1699318

Matrix: Soil/Solid (dry weight)

QC for Samples:

1227130005, 1227130006, 1227130007, 1227130008

Results by AK102

	E	Blank Spike	(mg/kg)	S	pike Duplic	ate (mg/kg)			
<u>Parameter</u>	Spike	Result	Rec (%)	Spike	Result	Rec (%)	<u>CL</u>	RPD (%)	RPD CL
Diesel Range Organics	667	641	96	667	575	86	(75-125)	10.90	(< 20)
Surrogates									
5a Androstane (surr)	16.7		105	16.7		93	(60-120)	12.10	

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK102 Instrument: Agilent 7890B R

Analyst: HMW

Prep Batch: XXX47410
Prep Method: SW3550C

Prep Date/Time: 12/14/2022 12:42

Spike Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL Dupe Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:33PM



Blank ID: MB for HBN 1849740 [XXX/47410]

Blank Lab ID: 1699316

QC for Samples:

1227130005, 1227130006, 1227130007, 1227130008

Matrix: Soil/Solid (dry weight)

Results by AK103

ParameterResultsLOQ/CLDLUnitsResidual Range Organics50.0U10043.0mg/kg

Surrogates

n-Triacontane-d62 (surr) 89.5 60-120 %

Batch Information

Analytical Batch: XFC16424 Prep Batch: XXX47410
Analytical Method: AK103 Prep Method: SW3550C

Instrument: Agilent 7890B R Prep Date/Time: 12/14/2022 12:42:30PM

Analyst: HMW Prep Initial Wt./Vol.: 30 g Analytical Date/Time: 12/14/2022 6:46:00PM Prep Extract Vol.: 5 mL

Print Date: 12/21/2022 1:18:35PM



Blank Spike ID: LCS for HBN 1227130 [XXX47410]

Blank Spike Lab ID: 1699317

Date Analyzed: 12/14/2022 18:56

Spike Duplicate ID: LCSD for HBN 1227130

[XXX47410]

Spike Duplicate Lab ID: 1699318

Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130005, 1227130006, 1227130007, 1227130008

Results by AK103

	E	Blank Spike	(mg/kg)	S	Spike Duplic	ate (mg/kg)			
<u>Parameter</u>	<u>Spike</u>	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	667	583	88	667	519	78	(60-120)	11.60	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	16.7		89	16.7		80	(60-120)	10.70	

Batch Information

Analytical Batch: XFC16424 Analytical Method: AK103 Instrument: Agilent 7890B R

Analyst: HMW

Prep Batch: XXX47410
Prep Method: SW3550C

Prep Date/Time: 12/14/2022 12:42

Spike Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL Dupe Init Wt./Vol.: 16.7 mg/kg Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:37PM



Blank ID: MB for HBN 1849775 [XXX/47415]

Blank Lab ID: 1699496

QC for Samples:

1227130007, 1227130008

Matrix: Soil/Solid (dry weight)

Results by 8270D SIM (PAH)

<u>Parameter</u>	Results	LOQ/CL	<u>DL</u>	<u>Units</u>
1-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
2-Methylnaphthalene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthene	0.0125U	0.0250	0.00625	mg/kg
Acenaphthylene	0.0125U	0.0250	0.00625	mg/kg
Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo(a)Anthracene	0.0125U	0.0250	0.00625	mg/kg
Benzo[a]pyrene	0.0125U	0.0250	0.00625	mg/kg
Benzo[b]Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Benzo[g,h,i]perylene	0.0125U	0.0250	0.00625	mg/kg
Benzo[k]fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Chrysene	0.0125U	0.0250	0.00625	mg/kg
Dibenzo[a,h]anthracene	0.0125U	0.0250	0.00625	mg/kg
Fluoranthene	0.0125U	0.0250	0.00625	mg/kg
Fluorene	0.0125U	0.0250	0.00625	mg/kg
Indeno[1,2,3-c,d] pyrene	0.0125U	0.0250	0.00625	mg/kg
Naphthalene	0.0100U	0.0200	0.00500	mg/kg
Phenanthrene	0.0125U	0.0250	0.00625	mg/kg
Pyrene	0.0125U	0.0250	0.00625	mg/kg
Surrogates				
2-Methylnaphthalene-d10 (surr)	89.9	58-103		%
Fluoranthene-d10 (surr)	96.6	54-113		%

Batch Information

Analytical Batch: XMS13493 Analytical Method: 8270D SIM (PAH)

Instrument: Agilent GC 7890B/5977A SWA

Analyst: NGG

Analytical Date/Time: 12/15/2022 7:00:00PM

Prep Batch: XXX47415 Prep Method: SW3550C

Prep Date/Time: 12/15/2022 2:02:44PM

Prep Initial Wt./Vol.: 22.5 g Prep Extract Vol: 5 mL

Print Date: 12/21/2022 1:18:40PM



Blank Spike ID: LCS for HBN 1227130 [XXX47415]

Blank Spike Lab ID: 1699497 Date Analyzed: 12/15/2022 19:21

Matrix: Soil/Solid (dry weight)

QC for Samples: 1227130007, 1227130008

Results by 8270D SIM (PAH)

Blank Spike (mg/kg)						
<u>Parameter</u>	<u>Spike</u>	Result	Rec (%)	<u>CL</u>		
1-Methylnaphthalene	0.111	0.0979	88	(43-111)		
2-Methylnaphthalene	0.111	0.0980	88	(39-114)		
Acenaphthene	0.111	0.101	91	(44-111)		
Acenaphthylene	0.111	0.0982	88	(39-116)		
Anthracene	0.111	0.100	90	(50-114)		
Benzo(a)Anthracene	0.111	0.0968	87	(54-122)		
Benzo[a]pyrene	0.111	0.0994	90	(50-125)		
Benzo[b]Fluoranthene	0.111	0.0998	90	(53-128)		
Benzo[g,h,i]perylene	0.111	0.103	92	(49-127)		
Benzo[k]fluoranthene	0.111	0.108	98	(56-123)		
Chrysene	0.111	0.102	92	(57-118)		
Dibenzo[a,h]anthracene	0.111	0.104	94	(50-129)		
Fluoranthene	0.111	0.104	94	(55-119)		
Fluorene	0.111	0.102	92	(47-114)		
Indeno[1,2,3-c,d] pyrene	0.111	0.104	93	(49-130)		
Naphthalene	0.111	0.0970	87	(38-111)		
Phenanthrene	0.111	0.0978	88	(49-113)		
Pyrene	0.111	0.102	92	(55-117)		
Surrogates						
2-Methylnaphthalene-d10 (surr)	0.111		87	(58-103)		
Fluoranthene-d10 (surr)	0.111		87	(54-113)		

Batch Information

Analytical Batch: XMS13493
Analytical Method: 8270D SIM (PAH)

Instrument: Agilent GC 7890B/5977A SWA

Analyst: NGG

Prep Batch: XXX47415
Prep Method: SW3550C

Prep Date/Time: 12/15/2022 14:02

Spike Init Wt./Vol.: 0.111 mg/kg Extract Vol: 5 mL

Dupe Init Wt./Vol.: Extract Vol:

Print Date: 12/21/2022 1:18:42PM



Matrix Spike Summary

Original Sample ID: 1227201004 MS Sample ID: 1699498 MS MSD Sample ID: 1699499 MSD

QC for Samples: 1227130007, 1227130008

Analysis Date: 12/19/2022 15:15 Analysis Date: 12/19/2022 15:35 Analysis Date: 12/19/2022 15:55 Matrix: Soil/Solid (dry weight)

Results by 8270D SIM (PAH)

		Mat	rix Spike (r	ng/kg)	Spike	Duplicate	(mg/kg)			
<u>Parameter</u>	<u>Sample</u>	<u>Spike</u>	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1-Methylnaphthalene	1.29	0.125	1.47	142 *	0.123	1.59	247	* 43-111	8.30	(< 20)
2-Methylnaphthalene	1.60	0.125	1.84	188 *	0.123	1.98	301	* 39-114	7.20	(< 20)
Acenaphthene	0.0140U	0.125	0.122	98	0.123	0.127	103	44-111	3.50	(< 20)
Acenaphthylene	0.0140U	0.125	0.106	85	0.123	0.107	87	39-116	1.50	(< 20)
Anthracene	0.0140U	0.125	0.0974	78	0.123	0.0972	79	50-114	0.24	(< 20)
Benzo(a)Anthracene	0.0140U	0.125	0.0989	80	0.123	0.0933	76	54-122	5.80	(< 20)
Benzo[a]pyrene	0.0140U	0.125	0.103	83	0.123	0.0965	78	50-125	6.20	(< 20)
Benzo[b]Fluoranthene	0.0140U	0.125	0.101	81	0.123	0.0960	78	53-128	4.70	(< 20)
Benzo[g,h,i]perylene	0.0140U	0.125	0.0972	78	0.123	0.0928	75	49-127	4.50	(< 20)
Benzo[k]fluoranthene	0.0140U	0.125	0.107	86	0.123	0.101	82	56-123	5.90	(< 20)
Chrysene	0.0140U	0.125	0.103	83	0.123	0.0974	79	57-118	5.60	(< 20)
Dibenzo[a,h]anthracene	0.0140U	0.125	0.0999	80	0.123	0.0954	77	50-129	4.60	(< 20)
Fluoranthene	0.0140U	0.125	0.0996	80	0.123	0.0949	77	55-119	4.80	(< 20)
Fluorene	0.0710	0.125	0.166	76	0.123	0.167	78	47-114	0.88	(< 20)
Indeno[1,2,3-c,d] pyrene	0.0140U	0.125	0.0983	79	0.123	0.0936	76	49-130	5.00	(< 20)
Naphthalene	0.188	0.125	0.282	75	0.123	0.284	78	38-111	0.69	(< 20)

77

Surrogates

Pyrene

Phenanthrene

2-Methylnaphthalene-d10 (surr) 0.125 0.114 92 0.123 0.110 89 58-103 3.30 Fluoranthene-d10 (surr) 0.0983 0.0938 76 4.60 0.125 79 0.123 54-113

0.109

0.0998

Batch Information

Analytical Batch: XMS13493

Analytical Method: 8270D SIM (PAH)
Instrument: Agilent GC 7890B/5977A SWA

0.0124J

0.0140U

0.125

0.125

Analyst: NGG

Analytical Date/Time: 12/15/2022 9:24:00PM

Analytical Batch: XMS13495

Analytical Method: 8270D SIM (PAH) Instrument: Agilent GC 7890B/5977A SWA

Analyst: NGG

Analytical Date/Time: 12/19/2022 3:35:00PM

Prep Batch: XXX47415

0.123

0.123

Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml

76

77

49-113

55-117

2.70

4.70

(< 20)

(< 20)

Prep Date/Time: 12/15/2022 2:02:44PM

0.106

0.0952

Prep Initial Wt./Vol.: 22.55g Prep Extract Vol: 5.00mL

Prep Batch: XXX47415

Prep Method: Sonication Extr Soil 8270 PAH SIM 5ml

Prep Date/Time: 12/15/2022 2:02:44PM

Prep Initial Wt./Vol.: 22.55g Prep Extract Vol: 5.00mL

Print Date: 12/21/2022 1:18:43PM

SHANNON & WILSON, INC. 2355 Hill Road Fairbanks, 74K 99709	CHAIN-	OF-CUST		ECORD	Attn:	tory S65 Page of
(907) 479-0600 www.shannonwilson.com			Ma V	Car Metrious (Inci	7 7	
Turn Around Time: Quote I Normal Rush J-Flags		ed Cap British	PAH			Remarks/Matrix Composition/Grab? Sample Containers
Please Specify Sample Identity Lab N	Date o. Time Sample	and the second				Remarks/Matrix Composition/Grab? Sample Containers
22077-5526 TAB	2040 12/1/22	2			2	Soil
220T2-5527 TAB 220T2-5528 34B	2050					
220T2-5529 UNB	2/30					
220TZ-SS30 (5AB) 220TZ-SS32 (BAB)	2120					
220+z-5533 THB	2220					
Trip Blank 9A	2240	1 4			1	MeOH trip blank
Project Information Sa	mple Receipt	Reliquished By	/: 1.	Reliquished B	y: 2.	Reliquished By: 3.
Number: 109531 Total No. of			Time: 1310 Signat		Time: 15:00	Signature: Time:
Contact: $\angle RF$ Received G		rinted Name: Adam Wylorny	r 🦳	d Name:		Printed Name: Date:
	thod: Hand	Moan wyserny ompany: Shannon & Wil	Compa	any: Ar		Company
Notes:		Received By:	1. 4.	Received By	2.	Received By: 3.
MSA:-SGS-2016		ignatule:	Time: /3 /O Signat			Signature: Time: 0400
Profile #385	367m	rinted Name: Justin A. Nels	Date: 12/5/22 Printer	d Name:		Wered Name: Date: 12/6/22 Were was Johnston- Carnes
1227130 ned to Shannon onsignee files job file	& Wilson w/ laboratory report	Sompany:	Comp	any:		Company: 5GS





e-Sample Receipt Form FBK

SGS Workorder #:

S&W



		ndition (Yes,	Na NVA	E	ontions No	4ad bal	
Review Criter				Exemption pe	eptions No		
	/ Temperature Requirem		Yes	Exemption pe	rmitted ii sam	pier nand ca	arries/deliver
The second secon	ody Seals intact? Note # & locat	10.77				- 1871	
	COC accompanied sample					···	
and the second s	ved in COC corresponding coole	1, 1					
and the second of the second o	**Exemption permitted if chille						
Temperature blank co	mpliant* (i.e., 0-6 °C after CF)? YES	Cooler ID:	1	@		Therm. ID: d
			Cooler ID:		@		Therm. ID:
If samples received without a temperature bla cumented instead & "COOLER TEMP" will be no		will	Cooler ID:		@	°QT	Γherm. ID:
be noted if neither is			Cooler ID:		@	°СТ	Γherm. ID:
						- - - - - - - - - - - - -	
*If >6°C, were sar	nples collected <8 hours ago	? N/A					
If <0°C, we	re sample containers ice free	e? N/A					
			,				
Note: Identify containers received							
Use form FS	i-0029 if more space is need	ed.					
Holding Time / Documentation			Note: Refer t	o form F-083 "S	Sample Guide	for specific	holding time
Do samples match COC** (i.e.,sam	ple IDs,dates/times collected	d)? YES					
**Note: If times differ <1hr, rec	ord details & login per COC.						
Note: If sample information on containers differs	from COC, SGS will default to COC i	information					
Were samples in good condition	on (no leaks/cracks/breakage	e)? YES					
Were analytical requests clear? (i.e., r	nethod is specified for analys for analysis (Ex: BTEX, Meta						
with multiple option	ioi alialysis (Ex. DTEA, Meta	YES	1				
		11.50					
Were Trip Blanks (i.e., VOAs,	LL-Hg) in cooler with sample			***		-	· · · · · · · · · · · · · · · · · · ·
Were Trip Blanks (i.e., VOAs, Were all water VOA vials free of he		es? Yes		<u></u>			
Were all water VOA vials free of he	adspace (i.e., bubbles ≤ 6mn	es? Yes n)? N/A					
Were all water VOA vials free of hea	adspace (i.e., bubbles ≤ 6mn eld extracted with MeOH+BF	es? Yes n)? N/A B? Yes					
Were all water VOA vials free of he Were all soil VOAs fi For Rush/Short Hold Time, w	adspace (i.e., bubbles ≤ 6mn eld extracted with MeOH+BF ras RUSH/Short HT email se	es? Yes n)? N/A B? Yes nt? N/A	<u> </u>	procedures an	d may import	data qualitu	
Were all water VOA vials free of he Were all soil VOAs fi For Rush/Short Hold Time, w	adspace (i.e., bubbles ≤ 6mn eld extracted with MeOH+BF	es? Yes n)? N/A B? Yes nt? N/A	<u> </u>	procedures an	d may impact	data quality	
Were all water VOA vials free of he Were all soil VOAs fi For Rush/Short Hold Time, w	adspace (i.e., bubbles ≤ 6mn eld extracted with MeOH+BF ras RUSH/Short HT email se	es? Yes n)? N/A EB? Yes nt? N/A mpliance	with standard	procedures an	d may impact	data quality	
Were all water VOA vials free of he Were all soil VOAs fi For Rush/Short Hold Time, w	adspace (i.e., bubbles ≤ 6mn eld extracted with MeOH+BF ras RUSH/Short HT email se answer above indicates non-co	es? Yes n)? N/A 'B? Yes nt? N/A mpliance otes (if a	with standard	procedures an	d may impact	data quality	



e-Sample Receipt Form

1227130 1227130 SGS Workorder #: **Review Criteria** ondition (Yes, No, N/A **Exceptions Noted below** Chain of Custody / Temperature Requirements Note: Temperature and COC seal information is found on the chain of custody form DOD only: Did all sample coolers have a corresponding COC? N/A If <0°C, were sample containers ice free? N/A Note containers received with ice: Identify any containers received at non-compliant temperature: (Use form FS-0029 if more space is needed) olding Time / Documentation / Sample Condition Requirement: Note: Refer to form F-083 "Sample Guide" for specific holding times and sample containers. Were samples received within analytical holding time? Do sample labels match COC? Record discrepancies. Note: If information on containers differs from COC, default to COC information for login. If times differ <1hr, record details & login per COC. Were analytical requests clear? Yes (i.e. method is specified for analyses with multiple option for method (Eg, BTEX 8021 vs 8260, Metals 6020 vs 200.8) Were proper containers (type/mass/volume/preservative)used? Note: Exemption for metals analysis by 200.8/6020 in water. Volatile Analysis Requirements (VOC, GRO, LL-Hg, etc.) Vere all soil VOAs received with a corresponding % solids container? Yes Were Trip Blanks (e.g., VOAs, LL-Hg) in cooler with samples? Yes Were all water VOA vials free of headspace (e.g., bubbles ≤ 6mm)? N/A Were all soil VOAs field extracted with Methanol+BFB? Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality. Additional notes (if applicable):

F102b SRFpm 20210526 Page 55 of 56



Sample Containers and Preservatives

Container Id	<u>Preservative</u>	Container Condition	Container Id	<u>Preservative</u>	Container Condition
1227130001-A	No Preservative Required	OK			
1227130001-B	Methanol field pres. 4 C	OK			
1227130002-A	No Preservative Required	OK			
1227130002-B	Methanol field pres. 4 C	OK			
1227130003-A	No Preservative Required	OK			
1227130003-B	Methanol field pres. 4 C	ОК			
1227130004-A	No Preservative Required	ОК			
1227130004-B	Methanol field pres. 4 C	OK			
1227130005-A	No Preservative Required	ОК			
1227130005-B	Methanol field pres. 4 C	OK			
1227130006-A	No Preservative Required	ОК			
1227130006-B	Methanol field pres. 4 C	ОК			
1227130007-A	No Preservative Required	OK			
1227130007-B	Methanol field pres. 4 C	ОК			
1227130008-A	No Preservative Required	OK			
1227130008-B	Methanol field pres. 4 C	ОК			
1227130009-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

- $\ensuremath{\mathsf{OK}}$ The container was received at an acceptable pH for the analysis requested.
- BU The container was received with headspace greater than 6mm.
- DM The container was received damaged.
- FR The container was received frozen and not usable for Bacteria or BOD analyses.
- IC The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
- NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
- PA The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
- PH The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added. QN Insufficient sample quantity provided.

Page 56 of 56

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Completed By: Dana Fjare		N/A	Lab Name:	SGS North America, Inc.		
Title:	Environmental Scientist	ADEC File No.:	N/A	Lab Report No.:	1227130		
Consulting Firm	Shannon & Wilson, Inc.	Hazard ID No.:	N/A	Lab Report Date:	12/21/22		
Note: Any N/A or		must have an exp	planation in the con	nments box.			
ap Ye Co	 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: Analyses were performed by SGS North America, Inc. in Anchorage, Alaska. 						
 b. If the samples were transferred to another "network" laboratory or sub-contracte to an alternate laboratory, was the laboratory performing the analyses CS-LAP approved? Yes □ No □ N/A ⋈ Comments: Samples were not contracted 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: 							
Ye Ar an	s ⊠ No □ N/A	: GRO (AK101), E	? BTEX (8021), DRO	(AK102), RRC	D (AK103),		

Revision 9/2022

3. Laboratory Sample Receipt Documentation

а	. 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): A temperature blank was included with the samples in the cooler and is used to assess temperature preservation. The temperature blank was reported at 2.3 °C upon arrival at the SGS laboratory. Comments:
b	. Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)? Yes ⊠ No □ N/A □ Comments:
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 receipt form noted that samples were received in acceptable condition.
d	. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.? Yes \square No \square N/A \boxtimes
	Comments: The laboratory did not report any sample handling discrepancies.
e	. Is the data quality or usability affected? Yes □ No □ N/A ⊠
	Comments: Data quality and usability are not affected; see above.
4. Case	e Narrative
а	. 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 ☒ Output The lebest translation of identification of identificati
	Comments: The laboratory did not identify any discrepancies, errors, or QC failures.
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: Data quality and usability are not affected; see above. 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: 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 \boxtimes No \square N/A \square Comments: e. Is the data quality or usability affected? Yes □ No ⋈ N/A □ Comments: Data quality and usability were not affected; 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 □ Comments: Method blank results were less than the LOQ: however, GRO were detected in the method blank at an estimated concentration of 1.74 J mg/kg, less than the LOQ but greater than the laboratory detection limit. iii. If above LoQ or RL, what samples are affected? Comments: The method blank was prepared with batch VXX/39524. The

SS34, and the Trip Blank.

associated project samples include 22OTZ-SS26, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS39, 22OTZ-SS30, 22OTZ-SS32, 22OTZ-SS33, 22OTZ-S

	iv.	Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes \boxtimes No \square N/A \square
		Comments: The GRO concentrations detected in the associated project samples 220TZ-SS26, 220TZ-SS27, 220TZ-SS28, 220TZ-SS29, 220TZ-SS30, 220TZ-SS32, 220TZ-SS33, 220TZ-SS34, and Trip Blank were reported less than the LOQ. The GRO results in the associated project samples are considered estimated non-detections and are qualified "UB" at the LOQ.
	V.	Data quality or usability affected? Yes ⊠ No □ N/A □ Comments: Data quality and usability are affected; see above.
b.	Labora	atory 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: An LCS/LCSD was reported for GRO, DRO, RRO, and BTEX analyses.
		An LCS-only was reported for PAH analysis. We cannot be certain of laboratory precision for analyses without an LCSD.
	ii.	Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples? Yes \square No \square N/A \boxtimes
		Comments: Metals/inorganic 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 \boxtimes No \square N/A \square 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 \boxtimes No \square N/A \square Comments:

	V.	Comments: N/A; accuracy and precision were within laboratory control limits.
	vi.	Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes No N/A Comments: accuracy and precision were within laboratory control limits; flags were not required.
	vii.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: Data quality and usability are not affected; see above.
c. M	atrix	Spike/Matrix Spike Duplicate (MS/MSD)
	i.	Organics – Are one MS/MSD reported per matrix, analysis and 20 samples? Yes No N/A Comments: An MS/MSD was reported for BTEX and PAH analyses. An MS/MSD was not reported for GRO, DRO, or RRO analyses.
	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 with this work order.
	iii.	Accuracy – Are all percent recoveries (%R) reported and within method of laboratory limits and project specified objectives, if applicable? Yes No N/A
	iv.	Comments: The recovery of PAH-analytes 1-methylnaphthalene and 2-methylnaphthalane exceeded laboratory QC limits in the MS/MSD pair 1699498/1699499.
	V.	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 \boxtimes No \square N/A \square Comments:
	vi.	If %R or RPD is outside of acceptable limits, what samples are affected? Comments: The project samples 220TZ-SS33 and 220TZ-SS34 are associated with the MS/MSD pair 1699498/1699499.

CS Site Name: N/A Lab Report No.: 1227130

	vii.	Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
		Yes □ No ⋈ N/A □
		Comments: Failures in MS/MSD accuracy or precision are considered to only affect the parent sample used to prepare the MS/MSD. The parent sample for the MS/MSD is not a sample from this work order. Consequently, the project sample results are considered unaffected by the high analyte recovery.
	viii.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: Data quality and usability are not affected; see above.
d.	-	gates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution ds Only
	i.	Are surrogate/IDA recoveries reported for organic analyses – field, QC, and laboratory samples? Yes \boxtimes No \square N/A \square 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 \boxtimes No \square N/A \square 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: Surrogate recoveries were within laboratory control limits.
	iv.	Is the data quality or usability affected? Yes □ No □ N/A ⊠ Comments: Data quality and usability are not affected; see above.
e.	Trip B	lanks
	i.	Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes \boxtimes No \square N/A \square Comments:
	ii.	Are all results less than LoQ or RL? Yes ⊠ No □ N/A □

CS Site Name: N/A **Lab Report No.:** 1227130

> Comments: Trip blank results were less than the LOQ; however, GRO were detected at an estimated concentration below the LOQ but greater than the detection limit.

	iii.	If above LoQ or RL, what samples are affected? Comments: The GRO detection in the Trip Blank was the result of laboratory cross-contamination as evidenced by the GRO detection in the method blank. The project samples associated with the Trip Blank have already been qualified for the method blank GRO detection.
	iv.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: Data quality and usability are not affected; see above.
f.	Field D	Ouplicate
	i.	Are one field duplicate submitted per matrix, analysis, and 10 project samples? Yes \boxtimes No \square N/A \square Comments:
	ii.	Was the duplicate submitted blind to lab? Yes \boxtimes No \square N/A \square Comments: Field duplicate sample pair 22OTZ-SS29 and 22OTZ-SS30 were submitted "blind" to the laboratory.
	iii.	Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water or air, 50% soil)
		$RPD (\%) = \left \frac{R_1 - R_2}{\left(\frac{R_1 + R_2}{2}\right)} \right X 100$
		Where R_1 = Sample Concentration
		R ₂ = Field Duplicate Concentration
	iv.	Is the data quality or usability affected? (Explain) Yes □ No ☒ N/A □ Comments: Field-duplicate sample RPDs were within the project objective for soil of 50%, where calculable.
g.	Decon	tamination or Equipment Blanks
	i.	Were decontamination or equipment blanks collected? Yes □ No ☒ N/A □ Comments:

ii.	Are all results less than LoQ or RL? Yes □ No □ N/A ☒ Comments: An equipment blank was not submitted with this work order
iii.	If above LoQ or RL, specify what samples are affected. Comments: N/A, an equipment blank was not submitted with this work order.
iv.	Are data quality or usability affected? Yes □ No □ N/A X Comments: Data quality and usability were not affected, see above.
7. Other Data F	lags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
Yes □	ey defined and appropriate? □ No □ N/A ⊠ ents: Other data qualifiers or flags were not required.

CS Site Name: N/A Lab Report No.: 1227130

PREPARED FOR

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

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JOB DESCRIPTION

ADQT&PP Statewide

JOB NUMBER

320-94968-1

Eurofins Sacramento 880 Riverside Parkway West Sacramento CA 95605

Eurofins Sacramento

Job Notes

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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

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

Client: Shannon & Wilson, Inc Project/Site: ADQT&PP Statewide Laboratory Job ID: 320-94968-1

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

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.

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

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Case Narrative

Client: Shannon & Wilson, Inc Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-94968-1

Receipt

The samples were received on 12/6/2022 1:36 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 3.4° C.

LCMS

Method EPA 537(Mod): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: MW10-09 (320-94968-3). 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 Perfluorobutanesulfonic acid (PFBS) of preparation batch 320-639072 and analytical batch 320-640016 were 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 320-639072 were light brown in color prior to extraction. MW110-04 (320-94968-1) and MW10-04 (320-94968-2)

Method 3535: The following samples in preparation batch 320-639072 were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction. MW110-04 (320-94968-1) and MW10-04 (320-94968-2)

Method 3535: Due to the thin layer of sediment present in the bottom of the bottle, the following samples were centrifuged and decanted into new 250 mL container: MW110-04 (320-94968-1) and MW10-04 (320-94968-2). After centrifuging and decanting, the samples were fortified with IDA and then extracted. 320-639072

Method 3535: The following sample in preparation batch 320-639072 was light brown in color and observed to have floating particulates present in the sample bottle. MW10-09 (320-94968-3)

Method 3535: During the solid phase extraction process, the following samples contained floating particulates which clogged the solid phase extraction column: MW10-09 (320-94968-3). 320-639072

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

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Job ID: 320-94968-1

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Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

Client Sample ID: MW110-04

Lab Sample ID: 320-94968-1

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	15	2.0	0.57	ng/L	1	_	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.5	2.0	0.25	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	10	2.0	0.84	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	24	2.0	0.27	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	2.3	2.0	0.31	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.78 J	2.0	0.20	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.5	2.0	0.56	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	150	2.0	0.53	ng/L	1		EPA 537(Mod)	Total/NA

Client Sample ID: MW10-04

Lab Sample ID: 320-94968-2

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	14	2.1	0.61	ng/L		EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	7.8	2.1	0.26	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	9.7	2.1	0.90	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	24	2.1	0.28	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	2.6	2.1	0.33	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	0.84 J	2.1	0.21	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	9.6	2.1	0.60	ng/L	1	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	160	2.1	0.57	ng/L	1	EPA 537(Mod)	Total/NA

Client Sample ID: MW10-09

Lab Sample ID: 320-94968-3

Analyte	Result Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	280	2.2	0.64	ng/L	1	_	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	160	2.2	0.28	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	41	2.2	0.94	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.2 J	2.2	0.30	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorobutanesulfonic acid (PFBS)	7.9	2.2	0.22	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	43	2.2	0.63	ng/L	1		EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	5.2	2.2	0.60	ng/L	1		EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Client Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94968-1

Project/Site: ADQT&PP Statewide

Client Sample ID: MW110-04 Lab Sample ID: 320-94968-1

Date Collected: 12/03/22 18:30 **Matrix: Water** Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL		D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	15		2.0	0.57	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluoroheptanoic acid (PFHpA)	7.5		2.0	0.25	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorooctanoic acid (PFOA)	10		2.0	0.84	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorononanoic acid (PFNA)	24		2.0	0.27	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorodecanoic acid (PFDA)	2.3		2.0	0.31	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.72	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorobutanesulfonic acid (PFBS)	0.78	J	2.0	0.20	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorohexanesulfonic acid (PFHxS)	9.5		2.0	0.56	ng/L		12/12/22 06:38	12/14/22 12:55	
Perfluorooctanesulfonic acid (PFOS)	150		2.0		ng/L		12/12/22 06:38	12/14/22 12:55	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		4.9	1.2	ng/L		12/12/22 06:38	12/14/22 12:55	
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		4.9		ng/L		12/12/22 06:38	12/14/22 12:55	
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		2.0	0.24	ng/L		12/12/22 06:38	12/14/22 12:55	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		12/12/22 06:38	12/14/22 12:55	
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		2.0	0.32	ng/L		12/12/22 06:38	12/14/22 12:55	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.39	ng/L		12/12/22 06:38	12/14/22 12:55	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	97		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C4 PFHpA	97		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C4 PFOA	94		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C5 PFNA	99		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C2 PFDA	91		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C2 PFUnA	97		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C2 PFDoA	85		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C2 PFTeDA	96		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C3 PFBS	101		50 - 150				12/12/22 06:38	12/14/22 12:55	
1802 PFHxS	98		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C4 PFOS	94		50 - 150				12/12/22 06:38	12/14/22 12:55	
d3-NMeFOSAA	79		50 ₋ 150				12/12/22 06:38	12/14/22 12:55	
d5-NEtFOSAA	75		50 - 150				12/12/22 06:38	12/14/22 12:55	
13C3 HFPO-DA	91		50 ₋ 150				12/12/22 06:38	12/14/22 12:55	

Client Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

Client Sample ID: MW10-04

Lab Sample ID: 320-94968-2

Date Collected: 12/03/22 18:40 **Matrix: Water** Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	14		2.1	0.61	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluoroheptanoic acid (PFHpA)	7.8		2.1	0.26	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorooctanoic acid (PFOA)	9.7		2.1	0.90	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorononanoic acid (PFNA)	24		2.1	0.28	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorodecanoic acid (PFDA)	2.6		2.1	0.33	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluoroundecanoic acid (PFUnA)	ND		2.1	1.2	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorododecanoic acid (PFDoA)	ND		2.1	0.58	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorotridecanoic acid (PFTriA)	ND		2.1	1.4	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.1	0.77	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorobutanesulfonic acid (PFBS)	0.84	J	2.1	0.21	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorohexanesulfonic acid (PFHxS)	9.6		2.1	0.60	ng/L		12/12/22 06:38	12/14/22 13:06	1
Perfluorooctanesulfonic acid (PFOS)	160		2.1	0.57	ng/L		12/12/22 06:38	12/14/22 13:06	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		5.3	1.3	ng/L		12/12/22 06:38	12/14/22 13:06	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		5.3	1.4	ng/L		12/12/22 06:38	12/14/22 13:06	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		2.1	0.25	ng/L		12/12/22 06:38	12/14/22 13:06	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.2		ng/L		12/12/22 06:38	12/14/22 13:06	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		2.1	0.34	ng/L		12/12/22 06:38	12/14/22 13:06	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.1	0.42	ng/L		12/12/22 06:38	12/14/22 13:06	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	96		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C4 PFHpA	90		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C4 PFOA	93		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C5 PFNA	96		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C2 PFDA	96		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C2 PFUnA	100		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C2 PFDoA	88		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C2 PFTeDA	94		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C3 PFBS	92		50 - 150				12/12/22 06:38	12/14/22 13:06	1
1802 PFHxS	94		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C4 PFOS	89		50 - 150				12/12/22 06:38	12/14/22 13:06	1
d3-NMeFOSAA	79		50 - 150				12/12/22 06:38	12/14/22 13:06	1
d5-NEtFOSAA	79		50 - 150				12/12/22 06:38	12/14/22 13:06	1
13C3 HFPO-DA	86		50 ₋ 150				12/12/22 06:38	12/14/22 13:06	1

Client Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94968-1

Project/Site: ADQT&PP Statewide

Date Received: 12/06/22 13:36

13C3 HFPO-DA

Client Sample ID: MW10-09 Lab Sample ID: 320-94968-3 Date Collected: 12/03/22 17:40

Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	280		2.2	0.64	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluoroheptanoic acid (PFHpA)	160		2.2	0.28	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorooctanoic acid (PFOA)	41		2.2	0.94	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorononanoic acid (PFNA)	1.2	J	2.2	0.30	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorodecanoic acid (PFDA)	ND		2.2	0.34	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluoroundecanoic acid (PFUnA)	ND		2.2	1.2	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorododecanoic acid (PFDoA)	ND		2.2	0.61	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorotridecanoic acid (PFTriA)	ND		2.2	1.4	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.2	0.81	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorobutanesulfonic acid	7.9		2.2	0.22	ng/L		12/12/22 06:38	12/14/22 13:36	1
(PFBS)									
Perfluorohexanesulfonic acid (PFHxS)	43		2.2	0.63	ng/L		12/12/22 06:38	12/14/22 13:36	1
Perfluorooctanesulfonic acid (PFOS)	5.2		2.2	0.60	ng/L		12/12/22 06:38	12/14/22 13:36	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		5.5	1.3	ng/L		12/12/22 06:38	12/14/22 13:36	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		5.5	1.4	ng/L		12/12/22 06:38	12/14/22 13:36	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		2.2	0.27	ng/L		12/12/22 06:38	12/14/22 13:36	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.4	1.7	ng/L		12/12/22 06:38	12/14/22 13:36	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		2.2	0.35	ng/L		12/12/22 06:38	12/14/22 13:36	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.2	0.44	ng/L		12/12/22 06:38	12/14/22 13:36	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	58		50 - 150				12/12/22 06:38	12/14/22 13:36	
13C4 PFHpA	59		50 ₋ 150				12/12/22 06:38	12/14/22 13:36	1
13C4 PFOA	63		50 ₋ 150				12/12/22 06:38	12/14/22 13:36	1
13C5 PFNA	66		50 - 150				12/12/22 06:38	12/14/22 13:36	1
13C2 PFDA	62		50 ₋ 150				12/12/22 06:38	12/14/22 13:36	1
13C2 PFUnA	59		50 - 150				12/12/22 06:38	12/14/22 13:36	1
13C2 PFDoA	48	*5-	50 - 150					12/14/22 13:36	1
13C2 PFTeDA	39		50 - 150					12/14/22 13:36	1
13C3 PFBS	56		50 - 150					12/14/22 13:36	1
1802 PFHxS	64		50 ₋ 150					12/14/22 13:36	
13C4 PFOS	62		50 - 150					12/14/22 13:36	1
d3-NMeFOSAA	43	*5-	50 - 150					12/14/22 13:36	1

12/12/22 06:38 12/14/22 13:36

50 - 150

Isotope Dilution Summary

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

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

Matrix Spike Duplicate

Lab Control Sample Dup

Lab Control Sample

Method Blank

Matrix: Water Prep Type: Total/NA

Γ			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		PFHxA	C4PFHA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFTDA
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)
320-94968-1	MW110-04	97	97	94	99	91	97	85	96
320-94968-2	MW10-04	96	90	93	96	96	100	88	94
320-94968-3	MW10-09	58	59	63	66	62	59	48 *5-	39 *5-
320-94998-A-1-B MS	Matrix Spike		93	95	90	86	93	81	92
320-94998-A-1-C MSD	Matrix Spike Duplicate		101	96	101	98	106	91	102
LCS 320-639072/2-A	Lab Control Sample	88	80	82	87	87	86	81	89
LCSD 320-639072/3-A	Lab Control Sample Dup	98	102	98	100	94	99	94	96
MB 320-639072/1-A	Method Blank	101	110	94	102	98	98	89	100
			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		C3PFBS	PFHxS	PFOS	d3NMFOS	d5NEFOS	HFPODA		
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)		
320-94968-1	MW110-04	101	98	94	79	75	91		
320-94968-2	MW10-04	92	94	89	79	79	86		
320-94968-3	MW10-09	56	64	62	43 *5-	43 *5-	54		
320-94998-A-1-B MS	Matrix Spike	100	102	92	68	69	90		

109

98

105

97

101

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98

99

82

69

76

80

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73

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109

94

99

102

_	
Surrogate	Leaend

320-94998-A-1-C MSD

LCSD 320-639072/3-A

LCS 320-639072/2-A

MB 320-639072/1-A

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

Eurofins Sacramento

Client: Shannon & Wilson, Inc
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

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

Lab Sample ID: MB 320-639072/1-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 639072

MB MB Dil Fac Result Qualifier RL **MDL** Unit Analyzed Analyte Prepared Perfluorohexanoic acid (PFHxA) ND 2.0 0.58 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluoroheptanoic acid (PFHpA) ND 2.0 0.25 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluorooctanoic acid (PFOA) ND 2.0 0.85 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluorononanoic acid (PFNA) ND 2.0 0.27 ng/L 12/12/22 06:38 12/14/22 11:34 0.31 ng/L Perfluorodecanoic acid (PFDA) ND 2.0 12/12/22 06:38 12/14/22 11:34 Perfluoroundecanoic acid (PFUnA) ND 2.0 12/12/22 06:38 12/14/22 11:34 1.1 ng/L ND Perfluorododecanoic acid (PFDoA) 2.0 12/12/22 06:38 12/14/22 11:34 0.55 ng/L Perfluorotridecanoic acid (PFTriA) ND 2.0 1.3 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluorotetradecanoic acid (PFTeA) ND 20 0.73 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluorobutanesulfonic acid (PFBS) ND 2.0 0.20 ng/L 12/12/22 06:38 12/14/22 11:34 Perfluorohexanesulfonic acid (PFHxS) ND 12/12/22 06:38 12/14/22 11:34 2.0 0.57 ng/L Perfluorooctanesulfonic acid (PFOS) ND 2.0 0.54 ng/L 12/12/22 06:38 12/14/22 11:34 N-methylperfluorooctanesulfonamidoa ND 5.0 12/12/22 06:38 12/14/22 11:34 1.2 ng/L cetic acid (NMeFOSAA) ND 5.0 1.3 ng/L 12/12/22 06:38 12/14/22 11:34 N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 2.0 0.24 ng/L 12/12/22 06:38 12/14/22 11:34 e-1-sulfonic acid ND 4.0 1.5 ng/L 12/12/22 06:38 12/14/22 11:34 Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) ND 2.0 0.32 ng/L 12/12/22 06:38 12/14/22 11:34 11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid 0.40 ng/L ND 2.0 12/12/22 06:38 12/14/22 11:34 4,8-Dioxa-3H-perfluorononanoic acid

MB MB

	IVID	IVID			
Isotope Dilution	%Recovery	Qualifier Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	101	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFHpA	110	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFOA	94	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C5 PFNA	102	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFDA	98	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFUnA	98	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFDoA	89	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFTeDA	100	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C3 PFBS	102	50 - 150	12/12/22 06:38	12/14/22 11:34	1
1802 PFHxS	97	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFOS	99	50 - 150	12/12/22 06:38	12/14/22 11:34	1
d3-NMeFOSAA	80	50 - 150	12/12/22 06:38	12/14/22 11:34	1
d5-NEtFOSAA	78	50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C3 HFPO-DA	91	50 - 150	12/12/22 06:38	12/14/22 11:34	1

Lab Sample ID: LCS 320-639072/2-A

Matrix: Water

(ADONA)

Analysis Batch: 640016

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

Prep Batch: 639072

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	40.0	39.3		ng/L		98	72 - 129	
Perfluoroheptanoic acid (PFHpA)	40.0	43.9		ng/L		110	72 - 130	
Perfluorooctanoic acid (PFOA)	40.0	42.1		ng/L		105	71 - 133	
Perfluorononanoic acid (PFNA)	40.0	43.7		ng/L		109	69 - 130	

Eurofins Sacramento

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Spike

Client: Shannon & Wilson, Inc
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

LCS LCS

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

Lab Sample ID: LCS 320-639072/2-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prop Ratch: 639072

Prep Type: Total/NA
Prep Batch: 639072
%Rec
Limits

	Opino						/0.100	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorodecanoic acid (PFDA)	40.0	40.7		ng/L		102	71 - 129	
Perfluoroundecanoic acid	40.0	42.8		ng/L		107	69 - 133	
(PFUnA)								
Perfluorododecanoic acid	40.0	43.8		ng/L		110	72 - 134	
(PFDoA)								
Perfluorotridecanoic acid	40.0	42.8		ng/L		107	65 - 144	
(PFTriA)								
Perfluorotetradecanoic acid	40.0	40.3		ng/L		101	71 - 132	
(PFTeA)								
Perfluorobutanesulfonic acid	35.5	35.7		ng/L		101	72 - 130	
(PFBS)				_				
Perfluorohexanesulfonic acid	36.5	35.6		ng/L		98	68 - 131	
(PFHxS)								
Perfluorooctanesulfonic acid	37.2	37.6		ng/L		101	65 - 140	
(PFOS)						400		
N-methylperfluorooctanesulfona	40.0	40.6		ng/L		102	65 - 136	
midoacetic acid (NMeFOSAA)	40.0	20.0				07	04 405	
N-ethylperfluorooctanesulfonami	40.0	38.8		ng/L		97	61 - 135	
doacetic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxan	37.4	36.8		ng/l		98	77 - 137	
onane-1-sulfonic acid	37.4	30.0		ng/L		90	11 - 131	
Hexafluoropropylene Oxide	40.0	39.9		ng/L		100	72 - 132	
Dimer Acid (HFPO-DA)	40.0	33.3		iig/L		100	72 - 102	
11-Chloroeicosafluoro-3-oxaund	37.8	37.0		ng/L		98	76 - 136	
ecane-1-sulfonic acid	37.0	01.0		∌/ ⊑		00	. 0 - 100	
4,8-Dioxa-3H-perfluorononanoic	37.8	37.8		ng/L		100	81 - 141	
acid (ADONA)				J				
· · · · · · · · · · · · · · · · · · ·								

LCS LCS

	LUU	L03	
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	88		50 - 150
13C4 PFHpA	80		50 - 150
13C4 PFOA	82		50 - 150
13C5 PFNA	87		50 - 150
13C2 PFDA	87		50 - 150
13C2 PFUnA	86		50 - 150
13C2 PFDoA	81		50 - 150
13C2 PFTeDA	89		50 - 150
13C3 PFBS	94		50 - 150
1802 PFHxS	98		50 - 150
13C4 PFOS	91		50 - 150
d3-NMeFOSAA	69		50 - 150
d5-NEtFOSAA	73		50 - 150
13C3 HFPO-DA	80		50 - 150

Lab Sample ID: LCSD 320-639072/3-A

Matrix: Water

Analyte

Analysis Batch: 640016

Perfluorohexanoic acid (PFHxA)

Perfluoroheptanoic acid (PFHpA)

Perfluorooctanoic acid (PFOA)

						Prep Ty Prep Ba	•		
Spike	LCSD	LCSD				%Rec		RPD	
Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
40.0	40.4		ng/L		101	72 - 129	3	30	
40.0	39.9		ng/L		100	72 - 130	10	30	
40.0	42.9		ng/L		107	71 - 133	2	30	

Client Sample ID: Lab Control Sample Dup

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12/19/2022

QC Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

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

Lab Sample ID: LCSD 320-639072/3-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 639072

	Spike	LCSD	LCSD				%Rec		RPD
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorononanoic acid (PFNA)	40.0	42.1		ng/L		105	69 - 130	4	30
Perfluorodecanoic acid (PFDA)	40.0	41.7		ng/L		104	71 - 129	2	30
Perfluoroundecanoic acid (PFUnA)	40.0	43.1		ng/L		108	69 - 133	1	30
Perfluorododecanoic acid (PFDoA)	40.0	43.4		ng/L		109	72 - 134	1	30
Perfluorotridecanoic acid (PFTriA)	40.0	43.3		ng/L		108	65 - 144	1	30
Perfluorotetradecanoic acid (PFTeA)	40.0	42.6		ng/L		107	71 - 132	6	30
Perfluorobutanesulfonic acid (PFBS)	35.5	39.3		ng/L		111	72 - 130	10	30
Perfluorohexanesulfonic acid (PFHxS)	36.5	36.0		ng/L		99	68 - 131	1	30
Perfluorooctanesulfonic acid (PFOS)	37.2	38.1		ng/L		102	65 - 140	1	30
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	40.0	42.0		ng/L		105	65 - 136	3	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	40.0	38.3		ng/L		96	61 - 135	1	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	37.4	35.1		ng/L		94	77 - 137	5	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	40.2		ng/L		100	72 - 132	1	30
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	37.8	37.7		ng/L		100	76 - 136	2	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	43.4		ng/L		115	81 - 141	14	30

LCSD LCSD

	LCSD	LUSD	
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	98		50 - 150
13C4 PFHpA	102		50 - 150
13C4 PFOA	98		50 - 150
13C5 PFNA	100		50 - 150
13C2 PFDA	94		50 - 150
13C2 PFUnA	99		50 - 150
13C2 PFDoA	94		50 - 150
13C2 PFTeDA	96		50 - 150
13C3 PFBS	99		50 - 150
1802 PFHxS	105		50 - 150
13C4 PFOS	98		50 - 150
d3-NMeFOSAA	76		50 - 150
d5-NEtFOSAA	77		50 - 150
13C3 HFPO-DA	96		50 - 150
-			

Lab Sample ID: 320-94998-A-1-B MS

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Matrix Spike **Prep Type: Total/NA** Prep Batch: 639072

_	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroheptanoic acid (PFHpA)	34		36.1	77.4		ng/L		120	72 - 130	
Perfluorooctanoic acid (PFOA)	70		36.1	112		ng/L		117	71 - 133	

Eurofins Sacramento

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Job ID: 320-94968-1 Client: Shannon & Wilson, Inc Project/Site: ADQT&PP Statewide

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

Lab Sample ID: 320-94998-A-1-B MS

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Matrix Spike

Prep Type: Total/NA Prep Batch: 639072

	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorononanoic acid (PFNA)	6.0		36.1	45.3		ng/L		109	69 - 130	
Perfluorodecanoic acid (PFDA)	2.7		36.1	43.0		ng/L		111	71 - 129	
Perfluoroundecanoic acid (PFUnA)	ND		36.1	36.4		ng/L		101	69 - 133	
Perfluorododecanoic acid (PFDoA)	ND		36.1	41.5		ng/L		115	72 - 134	
Perfluorotridecanoic acid (PFTriA)	ND		36.1	41.8		ng/L		116	65 - 144	
Perfluorotetradecanoic acid (PFTeA)	ND		36.1	35.7		ng/L		99	71 - 132	
Perfluorobutanesulfonic acid (PFBS)	71	F1	32.1	110		ng/L		121	72 - 130	
Perfluorohexanesulfonic acid (PFHxS)	28		33.0	60.5		ng/L		100	68 - 131	
Perfluorooctanesulfonic acid (PFOS)	120		33.6	161		ng/L		110	65 - 140	
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		36.1	37.7		ng/L		104	65 - 136	
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		36.1	34.9		ng/L		97	61 - 135	
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		33.8	33.7		ng/L		100	77 - 137	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		36.1	38.5		ng/L		106	72 - 132	
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		34.1	34.0		ng/L		100	76 - 136	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		34.1	39.9		ng/L		117	81 - 141	

MS MS

%Recovery 93	Qualifier	Limits
		50 450
		50 - 150
95		50 - 150
90		50 - 150
86		50 - 150
93		50 - 150
81		50 - 150
92		50 - 150
100		50 - 150
102		50 - 150
92		50 - 150
68		50 - 150
69		50 - 150
90		50 - 150
	95 90 86 93 81 92 100 102 92 68	95 90 86 93 81 92 100 102 92 68

Lab Sample ID: 320-94998-A-1-C MSD

Matrix: Water

Matrix: Water Analysis Batch: 640016							·		Prep Ty Prep Ba	•		
-	Sample	Sample	Spike	MSD	MSD				%Rec		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Perfluoroheptanoic acid (PFHpA)	34		37.8	79.8		ng/L		121	72 - 130	3	30	
Perfluorooctanoic acid (PFOA)	70		37.8	112		ng/L		112	71 - 133	0	30	
Perfluorononanoic acid (PFNA)	6.0		37.8	45.3		ng/L		104	69 - 130	0	30	

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Client Sample ID: Matrix Spike Duplicate

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QC Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

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

Lab Sample ID: 320-94998-A-1-C MSD **Matrix: Water**

Analysis Batch: 640016

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA Prep Batch: 639072

Analysis Balch: 640016	_								Ргер Ба	aten: 63	
	•	Sample	Spike		MSD				%Rec		RPD
Analyte		Qualifier	Added		Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorodecanoic acid (PFDA)	2.7		37.8	42.0		ng/L		104	71 - 129	2	30
Perfluoroundecanoic acid	ND		37.8	38.1		ng/L		101	69 - 133	5	30
(PFUnA)											
Perfluorododecanoic acid (PFDoA)	ND		37.8	42.8		ng/L		113	72 - 134	3	30
Perfluorotridecanoic acid (PFTriA)	ND		37.8	42.3		ng/L		112	65 - 144	1	30
Perfluorotetradecanoic acid (PFTeA)	ND		37.8	38.2		ng/L		101	71 - 132	7	30
Perfluorobutanesulfonic acid (PFBS)	71	F1	33.6	117	F1	ng/L		135	72 - 130	6	30
Perfluorohexanesulfonic acid (PFHxS)	28		34.5	62.0		ng/L		100	68 - 131	3	30
Perfluorooctanesulfonic acid (PFOS)	120		35.2	163		ng/L		110	65 - 140	1	30
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		37.8	37.7		ng/L		100	65 - 136	0	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		37.8	39.2		ng/L		103	61 - 135	11	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		35.3	34.6		ng/L		98	77 - 137	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		37.8	38.5		ng/L		102	72 - 132	0	30
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		35.7	34.2		ng/L		96	76 - 136	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		35.7	39.9		ng/L		112	81 - 141	0	30

otope Dilution	%Recovery	Qualifie
	MSD	MSD

Isotope Dilution	%Recovery Quali	fier Limits
13C4 PFHpA	101	50 - 150
13C4 PFOA	96	50 - 150
13C5 PFNA	101	50 - 150
13C2 PFDA	98	50 - 150
13C2 PFUnA	106	50 - 150
13C2 PFDoA	91	50 - 150
13C2 PFTeDA	102	50 - 150
13C3 PFBS	109	50 - 150
1802 PFHxS	109	50 - 150
13C4 PFOS	101	50 - 150
d3-NMeFOSAA	82	50 - 150
d5-NEtFOSAA	77	50 - 150
13C3 HFPO-DA	98	50 - 150

QC Association Summary

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

LCMS

Prep Batch: 639072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94968-1	MW110-04	Total/NA	Water	3535	
320-94968-2	MW10-04	Total/NA	Water	3535	
320-94968-3	MW10-09	Total/NA	Water	3535	
MB 320-639072/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-639072/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-639072/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
320-94998-A-1-B MS	Matrix Spike	Total/NA	Water	3535	
320-94998-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	3535	

Analysis Batch: 640016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94968-1	MW110-04	Total/NA	Water	EPA 537(Mod)	639072
320-94968-2	MW10-04	Total/NA	Water	EPA 537(Mod)	639072
320-94968-3	MW10-09	Total/NA	Water	EPA 537(Mod)	639072
MB 320-639072/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	639072
LCS 320-639072/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	639072
LCSD 320-639072/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	639072
320-94998-A-1-B MS	Matrix Spike	Total/NA	Water	EPA 537(Mod)	639072
320-94998-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 537(Mod)	639072

Lab Chronicle

Client: Shannon & Wilson, Inc Job ID: 320-94968-1 Project/Site: ADQT&PP Statewide

Client Sample ID: MW110-04

Lab Sample ID: 320-94968-1

Date Collected: 12/03/22 18:30 **Matrix: Water** Date Received: 12/06/22 13:36

Batch Batch Dil Initial Batch Final Prepared Method Number or Analyzed **Prep Type** Type Run **Factor Amount** Amount Analyst Total/NA 3535 253.3 mL 10.0 mL 639072 12/12/22 06:38 EET SAC Prep EJR Total/NA EPA 537(Mod) 640016 12/14/22 12:55 RS1 **EET SAC** Analysis 1 1 mL 1 mL

Lab Sample ID: 320-94968-2 Client Sample ID: MW10-04

Date Collected: 12/03/22 18:40 **Matrix: Water** Date Received: 12/06/22 13:36

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Method **Amount** Amount Number or Analyzed Type Run **Factor** Analyst Lab Total/NA Prep 3535 237 mL 10.0 mL 639072 12/12/22 06:38 EJR **EET SAC** Total/NA Analysis 1 mL 640016 12/14/22 13:06 RS1 EPA 537(Mod) 1 mL **EET SAC** 1

Client Sample ID: MW10-09 Lab Sample ID: 320-94968-3

Date Collected: 12/03/22 17:40 **Matrix: Water**

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			225.7 mL	10.0 mL	639072	12/12/22 06:38	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	640016	12/14/22 13:36	RS1	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 Job ID: 320-94968-1

Project/Site: ADQT&PP Statewide

Laboratory: Eurofins Sacramento

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

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

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Method Summary

Client: Shannon & Wilson, Inc Project/Site: ADQT&PP Statewide Job ID: 320-94968-1

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

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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

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Sample Summary

Client: Shannon & Wilson, Inc Project/Site: ADQT&PP Statewide Job ID: 320-94968-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
320-94968-1	MW110-04	Water	12/03/22 18:30	12/06/22 13:36
320-94968-2	MW10-04	Water	12/03/22 18:40	12/06/22 13:36
320-94968-3	MW10-09	Water	12/03/22 17:40	12/06/22 13:36

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SHANNON & WILSO 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 www.shannonwilson.com	3	IN-OF-CUS		RECORD Analytical Methods (in	Attn:	
Turn Around Time: Normal Rush Please Specify	Quote No: J-Flags: X Yes	Date Sampled	A. S.			Remarks/Matrix Composition/Grab? Sample Containers
Sample Identity	Lab No. Time	Sampled				Composition/Grab? Sample Containers
MW 110 - 04	1830	2/3/22 X			2	Groundwoter Grab Sample
MW10-04	1840	X			2	
MW10-09	1740	1 X			2	Y
Project Information	Sample Receipt	Reliquished I	By: 1.	Reliquished E	By: 2.	Reliquished By: 3,
Number: 102219	Total No. of Containers:	Signature:	Time: 1200	Signature:	Time:	Signature: Time:
Name: ADOTAPP Statewide	COC Seals/Intact? Y/N/NA	adam wylon	-			1110
Contact: Kristen Freibunger	Received Good Cond./Cold	Printed Name:	Date: 12/5	Printed Name:	Date:	Printed Name: Date:
Ongoing Project? Yes ▼ No No	Temp:	Adam Wyborn	4			
Sampler: APW / JKR	Delivery Method: AK AIC Cors	Company:	ilson Inc.	Company:		Company:
No	tes:	Received B		Received By	/: 2 .	Received By: 3.
		Signature:	Time: 13', 36	Signature:	Time:	Signature: Time:
		Printed Name: N, (ahil)	Date: 12 / 5	Printed Name:	Date:	Printed Name: Date:
Distribution: White - w/shipment - returned Yellow - w/shipment - for con Pink - Shannon & Wilson - jo	signee files	port Company: EETSAC		Company:		Company:
			3,4		·	No.

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc Job Number: 320-94968-1

Login Number: 94968 List Source: Eurofins Sacramento

List Number: 1

Creator: Cahill, Nicholas P

oroator. Gainii, Monoido i		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	N/A	
The cooler's custody seal, if present, is intact.	True	1722671
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	
s the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is 6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Mason Craker	CS Site Name:	N/A	Lab Name:	Eurofins Environment Testing		
Title:	Geology Staff	ADEC File No.:	N/A	Lab Report No.:	320-94968-1		
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID No.:	N/A	Lab Report Date:	December 19, 2022		
Note: Any N	'A or No box check	ed must have	an explanation in the	comments box.			
1. Labo	ratory						
a.	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 ADEC certified Eurofins Environment Testing, West Sacramento for the analysis of PFAS. These compounds were included in the ADEC's Contaminated Sites Laboratory Approval 17-020.						
b.	to an alternate la approved? Yes □ No □ N	boratory, was I/A ⊠	to another "network" the laboratory perform	ing the analyse	es CS-LAP		
2. Chair	n of Custody (CoC	;)					
a.	Is the CoC inform released/received Yes ⊠ No □ No Comments:	d by)?	ted, signed, and dated	(including			
b.	the Department of	N/A □ ted: Per- and of Defense (De	uested? polyfluorinated substar oD) Quality Systems M ersion 5.3 Table B-15.	` ,	•		

Revision 9/2022

CS Site Name: N/A

Lab Report No.: 320-94968-1

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): A temperature blank was included with the samples in the cooler and is used to assess sample temperature. The temperature blank was reported at 3.4°C upon arrival at the laboratory. Comments:
	b.	Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)? Yes \boxtimes No \square N/A \square
		Comments: PFAS does not require any additional preservation beyond temperature control.
	C.	Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.? Yes \boxtimes No \square N/A \square
		Comments: The laboratory notes that the samples arrived in good condition.
	d.	If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.? Yes \square No \square N/A \boxtimes
		Comments: The laboratory does not note any discrepancies.
	e.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: See above.
4.	Case I	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 \boxtimes No \square N/A \square Comments:
		The isotope dilution analyte (IDA) recovery associated with the sample <i>MW10-09</i> is below the method recommended limit. Generally, data quality is not affected if the IDA signal-to-noise ratio is greater than 10:1, which is achieved for all IDA in the samples.

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The matrix spike duplicate (MSD) recoveries for perfluorobutanesulfonic acid (PFBS) in preparation batch 320-639072 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The samples MW110-04 and MW10-04 in preparation batch 320-639072 were light brown in color and were observed to have a thin layer of sediment present in the bottom of the bottle prior to extraction.

The sample MW10-09 in preparation batch 320-639072 was light brown in color and observed to have floating particulates present in the sample bottle.

During the solid phase extraction process, the sample MW10-09 contained

		floating particulates which clogged the solid phase extraction column.
		Were all the corrective actions documented? Yes \boxtimes No \square N/A \square Comments: Due to the thin layer of sediment present in the bottom of the bottle the samples $MW110-04$ and $MW10-04$ were centrifuged and decanted into new 250mL containers. After centrifuging and decanting, the samples were fortified with IDA and then extracted
	C.	What is the effect on data quality/usability according to the case narrative? Comments: The case narrative does not note an effect on data quality or usability.
5. Sample Results		
	a.	Are the correct analyses performed/reported as requested on CoC? Yes \boxtimes No \square N/A \square 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: Soils were not submitted 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 \boxtimes No \square N/A \square Comments:

CS Site			N/A : 320-94968-1	
		e.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: See above.	
6.	QC	Sa	mples	
	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 □Comments:	
			iii. If above LOQ or RL, what samples are affected? Comments: There were no detections in the method blank associated with the project samples.	
			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: LCS/LCSD were reported for method EPA 537(Mod). 	
			 ii. Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples? Yes □ No □ N/A ☒ Comments: Metals/Inorganics 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

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	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) $ \begin{tabular}{ll} Yes & \boxtimes & No & \square & N/A & \square \\ Comments: \end{tabular} $
V.	If %R or RPD is outside of acceptable limits, what samples are affected? Comments: None. %R and RPD were within acceptable limits.
vi.	Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes \square No \square N/A \boxtimes 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/MSD samples were reported for EPA 537(Mod).
ii.	Metals/Inorganics – Are one MS/MSD reported per matrix, analysis and 20 samples? Yes □ No □ N/A ⊠ Comments: Metals/Inorganics 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 associated with preparation batch 639072 exhibited elevated recovery for PFBS.
iv.	Precision – Are all relative percent differences (RPD) reported and less

than method or laboratory limits and project specified objectives, if

CS Site Name: N/A Lab Report No.: 320-94968-1 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: The field sample from which the MS/MSD were spiked is not included with this work order. Additionally, the PFBS spike added to the matrix was insufficient for accurate quantitation against the background PFBS concentration. The reported sample results are not affected. vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes □ No □ N/A ☒ Comments: Project samples were not affected. 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: IDA recovery was below the acceptable range for 13C2-PFDoA, 13C2-PFTeDA, d3-NMeFOSAA, and d5-NEtFOSAA in sample MW10-09. iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined? Yes ⊠ No □ N/A □

Comments: The analytes PFDoA, PFTriA, PFTeA, NMeFOSAA, and NEtFOSAA in sample *MW10-09* are considered estimated and have been

assigned the data flag 'UJ' for reporting purposes.

iv. Is the data quality or usability affected?

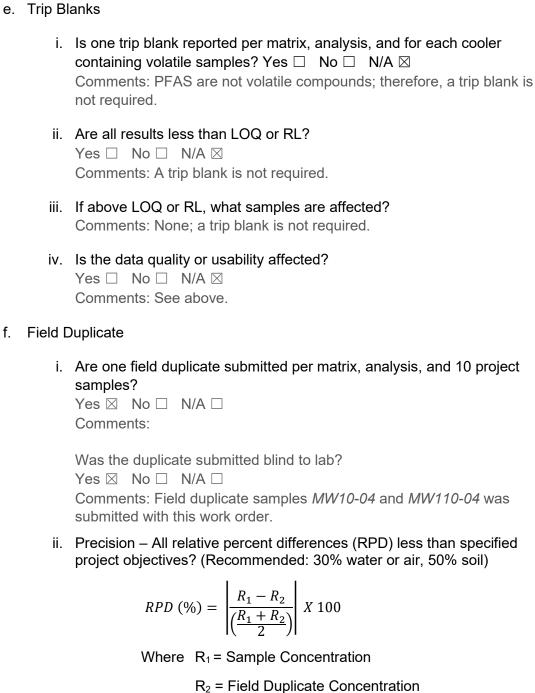
Yes ⊠ No □ N/A □

CS Site Name: N/A

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Comments: The data quality is affected. The affected results are considered usable with the qualifiers detailed above.

				_
e.	Trip	ВΙ	an	ks



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

Yes ⊠ No □ N/A □

Comments: RPD are within project DQOs, where calculable.

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	Yes □ No ⊠ N/A □ Comments: See above.
g. Decon	tamination or Equipment Blanks
i.	Were decontamination or equipment blanks collected? Yes \square No \square N/A \boxtimes Comments: Reusable equipment was not used; therefore, an equipment blank is 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: N/A; see above.
iv.	Are data quality or usability affected? Yes □ No □ N/A ⊠ Comments: See above.
7. Other Data Fl	ags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)
Yes □	ey defined and appropriate? No □ N/A ⊠ ents: There are no other data flags/qualifiers.

CS Site Name: N/A

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PREPARED FOR

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

ANALYTICAL REPORT

JOB DESCRIPTION

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Kotzenue DOT&PF

JOB NUMBER

320-94972-1

Eurofins Sacramento 880 Riverside Parkway West Sacramento CA 95605



Eurofins Sacramento

Job Notes

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Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF Laboratory Job ID: 320-94972-1

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Qualifiers

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
В	Compound was found in the blank and sample.
F1	MS and/or MSD recovery exceeds control limits.
G	The reported quantitation limit has been raised due to an exhibited elevated noise or matrix interference
Н	Sample was prepped or analyzed beyond the specified holding time
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary	
Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
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)
MDI	Made at Data stine Limit

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

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Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Laboratory: Eurofins Sacramento

Narrative

Job Narrative 320-94972-1

Receipt

The samples were received on 12/6/2022 1:36 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 4.9° C.

LCMS

Method EPA 537(Mod): The continuing calibration verification (CCVs) standard associated with batch 320-643841 recovered above the upper control limit for d3-NMeFOSAA and d5-NEtFOSAA. However, the corresponding targets in samples are ND, therefore there was no adverse impact to the data. 220TZ-SS01 (320-94972-1), 220TZ-SS02 (320-94972-2), 220TZ-SS03 (320-94972-3), 220TZ-SS04 (320-94972-4), 220TZ-SS05 (320-94972-5), 220TZ-SS06 (320-94972-6), 220TZ-SS07 (320-94972-7), 220TZ-SS08 (320-94972-8), 220TZ-SS09 (320-94972-9), 220TZ-SS10 (320-94972-10), 220TZ-SS11 (320-94972-11), 220TZ-SS12 (320-94972-12), 220TZ-SS13 (320-94972-13), 220TZ-SS14 (320-94972-14), 220TZ-SS15 (320-94972-15), 220TZ-SS17 (320-94972-17), 220TZ-SS18 (320-94972-18), 220TZ-SS19 (320-94972-19), 220TZ-SS20 (320-94972-20), (CCV 320-643841/15), (CCV 320-643841/27), (CCV 320-643841/3) and (CCVL 320-643841/2)

Method EPA 537(Mod): The continuing calibration verification (CCV) associated with batch 320-643847 recovered above the upper control limit for d3-NMeFOSAA and d5-NEtFOSAA. The samples associated with this CCV were non-detects for the affected Isotope Dilution Analytes (IDA); therefore, the data have been reported. The associated samples are impacted: 22OTZ-SS41 (320-94972-41), (CCV 320-643847/1) and (CCV 320-643847/11).

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte. 22OTZ-SS07 (320-94972-7), 22OTZ-SS09 (320-94972-9), 22OTZ-SS11 (320-94972-11), 22OTZ-SS12 (320-94972-12), 22OTZ-SS14 (320-94972-14), 22OTZ-SS15 (320-94972-15), 22OTZ-SS18 (320-94972-18) and (320-94972-A-1-C MSD)

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was above the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgment was used to positively identify the analyte. 22OTZ-SS08 (320-94972-8) and 22OTZ-SS13 (320-94972-13)

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte. 22OTZ-SS21 (320-94972-21), 22OTZ-SS22 (320-94972-22), 22OTZ-SS24 (320-94972-24), 22OTZ-SS27 (320-94972-27), 22OTZ-SS28 (320-94972-28), 22OTZ-SS33 (320-94972-33) and 22OTZ-SS37 (320-94972-37)

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte. 22OTZ-SS42 (320-94972-42), 22OTZ-SS43 (320-94972-43), 22OTZ-SS44 (320-94972-44), 22OTZ-SS45 (320-94972-45), 22OTZ-SS46 (320-94972-46) and 22OTZ-SS47 (320-94972-47)

Method EPA 537(Mod): The "I" qualifier means the transition mass ratio for the indicated analyte was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty. However, analyst judgment was used to positively identify the analyte. 22OTZ-SS45 (320-94972-45) and 22OTZ-SS47 (320-94972-47)

Method EPA 537(Mod): Perfluoroundecanoic acid (PFUnA) and Perfluorooctanesulfonic acid (PFOS) was detected above the half reporting limit (1/2RL) in the method blank associated with preparation batch 320-638278 and analytical batch 320-643847 as well as in the following samples: 22OTZ-SS42 (320-94972-42), 22OTZ-SS43 (320-94972-43), 22OTZ-SS44 (320-94972-44), 22OTZ-SS45 (320-94972-45), 22OTZ-SS46 (320-94972-46), 22OTZ-SS47 (320-94972-47) and (MB 320-638278/1-A). All affected samples were re-extracted outside of holding time. Both sets of data have been reported.

Method EPA 537(Mod): The matrix spike duplicate (MSD) recoveries for Perfluorobutanesulfonic acid (PFBS) of preparation batch 320-639072 and analytical batch 320-640016 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

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Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

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Laboratory: Eurofins Sacramento (Continued)

Method EPA 537(Mod): The Isotope Dilution Analyte (IDA) recovery associated with the following sample is below the method recommended limit: 22OTZ-SS12 (320-94972-12). 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): Results for samples 22OTZ-SS26 (320-94972-26), 22OTZ-SS27 (320-94972-27), 22OTZ-SS31 (320-94972-31) and 22OTZ-SS35 (320-94972-35) were reported from the analysis of a diluted extract due to high concentration of the target analyte 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): The following samples exhibited matrix interferences for Perfluorooctanesulfonic acid (PFOS) causing elevation of the reporting limit (RL): 22OTZ-SS36 (320-94972-36). The RL for the affected analyte has been raised to be equal to the matrix interferences, and a "G" qualifier applied.

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

General Chemistry

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

Organic Prep

Method SHAKE: The following samples were re-prepared outside of preparation holding time due to MB hits for PFTrDA and PFUnA: 22OTZ-SS42 (320-94972-42), 22OTZ-SS43 (320-94972-43), 22OTZ-SS44 (320-94972-44), 22OTZ-SS45 (320-94972-45), 22OTZ-SS46 (320-94972-46), 22OTZ-SS47 (320-94972-47), (320-94972-A-47 MS) and (320-94972-A-47 MSD).

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

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS01 Lab Sample ID: 320-94972-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.11	J	0.21	0.023	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.053	J	0.21	0.049	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.35		0.21	0.043	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.078	J	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS02

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.14	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.16	J	0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.043	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS03

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.064	J	0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.064	J	0.21	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.21	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.025	J	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS04

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.080	J	0.24	0.063	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.17	J	0.24	0.026	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.086	J	0.24	0.057	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.32		0.24	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.063	J	0.24	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS05

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.040	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.061	J	0.22	0.058	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.18	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.13	J	0.22	0.046	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.028	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS06

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.042	J	0.21	0.032	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.075	J	0.21	0.055	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.12	J	0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.052	J	0.21	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.093	J	0.21	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS07

– Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.62		0.21	0.024	ug/Kg	1	☆	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.070	J	0.21	0.051	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.056	J	0.21	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.026	J	0.21	0.022	ug/Kg	1	₽	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Lab Sample ID: 320-94972-2

Lab Sample ID: 320-94972-3

Lab Sample ID: 320-94972-4

Lab Sample ID: 320-94972-5

Lab Sample ID: 320-94972-6

Lab Sample ID: 320-94972-7

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS07 (Continued)

Lab Sample ID: 320-94972-7

Result Qualifier RL **MDL** Unit Dil Fac D Method **Prep Type** Perfluorooctanesulfonic acid (PFOS) 1.3 Ī 0.21 0.046 ug/Kg 1 🌣 EPA 537(Mod) Total/NA

Client Sample ID: 22OTZ-SS08

Lab Sample ID: 320-94972-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.1		0.20	0.032	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.067	J	0.20	0.039	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.79		0.20	0.054	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.028	J	0.20	0.023	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.16	J	0.20	0.043	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.058	J	0.20	0.031	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.048	J	0.20	0.021	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	1.5		0.20	0.030	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.4		0.20	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	0.034	JI	0.20	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS09

Lab Sample ID: 320-94972-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.11	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.062	J	0.22	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.12	J	0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.026	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.9	1	0.22	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS10

Lab Sample ID: 320-94972-10

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.051	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.56		0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.11	J	0.22	0.052	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.078	J	0.22	0.046	ug/Kg	1	⊅	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.024	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.3		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS11

Lab Sample ID: 320-94972-11

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.078	J	0.21	0.033	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.060	J	0.21	0.040	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.090	J	0.21	0.056	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.068	J	0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.21		0.21	0.051	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.38		0.21	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.051	J	0.21	0.032	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.058	J	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.90	I	0.21	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS12

Lab Sample ID: 320-94972-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.048	JI	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.056	J	0.22	0.042	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS12 (Continued)

Lab Sample ID: 320-94972-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.074	J	0.22	0.059	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.040	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.12	J	0.22	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.36		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.064	J	0.22	0.033	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.048	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS13

Lab Sample ID: 320-94972-13

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.058	JI	0.22	0.035	ug/Kg	1	-	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.047	J	0.22	0.043	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.076	J	0.22	0.060	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.37		0.22	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.27		0.22	0.054	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.62		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.12	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.16	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.043	J	0.22	0.042	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.3		0.22	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS14

Lab Sample ID: 320-94972-14

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.086	J	0.22	0.033	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.20	J	0.22	0.057	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.55		0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.089	J	0.22	0.052	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.22	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.044	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	I	0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS15

Lab Sample ID: 320-94972-15

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.028	J	0.22	0.024	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.11	J	0.22	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.33		0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.054	J	0.22	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.11	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.27	1	0.22	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS16

Lab Sample ID: 320-94972-16

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.049	J	0.20	0.048	ug/Kg		₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.35		0.20	0.042	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.040	J	0.20	0.030	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.054	J	0.20	0.021	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 220TZ-SS17

Lab Sample ID: 320-94972-17

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.22	J	0.23	0.025	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.15	J	0.23	0.055	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.26		0.23	0.048	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.081	J	0.23	0.024	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.7		0.23	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS18

Lab Sample ID: 320-9	4972-18
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.19	J	0.24	0.058	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.25		0.24	0.051	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.044	J	0.24	0.037	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.063	J	0.24	0.026	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.1	1	0.24	0.052	ug/Kg	1	₽	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS19

Lab Sample ID: 320-94972-19

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.037	J	0.25	0.028	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.17	J	0.25	0.060	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.50		0.25	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.058	J	0.25	0.038	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.11	J	0.25	0.026	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS20

Lab Sample ID: 320-94972-20

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.39		0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.20	J	0.22	0.052	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.24		0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.043	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	6.8		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS21

Lab Sample ID: 320-94972-21

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.024	J	0.21	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.055	J	0.21	0.051	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.41		0.21	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.057	J	0.21	0.032	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.12	J	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.26	1	0.21	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS22

Lab Sample ID: 320-94972-22

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.056	J	0.23	0.055	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.44		0.23	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.060	J	0.23	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.17	J	0.23	0.024	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.39	1	0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS23

Lab Sample ID: 320-94972-23

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.041	J	0.22	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.11	J	0.22	0.054	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.30		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.037	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.080	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.9		0.22	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS24

Lab Sample ID: 320-94972-24

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.047	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.078	J	0.22	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.054	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.69	1	0.22	0.048	ug/Kg	1	₽	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS25

Lab Sample ID: 320-94972-25

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.18	J	0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.036	J	0.22	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.12	J	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS26

Lab Sample ID: 320-94972-26

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	1.2	J	2.2	0.35	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	2.7		2.2	0.25	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	10		2.2	0.54	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	7.2		2.2	0.34	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	98		2.2	0.23	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	3.1		2.2	0.41	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.81	J	2.2	0.32	ug/Kg	10	₽	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	82		2.2	0.48	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - DL	240		4.5	0.94	ug/Kg	20	≎	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS27

Lab Sample ID: 320-94972-27

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.21		0.21	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.20	J	0.21	0.041	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.32		0.21	0.057	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.50		0.21	0.024	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	4.1		0.21	0.051	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.87		0.21	0.032	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	5.3		0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.28		0.21	0.040	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.11	JI	0.21	0.031	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - DL	26		1.1	0.23	ug/Kg	5	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	31		1.1	0.23	ug/Kg	5	₩	EPA 537(Mod)	Total/NA

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Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS28

Lab Sample ID: 320-94972-28

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.13	J	0.21	0.032	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.21	0.040	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.40		0.21	0.055	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.71		0.21	0.023	ug/Kg	1	⊅	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	3.2		0.21	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.7		0.21	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.36		0.21	0.031	ug/Kg	1	⊅	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.41		0.21	0.022	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.11	J	0.21	0.039	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.053	JI	0.21	0.030	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	10		0.21	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS29

Lab Sample	ID: 320-94972-29
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.30		0.23	0.035	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.21	J	0.23	0.043	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.63		0.23	0.060	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	1.4		0.23	0.025	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	2.6		0.23	0.054	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	9.3		0.23	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.62		0.23	0.034	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	2.5		0.23	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.21	J	0.23	0.042	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	15		0.23	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS30

Lab Sample ID: 320-94972-30

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.15	J	0.23	0.035	ug/Kg		₽	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.23	0.043	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.34		0.23	0.061	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.78		0.23	0.025	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	1.4		0.23	0.055	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.8		0.23	0.048	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.23		0.23	0.034	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.76		0.23	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.065	J	0.23	0.042	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.7		0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS31

Lab Sample ID: 320-94972-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.58		0.23	0.035	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.44		0.23	0.043	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.74		0.23	0.060	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	12		0.23	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	1.2		0.23	0.054	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	4.6		0.23	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.18	J	0.23	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	1.3		0.23	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.064	J	0.23	0.042	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS31 (Continued)

Lab Sample ID: 320-94972-31

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanesulfonic acid (PFHxS)	0.96		0.23	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) -	30		1.1	0.24	ug/Kg	5	₩	EPA 537(Mod)	Total/NA
DL									

Client Sample ID: 22OTZ-SS32

Lab Sample ID: 320-94972-32

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.090	J	0.22	0.034	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.077	J	0.22	0.041	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.11	J	0.22	0.058	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.64		0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.40		0.22	0.052	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	1.1		0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.065	J	0.22	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.29		0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	8.9		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS33

Lab Sample ID: 320-94972-33

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.061	J	0.23	0.036	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.050	J	0.23	0.044	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.087	J	0.23	0.062	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.26		0.23	0.026	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.65		0.23	0.056	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	3.4		0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.40		0.23	0.035	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.52		0.23	0.024	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.058	J	0.23	0.043	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	1.4	I	0.23	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS34

Lab Sample ID: 320-94972-34

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.073	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.066	J	0.22	0.042	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.15	J	0.22	0.059	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.14	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	2.9		0.22	0.053	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	6.3		0.22	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.86		0.22	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	1.4		0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.21	J	0.22	0.041	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	2.4		0.22	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS35

Lab Sample ID: 320-94972-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.20	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.22	0.041	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.29		0.22	0.058	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.64		0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	4.2		0.22	0.052	ug/Kg	1	₽	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS35 (Continued)

Lab Sample ID: 320-94972-35

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorododecanoic acid (PFDoA)	2.9		0.22	0.033	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	16		0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotetradecanoic acid (PFTeA)	0.33		0.22	0.040	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.22	0.032	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - DL	93		2.2	0.46	ug/Kg	10	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	29		2.2	0.47	ug/Kg	10	≎	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS36

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.074	J	0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.071	J	0.21	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.14	J	0.21	0.044	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.029	J	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.12	J	0.20	0.042	ug/Kg		₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.035	J	0.20	0.030	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.042	J	0.20	0.021	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.21	I	0.20	0.043	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS38

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.061	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.067	J	0.22	0.052	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.081	J	0.22	0.046	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.4		0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS39

Lab Sample ID: 320-94972	2-39
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Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.15	J	0.23	0.060	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.073	J	0.23	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS40

Lab Sample ID: 320-94972-40

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.035	J	0.22	0.034	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.11	J	0.22	0.058	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.091	J	0.22	0.024	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS41

Lab Sample ID: 320-94972-41

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D Method	Prep Type
Perfluorooctanoic acid (PFOA)	0.12 J	0.23	0.060 ug/Kg	1 🔅 EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.087 J	0.23	0.025 ug/Kg	1 🌣 EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS42

Lab Sample ID: 320-94972-42

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroheptanoic acid (PFHpA)	0.042	J	0.22	0.042	ug/Kg		☆	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.17	J	0.22	0.059	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.15	J	0.22	0.024	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.057	J	0.22	0.053	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.27	В	0.22	0.046	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.080	JB	0.22	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.19	JH	0.22	0.047	ug/Kg	1	*	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	2.4	HI	0.22	0.048	ug/Kg	1	☆	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS43

Lab Sample ID: 320-94972-43

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.14	J	0.24	0.037	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.12	J	0.24	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.30		0.24	0.063	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.27		0.24	0.026	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.089	JB	0.24	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.025	JB	0.24	0.025	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.090	JH	0.23	0.048	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RF	2.5	н	0.23	0.049	ug/Kg	1	₽	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS44

Lab Sample ID: 320-94972-44

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.062	J	0.24	0.037	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.062	J	0.24	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.25		0.24	0.063	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.30		0.24	0.026	ug/Kg	1		EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.14	J	0.24	0.057	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.39	В	0.24	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorododecanoic acid (PFDoA)	0.036	J	0.24	0.036	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.086	JB	0.24	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.29	Н	0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RF	1.5	HI	0.23	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 220TZ-SS45

Lab Sample ID: 320-94972-45

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.079	J	0.23	0.036	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.051	J	0.23	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanoic acid (PFOA)	0.091	J	0.23	0.062	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorononanoic acid (PFNA)	0.20	J	0.23	0.026	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorodecanoic acid (PFDA)	0.059	J	0.23	0.056	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.20	JB	0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.070	JВ	0.23	0.025	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.3	ΙB	0.23	0.050	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RF	0.20	JH	0.23	0.049	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

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Detection Summary

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sam	ple ID: 2	22OTZ-SS45	(Continued)

Lab Sample ID: 320-94972-45

Analyte	Result Qualifier	RL	MDL Unit	Dil Fac D Method	Prep Type
Perfluorooctanesulfonic acid (PFOS) -	8.4 H I	0.23	0.050 ug/Kg	1 🔅 EPA 537(Mod)	Total/NA
RF					

Client Sample ID: 22OTZ-SS46

Lab Sample ID: 320-94972-46

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.17	JB	0.22	0.047	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.052	JB	0.22	0.023	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.18	JH	0.22	0.046	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.31	HI	0.22	0.047	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-SS47

Lab Sample ID: 320-94972-47

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.025	J	0.21	0.023	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA)	0.29	В	0.21	0.043	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.13	JB	0.21	0.022	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.34	ΙΒ	0.21	0.044	ug/Kg	1	₽	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.16	JH	0.21	0.045	ug/Kg	1	₩	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.30	н	0.21	0.046	ug/Kg	1	₩	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-EB

Lab Sample ID: 320-94972-48

No Detections.

This Detection Summary does not include radiochemical test results.

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS01 Lab Sample ID: 320-94972-1

Date Collected: 11/30/22 20:45 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.032	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 04:50	
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.055	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorononanoic acid (PFNA)	0.11	J	0.21	0.023	ug/Kg	☆	12/07/22 19:13	01/02/23 04:50	1
Perfluorodecanoic acid (PFDA)	0.053	J	0.21	0.049	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluoroundecanoic acid (PFUnA)	0.35		0.21	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.031	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorotridecanoic acid (PFTriA)	0.078	J	0.21	0.022	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.039	ug/Kg		12/07/22 19:13	01/02/23 04:50	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.030	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.21	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
I-methylperfluorooctanesulfonamidoa etic acid (NMeFOSAA)	ND		0.21		ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	1
I-ethylperfluorooctanesulfonamidoac tic acid (NEtFOSAA)	ND		0.21	0.049	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	•
-Chlorohexadecafluoro-3-oxanonan -1-sulfonic acid	ND		0.21	0.036	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	
Hexafluoropropylene Oxide Dimer	ND		0.21	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	,
1-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	•
I,8-Dioxa-3H-perfluorononanoic acid ADONA)	ND		0.21	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 04:50	,
sotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	78		50 - 150				12/07/22 19:13	01/02/23 04:50	-
13C4 PFHpA	79		50 - 150				12/07/22 19:13	01/02/23 04:50	1
13C4 PFOA	86		50 - 150				12/07/22 19:13	01/02/23 04:50	1
13C5 PFNA	93		50 - 150				12/07/22 19:13	01/02/23 04:50	
13C2 PFDA	89		50 - 150				12/07/22 19:13	01/02/23 04:50	1
13C2 PFUnA	90		50 - 150				12/07/22 19:13	01/02/23 04:50	1
13C2 PFDoA	90		50 - 150				12/07/22 19:13	01/02/23 04:50	
13C2 PFTeDA	89		50 - 150				12/07/22 19:13	01/02/23 04:50	1
13C3 PFBS	62		50 - 150				12/07/22 19:13	01/02/23 04:50	
1802 PFHxS	65		50 - 150				12/07/22 19:13	01/02/23 04:50	
13C4 PFOS	67		50 - 150				12/07/22 19:13	01/02/23 04:50	
d3-NMeFOSAA	113		50 ₋ 150				12/07/22 19:13	01/02/23 04:50	1
d5-NEtFOSAA	135		50 - 150					01/02/23 04:50	:
13C3 HFPO-DA	80		50 - 150				12/07/22 19:13	01/02/23 04:50	•
General Chemistry						_			
Analyte		Qualifier	RL _	MDL		D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	13.8		0.1	0.1	%			12/07/22 12:40	1

12/07/22 12:40

0.1

0.1 %

86.2

Percent Solids (ASTM D 2216)

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS02

Percent Moisture (ASTM D 2216)

Percent Solids (ASTM D 2216)

13.8

86.2

Lab Sample ID: 320-94972-2 Date Collected: 11/30/22 21:10 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 86.2

Method: EPA 537(Mod) - PFAS Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.034	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 05:21	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.058	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorononanoic acid (PFNA)	0.14	J	0.22	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluoroundecanoic acid (PFUnA)	0.16	J	0.22	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₽	12/07/22 19:13	01/02/23 05:21	1
Perfluorotridecanoic acid (PFTriA)	0.043	J	0.22	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22		ug/Kg	☼	12/07/22 19:13	01/02/23 05:21	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg		12/07/22 19:13	01/02/23 05:21	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 05:21	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C4 PFOA	80		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C5 PFNA	89		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C2 PFDA	89		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C2 PFUnA	90		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C2 PFDoA	89		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C2 PFTeDA	90		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C3 PFBS	58		50 - 150				12/07/22 19:13	01/02/23 05:21	1
1802 PFHxS	61		50 - 150				12/07/22 19:13	01/02/23 05:21	1
13C4 PFOS	62		50 - 150				12/07/22 19:13	01/02/23 05:21	1
d3-NMeFOSAA	110		50 ₋ 150					01/02/23 05:21	1
d5-NEtFOSAA	126		50 - 150					01/02/23 05:21	1
13C3 HFPO-DA	76		50 - 150					01/02/23 05:21	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

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12/07/22 12:40

12/07/22 12:40

0.1

0.1

0.1 %

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS03

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-3 Date Collected: 11/30/22 21:30

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 89.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.033	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 05:31	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.056	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorononanoic acid (PFNA)	0.064	J	0.21	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorodecanoic acid (PFDA)	0.064	J	0.21	0.050	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.21	0.044	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorotridecanoic acid (PFTriA)	0.025	J	0.21	0.022	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 05:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.031	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.21	0.045	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21		ug/Kg			01/02/23 05:31	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21		ug/Kg			01/02/23 05:31	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21		ug/Kg			01/02/23 05:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 05:31	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	73		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C4 PFOA	80		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C5 PFNA	91		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C2 PFDA	85		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C2 PFUnA	93		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C2 PFDoA	86		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C2 PFTeDA	84		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C3 PFBS	61		50 - 150				12/07/22 19:13	01/02/23 05:31	1
18O2 PFHxS	65		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C4 PFOS	66		50 - 150				12/07/22 19:13	01/02/23 05:31	1
d3-NMeFOSAA	116		50 - 150				12/07/22 19:13	01/02/23 05:31	1
d5-NEtFOSAA	128		50 - 150				12/07/22 19:13	01/02/23 05:31	1
13C3 HFPO-DA	80		50 - 150				12/07/22 19:13	01/02/23 05:31	1
General Chemistry		.				_			 -
Analyte		Qualifier	RL _		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	11.0		0.1	0.1				12/07/22 12:40	1
Developed Options (AOTM DIOCES)	00.0		0.4	0.4	0/			10/07/00 10:40	

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12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS04

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-4

Date Collected: 11/30/22 21:45 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 84.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.037	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 05:41	
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.045	ug/Kg	≎	12/07/22 19:13	01/02/23 05:41	•
Perfluorooctanoic acid (PFOA)	0.080	J	0.24	0.063	ug/Kg	≎	12/07/22 19:13	01/02/23 05:41	•
Perfluorononanoic acid (PFNA)	0.17	J	0.24	0.026	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
Perfluorodecanoic acid (PFDA)	0.086	J	0.24	0.057	ug/Kg	≎	12/07/22 19:13	01/02/23 05:41	•
Perfluoroundecanoic acid (PFUnA)	0.32		0.24	0.050	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.035	ug/Kg	≎	12/07/22 19:13	01/02/23 05:41	
Perfluorotridecanoic acid (PFTriA)	0.063	J	0.24		ug/Kg	⇔	12/07/22 19:13	01/02/23 05:41	
Perfluorotetradecanoic acid (PFTeA)	ND		0.24		ug/Kg	⇔	12/07/22 19:13	01/02/23 05:41	
Perfluorobutanesulfonic acid (PFBS)	ND		0.24		ug/Kg		12/07/22 19:13	01/02/23 05:41	
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
Perfluorooctanesulfonic acid (PFOS)	ND		0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.24	0.057	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	•
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.24	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.048	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	•
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 05:41	,
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	78		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C4 PFHpA	80		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C4 PFOA	81		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C5 PFNA	88		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C2 PFDA	87		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C2 PFUnA	93		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C2 PFDoA	85		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C2 PFTeDA	80		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C3 PFBS	67		50 - 150				12/07/22 19:13	01/02/23 05:41	
1802 PFHxS	68		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C4 PFOS	65		50 - 150				12/07/22 19:13	01/02/23 05:41	
d3-NMeFOSAA	114		50 - 150				12/07/22 19:13	01/02/23 05:41	
d5-NEtFOSAA	119		50 - 150				12/07/22 19:13	01/02/23 05:41	
13C3 HFPO-DA	78		50 - 150				12/07/22 19:13	01/02/23 05:41	
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fa
Percent Moisture (ASTM D 2216)	15.9		0.1	0.1	%			12/07/22 12:40	•

Eurofins Sacramento

12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS05

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-5 Date Collected: 11/30/22 22:00 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 84.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.040	J	0.22	0.034	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 05:51	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	₽	12/07/22 19:13	01/02/23 05:51	1
Perfluorooctanoic acid (PFOA)	0.061	J	0.22	0.058	ug/Kg	₽	12/07/22 19:13	01/02/23 05:51	1
Perfluorononanoic acid (PFNA)	0.18	J	0.22	0.024	ug/Kg	₽	12/07/22 19:13	01/02/23 05:51	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.053	ug/Kg	₽	12/07/22 19:13	01/02/23 05:51	1
Perfluoroundecanoic acid (PFUnA)	0.13	J	0.22	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 05:51	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₽	12/07/22 19:13	01/02/23 05:51	1
Perfluorotridecanoic acid (PFTriA)	0.028	J	0.22	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	≎	12/07/22 19:13	01/02/23 05:51	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	≎	12/07/22 19:13	01/02/23 05:51	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 05:51	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 05:51	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	\$		01/02/23 05:51	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	≎	12/07/22 19:13	01/02/23 05:51	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	79		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C4 PFOA	79		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C5 PFNA	90		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C2 PFDA	86		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C2 PFUnA	91		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C2 PFDoA	84		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C2 PFTeDA	86		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C3 PFBS	66		50 - 150				12/07/22 19:13	01/02/23 05:51	1
1802 PFHxS	72		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C4 PFOS	69		50 - 150				12/07/22 19:13	01/02/23 05:51	1
d3-NMeFOSAA	115		50 - 150				12/07/22 19:13	01/02/23 05:51	1
d5-NEtFOSAA	130		50 - 150				12/07/22 19:13	01/02/23 05:51	1
13C3 HFPO-DA	74		50 - 150				12/07/22 19:13	01/02/23 05:51	1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	15.9		0.1	0.1	%			12/07/22 12:40	1

12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS06

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-6 Date Collected: 11/30/22 22:10 **Matrix: Solid**

Percent Solids: 85.9

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte **MDL** Unit Dil Fac Result Qualifier RL Prepared Analyzed Perfluorohexanoic acid (PFHxA) 12/07/22 19:13 01/02/23 06:01 0.042 J 0.21 0.032 ug/Kg Perfluoroheptanoic acid (PFHpA) 0.21 12/07/22 19:13 01/02/23 06:01 ND 0.040 ug/Kg Perfluorooctanoic acid (PFOA) 0.075 J 0.21 0.055 ug/Kg 12/07/22 19:13 01/02/23 06:01 0.21 0.023 ug/Kg 12/07/22 19:13 01/02/23 06:01 Perfluorononanoic acid (PFNA) 0.12 J Perfluorodecanoic acid (PFDA) 0.21 0.050 ug/Kg 12/07/22 19:13 01/02/23 06:01 0.052 J Perfluoroundecanoic acid 12/07/22 19:13 01/02/23 06:01 0.093 J 0.21 0.044 ug/Kg (PFUnA) 0.031 ug/Kg Perfluorododecanoic acid (PFDoA) ND 0.21 12/07/22 19:13 01/02/23 06:01 Perfluorotridecanoic acid (PFTriA) 0.022 ug/Kg 12/07/22 19:13 01/02/23 06:01 ND 0.21 Perfluorotetradecanoic acid (PFTeA) ND 0.21 0.039 ug/Kg # 12/07/22 19:13 01/02/23 06:01 Perfluorobutanesulfonic acid (PFBS) ND 0.040 ug/Kg 12/07/22 19:13 01/02/23 06:01 0.21 Perfluorohexanesulfonic acid (PFHxS) ND 0.030 ug/Kg 12/07/22 19:13 01/02/23 06:01 0.21 Perfluorooctanesulfonic acid (PFOS) ND 0.21 12/07/22 19:13 01/02/23 06:01 0.045 ug/Kg 0.024 ug/Kg N-methylperfluorooctanesulfonamidoa ND 12/07/22 19:13 01/02/23 06:01 0.21 cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac ND 0.21 0.050 ug/Kg 12/07/22 19:13 01/02/23 06:01 etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.21 0.036 ug/Kg 12/07/22 19:13 01/02/23 06:01 e-1-sulfonic acid ND 0.21 12/07/22 19:13 01/02/23 06:01 0.043 ug/Kg Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.21 0.032 ug/Kg 12/07/22 19:13 01/02/23 06:01 e-1-sulfonic acid 4,8-Dioxa-3H-perfluorononanoic acid ND 0.21 0.041 ug/Kg 12/07/22 19:13 01/02/23 06:01 (ADONA)

(ADONA)					
Isotope Dilution	%Recovery Qualif	ïer Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	80	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C4 PFHpA	85	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
13C4 PFOA	84	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
13C5 PFNA	99	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C2 PFDA	91	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
13C2 PFUnA	100	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C2 PFDoA	95	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C2 PFTeDA	92	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
13C3 PFBS	75	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
1802 PFHxS	74	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C4 PFOS	74	50 - 150	12/07/22 19:13	01/02/23 06:01	1
d3-NMeFOSAA	124	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1
d5-NEtFOSAA	133	50 - 150	12/07/22 19:13	01/02/23 06:01	1
13C3 HFPO-DA	85	50 ₋ 150	12/07/22 19:13	01/02/23 06:01	1

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	14.1		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	85.9		0.1	0.1	%			12/07/22 12:40	1

Eurofins Sacramento

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS07 Lab Sample ID: 320-94972-7

Date Collected: 11/30/22 22:25 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 87.6

Perfluorohexanoic acid (PFHxA)	ethod: EPA 537(Mod) - PFAS		•					_		
Perfluorochaptanoic acid (PFHpA)	•		Qualifier					<u> </u>	Analyzed	Dil Fac
Perfluoroctanoic acid (PFOA)	,						₽			1
Perfluoronanoic acid (PFNA) 0.62 0.21 0.024 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorodecanoic acid (PFDA) 0.070 J 0.21 0.051 ug/Kg 0 12/07/22 19:13 01/02/23 06 (PFUA) 0.056 J 0.021 0.045 ug/Kg 0 12/07/22 19:13 01/02/23 06 (PFUA) 0.026 0.021 0.032 ug/Kg 0 12/07/22 19:13 01/02/23 06 0.021 0.032 ug/Kg 0 12/07/22 19:13 01/02/23 06 0.021 0.022 ug/Kg 0 12/07/22 19:13 01/02/23 06 0.021 0.022 ug/Kg 0 12/07/22 19:13 01/02/23 06 0.022 ug/Kg 0 12/07/22 19:13 01							₽			1
Perfluorodecanoic acid (PFDA) 0.070 J 0.21 0.051 ug/Kg 0.1207/122 19:13 01/02/23 06	fluorooctanoic acid (PFOA)	ND		0.21	0.057	ug/Kg		12/07/22 19:13	01/02/23 06:31	1
Perfluoroundecanoic acid 0.056 J 0.21 0.045 ug/Kg 0. 12/07/22 19:13 01/02/23 06	rfluorononanoic acid (PFNA)	0.62		0.21	0.024	ug/Kg	≎	12/07/22 19:13	01/02/23 06:31	1
Perfluorododecanoic acid (PFDoA) ND 0.21 0.032 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorotridecanoic acid (PFTriA) 0.026 J 0.21 0.022 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorotridecanoic acid (PFTriA) ND 0.21 0.040 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorotrotradecanoic acid (PFTeA) ND 0.21 0.041 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorotrotradecanoic acid (PFTeA) ND 0.21 0.041 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluorotrotranesulfonic acid (PFHxS) ND 0.21 0.046 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonic acid (PFDA) ND 0.21 0.046 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonic acid ND 0.21 0.051 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.051 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.051 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.051 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.037 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.044 ug/Kg 0 12/07/22 19:13 01/02/23 06	rfluorodecanoic acid (PFDA)	0.070	J	0.21	0.051	ug/Kg	≎	12/07/22 19:13	01/02/23 06:31	1
Perfluorododecanoic acid (PFDA) ND 0.21 0.032 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorotridecanoic acid (PFTiA) 0.026 J 0.021 0.022 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorotridecanoic acid (PFTiA) ND 0.21 0.040 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorothaxanesulfonic acid (PFHxS) ND 0.21 0.041 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorochaxanesulfonic acid (PFHxS) ND 0.21 0.031 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonic acid (PFHxS) ND 0.21 0.046 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonic acid (PFOS) N-methylperfluorocatanesulfonamidoa ND 0.21 0.025 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.051 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.051 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.031 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.031 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.031 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.033 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.033 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.033 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.033 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 01/02/23 06 Perfluorocatanesulfonamidoa ND 0.21 0.034 ug/Kg 12(07/22 19:13 0		0.056	J	0.21	0.045	ug/Kg	≎	12/07/22 19:13	01/02/23 06:31	1
Perfluorotridecanoic acid (PFTriA) 0.026 J 0.21 0.021 0.024 0.0762 0.07722 19:13 0.102/23 06 0.07722 19:13 0.102/23 06 0.041 0.0762 0.041 0.0762 0.041 0.0762 0.07722 19:13 0.102/23 06 0.07722 19:13 0.102/23 06 0.041 0.0762 0.041 0.0762 0.041 0.0762 0.076		ND		0.21	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 06:31	1
Perfluorotetradecanoic acid (PFTeA) ND 0.21 0.040 ug/Kg 21/07/22 19:13 01/02/23 06 Perfluorobutanesulfonic acid (PFBS) ND 0.21 0.041 ug/Kg 21/07/22 19:13 01/02/23 06 Perfluorobutanesulfonic acid (PFBKS) ND 0.21 0.031 ug/Kg 21/07/22 19:13 01/02/23 06 Perfluoroctanesulfonic acid 1.3 0.21 0.046 ug/Kg 21/07/22 19:13 01/02/23 06 Perfluoroctanesulfonamidoa ND 0.21 0.025 ug/Kg 21/07/22 19:13 01/02/23 06 O.025 ug/Kg 21/07/22 19:13 O1/02/23 06 O.025 O.025 Ug/Kg 21/07/22 19:13 O1/02/23 06 O.025 O	rfluorotridecanoic acid (PFTriA)	0.026	J	0.21	0.022	ug/Kg	₽	12/07/22 19:13	01/02/23 06:31	1
Perfluorochexanesulfonic acid (PFHxS) ND 0.21 0.031 ug/Kg 0.12/07/22 19:13 01/02/23 06				0.21	0.040	ug/Kg	₽	12/07/22 19:13	01/02/23 06:31	1
Perfluorochexanesulfonic acid (PFHxS) ND 0.21 0.031 ug/Kg 0.12/07/22 19:13 01/02/23 06	fluorobutanesulfonic acid (PFBS)	ND		0.21	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 06:31	1
Perfluorocctanesulfonic acid (PFOS)	, ,	ND		0.21			₩	12/07/22 19:13	01/02/23 06:31	1
N-methylperfluorooctanesulfonamidoac estetic acid (NMeFOSAA) N-methylperfluorooctanesulfonamidoac etic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NMeFOSAA) ND 0.21 0.037 ug/Kg 0.12/07/22 19:13 01/02/23 06 0.21 0.044 ug/Kg 0.12/07/22 19:13 0.10/02/23 06 0.21 0.042 ug/Kg 0.12/07/22 19:13 0.10/02/23 06 0.13/04 0.0	, ,		1				±			1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-bethylperfluorooctanesulfonamidoac cetic acid (NMeFOSAA) N-bethylperfluorooctanesulfonamidoac etic acid (NEFOSAA) 9-Chlorohexadecafluoro-3-oxanonan			-			-3/1-3				
Nethylperfluorooctanesulfonamidoac etic acid (NEIFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.21 0.037 ug/Kg 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 13/02 PFHxA 07 00.21 0.042 0/Kg 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 13/02 PFHxA 07 00.21 0.042 0/Kg 01/02/23 06 12/07/22 19:13 01/02/23 06 12/07/22 19:13 01/02/23 06 13/02 PFHxA 07 00.21 0.042 0/Kg 01/02/23 06 12/07/22 19:13 01/02/23 06 13/02 PFHxA 07 00.045 01/02/23 06 13/02 PFHxA 07 00.045 01/02/23 06	nethylperfluorooctanesulfonamidoa	ND		0.21	0.025	ug/Kg	₽	12/07/22 19:13	01/02/23 06:31	1
9-Chlorohexadecafluoro-3-oxanonan ND 0.21 0.037 ug/Kg 212/07/22 19:13 01/02/23 06 e-1-sulfonic acid HPPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.21 0.044 ug/Kg 212/07/22 19:13 01/02/23 06 Acid (HPPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.21 0.033 ug/Kg 212/07/22 19:13 01/02/23 06 e-1-sulfonic acid (AB-Dioxa-3H-perfluorononanoic acid (ADONA) Isotope Dilution 8/Recovery Qualifier Limits Prepared 12/07/22 19:13 01/02/23 06 (ADONA) Isotope Dilution 8/Recovery Qualifier Limits Prepared 12/07/22 19:13 01/02/23 06 (ADONA) Isotope Dilution 8/Recovery Qualifier Limits Prepared 12/07/22 19:13 01/02/23 06 (ADONA) Isotope Dilution 8/Recovery 0/4	ethylperfluorooctanesulfonamidoac	ND		0.21	0.051	ug/Kg	₽	12/07/22 19:13	01/02/23 06:31	1
Hexafluoropropylene Oxide Dimer ND 0.21 0.044 ug/Kg 12/07/22 19:13 01/02/23 06 Acid (HFPO-DA) 0.033 ug/Kg 12/07/22 19:13 01/02/23 06 0.033	Chloronexadecafluoro-3-oxanonan	ND		0.21	0.037	ug/Kg	₽	12/07/22 19:13	01/02/23 06:31	1
Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.21 0.033 ug/Kg 12/07/22 19:13 01/02/23 06 e-1-sulfonic acid 4,8-Dioxa-3H-perfluorononanoic acid ND 0.21 0.042 ug/Kg 12/07/22 19:13 01/02/23 06 (ADONA) Sotope Dilution WRecovery Qualifier Limits Prepared Analyze		ND		0.04	0.044			40/07/00 40:40	04/00/00 00:04	
e-1-sulfonic acid 4,8-Dioxa-3H-perfluorononanoic acid (ADONA) Isotope Dilution Recovery Qualifier Limits Prepared Analyze		ND		0.21						1
Sotope Dilution SRecovery Qualifier Limits Prepared Analyze		ND		0.21	0.033	ug/Kg	≎	12/07/22 19:13	01/02/23 06:31	1
13C2 PFHXA 77 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFHpA 86 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOA 86 50 - 150 12/07/22 19:13 01/02/23 06 13C5 PFNA 95 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDA 91 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 43-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 45-NEIFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 <t< td=""><td>•</td><td>ND</td><td></td><td>0.21</td><td>0.042</td><td>ug/Kg</td><td>₩</td><td>12/07/22 19:13</td><td>01/02/23 06:31</td><td>1</td></t<>	•	ND		0.21	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 06:31	1
13C4 PFHpA 86 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOA 86 50 - 150 12/07/22 19:13 01/02/23 06 13C5 PFNA 95 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDA 91 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDOA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 18C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry	tope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOA 86 50 - 150 12/07/22 19:13 01/02/23 06 13C5 PFNA 95 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDA 91 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDOA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 33C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06	C2 PFHxA	77		50 - 150				12/07/22 19:13	01/02/23 06:31	1
13C5 PFNA 95 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDA 91 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 3C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06	C4 PFHpA	86		50 - 150				12/07/22 19:13	01/02/23 06:31	1
13C2 PFDA 91 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06	C4 PFOA	86		50 ₋ 150				12/07/22 19:13	01/02/23 06:31	1
13C2 PFUnA 100 50 - 150 12/07/22 19:13 01/02/23 00 13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 00 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 00 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 00 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 00 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 00 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 00 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 00 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 00	C5 PFNA	95		50 - 150				12/07/22 19:13	01/02/23 06:31	1
13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06	C2 PFDA	91		50 ₋ 150				12/07/22 19:13	01/02/23 06:31	1
13C2 PFDoA 90 50 - 150 12/07/22 19:13 01/02/23 06 13C2 PFTeDA 94 50 - 150 12/07/22 19:13 01/02/23 06 13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06	C2 PFUnA	100		50 ₋ 150				12/07/22 19:13	01/02/23 06:31	1
13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry	C2 PFDoA	90						12/07/22 19:13	01/02/23 06:31	1
13C3 PFBS 68 50 - 150 12/07/22 19:13 01/02/23 06 18O2 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry	C2 PFTeDA	94		50 ₋ 150				12/07/22 19:13	01/02/23 06:31	1
1802 PFHxS 68 50 - 150 12/07/22 19:13 01/02/23 06 13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry										1
13C4 PFOS 66 50 - 150 12/07/22 19:13 01/02/23 06 d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry								12/07/22 19:13	01/02/23 06:31	1
d3-NMeFOSAA 122 50 - 150 12/07/22 19:13 01/02/23 06 d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry										1
d5-NEtFOSAA 130 50 - 150 12/07/22 19:13 01/02/23 06 13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 06 General Chemistry										1
13C3 HFPO-DA 80 50 - 150 12/07/22 19:13 01/02/23 08 General Chemistry										1
										1
	eneral Chemistry									
	•	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
<u> </u>							=		12/07/22 12:40	1
7	•								12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS08 Lab Sample ID: 320-94972-8

Date Collected: 11/30/22 22:40 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 88.8

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	1.1		0.20	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
Perfluoroheptanoic acid (PFHpA)	0.067	J	0.20	0.039	ug/Kg	≎	12/07/22 19:13	01/02/23 06:42	
Perfluorooctanoic acid (PFOA)	0.79		0.20	0.054	ug/Kg	≎	12/07/22 19:13	01/02/23 06:42	
Perfluorononanoic acid (PFNA)	0.028	J	0.20	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
Perfluorodecanoic acid (PFDA)	ND		0.20	0.049	ug/Kg	≎	12/07/22 19:13	01/02/23 06:42	
Perfluoroundecanoic acid	0.16	J	0.20	0.043	ug/Kg	☆	12/07/22 19:13	01/02/23 06:42	
(PFUnA)									
Perfluorododecanoic acid	0.058	J	0.20	0.031	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
(PFDoA)									
Perfluorotridecanoic acid (PFTriA)	0.048	J	0.20		ug/Kg	₽	12/07/22 19:13	01/02/23 06:42	•
Perfluorotetradecanoic acid (PFTeA)	ND		0.20		ug/Kg			01/02/23 06:42	
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.039	ug/Kg	☆	12/07/22 19:13	01/02/23 06:42	•
Perfluorohexanesulfonic acid (PFHxS)	1.5		0.20	0.030	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	•
Perfluorooctanesulfonic acid (PFOS)	8.4		0.20	0.044	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
N-methylperfluorooctanesulfona	0.034	JI	0.20	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	
midoacetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac	ND		0.20	0.040	ug/Kg	**	12/07/22 10:13	01/02/23 06:42	
etic acid (NEtFOSAA)	ND		0.20	0.049	ug/rtg	740	12/01/22 19.13	01/02/23 00.42	
9-Chlorohexadecafluoro-3-oxanonan	ND		0.20	0.036	ug/Kg	÷	12/07/22 19:13	01/02/23 06:42	
e-1-sulfonic acid	112		0.20	0.000	ug/rtg	~	12/01/22 10:10	01/02/20 00:12	
Hexafluoropropylene Oxide Dimer	ND		0.20	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
Acid (HFPO-DA)					0 0				
11-Chloroeicosafluoro-3-oxaundecan	ND		0.20	0.032	ug/Kg	≎	12/07/22 19:13	01/02/23 06:42	
e-1-sulfonic acid									
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 06:42	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	79		50 - 150				12/07/22 19:13	01/02/23 06:42	
13C4 PFHpA	80		50 - 150				12/07/22 19:13	01/02/23 06:42	
13C4 PFOA	86		50 - 150				12/07/22 19:13	01/02/23 06:42	
13C5 PFNA	96		50 - 150				12/07/22 19:13	01/02/23 06:42	
13C2 PFDA	89		50 ₋ 150				12/07/22 19:13	01/02/23 06:42	
13C2 PFUnA	95		50 ₋ 150				12/07/22 19:13	01/02/23 06:42	
13C2 PFDoA	89		50 - 150					01/02/23 06:42	
13C2 PFTeDA	85		50 - 150					01/02/23 06:42	
13C3 PFBS	68		50 - 150					01/02/23 06:42	
1802 PFHxS	68		50 - 150 50 - 150					01/02/23 06:42	
13C4 PFOS	68		50 - 150 50 - 150					01/02/23 06:42	
d3-NMeFOSAA	116		50 - 150					01/02/23 06:42	
d5-NEtFOSAA								01/02/23 06:42	
13C3 HFPO-DA	136 80		50 ₋ 150 50 ₋ 150					01/02/23 06:42	
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fa
Percent Moisture (ASTM D 2216)	11.2		0.1	0.1	%		·	12/07/22 12:40	•
Percent Solids (ASTM D 2216)	88.8		0.1	0.1	%			12/07/22 12:40	

Eurofins Sacramento

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS09

Lab Sample ID: 320-94972-9 Date Collected: 11/30/22 22:55 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 87.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.034	ug/Kg	— <u></u>	12/07/22 19:13	01/02/23 06:52	
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	≎	12/07/22 19:13	01/02/23 06:52	
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Perfluorononanoic acid (PFNA)	0.11	J	0.22	0.024	ug/Kg	₽	12/07/22 19:13	01/02/23 06:52	
Perfluorodecanoic acid (PFDA)	0.062	J	0.22	0.053	ug/Kg	≎	12/07/22 19:13	01/02/23 06:52	
Perfluoroundecanoic acid (PFUnA)	0.12	J	0.22	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Perfluorotridecanoic acid (PFTriA)	0.026	J	0.22	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	≎	12/07/22 19:13	01/02/23 06:52	
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₽	12/07/22 19:13	01/02/23 06:52	
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Perfluorooctanesulfonic acid (PFOS)	1.9	I	0.22	0.048	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22		ug/Kg			01/02/23 06:52	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22		ug/Kg	#		01/02/23 06:52	
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	#		01/02/23 06:52	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 06:52	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	69		50 - 150					01/02/23 06:52	
13C4 PFHpA	74		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C4 PFOA	77		50 - 150					01/02/23 06:52	
13C5 PFNA	81		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C2 PFDA	86		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C2 PFUnA	85		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C2 PFDoA	82		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C2 PFTeDA	86		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C3 PFBS	55		50 - 150				12/07/22 19:13	01/02/23 06:52	
1802 PFHxS	63		50 ₋ 150				12/07/22 19:13	01/02/23 06:52	
13C4 PFOS	60		50 - 150				12/07/22 19:13	01/02/23 06:52	
d3-NMeFOSAA	111		50 - 150				12/07/22 19:13	01/02/23 06:52	
d5-NEtFOSAA	116		50 - 150				12/07/22 19:13	01/02/23 06:52	
13C3 HFPO-DA	72		50 - 150				12/07/22 19:13	01/02/23 06:52	
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Percent Moisture (ASTM D 2216)	12.8		0.1	0.1	%			12/07/22 12:40	
Percent Solids (ASTM D 2216)	87.2		0.1	0.1	%			12/07/22 12:40	

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS10

Lab Sample ID: 320-94972-10

Matrix: Solid

Date Collected: 11/30/22 23:05 Date Received: 12/06/22 13:36 Percent Solids: 87.6

Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.051	J	0.22	0.034	ug/Kg	— <u></u>	12/07/22 19:13	01/02/23 07:02	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.058	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorononanoic acid (PFNA)	0.56		0.22	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorodecanoic acid (PFDA)	0.11	J	0.22	0.052	ug/Kg	≎	12/07/22 19:13	01/02/23 07:02	1
Perfluoroundecanoic acid (PFUnA)	0.078	J	0.22	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₽	12/07/22 19:13	01/02/23 07:02	1
Perfluorotridecanoic acid (PFTriA)	0.024	J	0.22	0.023	ug/Kg	₽	12/07/22 19:13	01/02/23 07:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	≎	12/07/22 19:13	01/02/23 07:02	1
Perfluorooctanesulfonic acid (PFOS)	3.3		0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
9-Chlorohexadecafluoro-3-oxanonan	ND		0.22	0.038	ug/Kg	₽	12/07/22 19:13	01/02/23 07:02	1
e-1-sulfonic acid									
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22		ug/Kg	₽	12/07/22 19:13	01/02/23 07:02	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	₽	12/07/22 19:13	01/02/23 07:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 07:02	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:13	01/02/23 07:02	1
13C4 PFHpA	74		50 - 150				12/07/22 19:13	01/02/23 07:02	1
13C4 PFOA	81		50 - 150				12/07/22 19:13	01/02/23 07:02	1
13C5 PFNA	88		50 - 150				12/07/22 19:13	01/02/23 07:02	1
13C2 PFDA	80		50 ₋ 150				12/07/22 19:13	01/02/23 07:02	1
13C2 PFUnA	88		50 ₋ 150				12/07/22 19:13	01/02/23 07:02	1
13C2 PFDoA	82		50 - 150				12/07/22 19:13	01/02/23 07:02	1
13C2 PFTeDA	86		50 ₋ 150				12/07/22 19:13	01/02/23 07:02	1
13C3 PFBS	59		50 ₋ 150				12/07/22 19:13	01/02/23 07:02	1
1802 PFHxS	61		50 - 150					01/02/23 07:02	1
13C4 PFOS	62		50 ₋ 150					01/02/23 07:02	1
d3-NMeFOSAA	109		50 - 150					01/02/23 07:02	1
d5-NEtFOSAA	124		50 - 150					01/02/23 07:02	
13C3 HFPO-DA	73		50 - 150					01/02/23 07:02	1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.4		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	87.6		0.1	0.1	0/2			12/07/22 12:40	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS11

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-11 Date Collected: 11/30/22 23:25

Matrix: Solid

Percent Solids: 89.8 Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.078	J	0.21	0.033	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 07:12	
Perfluoroheptanoic acid (PFHpA)	0.060	J	0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorooctanoic acid (PFOA)	0.090	J	0.21	0.056	ug/Kg	≎	12/07/22 19:13	01/02/23 07:12	1
Perfluorononanoic acid (PFNA)	0.068	J	0.21	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
Perfluorodecanoic acid (PFDA)	0.21		0.21	0.051	ug/Kg	₽	12/07/22 19:13	01/02/23 07:12	1
Perfluoroundecanoic acid (PFUnA)	0.38		0.21	0.044	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
Perfluorododecanoic acid (PFDoA)	0.051	J	0.21		ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
Perfluorotridecanoic acid (PFTriA)	0.058	J	0.21		ug/Kg	≎	12/07/22 19:13	01/02/23 07:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21		ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.031	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorooctanesulfonic acid (PFOS)	0.90	I	0.21	0.045	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21	0.037	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21		ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21	0.033	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 07:12	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	75		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C4 PFHpA	80		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C4 PFOA	81		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C5 PFNA	92		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C2 PFDA	89		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C2 PFUnA	90		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C2 PFDoA	91		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C2 PFTeDA	91		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C3 PFBS	65		50 - 150				12/07/22 19:13	01/02/23 07:12	1
1802 PFHxS	66		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C4 PFOS	68		50 - 150					01/02/23 07:12	1
d3-NMeFOSAA	116		50 - 150				12/07/22 19:13	01/02/23 07:12	1
d5-NEtFOSAA	126		50 - 150				12/07/22 19:13	01/02/23 07:12	1
13C3 HFPO-DA	75		50 - 150				12/07/22 19:13	01/02/23 07:12	1
General Chemistry							_		
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	10.2		0.1	0.1				12/07/22 12:40	

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12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS12

Lab Sample ID: 320-94972-12 Date Collected: 11/30/22 23:15

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 83.9

Method: EPA 537(Mod) - PFAS Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.048	JI	0.22	0.034	ug/Kg	— <u></u>	12/07/22 19:13	01/02/23 07:22	1
Perfluoroheptanoic acid (PFHpA)	0.056	J	0.22	0.042	ug/Kg	₽	12/07/22 19:13	01/02/23 07:22	
Perfluorooctanoic acid (PFOA)	0.074	J	0.22	0.059	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	1
Perfluorononanoic acid (PFNA)	0.040	J	0.22	0.024	ug/Kg		12/07/22 19:13	01/02/23 07:22	1
Perfluorodecanoic acid (PFDA)	0.12	J	0.22		ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	
Perfluoroundecanoic acid	0.36		0.22		ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
(PFUnA)					0 0				
Perfluorododecanoic acid	0.064	J	0.22	0.033	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	1
(PFDoA)									
Perfluorotridecanoic acid (PFTriA)	0.048	J	0.22		ug/Kg	₩		01/02/23 07:22	•
Perfluorotetradecanoic acid (PFTeA)	ND		0.22		ug/Kg	*		01/02/23 07:22	
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	•
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.048	ug/Kg	≎	12/07/22 19:13	01/02/23 07:22	•
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	₽	12/07/22 19:13	01/02/23 07:22	,
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22		ug/Kg	≎	12/07/22 19:13	01/02/23 07:22	•
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.039	ug/Kg	₽	12/07/22 19:13	01/02/23 07:22	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	₽	12/07/22 19:13	01/02/23 07:22	,
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 07:22	•
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	45	*5-	50 - 150				12/07/22 19:13	01/02/23 07:22	
13C4 PFHpA	69		50 - 150				12/07/22 19:13	01/02/23 07:22	
13C4 PFOA	80		50 - 150				12/07/22 19:13	01/02/23 07:22	
13C5 PFNA	86		50 - 150				12/07/22 19:13	01/02/23 07:22	
13C2 PFDA	82		50 ₋ 150				12/07/22 19:13	01/02/23 07:22	
13C2 PFUnA	88		50 ₋ 150				12/07/22 19:13	01/02/23 07:22	
13C2 PFDoA	86		50 - 150				12/07/22 19:13	01/02/23 07:22	
13C2 PFTeDA	83		50 ₋ 150				12/07/22 19:13	01/02/23 07:22	
13C3 PFBS	63		50 - 150					01/02/23 07:22	
1802 PFHxS	71		50 - 150					01/02/23 07:22	
13C4 PFOS	73		50 - 150 50 - 150					01/02/23 07:22	
d3-NMeFOSAA	112		50 - 150					01/02/23 07:22	
d5-NEtFOSAA	121		50 - 150 50 - 150					01/02/23 07:22	
13C3 HFPO-DA		*5-	50 - 150 50 - 150					01/02/23 07:22	
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.1	-	0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	83.9		0.1		%			12/07/22 12:40	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS13

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-13 Date Collected: 11/30/22 23:40 Matrix: Solid

Percent Solids: 87.7

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte Result Qualifier **MDL** Unit Prepared Dil Fac RL Analyzed Perfluorohexanoic acid (PFHxA) 12/07/22 19:13 01/02/23 07:32 0.058 JI 0.22 0.035 ug/Kg 0.22 12/07/22 19:13 01/02/23 07:32 Perfluoroheptanoic acid (PFHpA) 0.047 J 0.043 ug/Kg Perfluorooctanoic acid (PFOA) 0.076 J 0.22 0.060 ug/Kg 12/07/22 19:13 01/02/23 07:32 0.22 0.025 ug/Kg 12/07/22 19:13 01/02/23 07:32 Perfluorononanoic acid (PFNA) 0.37 Perfluorodecanoic acid (PFDA) 0.22 0.054 ug/Kg 12/07/22 19:13 01/02/23 07:32 0.27 Perfluoroundecanoic acid 12/07/22 19:13 01/02/23 07:32 0.62 0.22 0.047 ug/Kg (PFUnA) Perfluorododecanoic acid 0.12 J 0.22 0.034 ug/Kg 12/07/22 19:13 01/02/23 07:32 (PFDoA) 0.22 0.024 ug/Kg 12/07/22 19:13 01/02/23 07:32 Perfluorotridecanoic acid (PFTriA) 0.16 J Perfluorotetradecanoic acid 0.042 ug/Kg 12/07/22 19:13 01/02/23 07:32 0.22 0.043 J (PFTeA) Perfluorobutanesulfonic acid (PFBS) ND 0.22 0.043 ug/Kg 12/07/22 19:13 01/02/23 07:32 Perfluorohexanesulfonic acid (PFHxS) 0.033 ug/Kg 12/07/22 19:13 01/02/23 07:32 ND 0.22 Perfluorooctanesulfonic acid 2.3 0.22 0.048 ug/Kg 12/07/22 19:13 01/02/23 07:32 (PFOS) N-methylperfluorooctanesulfonamidoa ND 0.22 0.026 ug/Kg 12/07/22 19:13 01/02/23 07:32 cetic acid (NMeFOSAA) ND 0.22 0.054 ug/Kg 12/07/22 19:13 01/02/23 07:32 N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 12/07/22 19:13 01/02/23 07:32 9-Chlorohexadecafluoro-3-oxanonan ND 0.22 0.039 ug/Kg e-1-sulfonic acid ND 0.22 0.046 ug/Kg 12/07/22 19:13 01/02/23 07:32 Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.22 0.035 ug/Kg 12/07/22 19:13 01/02/23 07:32 e-1-sulfonic acid ND 0.22 0.044 ug/Kg 12/07/22 19:13 01/02/23 07:32 4,8-Dioxa-3H-perfluorononanoic acid (ADONA)

Isotope Dilution	%Recovery Qualif	ïer Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	76	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C4 PFHpA	80	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C4 PFOA	82	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C5 PFNA	93	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C2 PFDA	90	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C2 PFUnA	94	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C2 PFDoA	89	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C2 PFTeDA	89	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C3 PFBS	71	50 - 150	12/07/22 19:13	01/02/23 07:32	1
1802 PFHxS	72	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C4 PFOS	73	50 - 150	12/07/22 19:13	01/02/23 07:32	1
d3-NMeFOSAA	108	50 - 150	12/07/22 19:13	01/02/23 07:32	1
d5-NEtFOSAA	125	50 - 150	12/07/22 19:13	01/02/23 07:32	1
13C3 HFPO-DA	73	50 - 150	12/07/22 19:13	01/02/23 07:32	1

General Chemis	strv
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Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.3		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	87.7		0.1	0.1	%			12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS14

Lab Sample ID: 320-94972-14 Date Collected: 11/30/22 23:55 **Matrix: Solid**

Percent Solids: 87.3 Date Received: 12/06/22 13:36

Method: EPA 537(Mod) - PFAS	for QSM 5	.3, Table E	3-15						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.086	J	0.22	0.033	ug/Kg	☆	12/07/22 19:13	01/02/23 07:42	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
Perfluorooctanoic acid (PFOA)	0.20	J	0.22	0.057	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
Perfluorononanoic acid (PFNA)	0.55		0.22	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Perfluorodecanoic acid (PFDA)	0.089	J	0.22	0.052	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
Perfluoroundecanoic acid (PFUnA)	0.15	J	0.22	0.045	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.032	ug/Kg		12/07/22 19:13	01/02/23 07:42	1
Perfluorotridecanoic acid (PFTriA)	0.044	J	0.22	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.031	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Perfluorooctanesulfonic acid	1.4	L	0.22	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
(PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg		12/07/22 19:13	01/02/23 07:42	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.038	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.044	ug/Kg	\$	12/07/22 19:13	01/02/23 07:42	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.033	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 07:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C4 PFOA	77		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C5 PFNA	89		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C2 PFDA	81		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C2 PFUnA	85		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C2 PFDoA	84		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C2 PFTeDA	80		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C3 PFBS	56		50 - 150				12/07/22 19:13	01/02/23 07:42	1
18O2 PFHxS	63		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C4 PFOS	61		50 - 150				12/07/22 19:13	01/02/23 07:42	1
d3-NMeFOSAA	113		50 - 150				12/07/22 19:13	01/02/23 07:42	1
d5-NEtFOSAA	115		50 - 150				12/07/22 19:13	01/02/23 07:42	1
13C3 HFPO-DA	73		50 - 150				12/07/22 19:13	01/02/23 07:42	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.7		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	87.3		0.1	0.1	%			12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Percent Solids (ASTM D 2216)

Client Sample ID: 220TZ-SS15 Lab Sample ID: 320-94972-15

Date Collected: 12/01/22 00:10 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 88.6

Perfluorodecanoic acid (PFDA) Perfluoroundecanoic acid (PFUnA) Perfluorododecanoic acid (PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorobecanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	ND ND 0.028 0.11 0.33 0.054 0.11 ND ND ND	J J	0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.042 0.059 0.024 0.053 0.046	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$ \$	12/07/22 19:13 12/07/22 19:13	01/02/23 07:53 01/02/23 07:53 01/02/23 07:53 01/02/23 07:53 01/02/23 07:53	1
Perfluorooctanoic acid (PFOA) Perfluorononanoic acid (PFNA) Perfluorodecanoic acid (PFDA) Perfluoroundecanoic acid (PFDA) Perfluorododecanoic acid (PFTIA) Perfluorotridecanoic acid (PFTIA) Perfluorotetradecanoic acid (PFTIA) Perfluorobutanesulfonic acid (PFTIA) Perfluorobutanesulfonic acid (PFHXS) Perfluorooctanesulfonic acid (PFHXS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.028 0.11 0.33 0.054 0.11 ND ND	J J	0.22 0.22 0.22 0.22 0.22	0.059 0.024 0.053 0.046 0.033	ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$	12/07/22 19:13 12/07/22 19:13 12/07/22 19:13 12/07/22 19:13	01/02/23 07:53 01/02/23 07:53 01/02/23 07:53 01/02/23 07:53	1 1 1
Perfluorononanoic acid (PFNA) Perfluorodecanoic acid (PFDA) Perfluoroundecanoic acid (PFDA) Perfluoroundecanoic acid (PFUNA) Perfluorododecanoic acid (PFDOA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFHxS) Perfluorobecanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.028 0.11 0.33 0.054 0.11 ND ND	J J	0.22 0.22 0.22 0.22	0.024 0.053 0.046 0.033	ug/Kg ug/Kg ug/Kg	\$ \$ \$	12/07/22 19:13 12/07/22 19:13 12/07/22 19:13	01/02/23 07:53 01/02/23 07:53 01/02/23 07:53	1
(PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorobecanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFDS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.11 0.33 0.054 0.11 ND ND	J J	0.22 0.22 0.22 0.22	0.024 0.053 0.046 0.033	ug/Kg ug/Kg ug/Kg	\$ \$	12/07/22 19:13 12/07/22 19:13	01/02/23 07:53 01/02/23 07:53	
Perfluorodecanoic acid (PFDA) Perfluoroundecanoic acid (PFUnA) Perfluorododecanoic acid (PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorobecanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.11 0.33 0.054 0.11 ND ND	J J	0.22 0.22 0.22	0.053 0.046 0.033	ug/Kg ug/Kg		12/07/22 19:13	01/02/23 07:53	1 1
Perfluoroundecanoic acid (PFUnA) Perfluorododecanoic acid (PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorobecanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.054 0.11 ND ND ND		0.22	0.046	ug/Kg				1
Perfluorododecanoic acid (PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTreA) Perfluorobutanesulfonic acid (PFBS) Perfluorobexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.11 ND ND ND		0.22	0.033			12/07/22 19:13	04/00/00 07 50	
Perfluorododecanoic acid (PFDoA) Perfluorotridecanoic acid (PFTriA) Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorobutanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	0.11 ND ND ND		0.22		ug/Kg	₩	12/07/22 19:13	04/00/00 07 50	
Perfluorotetradecanoic acid (PFTeA) Perfluorobutanesulfonic acid (PFBS) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	ND ND ND	J		U U33				01/02/23 07:53	1
Perfluorobutanesulfonic acid (PFBS) Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	ND ND		0.22	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorohexanesulfonic acid (PFHxS) Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	ND		-	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorooctanesulfonic acid (PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan			0.22	0.042	ug/Kg	⊅	12/07/22 19:13	01/02/23 07:53	1
(PFOS) N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	0.27		0.22	0.032	ug/Kg	≎	12/07/22 19:13	01/02/23 07:53	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan		I	0.22	0.048	ug/Kg	₩	12/07/22 19:13	01/02/23 07:53	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan	ND		0.22	0.025	ug/Kg		12/07/22 19:13	01/02/23 07:53	1
9-Chlorohexadecafluoro-3-oxanonan	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:13	01/02/23 07:53	1
	ND		0.22	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 07:53	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg		12/07/22 19:13	01/02/23 07:53	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:13	01/02/23 07:53	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 07:53	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	72		50 - 150				12/07/22 19:13	01/02/23 07:53	
13C4 PFHpA	79		50 ₋ 150				12/07/22 19:13	01/02/23 07:53	1
13C4 PFOA	81		50 ₋ 150				12/07/22 19:13	01/02/23 07:53	1
13C5 PFNA	93		50 ₋ 150				12/07/22 19:13	01/02/23 07:53	1
13C2 PFDA	88		50 ₋ 150				12/07/22 19:13	01/02/23 07:53	1
13C2 PFUnA	94		50 - 150					01/02/23 07:53	1
13C2 PFDoA	91		50 ₋ 150					01/02/23 07:53	
13C2 PFTeDA	90		50 - 150					01/02/23 07:53	
13C3 PFBS	64		50 - 150					01/02/23 07:53	1
1802 PFHxS	69		50 - 150					01/02/23 07:53	
13C4 PFOS	72		50 - 150 50 - 150					01/02/23 07:53	1
d3-NMeFOSAA	119		50 - 150 50 - 150					01/02/23 07:53	1
d5-NEtFOSAA	133		50 - 150 50 - 150					01/02/23 07:53	· · · · · · · · · · · · · · · · · · ·
13C3 HFPO-DA	74		50 - 150 50 - 150					01/02/23 07:53	1
General Chemistry									
Analyte	_	Qualifier	RL						
Percent Moisture (ASTM D 2216)	Result 11.4			MDL 0.1	Unit	D	Prepared	Analyzed 12/07/22 12:40	Dil Fac

Eurofins Sacramento

12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS16

Lab Sample ID: 320-94972-16 Date Collected: 12/01/22 00:25 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 91.6

Method: EPA 537(Mod) - PFAS		•					_		
Analyte		Qualifier	RL _		Unit	<u>D</u>	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20		ug/Kg	₩		01/02/23 08:03	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20		ug/Kg	₽		01/02/23 08:03	1
Perfluorooctanoic acid (PFOA)	ND		0.20		ug/Kg			01/02/23 08:03	1
Perfluorononanoic acid (PFNA)	ND		0.20		ug/Kg	₩	12/07/22 19:13	01/02/23 08:03	1
Perfluorodecanoic acid (PFDA)	0.049	J	0.20		ug/Kg	₩	12/07/22 19:13	01/02/23 08:03	1
Perfluoroundecanoic acid	0.35		0.20	0.042	ug/Kg	₩	12/07/22 19:13	01/02/23 08:03	1
(PFUnA)									
Perfluorododecanoic acid	0.040	J	0.20	0.030	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
(PFDoA) Perfluorotridecanoic acid (PFTriA)	0.054	1	0.20	0.021	ug/Kg	₩	12/07/22 10:13	01/02/23 08:03	1
Perfluorotetradecanoic acid (PFTeA)	ND	3	0.20		ug/Kg	₩		01/02/23 08:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20		ug/Kg			01/02/23 08:03	
, ,									
Perfluere estange ulfonic acid (PFHxS)	ND ND		0.20 0.20		ug/Kg	‡		01/02/23 08:03	1
Perfluorooctanesulfonic acid (PFOS)					ug/Kg	.		01/02/23 08:03	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg	₩	12/07/22 19:13	01/02/23 08:03	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg	₽	12/07/22 19:13	01/02/23 08:03	1
9-Chlorohexadecafluoro-3-oxanonan	ND		0.20	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
e-1-sulfonic acid					<u></u>				
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20		ug/Kg	.⇔	12/07/22 19:13	01/02/23 08:03	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.20	0.031	ug/Kg	.⇔	12/07/22 19:13	01/02/23 08:03	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 08:03	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	75		50 - 150				12/07/22 19:13	01/02/23 08:03	1
13C4 PFHpA	79		50 - 150				12/07/22 19:13	01/02/23 08:03	1
13C4 PFOA	81		50 ₋ 150				12/07/22 19:13	01/02/23 08:03	1
13C5 PFNA	91		50 ₋ 150				12/07/22 19:13	01/02/23 08:03	1
13C2 PFDA	85		50 ₋ 150				12/07/22 19:13	01/02/23 08:03	1
13C2 PFUnA	92		50 ₋ 150				12/07/22 19:13	01/02/23 08:03	1
13C2 PFDoA	90		50 - 150				12/07/22 19:13	01/02/23 08:03	1
13C2 PFTeDA	89		50 - 150					01/02/23 08:03	1
13C3 PFBS	62		50 - 150					01/02/23 08:03	1
1802 PFHxS	68		50 - 150					01/02/23 08:03	
13C4 PFOS	70		50 ₋ 150					01/02/23 08:03	. 1
d3-NMeFOSAA	108		50 - 150					01/02/23 08:03	1
d5-NEtFOSAA	124		50 - 150					01/02/23 08:03	
13C3 HFPO-DA	76		50 - 150					01/02/23 08:03	1
-									
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	8.4		0.1	0.1				12/07/22 12:40	1
Percent Solids (ASTM D 2216)	91.6		0.1	0.1	%			12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS17

Lab Sample ID: 320-94972-17

Date Collected: 12/01/22 00:40 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23	0.036	ug/Kg		12/07/22 19:13	01/02/23 08:33	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.044	ug/Kg	₽	12/07/22 19:13	01/02/23 08:33	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.061	ug/Kg	₽	12/07/22 19:13	01/02/23 08:33	1
Perfluorononanoic acid (PFNA)	0.22	J	0.23	0.025	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Perfluorodecanoic acid (PFDA)	0.15	J	0.23	0.055	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Perfluoroundecanoic acid (PFUnA)	0.26		0.23	0.048	ug/Kg	₽	12/07/22 19:13	01/02/23 08:33	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.035	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Perfluorotridecanoic acid (PFTriA)	0.081	J	0.23		ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23		ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23		ug/Kg	 .	12/07/22 19:13	01/02/23 08:33	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23		ug/Kg	₩		01/02/23 08:33	1
Perfluorooctanesulfonic acid (PFOS)	2.7		0.23		ug/Kg	₩		01/02/23 08:33	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23	0.055	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23	0.040	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.047	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23	0.036	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.045	ug/Kg	₩	12/07/22 19:13	01/02/23 08:33	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	72		50 - 150				12/07/22 19:13	01/02/23 08:33	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 08:33	1
13C4 PFOA	77		50 - 150				12/07/22 19:13	01/02/23 08:33	1
13C5 PFNA	85		50 - 150				12/07/22 19:13	01/02/23 08:33	1
13C2 PFDA	85		50 ₋ 150				12/07/22 19:13	01/02/23 08:33	1
13C2 PFUnA	95		50 ₋ 150				12/07/22 19:13	01/02/23 08:33	1
13C2 PFDoA	86		50 - 150					01/02/23 08:33	1
13C2 PFTeDA	83		50 ₋ 150					01/02/23 08:33	. 1
13C3 PFBS	61		50 - 150					01/02/23 08:33	1
1802 PFHxS	67		50 ₋ 150					01/02/23 08:33	
13C4 PFOS	68		50 - 150 50 - 150						1
								01/02/23 08:33	
d3-NMeFOSAA	110		50 - 150					01/02/23 08:33	
d5-NEtFOSAA 13C3 HFPO-DA	121 74		50 - 150 50 - 150					01/02/23 08:33 01/02/23 08:33	1 1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	13.9	_	0.1	0.1	%	_	_	12/07/22 12:40	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS18

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-18 Date Collected: 12/01/22 00:55

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 78.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.24	0.038	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 08:43	
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.046	ug/Kg	☆	12/07/22 19:13	01/02/23 08:43	1
Perfluorooctanoic acid (PFOA)	ND		0.24	0.065	ug/Kg	☆	12/07/22 19:13	01/02/23 08:43	1
Perfluorononanoic acid (PFNA)	ND		0.24	0.027	ug/Kg	₽	12/07/22 19:13	01/02/23 08:43	1
Perfluorodecanoic acid (PFDA)	0.19	J	0.24	0.058	ug/Kg	≎	12/07/22 19:13	01/02/23 08:43	1
Perfluoroundecanoic acid (PFUnA)	0.25		0.24		ug/Kg	#	12/07/22 19:13	01/02/23 08:43	
Perfluorododecanoic acid (PFDoA)	0.044	J	0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
Perfluorotridecanoic acid (PFTriA)	0.063	J	0.24	0.026	ug/Kg	≎	12/07/22 19:13	01/02/23 08:43	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.045	ug/Kg	₽	12/07/22 19:13	01/02/23 08:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
Perfluorooctanesulfonic acid (PFOS)	1.1	I	0.24	0.052	ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.24		ug/Kg	₿	12/07/22 19:13	01/02/23 08:43	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.24	0.058	ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.24	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.050	ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.24		ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.048	ug/Kg	₩	12/07/22 19:13	01/02/23 08:43	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	76		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C4 PFHpA	78		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C4 PFOA	80		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C5 PFNA	88		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C2 PFDA	84		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C2 PFUnA	93		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C2 PFDoA	87		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C2 PFTeDA	86		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C3 PFBS	69		50 - 150				12/07/22 19:13	01/02/23 08:43	1
18O2 PFHxS	75		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C4 PFOS	71		50 - 150				12/07/22 19:13	01/02/23 08:43	1
d3-NMeFOSAA	115		50 - 150				12/07/22 19:13	01/02/23 08:43	1
d5-NEtFOSAA	123		50 - 150				12/07/22 19:13	01/02/23 08:43	1
13C3 HFPO-DA	77		50 - 150				12/07/22 19:13	01/02/23 08:43	1
General Chemistry									
Analyte		Qualifier	RL	MDL 0.1	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	21.8		0.1					12/07/22 12:40	1

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12/07/22 12:40

0.1

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS19

Lab Sample ID: 320-94972-19 Date Collected: 12/01/22 01:05 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 79.7

Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.25	0.039	ug/Kg	☼		01/02/23 08:54	1
Perfluoroheptanoic acid (PFHpA)	ND		0.25		ug/Kg	☼		01/02/23 08:54	1
Perfluorooctanoic acid (PFOA)	ND		0.25	0.066	ug/Kg		12/07/22 19:13	01/02/23 08:54	1
Perfluorononanoic acid (PFNA)	0.037	J	0.25	0.028	ug/Kg	₽	12/07/22 19:13	01/02/23 08:54	1
Perfluorodecanoic acid (PFDA)	0.17	J	0.25	0.060	ug/Kg	₽	12/07/22 19:13	01/02/23 08:54	1
Perfluoroundecanoic acid (PFUnA)	0.50		0.25		ug/Kg		12/07/22 19:13	01/02/23 08:54	1
Perfluorododecanoic acid (PFDoA)	0.058		0.25		ug/Kg	₩		01/02/23 08:54	1
Perfluorotridecanoic acid (PFTriA)	0.11	J	0.25		ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25		ug/Kg		12/07/22 19:13	01/02/23 08:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25		ug/Kg	≎	12/07/22 19:13	01/02/23 08:54	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.25	0.036	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.25	0.054	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.25	0.029	ug/Kg	₩	12/07/22 19:13	01/02/23 08:54	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.25	0.060	ug/Kg	₩	12/07/22 19:13	01/02/23 08:54	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.25		ug/Kg	.	12/07/22 19:13	01/02/23 08:54	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25		ug/Kg	₩	12/07/22 19:13	01/02/23 08:54	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.25	0.039	ug/Kg	₩	12/07/22 19:13	01/02/23 08:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.25	0.049	ug/Kg	₩	12/07/22 19:13	01/02/23 08:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C4 PFHpA	77		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C4 PFOA	83		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C5 PFNA	85		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C2 PFDA	83		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C2 PFUnA	88		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C2 PFDoA	85		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C2 PFTeDA	85		50 - 150				12/07/22 19:13	01/02/23 08:54	1
13C3 PFBS	71		50 - 150				12/07/22 19:13	01/02/23 08:54	1
1802 PFHxS	71		50 ₋ 150				12/07/22 19:13	01/02/23 08:54	1
13C4 PFOS	71		50 ₋ 150				12/07/22 19:13	01/02/23 08:54	1
d3-NMeFOSAA	102		50 - 150					01/02/23 08:54	1
d5-NEtFOSAA	119		50 - 150					01/02/23 08:54	
13C3 HFPO-DA	75		50 - 150				12/07/22 19:13	01/02/23 08:54	1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	20.3		0.1	0.1				12/07/22 12:40	1
Percent Solids (ASTM D 2216)	79.7		0.1	0.1	%			12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS20 Lab Sample ID: 320-94972-20

Date Collected: 12/01/22 01:25 **Matrix: Solid** Date Received: 12/06/22 13:36 **Percent Solids: 82.8**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.034	ug/Kg	<u></u>	12/07/22 19:13	01/02/23 09:04	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.058	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
Perfluorononanoic acid (PFNA)	0.39		0.22	0.024	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
Perfluorodecanoic acid (PFDA)	0.20	J	0.22	0.052	ug/Kg	≎	12/07/22 19:13	01/02/23 09:04	1
Perfluoroundecanoic acid (PFUnA)	0.24		0.22	0.046	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
Perfluorododecanoic acid (PFDoA)	ND		0.22		ug/Kg	₽	12/07/22 19:13	01/02/23 09:04	1
Perfluorotridecanoic acid (PFTriA)	0.043	J	0.22	0.023	ug/Kg	≎	12/07/22 19:13	01/02/23 09:04	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	₽	12/07/22 19:13	01/02/23 09:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
Perfluorooctanesulfonic acid	6.8		0.22	0.047	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
(PFOS)									
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg	₩	12/07/22 19:13		1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22		ug/Kg	☼	12/07/22 19:13		1
9-Chlorohexadecafluoro-3-oxanonan	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
e-1-sulfonic acid Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg		12/07/22 19:13	01/02/23 09:04	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:13	01/02/23 09:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	72		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C4 PFHpA	78		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C4 PFOA	78		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C5 PFNA	87		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C2 PFDA	84		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C2 PFUnA	90		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C2 PFDoA	87		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C2 PFTeDA	84		50 ₋ 150				12/07/22 19:13	01/02/23 09:04	1
13C3 PFBS	65		50 ₋ 150				12/07/22 19:13	01/02/23 09:04	1
1802 PFHxS	69		50 - 150				12/07/22 19:13	01/02/23 09:04	1
13C4 PFOS	70		50 ₋ 150					01/02/23 09:04	1
d3-NMeFOSAA	104		50 - 150					01/02/23 09:04	1
d5-NEtFOSAA	118		50 - 150					01/02/23 09:04	1
13C3 HFPO-DA	77		50 - 150					01/02/23 09:04	1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	17.2		0.1	0.1				12/07/22 12:40	1
Percent Solids (ASTM D 2216)	82.8		0.1	0.1	0/2			12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS21

Percent Moisture (ASTM D 2216)

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-21 Date Collected: 12/01/22 01:45

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 88.1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.033	ug/Kg		12/07/22 19:17	01/01/23 10:32	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.041	ug/Kg	₽	12/07/22 19:17	01/01/23 10:32	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.057	ug/Kg	₽	12/07/22 19:17	01/01/23 10:32	1
Perfluorononanoic acid (PFNA)	0.024	J	0.21	0.024	ug/Kg	₽	12/07/22 19:17	01/01/23 10:32	1
Perfluorodecanoic acid (PFDA)	0.055	J	0.21	0.051	ug/Kg	₽	12/07/22 19:17	01/01/23 10:32	1
Perfluoroundecanoic acid	0.41		0.21	0.045	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
(PFUnA)									
Perfluorododecanoic acid	0.057	J	0.21	0.032	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
(PFDoA)	0.40		0.21	0.000		**	10/07/00 10:17	04/04/02 40:22	4
Perfluorotridecanoic acid (PFTriA)	0.12	J	0.21		ug/Kg			01/01/23 10:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21		ug/Kg			01/01/23 10:32	
Perfluorobutanesulfonic acid (PFBS)	ND		0.21		ug/Kg			01/01/23 10:32	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21		ug/Kg			01/01/23 10:32	1
Perfluorooctanesulfonic acid (PFOS)	0.26	1	0.21	0.046	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21	0.025	ug/Kg	 Φ	12/07/22 19:17	01/01/23 10:32	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21	0.037	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.044	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21		ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.042	ug/Kg	₩	12/07/22 19:17	01/01/23 10:32	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	82		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C4 PFHpA	82		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C4 PFOA	83		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C5 PFNA	95		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C2 PFDA	91		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C2 PFUnA	98		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C2 PFDoA	89		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C2 PFTeDA	92		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C3 PFBS	73		50 - 150				12/07/22 19:17	01/01/23 10:32	1
1802 PFHxS	78		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C4 PFOS	75		50 - 150				12/07/22 19:17	01/01/23 10:32	1
d3-NMeFOSAA	116		50 - 150				12/07/22 19:17	01/01/23 10:32	1
d5-NEtFOSAA	127		50 - 150				12/07/22 19:17	01/01/23 10:32	1
13C3 HFPO-DA	84		50 - 150				12/07/22 19:17	01/01/23 10:32	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

Eurofins Sacramento

12/07/22 12:40

12/07/22 12:40

0.1

0.1

0.1 %

0.1 %

11.9

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS22 Lab Sample ID: 320-94972-22

Date Collected: 12/01/22 01:35 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 85.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23	0.035	ug/Kg	<u></u>	12/07/22 19:17	01/01/23 10:42	
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.043	ug/Kg	₽	12/07/22 19:17	01/01/23 10:42	1
Perfluorooctanoic acid (PFOA)	ND		0.23	0.060	ug/Kg	₽	12/07/22 19:17	01/01/23 10:42	1
Perfluorononanoic acid (PFNA)	ND		0.23	0.025	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluorodecanoic acid (PFDA)	0.056	J	0.23	0.055	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluoroundecanoic acid (PFUnA)	0.44		0.23	0.048	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluorododecanoic acid (PFDoA)	0.060	J	0.23		ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluorotridecanoic acid (PFTriA)	0.17	J	0.23	0.024	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.042	ug/Kg	⇔	12/07/22 19:17	01/01/23 10:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	₽	12/07/22 19:17	01/01/23 10:42	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Perfluorooctanesulfonic acid (PFOS)	0.39	I	0.23	0.049	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23		ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23		ug/Kg			01/01/23 10:42	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23		ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23		ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.044	ug/Kg	₩	12/07/22 19:17	01/01/23 10:42	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	79		50 - 150				12/07/22 19:17	01/01/23 10:42	
13C4 PFHpA	83		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C4 PFOA	86		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C5 PFNA	92		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C2 PFDA	85		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C2 PFUnA	93		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C2 PFDoA	88		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C2 PFTeDA	85		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C3 PFBS	71		50 - 150				12/07/22 19:17	01/01/23 10:42	1
1802 PFHxS	72		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C4 PFOS	72		50 - 150				12/07/22 19:17	01/01/23 10:42	1
d3-NMeFOSAA	114		50 - 150				12/07/22 19:17	01/01/23 10:42	1
d5-NEtFOSAA	120		50 - 150				12/07/22 19:17	01/01/23 10:42	1
13C3 HFPO-DA	80		50 - 150					01/01/23 10:42	1
General Chemistry									
Analyte	Result	Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	14.8		0.1	0.1	0.1			12/07/22 12:40	1

General	Cnemistry
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Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Percent Moisture (ASTM D 2216)	14.8		0.1	0.1	%			12/07/22 12:40	1	
Percent Solids (ASTM D 2216)	85.2		0.1	0.1	%			12/07/22 12:40	1	

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS23

Lab Sample ID: 320-94972-23 Date Collected: 12/01/22 01:55

Matrix: Solid

Percent Solids: 87.1 Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.035	ug/Kg	<u></u>	12/07/22 19:17	01/01/23 10:52	
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.043	ug/Kg	≎	12/07/22 19:17	01/01/23 10:52	•
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
Perfluorononanoic acid (PFNA)	0.041	J	0.22	0.025	ug/Kg	≎	12/07/22 19:17	01/01/23 10:52	1
Perfluorodecanoic acid (PFDA)	0.11	J	0.22	0.054	ug/Kg	⇔	12/07/22 19:17	01/01/23 10:52	1
Perfluoroundecanoic acid (PFUnA)	0.30		0.22		ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
Perfluorododecanoic acid (PFDoA)	0.037	J	0.22	0.034	ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
Perfluorotridecanoic acid (PFTriA)	0.080	J	0.22	0.023	ug/Kg	≎	12/07/22 19:17	01/01/23 10:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	₽	12/07/22 19:17	01/01/23 10:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₽	12/07/22 19:17	01/01/23 10:52	1
Perfluorooctanesulfonic acid (PFOS)	2.9		0.22		ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22		ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22		ug/Kg	#	12/07/22 19:17	01/01/23 10:52	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22		ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.044	ug/Kg	₩	12/07/22 19:17	01/01/23 10:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	77		50 - 150				12/07/22 19:17	01/01/23 10:52	
13C4 PFHpA	79		50 - 150				12/07/22 19:17	01/01/23 10:52	1
13C4 PFOA	79		50 - 150				12/07/22 19:17	01/01/23 10:52	1
13C5 PFNA	86		50 - 150				12/07/22 19:17	01/01/23 10:52	1
13C2 PFDA	84		50 - 150				12/07/22 19:17	01/01/23 10:52	1
13C2 PFUnA	87		50 - 150				12/07/22 19:17	01/01/23 10:52	1
13C2 PFDoA	80		50 - 150				12/07/22 19:17	01/01/23 10:52	
13C2 PFTeDA	79		50 ₋ 150				12/07/22 19:17	01/01/23 10:52	1
13C3 PFBS	65		50 ₋ 150					01/01/23 10:52	1
1802 PFHxS	68		50 ₋ 150					01/01/23 10:52	
13C4 PFOS	65		50 - 150 50 - 150					01/01/23 10:52	1
d3-NMeFOSAA	106		50 - 150 50 - 150					01/01/23 10:52	1
d5-NEtFOSAA	119		50 - 150					01/01/23 10:52	
13C3 HFPO-DA	78		50 - 150 50 - 150					01/01/23 10:52	1
General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac	
Percent Moisture (ASTM D 2216)	12.9		0.1	0.1	%			12/07/22 12:40	1	
Percent Solids (ASTM D 2216)	87.1		0.1	0.1	%			12/07/22 12:40	1	

Eurofins Sacramento

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS24

Lab Sample ID: 320-94972-24 Date Collected: 12/01/22 02:10

Matrix: Solid Percent Solids: 85.1

Date Received: 12/06/22 13:36 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		0.22	0.034	ug/Kg	<u></u>	12/07/22 19:17	01/01/23 11:02	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
Perfluorononanoic acid (PFNA)	0.047	J	0.22	0.024	ug/Kg	⊅	12/07/22 19:17	01/01/23 11:02	1
Perfluorodecanoic acid (PFDA)	0.078	J	0.22	0.053	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
Perfluoroundecanoic acid (PFUnA)	0.21	J	0.22	0.047	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
Perfluorotridecanoic acid (PFTriA)	0.054	J	0.22	0.023	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	⊅	12/07/22 19:17	01/01/23 11:02	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
Perfluorooctanesulfonic acid (PFOS)	0.69	I	0.22	0.048	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.039	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:17	01/01/23 11:02	1

(ADONA)						
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	75		50 - 150	12/07/22 19:17	01/01/23 11:02	1
13C4 PFHpA	89		50 - 150	12/07/22 19:17	01/01/23 11:02	1
13C4 PFOA	87		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
13C5 PFNA	91		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
13C2 PFDA	88		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
13C2 PFUnA	97		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
13C2 PFDoA	86		50 - 150	12/07/22 19:17	01/01/23 11:02	1
13C2 PFTeDA	84		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
13C3 PFBS	70		50 - 150	12/07/22 19:17	01/01/23 11:02	1
18O2 PFHxS	78		50 - 150	12/07/22 19:17	01/01/23 11:02	1
13C4 PFOS	72		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1
d3-NMeFOSAA	120		50 - 150	12/07/22 19:17	01/01/23 11:02	1
d5-NEtFOSAA	131		50 - 150	12/07/22 19:17	01/01/23 11:02	1
13C3 HFPO-DA	87		50 ₋ 150	12/07/22 19:17	01/01/23 11:02	1

General Chemistry	Chemistr	y
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Analyte	Result Qualifier	RL	MDL Unit	D Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	14.9	0.1	0.1 %	 =	12/07/22 12:40	1
Percent Solids (ASTM D 2216)	85.1	0.1	0.1 %		12/07/22 12:40	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS25

Lab Sample ID: 320-94972-25 Date Collected: 12/01/22 02:25 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 86.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.034	ug/Kg	☆	12/07/22 19:17	01/01/23 11:13	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
Perfluorononanoic acid (PFNA)	ND		0.22	0.024	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Perfluoroundecanoic acid (PFUnA)	0.18	J	0.22	0.046	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Perfluorododecanoic acid (PFDoA)	0.036	J	0.22	0.033	ug/Kg	₽	12/07/22 19:17	01/01/23 11:13	1
Perfluorotridecanoic acid (PFTriA)	0.12	J	0.22	0.023	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg		12/07/22 19:17	01/01/23 11:13	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.048	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
9-Chlorohexadecafluoro-3-oxanonan	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
e-1-sulfonic acid Hexafluoropropylene Oxide Dimer	ND		0.22	0.045	ug/Kg	 Ф	12/07/22 19:17	01/01/23 11:13	1
Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:17	01/01/23 11:13	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	70		50 - 150				•	01/01/23 11:13	
13C4 PFHpA	72		50 - 150					01/01/23 11:13	1
13C4 PFOA	79		50 ₋ 150					01/01/23 11:13	1
13C5 PFNA	77		50 - 150					01/01/23 11:13	1
13C2 PFDA	80		50 ₋ 150					01/01/23 11:13	1
13C2 PFUnA	83		50 ₋ 150					01/01/23 11:13	1
13C2 PFDoA	77		50 - 150					01/01/23 11:13	
13C2 PFTeDA	76		50 ₋ 150					01/01/23 11:13	1
13C3 PFBS	63		50 ₋ 150					01/01/23 11:13	•
1802 PFHxS	65		50 - 150					01/01/23 11:13	
13C4 PFOS	56		50 - 150					01/01/23 11:13	1
d3-NMeFOSAA	98		50 - 150 50 - 150					01/01/23 11:13	1
d5-NEtFOSAA	90 111		50 - 150 50 - 150					01/01/23 11:13	
13C3 HFPO-DA	71		50 - 150 50 - 150					01/01/23 11:13	1
General Chemistry									
Analyte	Regult	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	13.5	- Quantities	0.1	0.1		_ =	Ticparea	12/07/22 12:40	1
Percent Solids (ASTM D 2216)			0.1					12/07/22 12:40	
reiteilt Stilus (ASTWID 2216)	86.5		U. I	0.1	/0			12/01/22 12:40	1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS26 Lab Sample ID: 320-94972-26

Date Collected: 12/01/22 20:40

Matrix: Solid

Date Received: 12/06/22 13:36

Matrix: Solid

Percent Solids: 87.2

Method: EPA 537(Mod) - PFAS Analyte	Result (•	RL	МП	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	1.2		2.2		ug/Kg	— -	•	01/05/23 21:44	
Perfluoroheptanoic acid (PFHpA)	ND	•	2.2		ug/Kg	₩		01/05/23 21:44	
Perfluorooctanoic acid (PFOA)	ND		2.2		ug/Kg	₩		01/05/23 21:44	
Perfluorononanoic acid (PFNA)	2.7		2.2		ug/Kg			01/05/23 21:44	
Perfluorodecanoic acid (PFDA)	10		2.2		ug/Kg ug/Kg	₩		01/05/23 21:44	
Perfluorodecanoic acid	7.2		2.2		ug/Kg ug/Kg	₩		01/05/23 21:44	
PFDoA)	1.2		2.2	0.54	ug/ixg	244	12/07/22 19.17	01/03/23 21.44	
Perfluorotridecanoic acid (PFTriA)	98		2.2	0.23	ug/Kg		12/07/22 19:17	01/05/23 21:44	
Perfluorotetradecanoic acid	3.1		2.2		ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
PFTeA)					-99				
Perfluorobutanesulfonic acid (PFBS)	ND		2.2	0.42	ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
Perfluorohexanesulfonic acid	0.81	J	2.2	0.32	ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
PFHxS)									
Perfluorooctanesulfonic acid	82		2.2	0.48	ug/Kg	≎	12/07/22 19:17	01/05/23 21:44	
PFOS)									
N-methylperfluorooctanesulfonamidoa	ND		2.2	0.26	ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
etic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac	ND		2.2	0.54	ug/Kg		12/07/22 10:17	01/05/23 21:44	
etic acid (NEtFOSAA)	ND		2.2	0.54	ug/Kg	244	12/07/22 19.17	01/03/23 21.44	
9-Chlorohexadecafluoro-3-oxanonan	ND		2.2	0.39	ug/Kg	☆	12/07/22 19:17	01/05/23 21:44	
e-1-sulfonic acid					-3/-3				
lexafluoropropylene Oxide Dimer	ND		2.2	0.46	ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
Acid (HFPO-DA)									
11-Chloroeicosafluoro-3-oxaundecan	ND		2.2	0.35	ug/Kg	≎	12/07/22 19:17	01/05/23 21:44	
e-1-sulfonic acid									
1,8-Dioxa-3H-perfluorononanoic acid	ND		2.2	0.44	ug/Kg	₩	12/07/22 19:17	01/05/23 21:44	
ADONA)									
sotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil F
13C2 PFHxA	74		50 - 150					01/05/23 21:44	
3C4 PFHpA	82		50 - 150					01/05/23 21:44	
3C4 PFOA	83		50 - 150					01/05/23 21:44	
3C5 PFNA	90		50 - 150					01/05/23 21:44	
3C2 PFDA	83		50 - 150					01/05/23 21:44	
3C2 PFDoA	77		50 - 150					01/05/23 21:44	
3C2 PFTeDA	61		50 - 150					01/05/23 21:44	
3C3 PFBS	75		50 - 150				12/07/22 19:17	01/05/23 21:44	
802 PFHxS	76		50 - 150				12/07/22 19:17	01/05/23 21:44	
13C4 PFOS	76		50 - 150				12/07/22 19:17	01/05/23 21:44	
13-NMeFOSAA	85		50 - 150				12/07/22 19:17	01/05/23 21:44	
I5-NEtFOSAA	89		50 - 150				12/07/22 19:17	01/05/23 21:44	
3C3 HFPO-DA	81		50 - 150				12/07/22 19:17	01/05/23 21:44	
		. 	4.5						
Method: EPA 537(Mod) - PFAS		•				_	_		
Analyte	Result	Qualifier	RL _		Unit	<u>D</u>	Prepared	Analyzed	Dil F
Perfluoroundecanoic acid PFUnA)	240		4.5	0.94	ug/Kg	☼	12/07/22 19:17	01/08/23 00:54	
sotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil F
sotope Dilution	•								

Eurofins Sacramento

Analyzed

12/07/22 12:40

Prepared

RL

0.1

MDL Unit

0.1 %

Result Qualifier

12.8

Analyte

Percent Moisture (ASTM D 2216)

2

Job ID: 320-94972-1

3

6

8

11

13

14

15

1/18/2023

Dil Fac

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS26 Lab Sample ID: 320-94972-26

Date Collected: 12/01/22 20:40

Matrix: Solid
Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 87.2

General Chemistry (Continued))								
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids (ASTM D 2216)	87.2		0.1	0.1	%			12/07/22 12:40	

5

9

44

12

14

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS27

Lab Sample ID: 320-94972-27 Date Collected: 12/01/22 20:50 Matrix: Solid Date Received: 12/06/22 13:36 Percent Solids: 89.0

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte Result Qualifier **MDL** Unit Dil Fac RL Prepared Analyzed Perfluorohexanoic acid (PFHxA) 12/07/22 19:17 01/01/23 11:33 0.21 0.21 0.033 ug/Kg 0.21 12/07/22 19:17 01/01/23 11:33 Perfluoroheptanoic acid (PFHpA) 0.20 J 0.041 ug/Kg Perfluorooctanoic acid (PFOA) 0.32 0.21 0.057 ug/Kg 12/07/22 19:17 01/01/23 11:33 0.21 0.024 ug/Kg 12/07/22 19:17 01/01/23 11:33 Perfluorononanoic acid (PFNA) 0.50 Perfluorodecanoic acid (PFDA) 0.21 0.051 ug/Kg 12/07/22 19:17 01/01/23 11:33 4.1 Perfluorododecanoic acid 0.87 0.21 0.032 ug/Kg \$\pri\$ 12/07/22 19:17 01/01/23 11:33 (PFDoA) Perfluorotridecanoic acid (PFTriA) 5.3 0.21 0.023 ug/Kg 12/07/22 19:17 01/01/23 11:33 Perfluorotetradecanoic acid 0.21 0.040 ug/Kg 12/07/22 19:17 01/01/23 11:33 0.28 (PFTeA) Perfluorobutanesulfonic acid (PFBS) ND 0.21 0.041 ug/Kg 12/07/22 19:17 01/01/23 11:33 Perfluorohexanesulfonic acid 0.21 0.031 ug/Kg 12/07/22 19:17 01/01/23 11:33 0.11 JI (PFHxS) N-methylperfluorooctanesulfonamidoa ND 12/07/22 19:17 01/01/23 11:33 0.21 0.025 ug/Kg cetic acid (NMeFOSAA) ND 0.21 0.051 ug/Kg 12/07/22 19:17 01/01/23 11:33 N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA) ND 12/07/22 19:17 01/01/23 11:33 9-Chlorohexadecafluoro-3-oxanonan 0.21 0.038 ug/Kg e-1-sulfonic acid 12/07/22 19:17 01/01/23 11:33 Hexafluoropropylene Oxide Dimer ND 0.21 0.044 ug/Kg Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.21 0.033 ug/Kg 12/07/22 19:17 01/01/23 11:33 e-1-sulfonic acid ND 0.21 0.042 ug/Kg 12/07/22 19:17 01/01/23 11:33 4,8-Dioxa-3H-perfluorononanoic acid

(ADONA)				
Isotope Dilution	%Recovery Qualifier	Limits	Prepared Analy	zed Dil Fac
13C2 PFHxA	76	50 - 150	12/07/22 19:17 01/01/23	3 11:33
13C4 PFHpA	80	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C4 PFOA	84	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C5 PFNA	89	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C2 PFDA	87	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C2 PFUnA	88	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C2 PFDoA	87	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C2 PFTeDA	82	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C3 PFBS	71	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
1802 PFHxS	75	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C4 PFOS	66	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
d3-NMeFOSAA	105	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
d5-NEtFOSAA	105	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1
13C3 HFPO-DA	82	50 - 150	12/07/22 19:17 01/01/23	3 11:33 1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	26		1.1	0.23	ug/Kg	☆	12/07/22 19:17	01/05/23 21:24	5
Perfluorooctanesulfonic acid (PFOS)	31		1.1	0.23	ug/Kg	≎	12/07/22 19:17	01/05/23 21:24	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	87		50 - 150				12/07/22 19:17	01/05/23 21:24	5
13C4 PFOS	75		50 ₋ 150				12/07/22 19:17	01/05/23 21:24	5

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS27 Lab Sample ID: 320-94972-27

Date Collected: 12/01/22 20:50 Matrix: Solid
Date Received: 12/06/22 13:36 Percent Solids: 89.0

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	11.0	0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	89.0	0.1	0.1	%			12/07/22 12:40	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS28 Lab Sample ID: 320-94972-28

Date Collected: 12/01/22 21:10 **Matrix: Solid** Percent Solids: 87.7 Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.13	J	0.21	0.032	ug/Kg		12/07/22 19:17	01/01/23 11:43	1
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.21	0.040	ug/Kg	₽	12/07/22 19:17	01/01/23 11:43	1
Perfluorooctanoic acid (PFOA)	0.40		0.21	0.055	ug/Kg	₽	12/07/22 19:17	01/01/23 11:43	1
Perfluorononanoic acid (PFNA)	0.71		0.21	0.023	ug/Kg	₽	12/07/22 19:17	01/01/23 11:43	1
Perfluorodecanoic acid (PFDA)	3.2		0.21	0.050	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
Perfluoroundecanoic acid (PFUnA)	1.7		0.21	0.044	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
Perfluorododecanoic acid (PFDoA)	0.36		0.21	0.031	ug/Kg	₿	12/07/22 19:17	01/01/23 11:43	1
Perfluorotridecanoic acid (PFTriA)	0.41		0.21	0.022	ug/Kg	≎	12/07/22 19:17	01/01/23 11:43	1
Perfluorotetradecanoic acid (PFTeA)	0.11	J	0.21	0.039	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.040	ug/Kg	₽	12/07/22 19:17	01/01/23 11:43	1
Perfluorohexanesulfonic acid (PFHxS)	0.053	JI	0.21	0.030	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
Perfluorooctanesulfonic acid (PFOS)	10		0.21	0.045	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21		ug/Kg	☼	12/07/22 19:17	01/01/23 11:43	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21		ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21		ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.043	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21	0.032	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.041	ug/Kg	₩	12/07/22 19:17	01/01/23 11:43	,
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	77		50 - 150				12/07/22 19:17	01/01/23 11:43	
13C4 PFHpA	79		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C4 PFOA	84		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C5 PFNA	91		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C2 PFDA	83		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C2 PFUnA	90		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C2 PFDoA	86		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C2 PFTeDA	80		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C3 PFBS	69		50 - 150				12/07/22 19:17	01/01/23 11:43	1
1802 PFHxS	74		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C4 PFOS	69		50 - 150				12/07/22 19:17	01/01/23 11:43	1
d3-NMeFOSAA	107		50 - 150				12/07/22 19:17	01/01/23 11:43	1
d5-NEtFOSAA	115		50 - 150				12/07/22 19:17	01/01/23 11:43	1
13C3 HFPO-DA	79		50 - 150				12/07/22 19:17	01/01/23 11:43	1
General Chemistry		0			1114	_	D	A	D.: -
Analyte		Qualifier	RL _		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.3		0.1	0.1	%			12/07/22 12:40	1

12/07/22 12:40

0.1

0.1 %

87.7

Percent Solids (ASTM D 2216)

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS29 Lab Sample ID: 320-94972-29

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte **MDL** Unit Result Qualifier RL Prepared Analyzed Dil Fac 0.30 Perfluorohexanoic acid (PFHxA) 0.23 0.035 ug/Kg 0.23 12/07/22 19:17 01/01/23 12:13 Perfluoroheptanoic acid (PFHpA) 0.21 J 0.043 ug/Kg Perfluorooctanoic acid (PFOA) 0.63 0.23 0.060 ug/Kg 12/07/22 19:17 01/01/23 12:13 0.025 ug/Kg 12/07/22 19:17 01/01/23 12:13 Perfluorononanoic acid (PFNA) 0.23 1.4 Perfluorodecanoic acid (PFDA) 0.23 0.054 ug/Kg 12/07/22 19:17 01/01/23 12:13 2.6 Perfluoroundecanoic acid 9.3 0.23 0.047 ug/Kg \$\pri\$ 12/07/22 19:17 01/01/23 12:13 (PFUnA) Perfluorododecanoic acid 0.62 0.23 0.034 ug/Kg 12/07/22 19:17 01/01/23 12:13 (PFDoA) 0.23 0.024 ug/Kg 12/07/22 19:17 01/01/23 12:13 Perfluorotridecanoic acid (PFTriA) 2.5 Perfluorotetradecanoic acid 12/07/22 19:17 01/01/23 12:13 0.23 0.042 ug/Kg 0.21 J (PFTeA) Perfluorobutanesulfonic acid (PFBS) ND 0.23 0.043 ug/Kg 12/07/22 19:17 01/01/23 12:13 Perfluorohexanesulfonic acid (PFHxS) 0.033 ug/Kg 12/07/22 19:17 01/01/23 12:13 ND 0.23 Perfluorooctanesulfonic acid 0.23 0.048 ug/Kg 12/07/22 19:17 01/01/23 12:13 15 (PFOS) N-methylperfluorooctanesulfonamidoa ND 0.026 ug/Kg 12/07/22 19:17 01/01/23 12:13 0.23 cetic acid (NMeFOSAA) 12/07/22 19:17 01/01/23 12:13 N-ethylperfluorooctanesulfonamidoac ND 0.23 0.054 ug/Kg etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.23 0.039 ug/Kg 12/07/22 19:17 01/01/23 12:13 e-1-sulfonic acid

4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND	0.23	0.044 ug/Kg	≎	12/07/22 19:17	01/01/23 12:13	1
Isotope Dilution	%Recovery Qualifier	Limits			Prepared	Analyzed	Dil Fac
13C2 PFHxA	79	50 - 150			12/07/22 19:17	01/01/23 12:13	1
13C4 PFHpA	79	50 - 150			12/07/22 19:17	01/01/23 12:13	1
13C4 PFOA	81	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
13C5 PFNA	89	50 - 150			12/07/22 19:17	01/01/23 12:13	1
13C2 PFDA	86	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
13C2 PFUnA	94	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
13C2 PFDoA	87	50 - 150			12/07/22 19:17	01/01/23 12:13	1
13C2 PFTeDA	81	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
13C3 PFBS	70	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
18O2 PFHxS	76	50 - 150			12/07/22 19:17	01/01/23 12:13	1
13C4 PFOS	74	50 ₋ 150			12/07/22 19:17	01/01/23 12:13	1
d3-NMeFOSAA	115	50 - 150			12/07/22 19:17	01/01/23 12:13	1
d5-NEtFOSAA	128	50 - 150			12/07/22 19:17	01/01/23 12:13	1

0.23

0.23

0.046 ug/Kg

0.035 ug/Kg

ND

ND

81

Hexafluoropropylene Oxide Dimer

11-Chloroeicosafluoro-3-oxaundecan

Acid (HFPO-DA)

e-1-sulfonic acid

13C3 HFPO-DA

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	19.4	0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	80.6	0.1	0.1	%			12/07/22 12:40	1

50 - 150

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<u>5</u>

0

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12/07/22 19:17 01/01/23 12:13

12/07/22 19:17 01/01/23 12:13

12/07/22 19:17 01/01/23 12:13

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS30

Lab Sample ID: 320-94972-30 Date Collected: 12/01/22 21:20

Matrix: Solid

Percent Solids: 83.2 Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.15	J	0.23	0.035	ug/Kg	<u></u>	12/07/22 19:17	01/01/23 12:24	1
Perfluoroheptanoic acid (PFHpA)	0.11	J	0.23	0.043	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
Perfluorooctanoic acid (PFOA)	0.34		0.23	0.061	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
Perfluorononanoic acid (PFNA)	0.78		0.23	0.025	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
Perfluorodecanoic acid (PFDA)	1.4		0.23	0.055	ug/Kg	₽	12/07/22 19:17	01/01/23 12:24	1
Perfluoroundecanoic acid	3.8		0.23	0.048	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
(PFUnA)					0 0				
Perfluorododecanoic acid	0.23		0.23	0.034	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
(PFDoA)									
Perfluorotridecanoic acid (PFTriA)	0.76		0.23		ug/Kg	₩		01/01/23 12:24	1
Perfluorotetradecanoic acid	0.065	J	0.23	0.042	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
(PFTeA)							10/07/00 10 17		
Perfluorobutanesulfonic acid (PFBS)	ND		0.23		ug/Kg			01/01/23 12:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23		ug/Kg			01/01/23 12:24	1
Perfluorooctanesulfonic acid	8.7		0.23	0.049	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
(PFOS) N-methylperfluorooctanesulfonamidoa	ND		0.23	0.026	ug/Kg		12/07/22 10:17	01/01/23 12:24	
cetic acid (NMeFOSAA)	ND		0.23	0.020	ug/Ng	¥	12/01/22 19:1/	01/01/23 12:24	1
N-ethylperfluorooctanesulfonamidoac	ND		0.23	0.055	ug/Kg	- '	12/07/22 19:17	01/01/23 12:24	1
etic acid (NEtFOSAA)			0.20	0.000	~g,g	-1-	, ., ,	0.70.720.2.2.	·
9-Chlorohexadecafluoro-3-oxanonan	ND		0.23	0.040	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
e-1-sulfonic acid									
Hexafluoropropylene Oxide Dimer	ND		0.23	0.047	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Acid (HFPO-DA)									
11-Chloroeicosafluoro-3-oxaundecan	ND		0.23	0.035	ug/Kg	₩	12/07/22 19:17	01/01/23 12:24	1
e-1-sulfonic acid	ND		0.33	0.045	ug/Kg	**	12/07/22 10:17	01/01/22 12:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.045	ug/Kg	1,2	12/07/22 19:17	01/01/23 12:24	'
` '	0/ 8	O!!#!	l invite				Duamanad	A I	D# 5
Isotope Dilution 13C2 PFHxA	%Recovery	Qualifier	Limits 50 - 150				Prepared 12/07/22 10:17	Analyzed 01/01/23 12:24	Dil Fac
									•
13C4 PFHpA	85		50 - 150					01/01/23 12:24	1
13C4 PFOA	80		50 - 150					01/01/23 12:24	
13C5 PFNA	89		50 - 150					01/01/23 12:24	1
13C2 PFDA	85		50 - 150					01/01/23 12:24	1
13C2 PFUnA	88		50 - 150					01/01/23 12:24	1
13C2 PFDoA	84		50 - 150				12/07/22 19:17	01/01/23 12:24	1
13C2 PFTeDA	86		50 - 150				12/07/22 19:17	01/01/23 12:24	1
13C3 PFBS	71		50 - 150				12/07/22 19:17	01/01/23 12:24	1
1802 PFHxS	72		50 - 150				12/07/22 19:17	01/01/23 12:24	1
13C4 PFOS	72		50 - 150				12/07/22 19:17	01/01/23 12:24	1
d3-NMeFOSAA	105		50 - 150				12/07/22 19:17	01/01/23 12:24	1
d5-NEtFOSAA	125		50 - 150				12/07/22 19:17	01/01/23 12:24	1
13C3 HFPO-DA	80		50 - 150				12/07/22 19:17	01/01/23 12:24	1
General Chemistry									
Analyte	Regult	Qualifier	RL	MDI	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.8		0.1	0.1		— <u>-</u>	opuiou	12/07/22 12:40	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS31

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-31 Date Collected: 12/01/22 21:50

Matrix: Solid Percent Solids: 82.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.58		0.23	0.035	ug/Kg	— <u></u>	12/07/22 19:44	01/01/23 12:34	1
Perfluoroheptanoic acid (PFHpA)	0.44		0.23	0.043	ug/Kg	≎	12/07/22 19:44	01/01/23 12:34	1
Perfluorooctanoic acid (PFOA)	0.74		0.23	0.060	ug/Kg	≎	12/07/22 19:44	01/01/23 12:34	1
Perfluorononanoic acid (PFNA)	12		0.23	0.025	ug/Kg	₽	12/07/22 19:44	01/01/23 12:34	1
Perfluorodecanoic acid (PFDA)	1.2		0.23	0.054	ug/Kg	₽	12/07/22 19:44	01/01/23 12:34	1
Perfluoroundecanoic acid (PFUnA)	4.6		0.23	0.047	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
Perfluorododecanoic acid (PFDoA)	0.18	J	0.23		ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
Perfluorotridecanoic acid (PFTriA)	1.3		0.23		ug/Kg	₽	12/07/22 19:44	01/01/23 12:34	1
Perfluorotetradecanoic acid (PFTeA)	0.064	J	0.23	0.042	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	₽	12/07/22 19:44	01/01/23 12:34	1
Perfluorohexanesulfonic acid (PFHxS)	0.96		0.23	0.033	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23	0.054	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23	0.040	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.046	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23	0.035	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.044	ug/Kg	₩	12/07/22 19:44	01/01/23 12:34	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:44	01/01/23 12:34	1
13C4 PFHpA	79		50 - 150				12/07/22 19:44	01/01/23 12:34	1
13C4 PEOA	83		50 150				12/07/22 10:44	01/01/23 12:34	1

(ADONA)						
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C4 PFHpA	79		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C4 PFOA	83		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C5 PFNA	85		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C2 PFDA	87		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C2 PFUnA	86		50 ₋ 150	12/07/22 19:44	01/01/23 12:34	1
13C2 PFDoA	79		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C2 PFTeDA	75		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C3 PFBS	70		50 ₋ 150	12/07/22 19:44	01/01/23 12:34	1
1802 PFHxS	72		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C4 PFOS	71		50 ₋ 150	12/07/22 19:44	01/01/23 12:34	1
d3-NMeFOSAA	109		50 - 150	12/07/22 19:44	01/01/23 12:34	1
d5-NEtFOSAA	124		50 - 150	12/07/22 19:44	01/01/23 12:34	1
13C3 HFPO-DA	77		50 ₋ 150	12/07/22 19:44	01/01/23 12:34	1

Method: EPA 537(Mod) - PFA	S for QSM 5.	.3, Table B	-15 - DL						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	30		1.1	0.24	ug/Kg	<u></u>	12/07/22 19:44	01/05/23 21:34	5
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFOS	75		50 - 150				12/07/22 19:44	01/05/23 21:34	5

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS31 Lab Sample ID: 320-94972-31

Date Collected: 12/01/22 21:50

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 82.7

General Chemistry									
Analyte	Result Qu	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	17.3		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	82.7		0.1	0.1	%			12/07/22 12:40	1

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1 A

Job ID: 320-94972-1 Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS32

Analyte

Percent Moisture (ASTM D 2216)

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-32

Date Collected: 12/01/22 22:00 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.1

Perfluorohexanolic acid (PFHxA) 0.090 J 0.22 0.034 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorochanolic acid (PFNA) 0.077 J 0.22 0.041 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorochanolic acid (PFNA) 0.64 0.22 0.058 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorodacanolic acid (PFNA) 0.64 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorodacanolic acid (PFNA) 0.64 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluoroundecanolic acid (PFNA) 0.65 0.22 0.030 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorododecanolic acid (PFNA) 0.29 0.22 0.033 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFTNA) 0.29 0.22 0.032 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.040 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.041 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.032 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.032 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecanolic acid (PFNA) ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecalfuoro-3-oxanonan ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecalfuoro-3-oxanonan ND 0.22 0.052 ug/Kg 5 12/07/22 19.44 0/10/1/23 12:44 Perfluorobletradecalfuoro-3-oxanonan ND 0.22 0.052 ug/Kg	Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluoronoctanoic acid (PFOA)	Perfluorohexanoic acid (PFHxA)	0.090	J	0.22	0.034	ug/Kg	<u></u>	12/07/22 19:44	01/01/23 12:44	
Perfluoronananic acid (PFNA) 0.64 0.22 0.024 ug/Kg 0 12/07/22 19:44 01/01/23 12:44	Perfluoroheptanoic acid (PFHpA)	0.077	J	0.22	0.041	ug/Kg	₽	12/07/22 19:44	01/01/23 12:44	
Perfluorodecanoic acid (PFDA)	Perfluorooctanoic acid (PFOA)	0.11	J	0.22	0.058	ug/Kg	≎	12/07/22 19:44	01/01/23 12:44	
Perfluoroundecanoic acid 1.1 0.22 0.046 ug/Kg	Perfluorononanoic acid (PFNA)	0.64		0.22	0.024	ug/Kg	₽	12/07/22 19:44	01/01/23 12:44	
Perfluorododecanoic acid PFTriA Perfluorododecanoic acid (PFTriA D.29 D.22 D.033 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorotridecanoic acid (PFTriA D.29 D.22 D.040 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorobutanesulfonic acid (PFTeA) ND D.22 D.041 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorobutanesulfonic acid (PFHxS) ND D.22 D.041 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorobutanesulfonic acid (PFHxS) ND D.22 D.047 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonic acid (PFHxS) ND D.22 D.047 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonic acid ND D.22 D.052 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.052 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.052 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.052 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 Perfluorooctanesulfonamidoa ND D.22 D.038 ug/Kg D.12/07/22 19:44 O1/01/23 12:44 D.12/07/22 19:44 O1/01/23 12:44 D.12/07/22 19:44 O1/01/23 12:44 D	Perfluorodecanoic acid (PFDA)	0.40		0.22	0.052	ug/Kg	₽	12/07/22 19:44	01/01/23 12:44	
Perfluorotridecanoic acid (PFTriA) 0.29 0.22 0.023 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluorotetradecanoic acid (PFTeA) ND 0.22 0.041 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluorotetradecanoic acid (PFBS) ND 0.22 0.041 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid (PFHxS) ND 0.22 0.032 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid (PFHxS) ND 0.22 0.047 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid (PFHxS) ND 0.22 0.047 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid (PFGS) ND 0.22 0.052 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa etic acid (NEFGSAA) NE-thylperfluorocatanesulfonamidoa etic acid (NEFGSAA) NE-thylperfluorocatanesulfonic acid ND 0.22 0.038 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.038 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.045 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.034 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.034 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid ND 0.22 0.042 ug/Kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctan		1.1		0.22	0.046	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
Perfluorotetradecanoic acid (PFTeA) ND 0.22 0.040 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluorobutanesulfonic acid (PFBS) ND 0.22 0.041 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonic acid (PFHxS) ND 0.22 0.032 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonic acid (PFHxS) ND 0.22 0.047 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.025 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.038 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg 12/07/22 19.44 01/01/23 12.44 Perfluoroctanesulfonamidoa ND 0.22 0.045 ug/Kg		0.065	J	0.22	0.033	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
Perfluorobutanesulfonic acid (PFBS) ND 0.22 0.041 ug/kg 12/07/22 19:44 01/01/23 12:44 Perfluorochexanesulfonic acid (PFHKS) ND 0.22 0.032 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid (PFHKS) ND 0.22 0.047 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.052 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.038 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.038 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.038 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.034 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.034 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.034 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa ND 0.22 0.042 ug/kg 0 12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonam	Perfluorotridecanoic acid (PFTriA)	0.29		0.22	0.023	ug/Kg	₽	12/07/22 19:44	01/01/23 12:44	
Perfluoronexanesulfonic acid (PFHxS) ND 0.22 0.032 ug/kg 0.12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonic acid 8.9 0.22 0.047 ug/kg 0.12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa 2016 acid (NMEFOSAA) N-methylperfluoroctanesulfonamidoa ND 0.22 0.052 ug/kg 0.12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa 2016 acid (NMEFOSAA) N-hethylperfluoroctanesulfonamidoa 2016 acid (NMEFOSAA) N-hethylperfluoroctanesulfonamidoa 2016 acid (NMEFOSAA) N-hethylperfluoroctanesulfonamidoa 2017 2018 ug/kg 0.12/07/22 19:44 01/01/23 12:44 Perfluoroctanesulfonamidoa 2	Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	
Perfluoroctanesulfonic acid PFOS) ND 0.22 0.025 ug/Kg 12/07/22 19:44 01/01/23 12:44 original perfosion pe	Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.041	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
N-methylperfluorooctanesulfonamidoa ND 0.22 0.025 ug/Kg 12/07/22 19:44 01/01/23 12:44 20:01/25 12:44 01/01/23 12:44 20:01/25 12:44 01/01/23 12:44 20:01/25 12:44 01/01/23 12:44 20:01/25 12:44 01/01/23 12:44 20:01/25 12:44 01/01/23 12:44 20:01/25 20:01/25 20:01/	Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEFOSAA) N-ethylperfluorooctanesulfonamidoac etic acid (NEFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.22 0.038 ug/Kg 12/07/22 19:44 01/01/23 12:44 e-1-sulfonic acid Hexafluoropropylene Oxide Dimer ND 0.22 0.045 ug/Kg 12/07/22 19:44 01/01/23 12:44 Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.22 0.034 ug/Kg 12/07/22 19:44 01/01/23 12:44 e-1-sulfonic acid 4.8-Dioxa-3H-perfluorononanoic acid (ND 0.22 0.042 ug/Kg 12/07/22 19:44 01/01/23 12:44 e-1-sulfonic acid 4.8-Dioxa-3H-perfluorononanoic acid (ND 0.22 0.042 ug/Kg 12/07/22 19:44 01/01/23 12:44 e-1-sulfonic acid (ADONA) Isotope Dilution %Recovery Qualifier Limits Prepared 12/07/22 19:44 01/01/23 12:44 13C4 PFHpA 80 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFHpA 80 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFHpA 80 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFDA 86 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFDA 86 50-150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50-150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50-150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 88 50-150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 85 50-150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 85 50-150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50-150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50-150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFDOS 73 50-150 12/07/22 19:44 01/01/23 12:44 13C4 PFDOS 74 01/01/23 12:44 01/01/23 12:44 01		8.9		0.22	0.047	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
### action (NEtFOSAA) ### action (NetFosa) ### acti	, ·	ND		0.22	0.025	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
2-1-sulfonic acid -lexafluoropropylene Oxide Dimer ND 0.22 0.045 ug/kg 12/07/22 19:44 01/01/23 12:44 Acid (HFPO-DA) 1-1-sulfonic acid 1,8-Dioxa-3H-perfluorononanoic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid 1,8-Dioxa-3H-perfluorononanoic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ADONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ND 0.22 0.042 ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic acid ug/kg 12/07/22 19:44 01/01/23 12:44 ODONA) -1-sulfonic a		ND		0.22	0.052	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
Acid (HFPO-DA) Acid (HFPO-Ba) Acid (HFPO-Ba)		ND		0.22	0.038	ug/Kg	₩	12/07/22 19:44	01/01/23 12:44	
8-1-sulfonic acid (4,8-Dioxa-3H-perfluorononanoic acid (4,8-Dioxa-3H-perfluoronoic acid (4,8-Dioxa-3H-perfluoronoic acid (4,8-Dioxa-3H-perfluoronoic acid (4,8-Dioxa-4H-perfluoronoic acid (4,8-Dioxa-4H-										
Sotope Dilution %Recovery Qualifier Limits Prepared Analyzed Dilution 12/07/22 19:44 01/01/23 12:44 01/01	e-1-sulfonic acid					0 0				
13C2 PFHxA 80 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFHpA 80 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOA 84 50 - 150 12/07/22 19:44 01/01/23 12:44 13C5 PFNA 91 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDOA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDOA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 1	•	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	
13C4 PFHpA 80 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOA 84 50 - 150 12/07/22 19:44 01/01/23 12:44 13C5 PFNA 91 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDOA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 750 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 750 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 12/0	lsotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C4 PFOA 84 50 - 150 12/07/22 19:44 01/01/23 12:44 13C5 PFNA 91 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDoA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 03-NMeFOSAA	13C2 PFHxA	80		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C5 PFNA 91 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDA 86 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDoA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 75 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 150 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 150 150 150 150 150 150 150 150 150 150	13C4 PFHpA	80		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C2 PFDA 86 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDoA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 13.NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07	13C4 PFOA	84		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C2 PFUnA 94 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFDoA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 13.NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 125 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 12/07/22 19:44 01/01/23 12:44 13C4 PFOSAA 12/07/22 19:44 12/07/22 19:44 13C4 PFOSAA 12/07/22 19:44	13C5 PFNA	91		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C2 PFDoA 83 50 - 150 12/07/22 19:44 01/01/23 12:44 13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 13.NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 135-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44 135-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C2 PFDA	86		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C2 PFTeDA 85 50 - 150 12/07/22 19:44 01/01/23 12:44 13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C2 PFUnA	94		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C3 PFBS 74 50 - 150 12/07/22 19:44 01/01/23 12:44 18O2 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C2 PFDoA	83		50 - 150				12/07/22 19:44	01/01/23 12:44	
1802 PFHxS 76 50 - 150 12/07/22 19:44 01/01/23 12:44 13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C2 PFTeDA	85		50 - 150				12/07/22 19:44	01/01/23 12:44	
13C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 13-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C3 PFBS	74		50 ₋ 150				12/07/22 19:44	01/01/23 12:44	
3C4 PFOS 73 50 - 150 12/07/22 19:44 01/01/23 12:44 /3-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 /5-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	802 PFHxS	76		50 - 150				12/07/22 19:44	01/01/23 12:44	
13-NMeFOSAA 117 50 - 150 12/07/22 19:44 01/01/23 12:44 15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44	13C4 PFOS	73								
15-NEtFOSAA 125 50 - 150 12/07/22 19:44 01/01/23 12:44										

Analyzed

12/07/22 12:40

12/07/22 12:40

RL

0.1

0.1

MDL Unit

0.1 %

0.1 %

D

Prepared

Result Qualifier

13.9

86.1

Dil Fac

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS33 Lab Sample ID: 320-94972-33

Date Collected: 12/01/22 22:20 **Matrix: Solid**

Percent Solids: 83.7 Date Received: 12/06/22 13:36

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.061	J	0.23	0.036	ug/Kg	— <u>—</u>	12/07/22 19:44	01/01/23 12:54	1
Perfluoroheptanoic acid (PFHpA)	0.050	J	0.23	0.044	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Perfluorooctanoic acid (PFOA)	0.087	J	0.23	0.062	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Perfluorononanoic acid (PFNA)	0.26		0.23	0.026	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Perfluorodecanoic acid (PFDA)	0.65		0.23	0.056	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Perfluoroundecanoic acid	3.4		0.23	0.049	ug/Kg	≎	12/07/22 19:44	01/01/23 12:54	1
(PFUnA)							10/07/00 10 11	04/04/00 40 54	
Perfluorododecanoic acid	0.40		0.23	0.035	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
(PFDoA) Perfluorotridecanoic acid (PFTriA)	0.52		0.23	0.024	ug/Kg	₩	12/07/22 10:44	01/01/23 12:54	1
Perfluorotetradecanoic acid	0.52		0.23		ug/Kg ug/Kg	☆		01/01/23 12:54	1
(PFTeA)	0.058	J	0.23	0.043	ug/Ng	14:	12/07/22 19.44	01/01/23 12.54	'
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.044	ug/Kg	 - ' Ö-	12/07/22 19:44	01/01/23 12:54	1
Perfluorohexanesulfonic acid (PFHxS)	ND.		0.23		ug/Kg			01/01/23 12:54	1
Perfluorooctanesulfonic acid	1.4	1	0.23		ug/Kg			01/01/23 12:54	1
(PFOS)		•	0.20	0.000	ug/itg	**	12/01/22 13.44	01/01/2012.04	'
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23	0.056	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23	0.041	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.048	ug/Kg		12/07/22 19:44	01/01/23 12:54	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23	0.036	ug/Kg	₽	12/07/22 19:44	01/01/23 12:54	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.045	ug/Kg	₩	12/07/22 19:44	01/01/23 12:54	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	76	qualifici	50 - 150					01/01/23 12:54	1
13C4 PFHpA	78		50 - 150					01/01/23 12:54	1
13C4 PFOA	80		50 ₋ 150					01/01/23 12:54	1
13C5 PFNA	89		50 ₋ 150					01/01/23 12:54	1
13C2 PFDA	84		50 ₋ 150					01/01/23 12:54	1
13C2 PFUnA	89		50 - 150					01/01/23 12:54	1
13C2 PFDoA	85		50 - 150					01/01/23 12:54	
13C2 PFTeDA	82							01/01/23 12:54	1
13C3 PFBS			50 ₋ 150						1
	69		50 - 150					01/01/23 12:54	
1802 PFHxS	71		50 ₋ 150					01/01/23 12:54	1
13C4 PFOS	68		50 ₋ 150					01/01/23 12:54	1
d3-NMeFOSAA	105		50 - 150					01/01/23 12:54	
d5-NEtFOSAA	119		50 - 150					01/01/23 12:54	1
13C3 HFPO-DA	77		50 - 150				12/07/22 19:44	01/01/23 12:54	1
General Chemistry Analyte	Docult	Qualifier	RL	MDI	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.3	- Quantitei	0.1	0.1			Fiehaien	12/07/22 12:40	1
	1n 4		UI	U. I	70			12/01/22 12:40	

Eurofins Sacramento

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS34

Lab Sample ID: 320-94972-34 Date Collected: 12/01/22 22:40

Matrix: Solid

Date Collected: 12/01/22 22:40	Matrix. John
Date Received: 12/06/22 13:36	Percent Solids: 87.4
Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15	

Method: EPA 537(Mod) - PFAS Analyte		Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.073	J	0.22	0.034	ug/Kg	— <u></u>	12/07/22 19:44	01/01/23 13:04	1
Perfluoroheptanoic acid (PFHpA)	0.066	J	0.22	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
Perfluorooctanoic acid (PFOA)	0.15	J	0.22	0.059	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
Perfluorononanoic acid (PFNA)	0.14	J	0.22	0.024	ug/Kg	≎	12/07/22 19:44	01/01/23 13:04	1
Perfluorodecanoic acid (PFDA)	2.9		0.22	0.053	ug/Kg	≎	12/07/22 19:44	01/01/23 13:04	1
Perfluoroundecanoic acid (PFUnA)	6.3		0.22	0.046	ug/Kg	₽	12/07/22 19:44	01/01/23 13:04	1
Perfluorododecanoic acid (PFDoA)	0.86		0.22	0.033	ug/Kg	ಘ	12/07/22 19:44	01/01/23 13:04	1
Perfluorotridecanoic acid (PFTriA)	1.4		0.22	0.023	ug/Kg	₩	12/07/22 19:44	01/01/23 13:04	1
Perfluorotetradecanoic acid (PFTeA)	0.21	J	0.22	0.041	ug/Kg	₩	12/07/22 19:44	01/01/23 13:04	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:44	01/01/23 13:04	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	≎	12/07/22 19:44	01/01/23 13:04	1
Perfluorooctanesulfonic acid (PFOS)	2.4		0.22	0.048	ug/Kg	₽	12/07/22 19:44	01/01/23 13:04	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	₩	12/07/22 19:44	01/01/23 13:04	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:44	01/01/23 13:04	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	80		50 - 150				12/07/22 19:44	01/01/23 13:04	1
13C4 PFHpA	83		50 - 150				12/07/22 19:44	01/01/23 13:04	1
13C4 PFOA	85		50 - 150				12/07/22 19:44	01/01/23 13:04	1
13C5 PFNA	92		50 - 150				12/07/22 19:44	01/01/23 13:04	1
13C2 PFDA	86		50 ₋ 150				12/07/22 19:44	01/01/23 13:04	1
13C2 PFUnA	92		50 ₋ 150				12/07/22 19:44	01/01/23 13:04	1
13C2 PFDoA	86		50 - 150				12/07/22 19:44	01/01/23 13:04	1
13C2 PFTeDA	84		50 ₋ 150				12/07/22 19:44	01/01/23 13:04	1
13C3 PFBS	69		50 ₋ 150					01/01/23 13:04	1
1802 PFHxS	72		50 - 150					01/01/23 13:04	1
13C4 PFOS	67		50 ₋ 150					01/01/23 13:04	1
d3-NMeFOSAA	115		50 - 150					01/01/23 13:04	1
d5-NEtFOSAA	125		50 - 150 50 - 150					01/01/23 13:04	
13C3 HFPO-DA	88		50 ₋ 150					01/01/23 13:04	1
General Chemistry									
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.6		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	87.4		0.1	0.1	%			12/07/22 12:40	1

Eurofins Sacramento

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS35 Lab Sample ID: 320-94972-35

Date Collected: 12/01/22 22:55 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 90.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.20	J	0.22	0.034	ug/Kg	— <u></u>	12/07/22 19:44	01/01/23 13:14	
Perfluoroheptanoic acid (PFHpA)	0.13	J	0.22	0.041	ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
Perfluorooctanoic acid (PFOA)	0.29		0.22	0.058	ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
Perfluorononanoic acid (PFNA)	0.64		0.22	0.024	ug/Kg	≎	12/07/22 19:44	01/01/23 13:14	1
Perfluorodecanoic acid (PFDA)	4.2		0.22	0.052	ug/Kg	₽	12/07/22 19:44	01/01/23 13:14	1
Perfluorododecanoic acid (PFDoA)	2.9		0.22	0.033	ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
Perfluorotridecanoic acid (PFTriA)	16		0.22	0.023	ug/Kg	₽	12/07/22 19:44	01/01/23 13:14	1
Perfluorotetradecanoic acid (PFTeA)	0.33		0.22	0.040	ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22		ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
Perfluorohexanesulfonic acid (PFHxS)	0.16	J	0.22	0.032	ug/Kg	₩	12/07/22 19:44	01/01/23 13:14	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg			01/01/23 13:14	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22		ug/Kg			01/01/23 13:14	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22		ug/Kg			01/01/23 13:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22		ug/Kg			01/01/23 13:14	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg			01/01/23 13:14	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.042	ug/Kg	‡	12/07/22 19:44	01/01/23 13:14	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	77		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C4 PFHpA	81		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C4 PFOA	85		50 - 150					01/01/23 13:14	1
13C5 PFNA	86		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C2 PFDA	86		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C2 PFUnA	79		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C2 PFDoA	83		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C2 PFTeDA	83		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C3 PFBS	67		50 - 150				12/07/22 19:44	01/01/23 13:14	1
18O2 PFHxS	72		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C4 PFOS	66		50 - 150				12/07/22 19:44	01/01/23 13:14	1
d3-NMeFOSAA	109		50 - 150				12/07/22 19:44	01/01/23 13:14	1
d5-NEtFOSAA	80		50 - 150				12/07/22 19:44	01/01/23 13:14	1
13C3 HFPO-DA	84		50 - 150				12/07/22 19:44	01/01/23 13:14	1
Method: EPA 537(Mod) - PFAS		.3, Table B Qualifier	-15 - DL RL	MDI	Unit	D	Prepared	Analyzed	Dil Fac
Analyte									

Analyzed

12/07/22 19:44 01/05/23 21:54

12/07/22 19:44 01/05/23 21:54

12/07/22 19:44 01/05/23 21:54

Prepared

2.2

Limits

50 - 150

50 - 150

29

%Recovery Qualifier

94

76

0.47 ug/Kg

Perfluorooctanesulfonic acid

(PFOS)

Isotope Dilution

13C2 PFUnA

13C4 PFOS

10

10

Dil Fac

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS35 Lab Sample ID: 320-94972-35

Date Collected: 12/01/22 22:55 Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 90.3

General Chemistry								
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	9.7	0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	90.3	0.1	0.1	%			12/07/22 12:40	1

5

8

10

12

1 4

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS36

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-36 Date Collected: 12/02/22 20:50 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 87.9

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.032	ug/Kg	<u></u>	12/07/22 19:44	01/01/23 13:25	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.040	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.055	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorononanoic acid (PFNA)	0.074	J	0.21	0.023	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorodecanoic acid (PFDA)	0.071	J	0.21	0.050	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluoroundecanoic acid (PFUnA)	0.14	J	0.21	0.044	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.031	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorotridecanoic acid (PFTriA)	0.029	J	0.21		ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21		ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.040	ug/Kg		12/07/22 19:44	01/01/23 13:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21		ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
Perfluorooctanesulfonic acid (PFOS)	ND	G	0.89	0.89	ug/Kg	₩	12/07/22 19:44	01/01/23 13:25	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21		ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	₽	12/07/22 19:44	01/01/23 13:25	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21	0.036	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.043	ug/Kg	≎	12/07/22 19:44	01/01/23 13:25	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21	0.032	ug/Kg	₽	12/07/22 19:44	01/01/23 13:25	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	80		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C4 PFHpA	82		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C4 PFOA	84		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C5 PFNA	89		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C2 PFDA	85		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C2 PFUnA	90		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C2 PFDoA	86		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C2 PFTeDA	82		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C3 PFBS	69		50 - 150				12/07/22 19:44	01/01/23 13:25	1
18O2 PFHxS	72		50 - 150				12/07/22 19:44	01/01/23 13:25	1
13C4 PFOS	70		50 - 150				12/07/22 19:44	01/01/23 13:25	1
d3-NMeFOSAA	107		50 - 150				12/07/22 19:44	01/01/23 13:25	1
d5-NEtFOSAA	127		50 - 150					01/01/23 13:25	1
13C3 HFPO-DA	86		50 - 150				12/07/22 19:44	01/01/23 13:25	1
General Chemistry							_		
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.1		0.1	0.1				12/07/22 12:40	1
	^= -		0.4	0.4	0/			10/07/00 10:10	4

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12/07/22 12:40

0.1

87.9

0.1 %

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS37

Percent Solids (ASTM D 2216)

Lab Sample ID: 320-94972-37 Date Collected: 12/02/22 21:00

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 93.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.031	ug/Kg		12/07/22 19:44	01/01/23 13:35	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.038	ug/Kg	₽	12/07/22 19:44	01/01/23 13:35	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.053	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.022	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.048	ug/Kg	≎	12/07/22 19:44	01/01/23 13:35	1
Perfluoroundecanoic acid (PFUnA)	0.12	J	0.20	0.042	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Perfluorododecanoic acid (PFDoA)	0.035	J	0.20	0.030	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Perfluorotridecanoic acid (PFTriA)	0.042	J	0.20	0.021	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.037	ug/Kg	₽	12/07/22 19:44	01/01/23 13:35	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.038	ug/Kg	₽	12/07/22 19:44	01/01/23 13:35	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.029	ug/Kg	≎	12/07/22 19:44	01/01/23 13:35	1
Perfluorooctanesulfonic acid (PFOS)	0.21	L	0.20	0.043	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.20		ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.20	0.035	ug/Kg		12/07/22 19:44	01/01/23 13:35	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20		ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.20		ug/Kg	₩		01/01/23 13:35	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.039	ug/Kg	₩	12/07/22 19:44	01/01/23 13:35	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	79		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C4 PFHpA	85		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C4 PFOA	81		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C5 PFNA	93		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C2 PFDA	84		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C2 PFUnA	89		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C2 PFDoA	85		50 - 150				12/07/22 19:44	01/01/23 13:35	1
13C2 PFTeDA	86		50 ₋ 150				12/07/22 19:44	01/01/23 13:35	1
13C3 PFBS	69		50 ₋ 150				12/07/22 19:44	01/01/23 13:35	1
1802 PFHxS	69		50 ₋ 150					01/01/23 13:35	1
13C4 PFOS	70		50 - 150					01/01/23 13:35	1
d3-NMeFOSAA	104		50 ₋ 150					01/01/23 13:35	. 1
d5-NEtFOSAA	116		50 - 150					01/01/23 13:35	
13C3 HFPO-DA	81		50 - 150					01/01/23 13:35	1
General Chemistry									
General Chemistry Analyte Percent Moisture (ASTM D 2216)	Result	Qualifier	RL	MDL 0.1	Unit	D	Prepared	Analyzed	Dil Fac

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12/07/22 12:40

0.1

0.1 %

93.6

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS38

Lab Sample ID: 320-94972-38 Date Collected: 12/02/22 21:10 **Matrix: Solid**

Date Received: 12/06/22 13:36 **Percent Solids: 87.1**

Analyte	Result	Qualifier	RL	MDL		D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.034	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.058	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorononanoic acid (PFNA)	0.061	J	0.22	0.024	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorodecanoic acid (PFDA)	0.067	J	0.22	0.052	ug/Kg	≎	12/07/22 19:44	01/01/23 13:45	1
Perfluoroundecanoic acid (PFUnA)	0.081	J	0.22	0.046	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorotridecanoic acid (PFTriA)	ND		0.22	0.023	ug/Kg	≎	12/07/22 19:44	01/01/23 13:45	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	≎	12/07/22 19:44	01/01/23 13:45	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₽	12/07/22 19:44	01/01/23 13:45	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Perfluorooctanesulfonic acid (PFOS)	3.4		0.22	0.047	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 13:45	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22	0.038	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22		ug/Kg	☼	12/07/22 19:44	01/01/23 13:45	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:44	01/01/23 13:45	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	78		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C4 PFHpA	83		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C4 PFOA	85		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C5 PFNA	94		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C2 PFDA	92		50 ₋ 150				12/07/22 19:44	01/01/23 13:45	1
13C2 PFUnA	92		50 ₋ 150				12/07/22 19:44	01/01/23 13:45	1
13C2 PFDoA	87		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C2 PFTeDA	86		50 ₋ 150				12/07/22 19:44	01/01/23 13:45	1
13C3 PFBS	69		50 ₋ 150				12/07/22 19:44	01/01/23 13:45	1
1802 PFHxS	73		50 - 150				12/07/22 19:44	01/01/23 13:45	1
13C4 PFOS	71		50 ₋ 150					01/01/23 13:45	1
d3-NMeFOSAA	107		50 - 150					01/01/23 13:45	1
d5-NEtFOSAA	123		50 - 150					01/01/23 13:45	
13C3 HFPO-DA	85		50 - 150					01/01/23 13:45	1
General Chemistry				. :		_	_		
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	12.9		0.1	0.1				12/07/22 12:40	1
Percent Solids (ASTM D 2216)	87.1		0.1	0.1	%			12/07/22 12:40	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS39

Lab Sample ID: 320-94972-39 Date Collected: 12/02/22 21:20 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 86.9

Method: EPA 537(Mod) - PFAS Analyte		Qualifier	RL	MDI	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluorooctanoic acid (PFOA)	0.15	J	0.23		ug/Kg	₩.		01/01/23 14:15	1
Perfluorononanoic acid (PFNA)	0.073		0.23		ug/Kg			01/01/23 14:15	1
Perfluorodecanoic acid (PFDA)	ND		0.23		ug/Kg	₩.		01/01/23 14:15	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluorododecanoic acid (PFDoA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23		ug/Kg			01/01/23 14:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23		ug/Kg			01/01/23 14:15	 1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23		ug/Kg	₩		01/01/23 14:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.23		ug/Kg	₩		01/01/23 14:15	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23		ug/Kg			01/01/23 14:15	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23	0.054	ug/Kg	₩	12/07/22 19:44	01/01/23 14:15	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23	0.039	ug/Kg	₩	12/07/22 19:44	01/01/23 14:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.046	ug/Kg		12/07/22 19:44	01/01/23 14:15	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23	0.035	ug/Kg	₩	12/07/22 19:44	01/01/23 14:15	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.044	ug/Kg	₩	12/07/22 19:44	01/01/23 14:15	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	74		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C4 PFHpA	81		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C4 PFOA	80		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C5 PFNA	92		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C2 PFDA	82		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C2 PFUnA	85		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C2 PFDoA	79		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C2 PFTeDA	84		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C3 PFBS	63		50 - 150				12/07/22 19:44	01/01/23 14:15	1
1802 PFHxS	69		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C4 PFOS	67		50 - 150				12/07/22 19:44	01/01/23 14:15	1
d3-NMeFOSAA	108		50 - 150				12/07/22 19:44	01/01/23 14:15	1
d5-NEtFOSAA	112		50 - 150				12/07/22 19:44	01/01/23 14:15	1
13C3 HFPO-DA	77		50 - 150				12/07/22 19:44	01/01/23 14:15	1
General Chemistry							_		
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	13.1		0.1	0.1				12/07/22 11:38	1
Percent Solids (ASTM D 2216)	86.9		0.1	0.1	%			12/07/22 11:38	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS40

Lab Sample ID: 320-94972-40 Date Collected: 12/02/22 21:30 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 86.3

0.035 ND 0.11 0.091 ND ND ND ND ND ND ND ND ND ND	J	0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.042 0.058 0.024 0.053 0.046 0.033 0.023 0.041 0.042 0.032	ug/Kg		12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1
0.11 0.091 ND ND ND ND ND ND ND		0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.058 0.024 0.053 0.046 0.033 0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg		12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1 1 1 1
0.091 ND		0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.024 0.053 0.046 0.033 0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1 1 1
ND	J	0.22 0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.053 0.046 0.033 0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$ \$ \$ \$	12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1 1 1
ND ND ND ND ND ND		0.22 0.22 0.22 0.22 0.22 0.22 0.22	0.046 0.033 0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$ \$ \$	12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1 1
ND ND ND ND ND ND		0.22 0.22 0.22 0.22 0.22 0.22	0.033 0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg ug/Kg	\$ \$ \$ \$	12/07/22 19:44 12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1
ND ND ND ND ND		0.22 0.22 0.22 0.22 0.22	0.023 0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg ug/Kg	# # #	12/07/22 19:44 12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25 01/01/23 14:25	1 1 1
ND ND ND ND		0.22 0.22 0.22 0.22	0.041 0.042 0.032 0.047	ug/Kg ug/Kg ug/Kg	\$ \$	12/07/22 19:44 12/07/22 19:44	01/01/23 14:25 01/01/23 14:25	1 1
ND ND ND		0.22 0.22 0.22	0.042 0.032 0.047	ug/Kg ug/Kg	\$	12/07/22 19:44	01/01/23 14:25	1
ND ND ND		0.22 0.22	0.032 0.047	ug/Kg	₽			
ND ND		0.22	0.047			12/07/22 19:44	04/04/00 11 0=	
ND							U1/U1/23 14:25	1
		0.22		ug/Kg	₩	12/07/22 19:44	01/01/23 14:25	1
ND			0.025	ug/Kg	₽	12/07/22 19:44	01/01/23 14:25	1
		0.22	0.053	ug/Kg	₩	12/07/22 19:44	01/01/23 14:25	1
ND		0.22	0.038	ug/Kg	₩	12/07/22 19:44	01/01/23 14:25	1
ND		0.22			≎	12/07/22 19:44	01/01/23 14:25	1
ND		0.22			☼	12/07/22 19:44	01/01/23 14:25	1
ND		0.22	0.043	ug/Kg	₩	12/07/22 19:44	01/01/23 14:25	1
%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
79		50 - 150				12/07/22 19:44	01/01/23 14:25	1
80		50 - 150				12/07/22 19:44	01/01/23 14:25	1
78		50 - 150				12/07/22 19:44	01/01/23 14:25	1
95		50 - 150				12/07/22 19:44	01/01/23 14:25	1
90		50 - 150				12/07/22 19:44	01/01/23 14:25	1
91		50 - 150				12/07/22 19:44	01/01/23 14:25	1
87		50 - 150				12/07/22 19:44	01/01/23 14:25	1
81		50 - 150				12/07/22 19:44	01/01/23 14:25	1
71		50 - 150				12/07/22 19:44	01/01/23 14:25	1
73		50 - 150				12/07/22 19:44	01/01/23 14:25	1
73		50 - 150				12/07/22 19:44	01/01/23 14:25	1
110		50 - 150				12/07/22 19:44	01/01/23 14:25	1
112		50 - 150				12/07/22 19:44	01/01/23 14:25	1
85		50 - 150				12/07/22 19:44	01/01/23 14:25	1
_					_	_		
	Qualifier				D	Prepared		Dil Fac
								1 1
	ND ND ND ND %Recovery 79 80 78 95 90 91 87 81 71 73 73 110 112 85	ND ND ND ND ND %Recovery 79 80 78 95 90 91 87 81 71 73 73 73 110 112 85 Result Qualifier 13.7	ND 0.22 ND 0.22 ND 0.22 ND 0.22 %Recovery Qualifier Limits 79 50 - 150 80 50 - 150 95 50 - 150 90 50 - 150 91 50 - 150 87 50 - 150 81 50 - 150 71 50 - 150 73 50 - 150 73 50 - 150 110 50 - 150 85 50 - 150 Result Qualifier RL 13.7 0.1	ND 0.22 0.038 ND 0.22 0.045 ND 0.22 0.034 ND 0.22 0.043 %Recovery Qualifier Limits 79 50 - 150 80 50 - 150 95 50 - 150 90 50 - 150 91 50 - 150 87 50 - 150 81 50 - 150 71 50 - 150 73 50 - 150 110 50 - 150 85 50 - 150 Result Qualifier RL MDL 13.7 0.1 0.1	ND 0.22 0.038 ug/Kg ND 0.22 0.045 ug/Kg ND 0.22 0.034 ug/Kg ND 0.22 0.043 ug/Kg MRecovery Qualifier Limits 79 50-150 80 50-150 95 50-150 96 50-150 97 50-150 97 50-150 98 50-150 78 50-150 78 50-150 78 50-150 79 50-150 87 50-150 87 50-150 71 50-150 73 50-150 73 50-150 73 50-150 73 50-150 73 50-150 73 50-150 74 50-150 75 50-150 76 Fesult Qualifier RL MDL Unit 13.7 0.1 0.1 W	ND 0.22 0.038 ug/Kg ★ ND 0.22 0.045 ug/Kg ★ ND 0.22 0.034 ug/Kg ★ ND 0.22 0.043 ug/Kg ★ *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***	ND 0.22 0.038 ug/Kg	ND 0.22 0.038 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.22 0.034 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.22 0.034 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.22 0.043 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.22 0.044 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.22 0.043 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.20 0.041 ug/Kg 12/07/22 19:44 01/01/23 14:25 ND 0.2

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS41

Lab Sample ID: 320-94972-41 Date Collected: 12/02/22 21:20 **Matrix: Solid** Date Received: 12/06/22 13:36

Percent Solids: 81.6

	•	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
ND		0.23	0.035	ug/Kg	<u></u>	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.043	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
0.12	J	0.23	0.060	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
0.087	J	0.23	0.025	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.055	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.048	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.034	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.024	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.042	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.043	ug/Kg	₽	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.033	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.049	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.026	ug/Kg	≎	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.055	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.040	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.047	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23			₩	12/07/22 19:17	01/02/23 10:05	1
ND		0.23	0.044	ug/Kg	₩	12/07/22 19:17	01/02/23 10:05	1
%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
78		50 - 150				12/07/22 19:17	01/02/23 10:05	1
80		50 - 150				12/07/22 19:17	01/02/23 10:05	1
84		50 - 150				12/07/22 19:17	01/02/23 10:05	1
95						,	01/02/23 10.03	
		50 - 150					01/02/23 10:05	1
87		50 - 150 50 - 150				12/07/22 19:17		1 1
						12/07/22 19:17 12/07/22 19:17	01/02/23 10:05	
87		50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05	1
87 95		50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1
87 95 87		50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1
87 95 87 89		50 - 150 50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1 1
87 95 87 89 77		50 - 150 50 - 150 50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1 1
87 95 87 89 77		50 - 150 50 - 150 50 - 150 50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1 1 1
87 95 87 89 77 77		50 - 150 50 - 150 50 - 150 50 - 150 50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1 1 1 1
87 95 87 89 77 77 75		50 - 150 50 - 150 50 - 150 50 - 150 50 - 150 50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05 01/02/23 10:05	1 1 1 1 1 1
87 95 87 89 77 75 112 122 83		50 - 150 50 - 150				12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05	1 1 1 1 1 1 1 1 1
87 95 87 89 77 75 112 122 83	Qualifier	50 - 150 50 - 150	MDL		<u>D</u> _	12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05	1 1 1 1 1 1 1 1
87 95 87 89 77 75 112 122 83	Qualifier	50 - 150 50 - 150	MDL 0.1 0.1	%	<u>D</u>	12/07/22 19:17 12/07/22 19:17	01/02/23 10:05 01/02/23 10:05	1 1 1 1 1 1 1 1 1
	Result ND ND ND ND ND ND ND N	Result Qualifier ND ND ND ND ND ND ND N	Result Qualifier RL ND 0.23 ND 0.23 0.12 J 0.23 ND 0.50	Result ND Qualifier RL MDL ND 0.23 0.035 ND 0.23 0.043 0.12 J 0.23 0.060 0.087 J 0.23 0.025 ND 0.23 0.048 ND 0.23 0.048 ND 0.23 0.048 ND 0.23 0.042 ND 0.23 0.042 ND 0.23 0.043 ND 0.23 0.049 ND 0.23 0.055 ND 0.23 0.040 ND 0.23 0.040 ND 0.23 0.047 ND 0.23 0.047 ND 0.23 0.044 ND 0.23 0.044	Result ND Qualifier RL MDL Unit ND 0.23 0.035 ug/Kg ND 0.23 0.043 ug/Kg 0.12 J 0.23 0.060 ug/Kg 0.087 J 0.23 0.025 ug/Kg ND 0.23 0.055 ug/Kg ND 0.23 0.048 ug/Kg ND 0.23 0.044 ug/Kg ND 0.23 0.042 ug/Kg ND 0.23 0.042 ug/Kg ND 0.23 0.043 ug/Kg ND 0.23 0.043 ug/Kg ND 0.23 0.049 ug/Kg ND 0.23 0.055 ug/Kg ND 0.23 0.055 ug/Kg ND 0.23 0.040 ug/Kg ND 0.23 0.047 ug/Kg ND 0.23 0.047 ug/Kg ND 0.23 0.047 ug/Kg ND 0.23 0.044 ug/Kg ND 0.23 0.044 ug/Kg ND 0.23 0.044 ug/Kg ND <td> Result Qualifier RL MDL Unit D </td> <td>Result Qualifier RL MDL Unit D Prepared ND 0.23 0.035 ug/Kg 12/07/22 19:17 12/07/22 19:17 ND 0.23 0.043 ug/Kg 12/07/22 19:17 1.012 J 0.23 0.060 ug/Kg 12/07/22 19:17 1.0087 J 0.23 0.065 ug/Kg 12/07/22 19:17 1.00 0.023 0.055 ug/Kg 12/07/22 19:17 1.00 0.023 0.048 ug/Kg 12/07/22 19:17 1.00 0.023 0.024 ug/Kg 12/07/22 19:17 1.00 0.023 0.042 ug/Kg 12/07/22 19:17 1.00 0.023 0.042 ug/Kg 12/07/22 19:17 1.00 0.023 0.049 ug/Kg 12/07/22 19:17 1.00 0.023</td> <td> ND</td>	Result Qualifier RL MDL Unit D	Result Qualifier RL MDL Unit D Prepared ND 0.23 0.035 ug/Kg 12/07/22 19:17 12/07/22 19:17 ND 0.23 0.043 ug/Kg 12/07/22 19:17 1.012 J 0.23 0.060 ug/Kg 12/07/22 19:17 1.0087 J 0.23 0.065 ug/Kg 12/07/22 19:17 1.00 0.023 0.055 ug/Kg 12/07/22 19:17 1.00 0.023 0.048 ug/Kg 12/07/22 19:17 1.00 0.023 0.024 ug/Kg 12/07/22 19:17 1.00 0.023 0.042 ug/Kg 12/07/22 19:17 1.00 0.023 0.042 ug/Kg 12/07/22 19:17 1.00 0.023 0.049 ug/Kg 12/07/22 19:17 1.00 0.023	ND

Eurofins Sacramento

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 220TZ-SS42 Lab Sample ID: 320-94972-42

Date Collected: 12/02/22 21:45

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 86.7

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte Result Qualifier **MDL** Unit RL Prepared Analyzed Dil Fac Perfluorohexanoic acid (PFHxA) 12/07/22 19:17 01/09/23 02:55 ND 0.22 0.034 ug/Kg 0.22 12/07/22 19:17 01/09/23 02:55 Perfluoroheptanoic acid (PFHpA) 0.042 J 0.042 ug/Kg Perfluorooctanoic acid (PFOA) 0.17 J 0.22 0.059 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.024 ug/Kg 12/07/22 19:17 01/09/23 02:55 Perfluorononanoic acid (PFNA) 0.22 0.15 J Perfluorodecanoic acid (PFDA) 0.22 0.053 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.057 J Perfluoroundecanoic acid 0.22 0.046 ug/Kg \$\pri\$ 12/07/22 19:17 01/09/23 02:55 0.27 B (PFUnA) Perfluorododecanoic acid (PFDoA) ND 0.22 0.033 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.22 0.023 ug/Kg 12/07/22 19:17 01/09/23 02:55 Perfluorotridecanoic acid (PFTriA) 0.080 JB Perfluorotetradecanoic acid (PFTeA) ND 0.22 0.041 ug/Kg 12/07/22 19:17 01/09/23 02:55 Perfluorobutanesulfonic acid (PFBS) ND 0.042 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.22 Perfluorohexanesulfonic acid (PFHxS) ND 0.032 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.22 Perfluorooctanesulfonic acid (PFOS) ND 0.22 12/07/22 19:17 01/09/23 02:55 0.048 ug/Kg N-methylperfluorooctanesulfonamidoa ND 0.025 ug/Kg 12/07/22 19:17 01/09/23 02:55 0.22 cetic acid (NMeFOSAA) N-ethylperfluorooctanesulfonamidoac ND 0.22 0.053 ug/Kg 12/07/22 19:17 01/09/23 02:55 etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.22 12/07/22 19:17 01/09/23 02:55 0.039 ug/Kg e-1-sulfonic acid 0.22 12/07/22 19:17 01/09/23 02:55 ND 0.045 ug/Kg Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 0.22 0.034 ug/Kg 12/07/22 19:17 01/09/23 02:55 e-1-sulfonic acid 4,8-Dioxa-3H-perfluorononanoic acid ND 0.22 0.043 ug/Kg 12/07/22 19:17 01/09/23 02:55

(ADONA)				 		
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	83		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C4 PFHpA	84		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C4 PFOA	77		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C5 PFNA	88		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C2 PFDA	87		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C2 PFUnA	98		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C2 PFDoA	84		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C2 PFTeDA	85		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C3 PFBS	73		50 - 150	12/07/22 19:17	01/09/23 02:55	1
18O2 PFHxS	79		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C4 PFOS	70		50 - 150	12/07/22 19:17	01/09/23 02:55	1
d3-NMeFOSAA	102		50 - 150	12/07/22 19:17	01/09/23 02:55	1
d5-NEtFOSAA	120		50 - 150	12/07/22 19:17	01/09/23 02:55	1
13C3 HFPO-DA	79		50 - 150	12/07/22 19:17	01/09/23 02:55	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.19	JH	0.22	0.047	ug/Kg	₽	01/10/23 19:43	01/11/23 15:28	1
Perfluorooctanesulfonic acid (PFOS)	2.4	HI	0.22	0.048	ug/Kg	₩	01/10/23 19:43	01/11/23 15:28	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	80		50 - 150				01/10/23 19:43	01/11/23 15:28	1
13C4 PFOS	71		50 - 150				01/10/23 19:43	01/11/23 15:28	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS42 Lab Sample ID: 320-94972-42

Date Collected: 12/02/22 21:45 **Matrix: Solid** Date Received: 12/06/22 13:36

Percent Solids: 86.7

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	13.3		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	86.7		0.1	0.1	%			12/07/22 11:38	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS43

Isotope Dilution

13C2 PFUnA

13C4 PFOS

Lab Sample ID: 320-94972-43 Date Collected: 12/02/22 21:55 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 83.8

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.14	J	0.24	0.037	ug/Kg	<u></u>	12/07/22 19:17	01/09/23 03:05	1
Perfluoroheptanoic acid (PFHpA)	0.12	J	0.24	0.045	ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	1
Perfluorooctanoic acid (PFOA)	0.30		0.24	0.063	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorononanoic acid (PFNA)	0.27		0.24	0.026	ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	1
Perfluorodecanoic acid (PFDA)	ND		0.24	0.057	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluoroundecanoic acid (PFUnA)	0.089	JB	0.24	0.050	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.035	ug/Kg		12/07/22 19:17	01/09/23 03:05	1
Perfluorotridecanoic acid (PFTriA)	0.025	JB	0.24		ug/Kg	☆	12/07/22 19:17	01/09/23 03:05	
Perfluorotetradecanoic acid (PFTeA)	ND		0.24		ug/Kg	☆	12/07/22 19:17	01/09/23 03:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24		ug/Kg		12/07/22 19:17	01/09/23 03:05	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24		ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.24	0.051		₩	12/07/22 19:17	01/09/23 03:05	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.24		ug/Kg			01/09/23 03:05	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.24	0.057	ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.24	0.041	ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	,
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.048	ug/Kg		12/07/22 19:17	01/09/23 03:05	
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.24	0.037	ug/Kg	₩	12/07/22 19:17	01/09/23 03:05	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.046	ug/Kg	₽	12/07/22 19:17	01/09/23 03:05	
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	88		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C4 PFHpA	85		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C4 PFOA	82		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C5 PFNA	93		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C2 PFDA	90		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C2 PFUnA	96		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C2 PFDoA	82		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C2 PFTeDA	96		50 ₋ 150				12/07/22 19:17	01/09/23 03:05	
13C3 PFBS	77		50 ₋ 150				12/07/22 19:17	01/09/23 03:05	
1802 PFHxS	84		50 - 150				12/07/22 19:17	01/09/23 03:05	
13C4 PFOS	75		50 - 150					01/09/23 03:05	1
d3-NMeFOSAA	115		50 ₋ 150					01/09/23 03:05	1
d5-NEtFOSAA	125		50 - 150					01/09/23 03:05	
13C3 HFPO-DA	80		50 - 150					01/09/23 03:05	1
Method: EPA 537(Mod) - PFAS		•							
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.090		0.23		ug/Kg	₩	01/10/23 19:43	01/11/23 15:38	1
Perfluorooctanesulfonic acid	2.5	HI	0.23	0.049	ug/Kg	**	01/10/23 19:43	01/11/23 15:38	1
(PFOS)	2.0		0.20	0.010	ug/rtg	~	01/10/20 10:10	0.7.1720 10.00	

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Analyzed

01/10/23 19:43 01/11/23 15:38

01/10/23 19:43 01/11/23 15:38

Prepared

Limits

50 - 150

50 - 150

%Recovery Qualifier

82

71

Dil Fac

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS43 Lab Sample ID: 320-94972-43

Date Collected: 12/02/22 21:55 **Matrix: Solid** Date Received: 12/06/22 13:36

Percent Solids: 83.8

General Chemistry									
Analyte	Result Q	ualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.2		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	83.8		0.1	0.1	%			12/07/22 11:38	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS44

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-44 Date Collected: 12/02/22 22:05

Matrix: Solid Percent Solids: 80.9

Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte Result Qualifier **MDL** Unit Dil Fac RL Prepared Analyzed 12/07/22 19:17 01/09/23 03:15 Perfluorohexanoic acid (PFHxA) 0.062 J 0.24 0.037 ug/Kg 0.24 12/07/22 19:17 01/09/23 03:15 Perfluoroheptanoic acid (PFHpA) 0.062 J 0.046 ug/Kg Perfluorooctanoic acid (PFOA) 0.25 0.24 0.063 ug/Kg 12/07/22 19:17 01/09/23 03:15 0.24 0.026 ug/Kg 12/07/22 19:17 01/09/23 03:15 Perfluorononanoic acid (PFNA) 0.30 Perfluorodecanoic acid (PFDA) 0.24 0.057 ug/Kg 12/07/22 19:17 01/09/23 03:15 0.14 J Perfluoroundecanoic acid 0.39 B 0.24 0.050 ug/Kg 12/07/22 19:17 01/09/23 03:15 (PFUnA) Perfluorododecanoic acid 0.036 J 0.24 0.036 ug/Kg 12/07/22 19:17 01/09/23 03:15 (PFDoA) 12/07/22 19:17 01/09/23 03:15 Perfluorotridecanoic acid (PFTriA) 0.086 JB 0.24 0.025 ug/Kg Perfluorotetradecanoic acid (PFTeA) ND 0.24 0.044 ug/Kg 12/07/22 19:17 01/09/23 03:15 Perfluorobutanesulfonic acid (PFBS) ND 0.24 0.046 ug/Kg 12/07/22 19:17 01/09/23 03:15 Perfluorohexanesulfonic acid (PFHxS) ND 0.24 0.035 ug/Kg 12/07/22 19:17 01/09/23 03:15 Perfluorooctanesulfonic acid (PFOS) ND 0.24 0.051 ug/Kg 12/07/22 19:17 01/09/23 03:15 N-methylperfluorooctanesulfonamidoa ND 0.24 0.028 ug/Kg 12/07/22 19:17 01/09/23 03:15 cetic acid (NMeFOSAA) 12/07/22 19:17 01/09/23 03:15 N-ethylperfluorooctanesulfonamidoac ND 0.24 0.057 ug/Kg etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 0.24 0.042 ug/Kg 12/07/22 19:17 01/09/23 03:15 e-1-sulfonic acid ND 0.24 12/07/22 19:17 01/09/23 03:15 Hexafluoropropylene Oxide Dimer 0.049 ug/Kg Acid (HFPO-DA) ND 0.24 0.037 ug/Kg 12/07/22 19:17 01/09/23 03:15 11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid ND 0.24 0.047 ug/Kg 12/07/22 19:17 01/09/23 03:15 4,8-Dioxa-3H-perfluorononanoic acid (ADONA)

(ADONA)					
Isotope Dilution	%Recovery Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	86	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C4 PFHpA	88	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C4 PFOA	81	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C5 PFNA	98	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C2 PFDA	94	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C2 PFUnA	105	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C2 PFDoA	90	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C2 PFTeDA	94	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C3 PFBS	80	50 - 150	12/07/22 19:17	01/09/23 03:15	1
1802 PFHxS	84	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C4 PFOS	79	50 - 150	12/07/22 19:17	01/09/23 03:15	1
d3-NMeFOSAA	114	50 - 150	12/07/22 19:17	01/09/23 03:15	1
d5-NEtFOSAA	132	50 - 150	12/07/22 19:17	01/09/23 03:15	1
13C3 HFPO-DA	81	50 - 150	12/07/22 19:17	01/09/23 03:15	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.29	Н	0.23	0.049	ug/Kg	₩	01/10/23 19:43	01/11/23 15:48	1
Perfluorooctanesulfonic acid (PFOS)	1.5	HI	0.23	0.050	ug/Kg	₩	01/10/23 19:43	01/11/23 15:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	88		50 - 150				01/10/23 19:43	01/11/23 15:48	1
13C4 PFOS	78		50 - 150				01/10/23 19:43	01/11/23 15:48	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS44 Lab Sample ID: 320-94972-44

Date Collected: 12/02/22 22:05

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 80.9

General Chemistry									
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	19.1		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	80.9		0.1	0.1	%			12/07/22 11:38	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS45

13C4 PFOS

Lab Sample ID: 320-94972-45

Date Collected: 12/02/22 22:15 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 83.6

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	0.079	J	0.23	0.036	ug/Kg	<u></u>	12/07/22 19:17	01/09/23 03:25	1
Perfluoroheptanoic acid (PFHpA)	0.051	J	0.23	0.045	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorooctanoic acid (PFOA)	0.091	J	0.23	0.062	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorononanoic acid (PFNA)	0.20	J	0.23	0.026	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorodecanoic acid (PFDA)	0.059	J	0.23	0.056	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluoroundecanoic acid (PFUnA)	0.20	JB	0.23	0.049	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.035	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorotridecanoic acid (PFTriA)	0.070	JB	0.23	0.025	ug/Kg	☆	12/07/22 19:17	01/09/23 03:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.043	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.045	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.034	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
Perfluorooctanesulfonic acid (PFOS)	7.3	IB	0.23	0.050	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.23	0.056	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.23		ug/Kg	\	12/07/22 19:17	01/09/23 03:25	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23		ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.23		ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.046	ug/Kg	₩	12/07/22 19:17	01/09/23 03:25	1
lsotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	78		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C4 PFHpA	81		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C4 PFOA	78		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C5 PFNA	86		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C2 PFDA	86		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C2 PFUnA	93		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C2 PFDoA	83		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C2 PFTeDA	85		50 ₋ 150				12/07/22 19:17	01/09/23 03:25	1
13C3 PFBS	73		50 - 150				12/07/22 19:17	01/09/23 03:25	1
1802 PFHxS	79		50 - 150				12/07/22 19:17	01/09/23 03:25	1
13C4 PFOS	72		50 ₋ 150				12/07/22 19:17	01/09/23 03:25	1
d3-NMeFOSAA	104		50 - 150					01/09/23 03:25	1
d5-NEtFOSAA	116		50 - 150					01/09/23 03:25	1
13C3 HFPO-DA	75		50 - 150				12/07/22 19:17	01/09/23 03:25	1
Method: EPA 537(Mod) - PFAS				MDI	11-24	_	Para and	A	D!! E
Analyte		Qualifier	RL	MDL		D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA) Perfluorooctanesulfonic acid	0.20 8.4	J H	0.23 0.23		ug/Kg ug/Kg	\$	01/10/23 19:43 01/10/23 19:43		1
(PFOS)									
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	85		50 - 150				01/10/23 19:43	01/11/23 15:58	

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01/10/23 19:43 01/11/23 15:58

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Percent Solids (ASTM D 2216)

Client Sample ID: 220TZ-SS45 Lab Sample ID: 320-94972-45

Date Collected: 12/02/22 22:15

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 83.6

General Chemistry							
Analyte	Result Qualifier	RL	MDL Un	nit D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.4	0.1	0.1 %			12/07/22 11:38	1

0.1

0.1 %

83.6

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4

5

12/07/22 11:38

46

11

13

14

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS46

Lab Sample ID: 320-94972-46 Date Collected: 12/02/22 22:30 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 88.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.22	0.035	ug/Kg	<u></u>	12/07/22 19:17	01/09/23 03:35	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	₽	12/07/22 19:17	01/09/23 03:35	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	₽	12/07/22 19:17	01/09/23 03:35	1
Perfluorononanoic acid (PFNA)	ND		0.22	0.025	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.054	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	1
Perfluoroundecanoic acid (PFUnA)	0.17	JB	0.22	0.047	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	₽	12/07/22 19:17	01/09/23 03:35	1
Perfluorotridecanoic acid (PFTriA)	0.052	JB	0.22	0.023	ug/Kg	≎	12/07/22 19:17	01/09/23 03:35	•
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	₽	12/07/22 19:17	01/09/23 03:35	•
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	· · · · · · · · ·
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	≎	12/07/22 19:17	01/09/23 03:35	
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.048	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.22		ug/Kg		12/07/22 19:17	01/09/23 03:35	,
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.22	0.054	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	,
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.22		ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	•
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.22	0.035	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	,
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	₩	12/07/22 19:17	01/09/23 03:35	•
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFHxA	85		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C4 PFHpA	90		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C4 PFOA	84		50 - 150				12/07/22 19:17	01/09/23 03:35	:
13C5 PFNA	95		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C2 PFDA	91		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C2 PFUnA	101		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C2 PFDoA	96		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C2 PFTeDA	92		50 - 150				12/07/22 19:17	01/09/23 03:35	
13C3 PFBS	76		50 ₋ 150				12/07/22 19:17	01/09/23 03:35	
1802 PFHxS	82		50 ₋ 150				12/07/22 19:17	01/09/23 03:35	
13C4 PFOS	74		50 - 150					01/09/23 03:35	
d3-NMeFOSAA	106		50 - 150					01/09/23 03:35	
d5-NEtFOSAA	123		50 - 150					01/09/23 03:35	
13C3 HFPO-DA	81		50 - 150					01/09/23 03:35	•
Method: EPA 537(Mod) - PFAS		•							
Analyte		Qualifier	RL		Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.18		0.22		ug/Kg			01/11/23 16:08	1
Perfluorooctanesulfonic acid	0.31	11.1	0.22	0.047	ug/Kg	· Lu	01/10/23 19:43	04/44/02 46:00	

Method: EPA 537(Mod) - PFA	AS for QSM 5	.3, Table B	3-15 - RE						
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	0.18	JH	0.22	0.046	ug/Kg	<u></u>	01/10/23 19:43	01/11/23 16:08	1
Perfluorooctanesulfonic acid (PFOS)	0.31	HI	0.22	0.047	ug/Kg	☼	01/10/23 19:43	01/11/23 16:08	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	95		50 - 150				01/10/23 19:43	01/11/23 16:08	

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01/10/23 19:43 01/11/23 16:08

50 - 150

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13C4 PFOS

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS46 Lab Sample ID: 320-94972-46

Date Collected: 12/02/22 22:30 Matrix: Solid
Date Received: 12/06/22 13:36 Percent Solids: 88.5

General Chemistry									
Analyte	Result Q	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	11.5		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	88.5		0.1	0.1	%			12/07/22 11:38	1

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS47

Lab Sample ID: 320-94972-47

Matrix: Solid

Date Collected: 12/02/22 22:20 Date Received: 12/06/22 13:36 **Percent Solids: 91.1**

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fa
Perfluorohexanoic acid (PFHxA)	ND		0.21	0.032	ug/Kg	— <u></u>	12/07/22 19:17	01/09/23 03:46	
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.039	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	
Perfluorooctanoic acid (PFOA)	ND		0.21	0.054	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorononanoic acid (PFNA)	0.025	J	0.21	0.023	ug/Kg	≎	12/07/22 19:17	01/09/23 03:46	
Perfluorodecanoic acid (PFDA)	ND		0.21	0.049	ug/Kg	≎	12/07/22 19:17	01/09/23 03:46	
Perfluoroundecanoic acid (PFUnA)	0.29	В	0.21	0.043	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.031	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorotridecanoic acid (PFTriA)	0.13	JB	0.21	0.022	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.038	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.039	ug/Kg	₽	12/07/22 19:17	01/09/23 03:46	
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21		ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
Perfluorooctanesulfonic acid (PFOS)	0.34	IB	0.21	0.044	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.21	0.049	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.21		ug/Kg		12/07/22 19:17		
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21		ug/Kg		12/07/22 19:17		
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.21		ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.040	ug/Kg	₩	12/07/22 19:17	01/09/23 03:46	
lsotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fa
13C2 PFHxA	75		50 - 150				12/07/22 19:17	01/09/23 03:46	
13C4 PFHpA	81		50 - 150				12/07/22 19:17	01/09/23 03:46	
13C4 PFOA	75		50 - 150				12/07/22 19:17	01/09/23 03:46	
13C5 PFNA	81		50 - 150				12/07/22 19:17	01/09/23 03:46	
13C2 PFDA	80		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
13C2 PFUnA	88		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
13C2 PFDoA	70		50 - 150				12/07/22 19:17	01/09/23 03:46	
13C2 PFTeDA	88		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
13C3 PFBS	62		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
1802 PFHxS	64		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
13C4 PFOS	66		50 ₋ 150				12/07/22 19:17	01/09/23 03:46	
d3-NMeFOSAA	91		50 - 150					01/09/23 03:46	
d5-NEtFOSAA	102		50 - 150					01/09/23 03:46	
13C3 HFPO-DA	72		50 - 150					01/09/23 03:46	
Method: EPA 537(Mod) - PFAS						_			 -
• • •	Result	Qualifier	RL _	MDL		D	Prepared	Analyzed	Dil F
Analyte			0.21	0.045	ug/Kg	☼	01/10/23 19:43	01/11/23 16:18	
Analyte Perfluoroundecanoic acid (PFUnA)	0.16								
Analyte Perfluoroundecanoic acid (PFUnA) Perfluorooctanesulfonic acid	0.16 0.30		0.21	0.046	ug/Kg	₩	01/10/23 19:43	01/11/23 16:18	
Analyte Perfluoroundecanoic acid (PFUnA) Perfluorooctanesulfonic acid (PFOS)		ні		0.046	ug/Kg	\$	01/10/23 19:43 Prepared	01/11/23 16:18 Analyzed	
Analyte Perfluoroundecanoic acid (PFUnA) Perfluorooctanesulfonic acid (PFOS) Isotope Dilution 13C2 PFUnA	0.30	ні	0.21	0.046	ug/Kg	≎	Prepared		Dil Fa

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS47 Lab Sample ID: 320-94972-47

Date Collected: 12/02/22 22:20

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 91.1

General Chemistry Analyte	Result (Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	8.9		0.1	0.1	%	= -		12/07/22 11:38	1
Percent Solids (ASTM D 2216)	91.1		0.1	0.1	%			12/07/22 11:38	1

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-EB

Lab Sample ID: 320-94972-48 Date Collected: 12/03/22 21:17

Matrix: Water

Date Received: 12/06/22 13:36 Method: EPA 537(Mod) - PFAS for QSM 5.3, Table B-15 Analyte Result Qualifier RL **MDL** Unit Dil Fac Prepared Analyzed Perfluorohexanoic acid (PFHxA) 2.0 ND 0.57 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluoroheptanoic acid (PFHpA) ND 2.0 0.25 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorooctanoic acid (PFOA) ND 2.0 0.84 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorononanoic acid (PFNA) ND 2.0 0.27 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorodecanoic acid (PFDA) ND 2.0 0.31 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluoroundecanoic acid (PFUnA) ND 2.0 1.1 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorododecanoic acid (PFDoA) ND 2.0 0.54 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorotridecanoic acid (PFTriA) ND 2.0 12/12/22 06:38 12/14/22 13:46 1.3 ng/L Perfluorotetradecanoic acid (PFTeA) ND 2.0 0.72 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorobutanesulfonic acid (PFBS) ND 2.0 0.20 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorohexanesulfonic acid (PFHxS) ND 2.0 0.56 ng/L 12/12/22 06:38 12/14/22 13:46 Perfluorooctanesulfonic acid (PFOS) ND 2.0 0.53 ng/L 12/12/22 06:38 12/14/22 13:46 N-methylperfluorooctanesulfonamidoa ND 4.9 1.2 ng/L 12/12/22 06:38 12/14/22 13:46 cetic acid (NMeFOSAA) 12/12/22 06:38 12/14/22 13:46 ND N-ethylperfluorooctanesulfonamidoac 4.9 1.3 ng/L etic acid (NEtFOSAA) 9-Chlorohexadecafluoro-3-oxanonan ND 2.0 0.24 ng/L 12/12/22 06:38 12/14/22 13:46 e-1-sulfonic acid ND 3.9 1.5 ng/L 12/12/22 06:38 12/14/22 13:46 Hexafluoropropylene Oxide Dimer Acid (HFPO-DA) 11-Chloroeicosafluoro-3-oxaundecan ND 2.0 0.31 ng/L 12/12/22 06:38 12/14/22 13:46 e-1-sulfonic acid ND 4,8-Dioxa-3H-perfluorononanoic acid 2.0 0.39 ng/L 12/12/22 06:38 12/14/22 13:46

Isotope Dilution %Recovery Qualifier Limits Prepared Analyzed 13C2 PFHxA 99 50 - 150 12/12/22 06:38 12/14/22 13:46 13C4 PFHpA 93 50 - 150 12/12/22 06:38 12/14/22 13:46	Dil Fac
13C4 PFHpA 93 50 - 150 12/12/22 06:38 12/14/22 13:46	1
	1
13C4 PFOA 92 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C5 PFNA 92 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C2 PFDA 91 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C2 PFUnA 95 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C2 PFDoA 89 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C2 PFTeDA 95 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C3 PFBS 98 50 - 150 12/12/22 06:38 12/14/22 13:46	1
18O2 PFHxS 98 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C4 PFOS 95 50 - 150 12/12/22 06:38 12/14/22 13:46	1
d3-NMeFOSAA 75 50 - 150 12/12/22 06:38 12/14/22 13:46	1
d5-NEtFOSAA 79 50 - 150 12/12/22 06:38 12/14/22 13:46	1
13C3 HFPO-DA 89 50 - 150 12/12/22 06:38 12/14/22 13:46	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF Job ID: 320-94972-1

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

Matrix: Solid Prep Type: Total/NA

		PFHxA	Perce C4PFHA	ent Isotope PFOA	Dilution Re	covery (Ac	ceptance L PFUnA	imits) PFDoA	PFTDA
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150
320-94972-1	22OTZ-SS01	78	79	86	93	89	90	90	89
320-94972-1 MS	22OTZ-SS01	71	73	82	88	83	92	87	82
320-94972-1 MSD	22OTZ-SS01	72	75	82	91	81	92	86	79
320-94972-2	22OTZ-SS02	74	77	80	89	89	90	89	90
320-94972-3	22OTZ-SS03	73	77	80	91	85	93	86	84
320-94972-4	22OTZ-SS04	78	80	81	88	87	93	85	80
320-94972-5	22OTZ-SS05	79	77	79	90	86	91	84	86
320-94972-6	22OTZ-SS06	80	85	84	99	91	100	95	92
320-94972-7	22OTZ-SS07	77	86	86	95	91	100	90	94
320-94972-8	22OTZ-SS08	79	80	86	96	89	95	89	85
320-94972-9	22OTZ-SS09	69	74	77	81	86	85	82	86
320-94972-10	220TZ-SS10	74	74	81	88	80	88	82	86
320-94972-11	220TZ-SS11	75	80	81	92	89	90	91	91
320-94972-12	220TZ-SS12	45 *5-	69	80	86	82	88	86	83
320-94972-13	220TZ-SS12 220TZ-SS13	76	80	82	93	90	94	89	89
320-94972-14	22OTZ-SS14 22OTZ-SS15	74 72	77 79	77 81	89	81 88	85 94	84 91	80
320-94972-15					93				90
320-94972-16	22OTZ-SS16	75	79	81	91	85	92	90	89
320-94972-17	220TZ-SS17	72	77 -	77	85	85	95	86	83
320-94972-18	22OTZ-SS18	76	78	80	88	84	93	87	86
320-94972-19	22OTZ-SS19	74	77	83	85	83	88	85	85
320-94972-20	22OTZ-SS20	72	78	78	87	84	90	87	84
320-94972-21	22OTZ-SS21	82	82	83	95	91	98	89	92
320-94972-22	22OTZ-SS22	79	83	86	92	85	93	88	85
320-94972-23	22OTZ-SS23	77	79	79	86	84	87	80	79
320-94972-24	22OTZ-SS24	75	89	87	91	88	97	86	84
320-94972-25	22OTZ-SS25	70	72	79	77	80	83	77	76
320-94972-26	22OTZ-SS26	74	82	83	90	83		77	61
320-94972-26 - DL	22OTZ-SS26						103		
320-94972-27	22OTZ-SS27	76	80	84	89	87	88	87	82
320-94972-27 - DL	22OTZ-SS27						87		
320-94972-28	22OTZ-SS28	77	79	84	91	83	90	86	80
320-94972-29	22OTZ-SS29	79	79	81	89	86	94	87	81
320-94972-30	22OTZ-SS30	80	85	80	89	85	88	84	86
320-94972-31	22OTZ-SS31	74	79	83	85	87	86	79	75
320-94972-31 - DL	22OTZ-SS31								
320-94972-32	22OTZ-SS32	80	80	84	91	86	94	83	85
320-94972-33	22OTZ-SS33	76	78	80	89	84	89	85	82
320-94972-34	22OTZ-SS34	80	83	85	92	86	92	86	84
320-94972-35	22OTZ-SS35	77	81	85	86	86	79	83	83
320-94972-35 - DL	220TZ-SS35		01	00	00	00	94	00	00
320-94972-36	2201Z-SS36	80	82	84	89	85	90	86	82
320-94972-37	220TZ-SS37 220TZ-SS38	79 78	85 92	81 85	93	84 92	89	85 87	86 86
320-94972-38			83	85	94		92	87	86
320-94972-39	22OTZ-SS39	74	81	80	92	82	85	79	84
320-94972-40	22OTZ-SS40	79	80	78	95	90	91	87	81
320-94972-40 MS	22OTZ-SS40	82	82	86	94	87	90	86	84
320-94972-40 MSD	22OTZ-SS40	82	84	85	97	93	94	90	84
320-94972-41	22OTZ-SS41	78	80	84	95	87	95	87	8

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Isotope Dilution Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

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

Matrix: Solid Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)								
		PFHxA	C4PFHA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFTDA	
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	
320-94972-42	220TZ-SS42	83	84	77	88	87	98	84	85	
320-94972-42 - RE	22OTZ-SS42						80			
320-94972-43	22OTZ-SS43	88	85	82	93	90	96	82	96	
320-94972-43 - RE	22OTZ-SS43						82			
320-94972-44	220TZ-SS44	86	88	81	98	94	105	90	94	
320-94972-44 - RE	220TZ-SS44						88			
320-94972-45	22OTZ-SS45	78	81	78	86	86	93	83	85	
320-94972-45 - RE	22OTZ-SS45						85			
320-94972-46	22OTZ-SS46	85	90	84	95	91	101	96	92	
320-94972-46 - RE	22OTZ-SS46						95			
320-94972-47	22OTZ-SS47	75	81	75	81	80	88	70	88	
320-94972-47 - RE	220TZ-SS47						84			
320-94972-47 MS	22OTZ-SS47	78	78	77	85	80	88	87	82	
320-94972-47 MS - RE	220TZ-SS47						88			
320-94972-47 MSD	22OTZ-SS47	78	81	80	91	84	92	89	86	
320-94972-47 MSD - RE	22OTZ-SS47						89			
LCS 320-638274/2-A	Lab Control Sample	71	75	77	85	79	83	81	83	
LCS 320-638277/2-A	Lab Control Sample	80	85	82	95	87	97	87	86	
LCS 320-638278/2-A	Lab Control Sample	79	84	83	88	87	92	88	87	
LCS 320-646043/2-A	Lab Control Sample						85			
MB 320-638274/1-A	Method Blank	75	82	84	92	87	89	89	87	
MB 320-638277/1-A	Method Blank	77	85	85	91	87	96	87	81	
MB 320-638278/1-A	Method Blank	80	78	83	91	81	87	84	84	
MB 320-646043/1-A	Method Blank						85			

		Percent Isotope Dilution Recovery (Acceptance Limits)							
		C3PFBS	PFHxS	PFOS	d3NMFOS	d5NEFOS	HFPODA		
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)		
320-94972-1	22OTZ-SS01	62	65	67	113	135	80		
320-94972-1 MS	22OTZ-SS01	59	62	65	114	121	76		
320-94972-1 MSD	22OTZ-SS01	58	61	64	106	117	75		
320-94972-2	22OTZ-SS02	58	61	62	110	126	76		
320-94972-3	22OTZ-SS03	61	65	66	116	128	80		
320-94972-4	22OTZ-SS04	67	68	65	114	119	78		
320-94972-5	22OTZ-SS05	66	72	69	115	130	74		
320-94972-6	22OTZ-SS06	75	74	74	124	133	85		
320-94972-7	22OTZ-SS07	68	68	66	122	130	80		
320-94972-8	22OTZ-SS08	68	68	68	116	136	80		
320-94972-9	22OTZ-SS09	55	63	60	111	116	72		
320-94972-10	22OTZ-SS10	59	61	62	109	124	73		
320-94972-11	22OTZ-SS11	65	66	68	116	126	75		
320-94972-12	22OTZ-SS12	63	71	73	112	121	42 *5-		
320-94972-13	22OTZ-SS13	71	72	73	108	125	73		
320-94972-14	22OTZ-SS14	56	63	61	113	115	73		
320-94972-15	22OTZ-SS15	64	69	72	119	133	74		
320-94972-16	22OTZ-SS16	62	68	70	108	124	76		
320-94972-17	22OTZ-SS17	61	67	68	110	121	74		
320-94972-18	22OTZ-SS18	69	75	71	115	123	77		
320-94972-19	22OTZ-SS19	71	71	71	102	119	75		
320-94972-20	22OTZ-SS20	65	69	70	104	118	77		
320-94972-21	22OTZ-SS21	73	78	75	116	127	84		

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Job ID: 320-94972-1

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Isotope Dilution Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

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

Matrix: Solid Prep Type: Total/NA

		C3PFBS	PFHxS	PFOS	d3NMFOS	d5NEFOS	
_ab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)
20-94972-22	22OTZ-SS22	71	72	72	114	120	80
20-94972-23	22OTZ-SS23	65	68	65	106	119	78
20-94972-24	22OTZ-SS24	70	78	72	120	131	87
20-94972-25	22OTZ-SS25	63	65	56	98	111	71
20-94972-26	22OTZ-SS26	75	76	76	85	89	81
20-94972-26 - DL	22OTZ-SS26						
20-94972-27	22OTZ-SS27	71	75	66	105	105	82
20-94972-27 - DL	22OTZ-SS27			75			
20-94972-28	22OTZ-SS28	69	74	69	107	115	79
20-94972-29	22OTZ-SS29	70	76	74	115	128	81
20-94972-30	22OTZ-SS30	71	72	72	105	125	80
20-94972-31	22OTZ-SS31	70	72	71	109	124	77
20-94972-31 - DL	22OTZ-SS31			75			
20-94972-32	22OTZ-SS32	74	76	73	117	125	78
20-94972-33	22OTZ-SS33	69	71	68	105	119	77
20-94972-34	22OTZ-SS34	69	72	67	115	125	88
20-94972-35	22OTZ-SS35	67	72	66	109	80	84
20-94972-35 - DL	22OTZ-SS35			76			
20-94972-36	22OTZ-SS36	69	72	70	107	127	86
20-94972-37	220TZ-SS37	69	69	70	104	116	81
20-94972-38	22OTZ-SS38	69	73	71	107	123	85
20-94972-39	22OTZ-SS39	63	69	67	108	112	77
20-94972-40	220TZ-SS40	71	73	73	110	112	85
20-94972-40 MS	220TZ-SS40	72	73 77	73 71	104	116	87
	220TZ-SS40 220TZ-SS40	72 71	7 <i>7</i> 75				90
20-94972-40 MSD				74	115	126	
20-94972-41	220TZ-SS41	77	77 70	75 70	112	122	83
20-94972-42	220TZ-SS42	73	79	70	102	120	79
20-94972-42 - RE	22OTZ-SS42	<u></u>		71			
20-94972-43	22OTZ-SS43	77	84	75	115	125	80
20-94972-43 - RE	22OTZ-SS43			71			
20-94972-44	220TZ-SS44	80	84	79	114	132	81
20-94972-44 - RE	220TZ-SS44			78			
20-94972-45	22OTZ-SS45	73	79	72	104	116	75
20-94972-45 - RE	22OTZ-SS45			76			
20-94972-46	22OTZ-SS46	76	82	74	106	123	81
20-94972-46 - RE	22OTZ-SS46			78			
20-94972-47	22OTZ-SS47	62	64	66	91	102	72
20-94972-47 - RE	22OTZ-SS47			70			
20-94972-47 MS	22OTZ-SS47	64	62	64	93	104	70
20-94972-47 MS - RE	22OTZ-SS47			70			
20-94972-47 MSD	22OTZ-SS47	64	68	67	92	105	78
20-94972-47 MSD - RE	22OTZ-SS47			71			
CS 320-638274/2-A	Lab Control Sample	65	72	71	105	108	73
CS 320-638277/2-A	Lab Control Sample	81	81	77	113	114	82
CS 320-638278/2-A	Lab Control Sample	80	82	79	106	103	80
CS 320-646043/2-A	Lab Control Sample		-	79			
B 320-638274/1-A	Method Blank	80	79	76	114	116	81
B 320-638277/1-A	Method Blank	77	79	76	117	125	83
B 320-638278/1-A	Method Blank	72	75 75	77	99	108	77
IB 320-646043/1-A	Method Blank			81			

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Job ID: 320-94972-1

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Isotope Dilution Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF Job ID: 320-94972-1

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

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

Matrix: Water Prep Type: Total/NA

			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance L	imits)	
		PFHxA	C4PFHA	PFOA	PFNA	PFDA	PFUnA	PFDoA	PFTDA
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)
320-94972-48	22OTZ-EB	99	93	92	92	91	95	89	95
320-94998-A-1-B MS	Matrix Spike		93	95	90	86	93	81	92
320-94998-A-1-C MSD	Matrix Spike Duplicate		101	96	101	98	106	91	102
LCS 320-639072/2-A	Lab Control Sample	88	80	82	87	87	86	81	89
LCSD 320-639072/3-A	Lab Control Sample Dup	98	102	98	100	94	99	94	96
MB 320-639072/1-A	Method Blank	101	110	94	102	98	98	89	100

			Perce	ent Isotope	Dilution Re	covery (Ac	ceptance l
		C3PFBS	PFHxS	PFOS	d3NMFOS	d5NEFOS	HFPODA
Lab Sample ID	Client Sample ID	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)	(50-150)
320-94972-48	22OTZ-EB	98	98	95	75	79	89
320-94998-A-1-B MS	Matrix Spike	100	102	92	68	69	90
320-94998-A-1-C MSD	Matrix Spike Duplicate	109	109	101	82	77	98
LCS 320-639072/2-A	Lab Control Sample	94	98	91	69	73	80
LCSD 320-639072/3-A	Lab Control Sample Dup	99	105	98	76	77	96
MB 320-639072/1-A	Method Blank	102	97	99	80	78	91

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

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: MB 320-638274/1-A

Matrix: Solid

Analysis Batch: 643841

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 638274

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.031	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.038	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.053	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.022	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.048	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.042	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.030	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.021	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.037	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.038	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.029	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.20	0.043	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.20	0.035	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.041	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.20	0.031	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.039	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
	MB	MB							

	IVID IVID			
Isotope Dilution	%Recovery Qualifier	Limits	Prepared Analyzed	Dil Fac
13C2 PFHxA	75	50 - 150	12/07/22 19:13 01/02/23 04:3	10 1
13C4 PFHpA	82	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C4 PFOA	84	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C5 PFNA	92	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C2 PFDA	87	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C2 PFUnA	89	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C2 PFDoA	89	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C2 PFTeDA	87	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C3 PFBS	80	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
1802 PFHxS	79	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C4 PFOS	76	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
d3-NMeFOSAA	114	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
d5-NEtFOSAA	116	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1
13C3 HFPO-DA	81	50 - 150	12/07/22 19:13 01/02/23 04:3	0 1

Lab Sample ID: LCS 320-638274/2-A

Matrix: Solid

Analysis Batch: 643841

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

Prep Batch: 638274

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	2.00	2.10		ug/Kg		105	70 - 132	
Perfluoroheptanoic acid (PFHpA)	2.00	2.18		ug/Kg		109	71 - 131	
Perfluorooctanoic acid (PFOA)	2.00	2.12		ug/Kg		106	69 - 133	
Perfluorononanoic acid (PFNA)	2.00	2.01		ug/Kg		101	72 - 129	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

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

Lab Sample ID: LCS 320-638274/2-A

Matrix: Solid

Analysis Batch: 643841

Project/Site: Kotzenue DOT&PF

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 638274

Analysis Batom 640041	Spike	LCS L	cs		%Rec
Analyte	Added	Result Q	ualifier Unit	D %Rec	Limits
Perfluorodecanoic acid (PFDA)	2.00	2.11	ug/Kg	105	69 - 133
Perfluoroundecanoic acid	2.00	2.10	ug/Kg	105	64 - 136
(PFUnA)	2.00	2 20		110	69 - 135
Perfluorododecanoic acid (PFDoA)	2.00	2.20	ug/Kg	110	09 - 133
Perfluorotridecanoic acid	2.00	2.18	ug/Kg	109	66 - 139
(PFTriA)					
Perfluorotetradecanoic acid	2.00	2.10	ug/Kg	105	69 - 133
(PFTeA)					
Perfluorobutanesulfonic acid	1.78	1.96	ug/Kg	111	72 - 128
(PFBS)	1.82	4 77	/1/	07	07 400
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.77	ug/Kg	97	67 - 130
Perfluorooctanesulfonic acid	1.86	1.91	ug/Kg	103	68 - 136
(PFOS)			3. 3		
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	2.00	2.13	ug/Kg	107	63 - 144
N-ethylperfluorooctanesulfonami	2.00	2.06	ug/Kg	103	61 - 139
doacetic acid (NEtFOSAA)					
9-Chlorohexadecafluoro-3-oxan	1.87	1.93	ug/Kg	103	75 - 135
onane-1-sulfonic acid					
Hexafluoropropylene Oxide	2.00	2.00	ug/Kg	100	77 - 137
Dimer Acid (HFPO-DA)					
11-Chloroeicosafluoro-3-oxaund	1.89	1.98	ug/Kg	105	76 - 136
ecane-1-sulfonic acid					
4,8-Dioxa-3H-perfluorononanoic	1.89	2.14	ug/Kg	114	79 - 139
acid (ADONA)	100				

LCS LCS

	LUU	L00	
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	71		50 - 150
13C4 PFHpA	75		50 - 150
13C4 PFOA	77		50 - 150
13C5 PFNA	85		50 - 150
13C2 PFDA	79		50 - 150
13C2 PFUnA	83		50 - 150
13C2 PFDoA	81		50 - 150
13C2 PFTeDA	83		50 - 150
13C3 PFBS	65		50 - 150
1802 PFHxS	72		50 - 150
13C4 PFOS	71		50 - 150
d3-NMeFOSAA	105		50 - 150
d5-NEtFOSAA	108		50 - 150
13C3 HFPO-DA	73		50 - 150

Lab Sample ID: 320-94972-1 MS Client Sample ID: 220TZ-SS01

Matrix: Solid

Analysis Batch: 643841									Prep Bat	ch: 638274
	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	ND		2.14	2.26		ug/Kg	<u></u>	106	70 - 132	
Perfluoroheptanoic acid (PFHpA)	ND		2.14	2.23		ug/Kg	₩	104	71 - 131	
Perfluorooctanoic acid (PFOA)	ND		2.14	2.18		ug/Kg	☆	102	69 - 133	

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Prep Type: Total/NA

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1/18/2023

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: 320-94972-1 MS

Matrix: Solid

Analysis Batch: 643841

Client Sample ID: 220TZ-SS01

Prep Type: Total/NA Prep Batch: 638274 %Rec

Analysis Baton. 040041	Sample	Sample	Spike	MS	MS				%Rec
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits
Perfluorononanoic acid (PFNA)	0.11	J	2.14	2.19		ug/Kg	☆	97	72 - 129
Perfluorodecanoic acid (PFDA)	0.053	J	2.14	2.58		ug/Kg	≎	118	69 - 133
Perfluoroundecanoic acid (PFUnA)	0.35		2.14	2.67		ug/Kg	₩	108	64 - 136
Perfluorododecanoic acid (PFDoA)	ND		2.14	2.33		ug/Kg	₩	109	69 - 135
Perfluorotridecanoic acid (PFTriA)	0.078	J	2.14	2.39		ug/Kg	☼	108	66 - 139
Perfluorotetradecanoic acid (PFTeA)	ND		2.14	2.21		ug/Kg	☼	103	69 - 133
Perfluorobutanesulfonic acid (PFBS)	ND		1.90	2.00		ug/Kg	₩	106	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	ND		1.95	1.88		ug/Kg	₩	96	67 - 130
Perfluorooctanesulfonic acid (PFOS)	ND		1.99	2.51		ug/Kg	☼	126	68 - 136
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.14	2.15		ug/Kg	☼	100	63 - 144
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.14	2.21		ug/Kg	☼	103	61 - 139
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		2.00	1.99		ug/Kg	☼	100	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.14	2.16		ug/Kg	₩	101	77 - 137
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		2.02	2.22		ug/Kg	₩	110	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.02	2.49		ug/Kg	☼	123	79 ₋ 139

MS MS

Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	71		50 - 150
13C4 PFHpA	73		50 ₋ 150
13C4 PFOA	82		50 - 150
13C5 PFNA	88		50 - 150
13C2 PFDA	83		50 - 150
13C2 PFUnA	92		50 - 150
13C2 PFDoA	87		50 - 150
13C2 PFTeDA	82		50 ₋ 150
13C3 PFBS	59		50 ₋ 150
1802 PFHxS	62		50 - 150
13C4 PFOS	65		50 - 150
d3-NMeFOSAA	114		50 ₋ 150
d5-NEtFOSAA	121		50 - 150
13C3 HFPO-DA	76		50 - 150

Lab Sample ID: 320-94972-1 MSD

Matrix: Solid

Client Sample ID: 22OTZ-SS01

Prep Type: Total/NA

Prep Batch: 638274

Analysis Batch: 643841								Prep Batch: 638274			
_	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorohexanoic acid (PFHxA)	ND		2.15	2.18		ug/Kg		101	70 - 132	4	30
Perfluoroheptanoic acid (PFHpA)	ND		2.15	2.15		ug/Kg	₩	100	71 - 131	3	30

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: 320-94972-1 Matrix: Solid	I MSD						CI	ient Sa	mple ID: 2		
Analysis Batch: 643841									Prep Ba		
Analysis Batch: 040041	Sample	Sample	Spike	MSD	MSD				%Rec	accii. Oc	RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorooctanoic acid (PFOA)	ND		2.15	2.14		ug/Kg	— <u>—</u>	100	69 - 133	2	30
Perfluorononanoic acid (PFNA)	0.11	J	2.15	2.12		ug/Kg		93	72 - 129	3	30
Perfluorodecanoic acid (PFDA)	0.053	J	2.15	2.51		ug/Kg	₽	115	69 - 133	3	30
Perfluoroundecanoic acid (PFUnA)	0.35		2.15	2.52		ug/Kg	☼	101	64 - 136	6	30
Perfluorododecanoic acid (PFDoA)	ND		2.15	2.28		ug/Kg	₽	106	69 - 135	2	30
Perfluorotridecanoic acid (PFTriA)	0.078	J	2.15	2.19		ug/Kg	₽	99	66 - 139	8	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.15	2.14		ug/Kg	₽	100	69 - 133	3	30
Perfluorobutanesulfonic acid (PFBS)	ND		1.91	1.98		ug/Kg	₽	104	72 - 128	1	30
Perfluorohexanesulfonic acid (PFHxS)	ND		1.96	1.89		ug/Kg	₽	97	67 - 130	1	30
Perfluorooctanesulfonic acid (PFOS)	ND		2.00	2.59	I	ug/Kg	₽	130	68 - 136	3	30
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.15	2.40		ug/Kg	₽	112	63 - 144	11	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.15	2.10		ug/Kg	₩	98	61 - 139	5	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		2.00	2.04		ug/Kg	₽	102	75 - 135	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.15	2.23		ug/Kg	₽	104	77 - 137	3	30
11-Chloroeicosafluoro-3-oxaund	ND		2.03	2.11		ug/Kg	☼	104	76 - 136	5	30

2.03

2.59

MSD	MSD

ND

Isotope Dilution	%Recovery Q	ualifier	Limits
13C2 PFHxA	72		50 - 150
13C4 PFHpA	75		50 - 150
13C4 PFOA	82		50 - 150
13C5 PFNA	91		50 - 150
13C2 PFDA	81		50 - 150
13C2 PFUnA	92		50 - 150
13C2 PFDoA	86		50 - 150
13C2 PFTeDA	79		50 - 150
13C3 PFBS	58		50 - 150
1802 PFHxS	61		50 - 150
13C4 PFOS	64		50 - 150
d3-NMeFOSAA	106		50 - 150
d5-NEtFOSAA	117		50 - 150
13C3 HFPO-DA	75		50 - 150

Lab Sample ID: MB 320-638277/1-A

Matrix: Solid

ecane-1-sulfonic acid

acid (ADONA)

4,8-Dioxa-3H-perfluorononanoic

Analysis Batch: 643816

Client Sample ID: Method Blank Prep Type: Total/NA Prep Batch: 638277

ug/Kg

128

₩

79 - 139

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2

3

4

6

8

10

12

13

14

113

30

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: MB 320-638277/1-A

Matrix: Solid

Analysis Batch: 643816

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 638277

7 mm, 010 = attorn 0 100 10								op = a.c	
	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.038	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.053	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.022	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluoroundecanoic acid (PFUnA)	ND		0.20	0.042	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.030	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorotridecanoic acid (PFTriA)	ND		0.20	0.021	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.037	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.038	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.029	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.20	0.043	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.20	0.035	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.041	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.20	0.031	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.039	ug/Kg		12/07/22 19:17	01/01/23 10:12	1

	MB	MB				
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	77		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C4 PFHpA	85		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C4 PFOA	85		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C5 PFNA	91		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C2 PFDA	87		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C2 PFUnA	96		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C2 PFDoA	87		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C2 PFTeDA	81		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C3 PFBS	77		50 - 150	12/07/22 19:17	01/01/23 10:12	1
1802 PFHxS	79		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C4 PFOS	76		50 - 150	12/07/22 19:17	01/01/23 10:12	1
d3-NMeFOSAA	117		50 - 150	12/07/22 19:17	01/01/23 10:12	1
d5-NEtFOSAA	125		50 - 150	12/07/22 19:17	01/01/23 10:12	1
13C3 HEPO-DA	83		50 - 150	12/07/22 19:17	01/01/23 10:12	1

Lab Sample ID: LCS 320-638277/2-A

Matrix: Solid

Analysis Batch: 643816

CI	ient	Sampl	le ID	: La	b Cont	trol	Sample
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Prep Type: Total/NA Prep Batch: 638277

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	2.00	2.11		ug/Kg		106	70 - 132	
Perfluoroheptanoic acid (PFHpA)	2.00	2.08		ug/Kg		104	71 - 131	
Perfluorooctanoic acid (PFOA)	2.00	2.14		ug/Kg		107	69 - 133	
Perfluorononanoic acid (PFNA)	2.00	1.89		ug/Kg		95	72 - 129	
Perfluorodecanoic acid (PFDA)	2.00	2.12		ug/Kg		106	69 - 133	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: LCS 320-638277/2-A

Matrix: Solid

Analysis Batch: 643816

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 638277

_	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroundecanoic acid	2.00	1.94		ug/Kg		97	64 - 136	
(PFUnA)								
Perfluorododecanoic acid	2.00	2.18		ug/Kg		109	69 - 135	
(PFDoA)								
Perfluorotridecanoic acid	2.00	2.11		ug/Kg		105	66 - 139	
(PFTriA)								
Perfluorotetradecanoic acid	2.00	2.09		ug/Kg		105	69 - 133	
(PFTeA)								
Perfluorobutanesulfonic acid	1.78	1.77		ug/Kg		100	72 - 128	
(PFBS)								
Perfluorohexanesulfonic acid	1.82	1.72		ug/Kg		94	67 - 130	
(PFHxS)								
Perfluorooctanesulfonic acid	1.86	2.01		ug/Kg		108	68 - 136	
(PFOS)								
N-methylperfluorooctanesulfona	2.00	2.04		ug/Kg		102	63 - 144	
midoacetic acid (NMeFOSAA)								
N-ethylperfluorooctanesulfonami	2.00	2.13		ug/Kg		107	61 - 139	
doacetic acid (NEtFOSAA)								
9-Chlorohexadecafluoro-3-oxan	1.87	2.02		ug/Kg		108	75 - 135	
onane-1-sulfonic acid								
Hexafluoropropylene Oxide	2.00	2.16		ug/Kg		108	77 ₋ 137	
Dimer Acid (HFPO-DA)								
11-Chloroeicosafluoro-3-oxaund	1.89	1.99		ug/Kg		106	76 - 136	
ecane-1-sulfonic acid								
4,8-Dioxa-3H-perfluorononanoic	1.89	2.18		ug/Kg		116	79 - 139	

LCS LCS

	LCS	LUS	
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	80		50 - 150
13C4 PFHpA	85		50 - 150
13C4 PFOA	82		50 - 150
13C5 PFNA	95		50 - 150
13C2 PFDA	87		50 - 150
13C2 PFUnA	97		50 - 150
13C2 PFDoA	87		50 - 150
13C2 PFTeDA	86		50 - 150
13C3 PFBS	81		50 - 150
1802 PFHxS	81		50 - 150
13C4 PFOS	77		50 - 150
d3-NMeFOSAA	113		50 - 150
d5-NEtFOSAA	114		50 - 150
13C3 HFPO-DA	82		50 - 150

Lab Sample ID: 320-94972-40 MS

Matrix: Solid

acid (ADONA)

Analysis Batch: 643816

Client Sam	ple I	D: 220)TZ-SS40
	Dron	Type:	Total/NA

Prep Type: Total/NA Prep Batch: 638277

	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	0.035	J	2.23	2.30		ug/Kg	-	102	70 - 132	
Perfluoroheptanoic acid (PFHpA)	ND		2.23	2.39		ug/Kg	☼	107	71 - 131	
Perfluorooctanoic acid (PFOA)	0.11	J	2.23	2.36		ug/Kg	☼	101	69 - 133	
Perfluorononanoic acid (PFNA)	0.091	J	2.23	2.28		ug/Kg	₽	99	72 - 129	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: 320-94972-40 MS

Matrix: Solid

Analysis Batch: 643816

Client Sample ID: 22OTZ-SS40

Prep Type: Total/NA Prep Batch: 638277

	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorodecanoic acid (PFDA)	ND		2.23	2.63		ug/Kg	<u></u>	118	69 - 133	
Perfluoroundecanoic acid (PFUnA)	ND		2.23	2.48		ug/Kg	₩	111	64 - 136	
Perfluorododecanoic acid (PFDoA)	ND		2.23	2.56		ug/Kg	☼	115	69 - 135	
Perfluorotridecanoic acid (PFTriA)	ND		2.23	2.40		ug/Kg	₩	108	66 - 139	
Perfluorotetradecanoic acid (PFTeA)	ND		2.23	2.30		ug/Kg	₩	104	69 - 133	
Perfluorobutanesulfonic acid (PFBS)	ND		1.98	2.10		ug/Kg	☼	106	72 - 128	
Perfluorohexanesulfonic acid (PFHxS)	ND		2.03	1.94		ug/Kg	☼	92	67 - 130	
Perfluorooctanesulfonic acid (PFOS)	ND		2.07	2.61		ug/Kg	₩	102	68 - 136	
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.23	2.45		ug/Kg	₩	110	63 - 144	
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.23	2.27		ug/Kg	₩	102	61 - 139	
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		2.08	2.42		ug/Kg	₩	117	75 - 135	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.23	2.35		ug/Kg	₩	106	77 - 137	
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		2.10	2.45		ug/Kg	₩	117	76 - 136	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.10	2.74		ug/Kg	₩	130	79 - 139	
•	MS	MS								

Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	82		50 - 150
13C4 PFHpA	82		50 ₋ 150
13C4 PFOA	86		50 ₋ 150
13C5 PFNA	94		50 - 150
13C2 PFDA	87		50 - 150
13C2 PFUnA	90		50 ₋ 150
13C2 PFDoA	86		50 - 150
13C2 PFTeDA	84		50 ₋ 150
13C3 PFBS	72		50 - 150
1802 PFHxS	77		50 - 150
13C4 PFOS	71		50 ₋ 150
d3-NMeFOSAA	104		50 - 150
d5-NEtFOSAA	116		50 - 150
13C3 HFPO-DA	87		50 - 150

Lab Sample ID: 320-94972-40 MSD

Matrix: Solid

Analysis Batch: 643816								Prep Batch: 6382				
	Sample	Sample	Spike	MSD	MSD				%Rec		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Perfluorohexanoic acid (PFHxA)	0.035	J	2.26	2.27		ug/Kg	<u></u>	99	70 - 132	1	30	
Perfluoroheptanoic acid (PFHpA)	ND		2.26	2.49		ug/Kg	₩	110	71 - 131	4	30	
Perfluorooctanoic acid (PFOA)	0.11	J	2.26	2.48		ug/Kg	₩	105	69 - 133	5	30	

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Prep Type: Total/NA

Client Sample ID: 220TZ-SS40

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Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

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

Lab Sample ID: 320-94972-40 MSD

Matrix: Solid

Analysis Batch: 643816

Client Sample ID: 22OTZ-SS40

Prep Type: Total/NA Prep Batch: 638277

	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorononanoic acid (PFNA)	0.091	J	2.26	2.20		ug/Kg	<u></u>	94	72 - 129	4	30
Perfluorodecanoic acid (PFDA)	ND		2.26	2.34		ug/Kg	☼	104	69 - 133	12	30
Perfluoroundecanoic acid (PFUnA)	ND		2.26	2.48		ug/Kg	₽	110	64 - 136	0	30
Perfluorododecanoic acid (PFDoA)	ND		2.26	2.45		ug/Kg	₽	109	69 - 135	4	30
Perfluorotridecanoic acid (PFTriA)	ND		2.26	2.30		ug/Kg	≎	102	66 - 139	4	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.26	2.30		ug/Kg	₽	102	69 - 133	0	30
Perfluorobutanesulfonic acid (PFBS)	ND		2.00	2.06		ug/Kg	₽	103	72 - 128	2	30
Perfluorohexanesulfonic acid (PFHxS)	ND		2.06	2.04		ug/Kg	₽	96	67 - 130	5	30
Perfluorooctanesulfonic acid (PFOS)	ND		2.10	2.75		ug/Kg	₽	108	68 - 136	5	30
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.26	2.29		ug/Kg	₽	102	63 - 144	7	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.26	2.19		ug/Kg	≎	97	61 - 139	3	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		2.11	2.32		ug/Kg	≎	110	75 - 135	5	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.26	2.19		ug/Kg	≎	97	77 - 137	7	30
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		2.13	2.34		ug/Kg	₽	110	76 - 136	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.13	2.76		ug/Kg	≎	130	79 - 139	1	30

MSD MSD

Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	82		50 - 150
13C4 PFHpA	84		50 - 150
13C4 PFOA	85		50 - 150
13C5 PFNA	97		50 - 150
13C2 PFDA	93		50 ₋ 150
13C2 PFUnA	94		50 - 150
13C2 PFDoA	90		50 - 150
13C2 PFTeDA	84		50 - 150
13C3 PFBS	71		50 ₋ 150
1802 PFHxS	75		50 - 150
13C4 PFOS	74		50 - 150
d3-NMeFOSAA	115		50 ₋ 150
d5-NEtFOSAA	126		50 - 150
13C3 HFPO-DA	90		50 - 150

Lab Sample ID: MB 320-638278/1-A

Matrix: Solid

Analysis Batch: 643847

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Patch: 638278

Prep Batch: 638278

-	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.031	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.038	ug/Kg		12/07/22 19:17	01/02/23 09:44	1

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Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: MB 320-638278/1-A

Matrix: Solid

Analysis Batch: 643847

Client Sam	ple ID): Met	hod	Blank
	_	_	_	

Prep Type: Total/NA

Prep Batch: 638278

7									
		MB							
Analyte	Result	Qualifier	RL _	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanoic acid (PFOA)	ND		0.20	0.053	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.022	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluoroundecanoic acid (PFUnA)	0.332		0.20	0.042	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorododecanoic acid (PFDoA)	ND		0.20	0.030	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorotridecanoic acid (PFTriA)	0.0990	J	0.20	0.021	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.037	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.038	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.029	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Perfluorooctanesulfonic acid (PFOS)	0.130	J	0.20	0.043	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		0.20	0.035	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.041	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		0.20	0.031	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.039	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
	MB	MB							

	IVIB	IVIB				
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	80		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C4 PFHpA	78		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C4 PFOA	83		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C5 PFNA	91		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C2 PFDA	81		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C2 PFUnA	87		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C2 PFDoA	84		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C2 PFTeDA	84		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C3 PFBS	72		50 - 150	12/07/22 19:17	01/02/23 09:44	1
1802 PFHxS	75		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C4 PFOS	77		50 - 150	12/07/22 19:17	01/02/23 09:44	1
d3-NMeFOSAA	99		50 - 150	12/07/22 19:17	01/02/23 09:44	1
d5-NEtFOSAA	108		50 - 150	12/07/22 19:17	01/02/23 09:44	1
13C3 HFPO-DA	77		50 - 150	12/07/22 19:17	01/02/23 09:44	1

Lab Sample ID: LCS 320-638278/2-A

Matrix: Solid

Analysis Batch: 643847

Client Sample	ID: Lab Control Sample
	Pren Type: Total/NA

Prep Batch: 638278

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	2.00	2.08		ug/Kg		104	70 - 132	
Perfluoroheptanoic acid (PFHpA)	2.00	1.99		ug/Kg		100	71 - 131	
Perfluorooctanoic acid (PFOA)	2.00	2.03		ug/Kg		101	69 - 133	
Perfluorononanoic acid (PFNA)	2.00	1.98		ug/Kg		99	72 - 129	
Perfluorodecanoic acid (PFDA)	2.00	2.06		ug/Kg		103	69 - 133	
Perfluoroundecanoic acid	2.00	2.01		ug/Kg		100	64 - 136	
(PFUnA)								

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: LCS 320-638278/2-A

Matrix: Solid

Analysis Batch: 643847

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 638278 %Rec

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	Spike		LCS		_	0/ 5	%Rec
Analyte	Added		Qualifier	Unit	D	%Rec	Limits
Perfluorododecanoic acid	2.00	2.13		ug/Kg		106	69 - 135
(PFDoA)							
Perfluorotridecanoic acid	2.00	2.09		ug/Kg		105	66 - 139
(PFTriA)							
Perfluorotetradecanoic acid	2.00	1.97		ug/Kg		99	69 - 133
(PFTeA)							
Perfluorobutanesulfonic acid	1.78	1.75		ug/Kg		98	72 - 128
(PFBS)							
Perfluorohexanesulfonic acid	1.82	1.73		ug/Kg		95	67 - 130
(PFHxS)							
Perfluorooctanesulfonic acid	1.86	1.94		ug/Kg		104	68 - 136
(PFOS)							
N-methylperfluorooctanesulfona	2.00	2.06		ug/Kg		103	63 - 144
midoacetic acid (NMeFOSAA)							
N-ethylperfluorooctanesulfonami	2.00	2.04		ug/Kg		102	61 - 139
doacetic acid (NEtFOSAA)							
9-Chlorohexadecafluoro-3-oxan	1.87	1.88		ug/Kg		101	75 - 135
onane-1-sulfonic acid							
Hexafluoropropylene Oxide	2.00	2.02		ug/Kg		101	77 - 137
Dimer Acid (HFPO-DA)							
11-Chloroeicosafluoro-3-oxaund	1.89	1.88		ug/Kg		99	76 - 136
ecane-1-sulfonic acid							
4,8-Dioxa-3H-perfluorononanoic	1.89	2.09		ug/Kg		110	79 - 139
acid (ADONA)							
20.2 (1.20.1)							

LCS LCS

Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	79		50 - 150
13C4 PFHpA	84		50 ₋ 150
13C4 PFOA	83		50 - 150
13C5 PFNA	88		50 ₋ 150
13C2 PFDA	87		50 ₋ 150
13C2 PFUnA	92		50 ₋ 150
13C2 PFDoA	88		50 ₋ 150
13C2 PFTeDA	87		50 - 150
13C3 PFBS	80		50 ₋ 150
1802 PFHxS	82		50 - 150
13C4 PFOS	79		50 ₋ 150
d3-NMeFOSAA	106		50 ₋ 150
d5-NEtFOSAA	103		50 - 150
13C3 HFPO-DA	80		50 ₋ 150

Lab Sample ID: 320-94972-47 MS

Matrix: Solid

Analysis Batch: 645416

Client Sa	mple	ID:	220	TZ-	SS47

Prep Type: Total/NA Prep Batch: 638278

Alluly 313 Butolli 040410									1 Top Baton. 00027	•
	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	ND		2.13	2.03		ug/Kg	<u></u>	95	70 - 132	_
Perfluoroheptanoic acid (PFHpA)	ND		2.13	2.07		ug/Kg	☼	97	71 - 131	
Perfluorooctanoic acid (PFOA)	ND		2.13	2.34		ug/Kg	≎	110	69 - 133	
Perfluorononanoic acid (PFNA)	0.025	J	2.13	2.04		ug/Kg	₽	94	72 - 129	
Perfluorodecanoic acid (PFDA)	ND		2.13	2.29		ug/Kg	₩	107	69 - 133	

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Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

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

Lab Sample ID: 320-94972-47 MS

Matrix: Solid

Analysis Batch: 645416

Client Sample ID: 22OTZ-SS47

Prep Type: Total/NA Prep Batch: 638278

	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroundecanoic acid	0.29	В	2.13	2.27		ug/Kg	<u></u>	93	64 - 136	
(PFUnA)										
Perfluorododecanoic acid	ND		2.13	2.26		ug/Kg	₽	106	69 - 135	
(PFDoA)										
Perfluorotridecanoic acid (PFTriA)	0.13	JB	2.13	2.16		ug/Kg	₽	95	66 - 139	
Perfluorotetradecanoic acid (PFTeA)	ND		2.13	2.07		ug/Kg	₩	97	69 - 133	
Perfluorobutanesulfonic acid (PFBS)	ND		1.89	1.87		ug/Kg		99	72 - 128	
Perfluorohexanesulfonic acid (PFHxS)	ND		1.94	2.01		ug/Kg	₽	103	67 - 130	
Perfluorooctanesulfonic acid (PFOS)	0.34	IB	1.98	2.40		ug/Kg	₽	104	68 - 136	
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.13	2.10		ug/Kg	₽	99	63 - 144	
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.13	2.10		ug/Kg	₽	98	61 - 139	
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		1.99	2.18		ug/Kg	₽	109	75 - 135	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.13	2.25		ug/Kg	₽	106	77 - 137	
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		2.01	2.41		ug/Kg	₩	120	76 - 136	
4,8-Dioxa-3H-perfluorononanoic	ND		2.01	2.40		ug/Kg	☼	119	79 - 139	

MS MS

	1110		
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	78		50 - 150
13C4 PFHpA	78		50 - 150
13C4 PFOA	77		50 - 150
13C5 PFNA	85		50 - 150
13C2 PFDA	80		50 - 150
13C2 PFUnA	88		50 - 150
13C2 PFDoA	87		50 - 150
13C2 PFTeDA	82		50 - 150
13C3 PFBS	64		50 - 150
1802 PFHxS	62		50 - 150
13C4 PFOS	64		50 - 150
d3-NMeFOSAA	93		50 - 150
d5-NEtFOSAA	104		50 - 150
13C3 HFPO-DA	70		50 - 150

Lab Sample ID: 320-94972-47 MSD

Matrix: Solid

acid (ADONA)

Analysis Batch: 645416

Client	Sample	ID: 220	OTZ-SS47

Prep Type: Total/NA Prep Batch: 638278

	Sample	Sample	Spike	MSD	MSD				%Rec		RPD	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit	
Perfluorohexanoic acid (PFHxA)	ND		2.06	2.08		ug/Kg		101	70 - 132	3	30	
Perfluoroheptanoic acid (PFHpA)	ND		2.06	2.11		ug/Kg	₩	102	71 - 131	2	30	
Perfluorooctanoic acid (PFOA)	ND		2.06	2.18		ug/Kg	₩	106	69 - 133	7	30	
Perfluorononanoic acid (PFNA)	0.025	J	2.06	2.03		ug/Kg	₩	97	72 - 129	0	30	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: 320-94972-47 MSD

Matrix: Solid

Analysis Batch: 645416

Client Sample ID: 220TZ-SS47

Prep Type: Total/NA

Prep Batch: 638278

	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluorodecanoic acid (PFDA)	ND		2.06	2.24		ug/Kg	-	109	69 - 133	2	30
Perfluoroundecanoic acid (PFUnA)	0.29	В	2.06	2.20		ug/Kg	₽	93	64 - 136	3	30
Perfluorododecanoic acid (PFDoA)	ND		2.06	2.17		ug/Kg	☼	106	69 - 135	4	30
Perfluorotridecanoic acid (PFTriA)	0.13	JB	2.06	2.29		ug/Kg	☼	105	66 - 139	6	30
Perfluorotetradecanoic acid (PFTeA)	ND		2.06	2.06		ug/Kg	☼	100	69 - 133	1	30
Perfluorobutanesulfonic acid (PFBS)	ND		1.83	1.91		ug/Kg	₩	104	72 - 128	2	30
Perfluorohexanesulfonic acid (PFHxS)	ND		1.88	1.95		ug/Kg	₽	104	67 - 130	3	30
Perfluorooctanesulfonic acid (PFOS)	0.34	ΙB	1.92	2.30		ug/Kg	₩	102	68 - 136	4	30
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		2.06	2.18		ug/Kg	₽	106	63 - 144	4	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		2.06	2.08		ug/Kg	₽	101	61 - 139	1	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		1.92	2.09		ug/Kg	₽	109	75 - 135	4	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.06	2.08		ug/Kg	₩	101	77 - 137	8	30
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		1.94	2.26		ug/Kg	₩	116	76 - 136	6	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		1.94	2.43		ug/Kg	₩	125	79 - 139	1	30

(
	MSD	MSD		
Isotope Dilution	%Recovery	Qualifier	Limits	
13C2 PFHxA	78		50 - 150	
13C4 PFHpA	81		50 - 150	
13C4 PFOA	80		50 - 150	
13C5 PFNA	91		50 - 150	
13C2 PFDA	84		50 - 150	
13C2 PFUnA	92		50 - 150	
13C2 PFDoA	89		50 - 150	
13C2 PFTeDA	86		50 - 150	
13C3 PFBS	64		50 - 150	
1802 PFHxS	68		50 - 150	
13C4 PFOS	67		50 - 150	
d3-NMeFOSAA	92		50 - 150	
d5-NEtFOSAA	105		50 - 150	
13C3 HFPO-DA	78		50 ₋ 150	

Lab Sample ID: MB 320-639072/1-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 639072

	MR MR							
Analyte	Result Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND	2.0	0.58	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluoroheptanoic acid (PFHpA)	ND	2.0	0.25	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorooctanoic acid (PFOA)	ND	2.0	0.85	ng/L		12/12/22 06:38	12/14/22 11:34	1

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1/18/2023

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

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

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Method Blank

Prep Type: Total/NA Prep Batch: 639072

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/12/22 06:38	12/14/22 11:34	
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.55	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.73	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		12/12/22 06:38	12/14/22 11:34	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		12/12/22 06:38	12/14/22 11:34	1
N-methylperfluorooctanesulfonamidoa cetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		12/12/22 06:38	12/14/22 11:34	1
N-ethylperfluorooctanesulfonamidoac etic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		12/12/22 06:38	12/14/22 11:34	•
9-Chlorohexadecafluoro-3-oxanonan e-1-sulfonic acid	ND		2.0	0.24	ng/L		12/12/22 06:38	12/14/22 11:34	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		4.0	1.5	ng/L		12/12/22 06:38	12/14/22 11:34	1
11-Chloroeicosafluoro-3-oxaundecan e-1-sulfonic acid	ND		2.0	0.32	ng/L		12/12/22 06:38	12/14/22 11:34	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.40	ng/L		12/12/22 06:38	12/14/22 11:34	1

	IVIB	IVIB				
Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C2 PFHxA	101		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFHpA	110		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFOA	94		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C5 PFNA	102		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFDA	98		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFUnA	98		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFDoA	89		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C2 PFTeDA	100		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C3 PFBS	102		50 - 150	12/12/22 06:38	12/14/22 11:34	1
18O2 PFHxS	97		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C4 PFOS	99		50 - 150	12/12/22 06:38	12/14/22 11:34	1
d3-NMeFOSAA	80		50 - 150	12/12/22 06:38	12/14/22 11:34	1
d5-NEtFOSAA	78		50 - 150	12/12/22 06:38	12/14/22 11:34	1
13C3 HFPO-DA	91		50 ₋ 150	12/12/22 06:38	12/14/22 11:34	1

Lab Sample ID: LCS 320-639072/2-A

Matrix: Water

Analysis Batch: 640016

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

Prep Batch: 639072

	Spike	LCS	LCS				%Rec	
Analyte	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluorohexanoic acid (PFHxA)	40.0	39.3		ng/L		98	72 - 129	
Perfluoroheptanoic acid (PFHpA)	40.0	43.9		ng/L		110	72 - 130	
Perfluorooctanoic acid (PFOA)	40.0	42.1		ng/L		105	71 - 133	
Perfluorononanoic acid (PFNA)	40.0	43.7		ng/L		109	69 - 130	
Perfluorodecanoic acid (PFDA)	40.0	40.7		ng/L		102	71 - 129	
Perfluoroundecanoic acid (PFUnA)	40.0	42.8		ng/L		107	69 - 133	

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Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

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

Lab Sample ID: LCS 320-639072/2-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Lab Control Sample

Prep Type: Total/NA Prep Batch: 639072 %Rec

7 , 0.00 0.100.10	Spike	LCS	LCS				%Rec
Analyte	Added		Qualifier	Unit	D	%Rec	Limits
Perfluorododecanoic acid	40.0	43.8		ng/L		110	72 - 134
(PFDoA)				-			
Perfluorotridecanoic acid	40.0	42.8		ng/L		107	65 - 144
(PFTriA)							
Perfluorotetradecanoic acid	40.0	40.3		ng/L		101	71 - 132
(PFTeA)							
Perfluorobutanesulfonic acid	35.5	35.7		ng/L		101	72 - 130
(PFBS)							
Perfluorohexanesulfonic acid	36.5	35.6		ng/L		98	68 - 131
(PFHxS)							
Perfluorooctanesulfonic acid	37.2	37.6		ng/L		101	65 - 140
(PFOS)							
N-methylperfluorooctanesulfona	40.0	40.6		ng/L		102	65 - 136
midoacetic acid (NMeFOSAA)							
N-ethylperfluorooctanesulfonami	40.0	38.8		ng/L		97	61 - 135
doacetic acid (NEtFOSAA)							
9-Chlorohexadecafluoro-3-oxan	37.4	36.8		ng/L		98	77 - 137
onane-1-sulfonic acid							
Hexafluoropropylene Oxide	40.0	39.9		ng/L		100	72 - 132
Dimer Acid (HFPO-DA)							
11-Chloroeicosafluoro-3-oxaund	37.8	37.0		ng/L		98	76 - 136
ecane-1-sulfonic acid							
4,8-Dioxa-3H-perfluorononanoic	37.8	37.8		ng/L		100	81 ₋ 141
acid (ADONA)							

LCS LCS

Isotope Dilution	%Recovery Qualif	ier Limits
13C2 PFHxA	88	50 - 150
13C4 PFHpA	80	50 - 150
13C4 PFOA	82	50 - 150
13C5 PFNA	87	50 - 150
13C2 PFDA	87	50 - 150
13C2 PFUnA	86	50 - 150
13C2 PFDoA	81	50 - 150
13C2 PFTeDA	89	50 - 150
13C3 PFBS	94	50 - 150
1802 PFHxS	98	50 - 150
13C4 PFOS	91	50 - 150
d3-NMeFOSAA	69	50 - 150
d5-NEtFOSAA	73	50 - 150
13C3 HFPO-DA	80	50 - 150

Lab Sample ID: LCSD 320-639072/3-A

Matrix: Water

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA Prep Batch: 639072

Analysis Batch: 640016 Spike LCSD LCSD %Rec **RPD** Added Result Qualifier RPD Unit D %Rec Limits Limit Perfluorohexanoic acid (PFHxA) 40.0 72 - 129 3 40.4 ng/L 101 30 40.0 39.9 30 Perfluoroheptanoic acid (PFHpA) ng/L 100 72 - 130 10 Perfluorooctanoic acid (PFOA) 40.0 42.9 ng/L 107 71 - 133 2 30 Perfluorononanoic acid (PFNA) 105 40.0 42.1 ng/L 69 - 130 4 30 Perfluorodecanoic acid (PFDA) 40.0 41.7 ng/L 104 71 - 129 30

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: LCSD 320-639072/3-A

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 639072

analysis Baton. 040010	Spike	LCSD	LCSD				%Rec		RPD
Analyte	Added	_	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroundecanoic acid	40.0	43.1		ng/L		108	69 - 133	1	30
(PFUnA)									
Perfluorododecanoic acid	40.0	43.4		ng/L		109	72 - 134	1	30
(PFDoA)									
Perfluorotridecanoic acid	40.0	43.3		ng/L		108	65 - 144	1	30
(PFTriA)									
Perfluorotetradecanoic acid	40.0	42.6		ng/L		107	71 - 132	6	30
(PFTeA)									
Perfluorobutanesulfonic acid	35.5	39.3		ng/L		111	72 - 130	10	30
(PFBS)									
Perfluorohexanesulfonic acid	36.5	36.0		ng/L		99	68 - 131	1	30
(PFHxS)									
Perfluorooctanesulfonic acid	37.2	38.1		ng/L		102	65 - 140	1	30
(PFOS)									
N-methylperfluorooctanesulfona	40.0	42.0		ng/L		105	65 - 136	3	30
midoacetic acid (NMeFOSAA)									
N-ethylperfluorooctanesulfonami	40.0	38.3		ng/L		96	61 - 135	1	30
doacetic acid (NEtFOSAA)								_	
9-Chlorohexadecafluoro-3-oxan	37.4	35.1		ng/L		94	77 - 137	5	30
onane-1-sulfonic acid				<u>.</u>					
Hexafluoropropylene Oxide	40.0	40.2		ng/L		100	72 - 132	1	30
Dimer Acid (HFPO-DA)								_	
11-Chloroeicosafluoro-3-oxaund	37.8	37.7		ng/L		100	76 - 136	2	30
ecane-1-sulfonic acid	0- 0	46.1				445	04 44:		-
4,8-Dioxa-3H-perfluorononanoic	37.8	43.4		ng/L		115	81 - 141	14	30
acid (ADONA)									

LCSD LCSD

	LOOD	LOOD	
Isotope Dilution	%Recovery	Qualifier	Limits
13C2 PFHxA	98		50 - 150
13C4 PFHpA	102		50 - 150
13C4 PFOA	98		50 - 150
13C5 PFNA	100		50 - 150
13C2 PFDA	94		50 - 150
13C2 PFUnA	99		50 - 150
13C2 PFDoA	94		50 - 150
13C2 PFTeDA	96		50 - 150
13C3 PFBS	99		50 - 150
1802 PFHxS	105		50 - 150
13C4 PFOS	98		50 - 150
d3-NMeFOSAA	76		50 - 150
d5-NEtFOSAA	77		50 - 150
13C3 HFPO-DA	96		50 - 150

Lab Sample ID: 320-94998-A-1-B MS

Matrix: Water

Analysis Batch: 640016

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

Prep Batch: 639072

	Sample	Sample	Spike	MS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroheptanoic acid (PFHpA)	34		36.1	77.4		ng/L		120	72 - 130	
Perfluorooctanoic acid (PFOA)	70		36.1	112		ng/L		117	71 - 133	
Perfluorononanoic acid (PFNA)	6.0		36.1	45.3		ng/L		109	69 - 130	
Perfluorodecanoic acid (PFDA)	2.7		36.1	43.0		ng/L		111	71 - 129	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

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

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ab Sample ID: 320-94998-A-1-B MS				Client Sample ID: Matrix Spike
latrix: Water				Prep Type: Total/NA
nalysis Batch: 640016				Prep Batch: 639072
Sample	Sample	Spike	MS MS	%Rec

	Sample	Sample	Spike	IVIS	MS				%Rec	
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	
Perfluoroundecanoic acid (PFUnA)	ND		36.1	36.4		ng/L		101	69 - 133	
Perfluorododecanoic acid (PFDoA)	ND		36.1	41.5		ng/L		115	72 - 134	
Perfluorotridecanoic acid (PFTriA)	ND		36.1	41.8		ng/L		116	65 - 144	
Perfluorotetradecanoic acid (PFTeA)	ND		36.1	35.7		ng/L		99	71 - 132	
Perfluorobutanesulfonic acid (PFBS)	71	F1	32.1	110		ng/L		121	72 - 130	
Perfluorohexanesulfonic acid (PFHxS)	28		33.0	60.5		ng/L		100	68 - 131	
Perfluorooctanesulfonic acid (PFOS)	120		33.6	161		ng/L		110	65 - 140	
N-methylperfluorooctanesulfona midoacetic acid (NMeFOSAA)	ND		36.1	37.7		ng/L		104	65 - 136	
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		36.1	34.9		ng/L		97	61 - 135	
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		33.8	33.7		ng/L		100	77 - 137	
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		36.1	38.5		ng/L		106	72 - 132	
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		34.1	34.0		ng/L		100	76 - 136	
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		34.1	39.9		ng/L		117	81 - 141	

MS MS

	IVIS	IVIS	
Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFHpA	93		50 - 150
13C4 PFOA	95		50 - 150
13C5 PFNA	90		50 - 150
13C2 PFDA	86		50 - 150
13C2 PFUnA	93		50 - 150
13C2 PFDoA	81		50 - 150
13C2 PFTeDA	92		50 - 150
13C3 PFBS	100		50 - 150
1802 PFHxS	102		50 - 150
13C4 PFOS	92		50 - 150
d3-NMeFOSAA	68		50 - 150
d5-NEtFOSAA	69		50 - 150
13C3 HFPO-DA	90		50 - 150

Lab Sample ID: 320-94998-A-1-C MSD

Matrix: Water Analysis Batch: 640016							·		Prep Ty Prep Ba	•	
_	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroheptanoic acid (PFHpA)	34		37.8	79.8		ng/L		121	72 - 130	3	30
Perfluorooctanoic acid (PFOA)	70		37.8	112		ng/L		112	71 - 133	0	30
Perfluorononanoic acid (PFNA)	6.0		37.8	45.3		ng/L		104	69 - 130	0	30
Perfluorodecanoic acid (PFDA)	2.7		37.8	42.0		ng/L		104	71 - 129	2	30

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Client Sample ID: Matrix Spike Duplicate

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Job ID: 320-94972-1 Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: 320-94998-A-1-C MSD

Matrix: Water

Analysis Batch: 640016

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Prep Batch: 639072

	Sample	Sample	Spike	MSD	MSD				%Rec		RPD
Analyte	Result	Qualifier	Added	Result	Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Perfluoroundecanoic acid	ND		37.8	38.1		ng/L		101	69 - 133	5	30
(PFUnA)											
Perfluorododecanoic acid	ND		37.8	42.8		ng/L		113	72 - 134	3	30
(PFDoA)											
Perfluorotridecanoic acid (PFTriA)	ND		37.8	42.3		ng/L		112	65 - 144	1	30
Perfluorotetradecanoic acid (PFTeA)	ND		37.8	38.2		ng/L		101	71 - 132	7	30
Perfluorobutanesulfonic acid (PFBS)	71	F1	33.6	117	F1	ng/L		135	72 - 130	6	30
Perfluorohexanesulfonic acid	28		34.5	62.0		ng/L		100	68 - 131	3	30
(PFHxS)											
Perfluorooctanesulfonic acid (PFOS)	120		35.2	163		ng/L		110	65 - 140	1	30
N-methylperfluorooctanesulfona	ND		37.8	37.7		ng/L		100	65 - 136	0	30
midoacetic acid (NMeFOSAA)	ND		27.0	39.2				103	61 - 135	11	30
N-ethylperfluorooctanesulfonami doacetic acid (NEtFOSAA)	ND		37.8	39.2		ng/L		103	01-133	11	30
9-Chlorohexadecafluoro-3-oxan onane-1-sulfonic acid	ND		35.3	34.6		ng/L		98	77 - 137	3	30
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		37.8	38.5		ng/L		102	72 - 132	0	30
11-Chloroeicosafluoro-3-oxaund ecane-1-sulfonic acid	ND		35.7	34.2		ng/L		96	76 - 136	1	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		35.7	39.9		ng/L		112	81 - 141	0	30

MSD MSD

Isotope Dilution	%Recovery	Qualifier	Limits
13C4 PFHpA	101		50 - 150
13C4 PFOA	96		50 - 150
13C5 PFNA	101		50 - 150
13C2 PFDA	98		50 - 150
13C2 PFUnA	106		50 - 150
13C2 PFDoA	91		50 - 150
13C2 PFTeDA	102		50 - 150
13C3 PFBS	109		50 - 150
1802 PFHxS	109		50 - 150
13C4 PFOS	101		50 - 150
d3-NMeFOSAA	82		50 - 150
d5-NEtFOSAA	77		50 - 150
13C3 HFPO-DA	98		50 - 150

Lab Sample ID: MB 320-646043/1-A

Matrix: Solid

Analysis Batch: 646180

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

Prep Batch: 646043

	MB	MB							
Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	ND	-	0.20	0.042	ug/Kg		01/10/23 19:43	01/11/23 15:08	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.20	0.043	ug/Kg		01/10/23 19:43	01/11/23 15:08	1
	MB	MB							
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C2 PFUnA	85		50 - 150				01/10/23 19:43	01/11/23 15:08	1

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QC Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

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

Lab Sample ID: MB 320-646043/1-A **Matrix: Solid**

Lab Sample ID: LCS 320-646043/2-A

Analysis Batch: 646180

Analysis Batch: 646180

MB MB

Isotope Dilution %Recovery Qualifier Limits 13C4 PFOS 81 50 - 150 Client Sample ID: Method Blank

Prep Type: Total/NA **Prep Batch: 646043**

Analyzed Dil Fac

Client Sample ID: Lab Control Sample

01/10/23 19:43 01/11/23 15:08

Prepared

Prep Type: Total/NA

Prep Batch: 646043

Spike LCS LCS %Rec Added Result Qualifier Unit D %Rec Limits Analyte Perfluoroundecanoic acid 2.00 2.26 64 - 136 ug/Kg 113 (PFUnA) Perfluorooctanesulfonic acid 1.86 2.03 ug/Kg 109 68 - 136 (PFOS)

LCS LCS

Isotope Dilution %Recovery Qualifier Limits 13C2 PFUnA 85 50 - 150 79 13C4 PFOS 50 - 150

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

Lab Sample ID: 320-94972-47 MS Client Sample ID: 22OTZ-SS47

Matrix: Solid

Matrix: Solid

Analysis Batch: 646180

Prep Type: Total/NA

Prep Batch: 646043

MS MS %Rec Sample Sample Spike Result Qualifier Analyte Added Result Qualifier Unit D %Rec Limits 0.16 J H 2.09 2.59 ug/Kg 116 64 - 136 Perfluoroundecanoic acid (PFUnA) - RE 1.95 Perfluorooctanesulfonic acid 0.30 HI 2.45 ug/Kg ∜ 110 68 - 136 (PFOS) - RE

MS MS Isotope Dilution %Recovery Qualifier Limits

13C2 PFUnA - RE 50 - 150 88 13C4 PFOS - RE 70 50 - 150

Lab Sample ID: 320-94972-47 MSD Client Sample ID: 220TZ-SS47

Matrix: Solid Prep Type: Total/NA **Analysis Batch: 646180 Prep Batch: 646043**

Sample Sample Spike MSD MSD %Rec **RPD Analyte** Result Qualifier Added Result Qualifier Unit D %Rec Limits RPD Limit 0.16 J H 2.02 2.36 109 64 - 136 Perfluoroundecanoic acid ug/Kg Ö 9 30 (PFUnA) - RE 1.88 106 30 0.30 HI 2.29 ug/Kg 68 - 136 7 Perfluorooctanesulfonic acid 77

(PFOS) - RE

MSD MSD Qualifier

Isotope Dilution Limits %Recovery 13C2 PFUnA - RE 89 50 - 150 13C4 PFOS - RE 71 50 - 150

QC Sample Results

Client: Shannon & Wilson, Inc Job ID: 320-94972-1

Project/Site: Kotzenue DOT&PF

Method: D 2216 - Percent Moisture

Lab Sample ID: 320-94983-A-30 DU **Client Sample ID: Duplicate** Prep Type: Total/NA

Matrix: Solid

Analysis Batch: 638015

	Sample	Sample	DU	DU					RPD
Analyte	Result	Qualifier	Result	Qualifier	Unit	D		RPD	Limit
Percent Moisture	12.2		12.3		%			0.8	20
Percent Solids	87.8		87.7		%			0.1	20

Lab Sample ID: 320-94972-1 DU Client Sample ID: 220TZ-SS01 **Matrix: Solid** Prep Type: Total/NA

Analysis Batch: 638112

DU DU Sample Sample RPD RPD Analyte Result Qualifier Result Qualifier Unit Limit 12.3 % Percent Moisture 13.8 12 20 Percent Solids 86.2 87.7 % 2 20

Lab Sample ID: 320-94972-20 DU Client Sample ID: 220TZ-SS20 **Prep Type: Total/NA**

Matrix: Solid

Analysis Batch: 638113

Tillary old Batolii doo i id								
	Sample	Sample	DU	DU				RPD
Analyte	Result	Qualifier	Result	Qualifier	Unit	D	RPD	Limit
Percent Moisture	17.2		16.3		%		 5	20
Percent Solids	82.8		83.7		%		1	20

Client: Shannon & Wilson, Inc
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

LCMS

Prep Batch: 638274

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-1	22OTZ-SS01	Total/NA	Solid	SHAKE	
320-94972-2	22OTZ-SS02	Total/NA	Solid	SHAKE	
320-94972-3	22OTZ-SS03	Total/NA	Solid	SHAKE	
320-94972-4	22OTZ-SS04	Total/NA	Solid	SHAKE	
320-94972-5	22OTZ-SS05	Total/NA	Solid	SHAKE	
320-94972-6	22OTZ-SS06	Total/NA	Solid	SHAKE	
320-94972-7	22OTZ-SS07	Total/NA	Solid	SHAKE	
320-94972-8	22OTZ-SS08	Total/NA	Solid	SHAKE	
320-94972-9	22OTZ-SS09	Total/NA	Solid	SHAKE	
320-94972-10	22OTZ-SS10	Total/NA	Solid	SHAKE	
320-94972-11	22OTZ-SS11	Total/NA	Solid	SHAKE	
320-94972-12	22OTZ-SS12	Total/NA	Solid	SHAKE	
320-94972-13	22OTZ-SS13	Total/NA	Solid	SHAKE	
320-94972-14	22OTZ-SS14	Total/NA	Solid	SHAKE	
320-94972-15	22OTZ-SS15	Total/NA	Solid	SHAKE	
320-94972-16	22OTZ-SS16	Total/NA	Solid	SHAKE	
320-94972-17	22OTZ-SS17	Total/NA	Solid	SHAKE	
320-94972-18	22OTZ-SS18	Total/NA	Solid	SHAKE	
320-94972-19	22OTZ-SS19	Total/NA	Solid	SHAKE	
320-94972-20	22OTZ-SS20	Total/NA	Solid	SHAKE	
MB 320-638274/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-638274/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-94972-1 MS	22OTZ-SS01	Total/NA	Solid	SHAKE	
320-94972-1 MSD	22OTZ-SS01	Total/NA	Solid	SHAKE	

Prep Batch: 638277

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-21	22OTZ-SS21	Total/NA	Solid	SHAKE	
320-94972-22	22OTZ-SS22	Total/NA	Solid	SHAKE	
320-94972-23	22OTZ-SS23	Total/NA	Solid	SHAKE	
320-94972-24	22OTZ-SS24	Total/NA	Solid	SHAKE	
320-94972-25	22OTZ-SS25	Total/NA	Solid	SHAKE	
320-94972-26 - DL	22OTZ-SS26	Total/NA	Solid	SHAKE	
320-94972-26	22OTZ-SS26	Total/NA	Solid	SHAKE	
320-94972-27	22OTZ-SS27	Total/NA	Solid	SHAKE	
320-94972-27 - DL	22OTZ-SS27	Total/NA	Solid	SHAKE	
320-94972-28	22OTZ-SS28	Total/NA	Solid	SHAKE	
320-94972-29	22OTZ-SS29	Total/NA	Solid	SHAKE	
320-94972-30	22OTZ-SS30	Total/NA	Solid	SHAKE	
320-94972-31	22OTZ-SS31	Total/NA	Solid	SHAKE	
320-94972-31 - DL	22OTZ-SS31	Total/NA	Solid	SHAKE	
320-94972-32	22OTZ-SS32	Total/NA	Solid	SHAKE	
320-94972-33	22OTZ-SS33	Total/NA	Solid	SHAKE	
320-94972-34	22OTZ-SS34	Total/NA	Solid	SHAKE	
320-94972-35 - DL	22OTZ-SS35	Total/NA	Solid	SHAKE	
320-94972-35	22OTZ-SS35	Total/NA	Solid	SHAKE	
320-94972-36	22OTZ-SS36	Total/NA	Solid	SHAKE	
320-94972-37	22OTZ-SS37	Total/NA	Solid	SHAKE	
320-94972-38	22OTZ-SS38	Total/NA	Solid	SHAKE	
320-94972-39	22OTZ-SS39	Total/NA	Solid	SHAKE	
320-94972-40	22OTZ-SS40	Total/NA	Solid	SHAKE	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

LCMS (Continued)

Prep Batch: 638277 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method Prep Batch
MB 320-638277/1-A	Method Blank	Total/NA	Solid	SHAKE
LCS 320-638277/2-A	Lab Control Sample	Total/NA	Solid	SHAKE
320-94972-40 MS	22OTZ-SS40	Total/NA	Solid	SHAKE
320-94972-40 MSD	22OTZ-SS40	Total/NA	Solid	SHAKE

Prep Batch: 638278

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-41	22OTZ-SS41	Total/NA	Solid	SHAKE	
320-94972-42	22OTZ-SS42	Total/NA	Solid	SHAKE	
320-94972-43	22OTZ-SS43	Total/NA	Solid	SHAKE	
320-94972-44	22OTZ-SS44	Total/NA	Solid	SHAKE	
320-94972-45	22OTZ-SS45	Total/NA	Solid	SHAKE	
320-94972-46	22OTZ-SS46	Total/NA	Solid	SHAKE	
320-94972-47	22OTZ-SS47	Total/NA	Solid	SHAKE	
MB 320-638278/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-638278/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-94972-47 MS	22OTZ-SS47	Total/NA	Solid	SHAKE	
320-94972-47 MSD	220TZ-SS47	Total/NA	Solid	SHAKE	

Prep Batch: 639072

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-48	22OTZ-EB	Total/NA	Water	3535	
MB 320-639072/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-639072/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-639072/3-A	Lab Control Sample Dup	Total/NA	Water	3535	
320-94998-A-1-B MS	Matrix Spike	Total/NA	Water	3535	
320-94998-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	3535	

Analysis Batch: 640016

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-48	22OTZ-EB	Total/NA	Water	EPA 537(Mod)	639072
MB 320-639072/1-A	Method Blank	Total/NA	Water	EPA 537(Mod)	639072
LCS 320-639072/2-A	Lab Control Sample	Total/NA	Water	EPA 537(Mod)	639072
LCSD 320-639072/3-A	Lab Control Sample Dup	Total/NA	Water	EPA 537(Mod)	639072
320-94998-A-1-B MS	Matrix Spike	Total/NA	Water	EPA 537(Mod)	639072
320-94998-A-1-C MSD	Matrix Spike Duplicate	Total/NA	Water	EPA 537(Mod)	639072

Analysis Batch: 643816

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-21	22OTZ-SS21	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-22	22OTZ-SS22	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-23	22OTZ-SS23	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-24	22OTZ-SS24	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-25	22OTZ-SS25	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-27	22OTZ-SS27	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-28	22OTZ-SS28	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-29	22OTZ-SS29	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-30	22OTZ-SS30	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-31	22OTZ-SS31	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-32	22OTZ-SS32	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-33	22OTZ-SS33	Total/NA	Solid	EPA 537(Mod)	638277

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

LCMS (Continued)

Analysis Batch: 643816 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-34	22OTZ-SS34	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-35	22OTZ-SS35	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-36	22OTZ-SS36	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-37	22OTZ-SS37	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-38	22OTZ-SS38	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-39	22OTZ-SS39	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-40	22OTZ-SS40	Total/NA	Solid	EPA 537(Mod)	638277
MB 320-638277/1-A	Method Blank	Total/NA	Solid	EPA 537(Mod)	638277
LCS 320-638277/2-A	Lab Control Sample	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-40 MS	22OTZ-SS40	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-40 MSD	22OTZ-SS40	Total/NA	Solid	EPA 537(Mod)	638277

Analysis Batch: 643841

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-1	22OTZ-SS01	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-2	22OTZ-SS02	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-3	22OTZ-SS03	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-4	22OTZ-SS04	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-5	22OTZ-SS05	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-6	22OTZ-SS06	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-7	22OTZ-SS07	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-8	22OTZ-SS08	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-9	22OTZ-SS09	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-10	22OTZ-SS10	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-11	22OTZ-SS11	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-12	22OTZ-SS12	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-13	22OTZ-SS13	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-14	22OTZ-SS14	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-15	22OTZ-SS15	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-16	22OTZ-SS16	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-17	22OTZ-SS17	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-18	22OTZ-SS18	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-19	22OTZ-SS19	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-20	22OTZ-SS20	Total/NA	Solid	EPA 537(Mod)	638274
MB 320-638274/1-A	Method Blank	Total/NA	Solid	EPA 537(Mod)	638274
LCS 320-638274/2-A	Lab Control Sample	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-1 MS	22OTZ-SS01	Total/NA	Solid	EPA 537(Mod)	638274
320-94972-1 MSD	22OTZ-SS01	Total/NA	Solid	EPA 537(Mod)	638274

Analysis Batch: 643847

Lab Sample ID 320-94972-41	Client Sample ID 220TZ-SS41	Prep Type Total/NA	Matrix Solid	Method EPA 537(Mod)	Prep Batch 638278
MB 320-638278/1-A	Method Blank	Total/NA	Solid	EPA 537(Mod)	638278
LCS 320-638278/2-A	Lab Control Sample	Total/NA	Solid	EPA 537(Mod)	638278

Analysis Batch: 644845

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method P	ep Batch
320-94972-26	220TZ-SS26	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-27 - DL	22OTZ-SS27	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-31 - DL	22OTZ-SS31	Total/NA	Solid	EPA 537(Mod)	638277
320-94972-35 - DL	22OTZ-SS35	Total/NA	Solid	EPA 537(Mod)	638277

Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

LCMS

Analysis Batch: 645221

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-26 - DL	22OTZ-SS26	Total/NA	Solid	EPA 537(Mod)	638277

Analysis Batch: 645416

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-42	22OTZ-SS42	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-43	22OTZ-SS43	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-44	22OTZ-SS44	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-45	22OTZ-SS45	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-46	22OTZ-SS46	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-47	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-47 MS	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	638278
320-94972-47 MSD	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	638278

Prep Batch: 646043

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-42 - RE	220TZ-SS42	Total/NA	Solid	SHAKE	
320-94972-43 - RE	22OTZ-SS43	Total/NA	Solid	SHAKE	
320-94972-44 - RE	22OTZ-SS44	Total/NA	Solid	SHAKE	
320-94972-45 - RE	22OTZ-SS45	Total/NA	Solid	SHAKE	
320-94972-46 - RE	22OTZ-SS46	Total/NA	Solid	SHAKE	
320-94972-47 - RE	22OTZ-SS47	Total/NA	Solid	SHAKE	
MB 320-646043/1-A	Method Blank	Total/NA	Solid	SHAKE	
LCS 320-646043/2-A	Lab Control Sample	Total/NA	Solid	SHAKE	
320-94972-47 MS - RE	22OTZ-SS47	Total/NA	Solid	SHAKE	
320-94972-47 MSD - RE	22OTZ-SS47	Total/NA	Solid	SHAKE	

Analysis Batch: 646180

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-42 - RE	22OTZ-SS42	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-43 - RE	22OTZ-SS43	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-44 - RE	22OTZ-SS44	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-45 - RE	22OTZ-SS45	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-46 - RE	22OTZ-SS46	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-47 - RE	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	646043
MB 320-646043/1-A	Method Blank	Total/NA	Solid	EPA 537(Mod)	646043
LCS 320-646043/2-A	Lab Control Sample	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-47 MS - RE	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	646043
320-94972-47 MSD - RE	22OTZ-SS47	Total/NA	Solid	EPA 537(Mod)	646043

General Chemistry

Analysis Batch: 638015

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-39	22OTZ-SS39	Total/NA	Solid	D 2216	
320-94972-40	22OTZ-SS40	Total/NA	Solid	D 2216	
320-94972-41	22OTZ-SS41	Total/NA	Solid	D 2216	
320-94972-42	22OTZ-SS42	Total/NA	Solid	D 2216	
320-94972-43	22OTZ-SS43	Total/NA	Solid	D 2216	
320-94972-44	22OTZ-SS44	Total/NA	Solid	D 2216	
320-94972-45	22OTZ-SS45	Total/NA	Solid	D 2216	
320-94972-46	22OTZ-SS46	Total/NA	Solid	D 2216	

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Client: Shannon & Wilson, Inc Job ID: 320-94972-1 Project/Site: Kotzenue DOT&PF

General Chemistry (Continued)

Analysis Batch: 638015 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-47	220TZ-SS47	Total/NA	Solid	D 2216	
320-94983-A-30 DU	Duplicate	Total/NA	Solid	D 2216	

Analysis Batch: 638112

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batcl
320-94972-1	22OTZ-SS01	Total/NA	Solid	D 2216	
320-94972-2	22OTZ-SS02	Total/NA	Solid	D 2216	
320-94972-3	22OTZ-SS03	Total/NA	Solid	D 2216	
320-94972-4	22OTZ-SS04	Total/NA	Solid	D 2216	
320-94972-5	22OTZ-SS05	Total/NA	Solid	D 2216	
320-94972-6	22OTZ-SS06	Total/NA	Solid	D 2216	
320-94972-7	22OTZ-SS07	Total/NA	Solid	D 2216	
320-94972-8	22OTZ-SS08	Total/NA	Solid	D 2216	
320-94972-9	22OTZ-SS09	Total/NA	Solid	D 2216	
320-94972-10	22OTZ-SS10	Total/NA	Solid	D 2216	
320-94972-11	220TZ-SS11	Total/NA	Solid	D 2216	
320-94972-12	22OTZ-SS12	Total/NA	Solid	D 2216	
320-94972-13	220TZ-SS13	Total/NA	Solid	D 2216	
320-94972-14	22OTZ-SS14	Total/NA	Solid	D 2216	
320-94972-15	22OTZ-SS15	Total/NA	Solid	D 2216	
320-94972-16	22OTZ-SS16	Total/NA	Solid	D 2216	
320-94972-17	220TZ-SS17	Total/NA	Solid	D 2216	
320-94972-18	22OTZ-SS18	Total/NA	Solid	D 2216	
320-94972-19	22OTZ-SS19	Total/NA	Solid	D 2216	
320-94972-1 DU	220TZ-SS01	Total/NA	Solid	D 2216	

Analysis Batch: 638113

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-20	22OTZ-SS20	Total/NA	Solid	D 2216	<u> </u>
320-94972-21	22OTZ-SS21	Total/NA	Solid	D 2216	
320-94972-22	22OTZ-SS22	Total/NA	Solid	D 2216	
320-94972-23	22OTZ-SS23	Total/NA	Solid	D 2216	
320-94972-24	22OTZ-SS24	Total/NA	Solid	D 2216	
320-94972-25	22OTZ-SS25	Total/NA	Solid	D 2216	
320-94972-26	22OTZ-SS26	Total/NA	Solid	D 2216	
320-94972-27	22OTZ-SS27	Total/NA	Solid	D 2216	
320-94972-28	22OTZ-SS28	Total/NA	Solid	D 2216	
320-94972-29	22OTZ-SS29	Total/NA	Solid	D 2216	
320-94972-30	22OTZ-SS30	Total/NA	Solid	D 2216	
320-94972-31	22OTZ-SS31	Total/NA	Solid	D 2216	
320-94972-32	22OTZ-SS32	Total/NA	Solid	D 2216	
320-94972-33	22OTZ-SS33	Total/NA	Solid	D 2216	
320-94972-34	22OTZ-SS34	Total/NA	Solid	D 2216	
320-94972-35	22OTZ-SS35	Total/NA	Solid	D 2216	
320-94972-36	22OTZ-SS36	Total/NA	Solid	D 2216	
320-94972-37	22OTZ-SS37	Total/NA	Solid	D 2216	
320-94972-38	22OTZ-SS38	Total/NA	Solid	D 2216	
320-94972-20 DU	22OTZ-SS20	Total/NA	Solid	D 2216	

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS01

Date Collected: 11/30/22 20:45

Lab Sample ID: 320-94972-1

Lab Sample ID: 320-94972-2

Lab Sample ID: 320-94972-3

Lab Sample ID: 320-94972-4

Matrix: Solid

Matrix: Solid

Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 220TZ-SS01

Date Collected: 11/30/22 20:45

Lab Sample ID: 320-94972-1 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.2

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA Prep SHAKE 5.63 g 10.0 mL 638274 12/07/22 19:13 AM EET SAC Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643841 01/02/23 04:50 D1R **EET SAC**

Client Sample ID: 220TZ-SS02

Date Collected: 11/30/22 21:10

Date Received: 12/06/22 13:36

Dil Batch Batch Initial Final Batch Prepared **Prep Type** Method Factor **Amount** Amount Number or Analyzed Type Run **Analyst** Lab Total/NA 638112 12/07/22 12:40 TCS EET SAC Analysis D 2216

Client Sample ID: 22OTZ-SS02

Lab Sample ID: 320-94972-2 Date Collected: 11/30/22 21:10 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.2

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.27 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 05:21	D1R	EET SAC

Client Sample ID: 22OTZ-SS03

Date Collected: 11/30/22 21:30

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Date Collected: 11/30/22 21:30

Total/NA	Analysis	D 2216	 638112	12/07/22 12:40 TC	S EET SAC
Client Sam	ple ID: 220	OTZ-SS03	L	ab Sample ID:	320-94972-3
Date Collecte	ed: 11/30/22 2	1:30			Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 89.0

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 05:31	D1R	EET SAC

Client Sample ID: 22OTZ-SS04

Date Collected: 11/30/22 21:45

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

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Matrix: Solid

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS04

Lab Sample ID: 320-94972-4 Date Collected: 11/30/22 21:45

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 84.1

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.03 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 05:41	D1R	EET SAC

Lab Sample ID: 320-94972-5 Client Sample ID: 22OTZ-SS05

Date Collected: 11/30/22 22:00

Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS05 Lab Sample ID: 320-94972-5

Date Collected: 11/30/22 22:00

Matrix: Solid

Date Received: 12/06/22 13:36

Percent Solids: 84.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.39 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 05:51	D1R	EET SAC

Client Sample ID: 22OTZ-SS06 Lab Sample ID: 320-94972-6

Matrix: Solid

Date Collected: 11/30/22 22:10 Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS06 Lab Sample ID: 320-94972-6

Date Collected: 11/30/22 22:10

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 85.9

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.59 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 06:01	D1R	EET SAC

Client Sample ID: 22OTZ-SS07 Lab Sample ID: 320-94972-7 Date Collected: 11/30/22 22:25 **Matrix: Solid**

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared			
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab	
Total/NA	Analysis	D 2216					638112	12/07/22 12:40	TCS	FFT SAC	-

2

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Date Collected: 11/30/22 22:25

Client Sample ID: 22OTZ-SS07

Lab Sample ID: 320-94972-7

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 87.6

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 06:31	D1R	EET SAC

Client Sample ID: 220TZ-SS08 Lab Sample ID: 320-94972-8

Date Collected: 11/30/22 22:40 East Sample 15: 526-5457 2-6

Date Received: 12/06/22 13:36

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 220TZ-SS08 Lab Sample ID: 320-94972-8

Date Collected: 11/30/22 22:40

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 88.8

Batch Batch Batch Dil Initial Final Prepared **Prep Type** Type Method Factor Amount Amount Number or Analyzed Analyst Run Lab Total/NA Prep SHAKE 5.50 g 638274 12/07/22 19:13 AM EET SAC 10.0 mL Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643841 01/02/23 06:42 D1R **EET SAC**

Client Sample ID: 22OTZ-SS09 Lab Sample ID: 320-94972-9

Date Collected: 11/30/22 22:55 Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS09 Lab Sample ID: 320-94972-9

Date Collected: 11/30/22 22:55

Date Received: 12/06/22 13:36

Matrix: Solid
Percent Solids: 87.2

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.18 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 06:52	D1R	EET SAC

Client Sample ID: 220TZ-SS10 Lab Sample ID: 320-94972-10

Date Collected: 11/30/22 23:05 Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS10

Lab Sample ID: 320-94972-10 Date Collected: 11/30/22 23:05 **Matrix: Solid**

Percent Solids: 87.6

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.22 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 07:02	D1R	EET SAC

Client Sample ID: 220TZ-SS11

Lab Sample ID: 320-94972-11

Date Collected: 11/30/22 23:25 Date Received: 12/06/22 13:36

Matrix: Solid

		Batch	Batch		Dil	Initial	Final	Batch	Prepared		
	Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
L	Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 220TZ-SS11

Lab Sample ID: 320-94972-11

Date Collected: 11/30/22 23:25 Date Received: 12/06/22 13:36

Matrix: Solid Percent Solids: 89.8

Batch Batch Batch Dil Initial Final Prepared **Prep Type** Type Method Factor Amount Amount Number or Analyzed Run Analyst Lab Total/NA Prep SHAKE 5.28 g 638274 12/07/22 19:13 AM EET SAC 10.0 mL Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643841 01/02/23 07:12 D1R **EET SAC**

Client Sample ID: 22OTZ-SS12

Lab Sample ID: 320-94972-12

Date Collected: 11/30/22 23:15

Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS12

Lab Sample ID: 320-94972-12

Date Collected: 11/30/22 23:15

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 83.9

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE	· ——		5.36 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 07:22	D1R	EET SAC

Client Sample ID: 220TZ-SS13

Lab Sample ID: 320-94972-13

Date Collected: 11/30/22 23:40 Date Received: 12/06/22 13:36

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

10

EET SAC

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS13

Lab Sample ID: 320-94972-13 Date Collected: 11/30/22 23:40 Matrix: Solid

Percent Solids: 87.7

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 07:32	D1R	EET SAC

Client Sample ID: 220TZ-SS14 Lab Sample ID: 320-94972-14

Matrix: Solid

01/02/23 07:42 D1R

Date Collected: 11/30/22 23:55 Date Received: 12/06/22 13:36

Batch Batch Dil Initial Final Batch Prepared Method Number **Prep Type Amount Amount** or Analyzed Type Run **Factor** Analyst Lab Total/NA Analysis D 2216 638112 12/07/22 12:40 TCS **EET SAC**

Client Sample ID: 220TZ-SS14 Lab Sample ID: 320-94972-14

Date Collected: 11/30/22 23:55 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 87.3

Batch Batch Batch Dil Initial Final **Prepared** Method Factor **Amount** Number or Analyzed **Prep Type** Type Run Amount **Analyst** Lab Total/NA Prep SHAKE 638274 12/07/22 19:13 AM EET SAC 5.32 g 10.0 mL

Client Sample ID: 220TZ-SS15 Lab Sample ID: 320-94972-15

1 mL

1 mL

643841

1

Date Collected: 12/01/22 00:10 **Matrix: Solid**

Date Received: 12/06/22 13:36

Analysis

EPA 537(Mod)

Total/NA

Dil Initial Final Batch **Prepared** Batch Batch **Prep Type** Type Method **Factor** Amount Amount Number or Analyzed Run Analyst Lab Total/NA Analysis D 2216 638112 12/07/22 12:40 TCS EET SAC 1

Client Sample ID: 22OTZ-SS15 Lab Sample ID: 320-94972-15

Date Collected: 12/01/22 00:10 Matrix: Solid Date Received: 12/06/22 13:36 Percent Solids: 88.6

Batch Batch Dil Initial Final **Batch** Prepared **Prep Type** Type Method Run Factor Amount Amount Number or Analyzed **Analyst** Lab Total/NA Prep SHAKE 638274 12/07/22 19:13 AM 5.11 g 10.0 mL **EET SAC** Total/NA Analysis 643841 01/02/23 07:53 D1R EPA 537(Mod) 1 1 mL 1 ml **EET SAC**

Client Sample ID: 220TZ-SS16 Lab Sample ID: 320-94972-16

Date Collected: 12/01/22 00:25 Matrix: Solid Date Received: 12/06/22 13:36

Dil Final Batch Batch Initial Batch **Prepared** Method **Factor** Amount Amount Number or Analyzed **Prep Type** Type Run Analyst Lab D 2216 12/07/22 12:40 EET SAC 638112 TCS Total/NA Analysis

10

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Date Received: 12/06/22 13:36

Client Sample ID: 220TZ-SS16

Lab Sample ID: 320-94972-16 Date Collected: 12/01/22 00:25 Matrix: Solid

Percent Solids: 91.6

Batch Batch Batch Dil Initial Final Prepared Method Factor Number or Analyzed **Prep Type** Type Run **Amount** Amount Analyst Lab Total/NA SHAKE 638274 12/07/22 19:13 EET SAC Prep 5.45 g 10.0 mL Total/NA Analysis EPA 537(Mod) 643841 01/02/23 08:03 D1R **EET SAC** 1 1 mL 1 mL

Client Sample ID: 22OTZ-SS17 Lab Sample ID: 320-94972-17

Matrix: Solid

Date Collected: 12/01/22 00:40 Date Received: 12/06/22 13:36

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Method Run **Amount Amount** Number or Analyzed Type **Factor** Analyst Lab Total/NA Analysis D 2216 638112 12/07/22 12:40 TCS **EET SAC**

Client Sample ID: 220TZ-SS17 Lab Sample ID: 320-94972-17

Date Collected: 12/01/22 00:40 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 86.1

Batch Batch Dil Initial Final **Batch Prepared** Method Factor Number or Analyzed **Prep Type** Type Run **Amount** Amount **Analyst** Lab Total/NA Prep SHAKE 5.04 g 638274 12/07/22 19:13 EET SAC 10.0 mL AM Total/NA Analysis EPA 537(Mod) 1 1 mL 1 mL 643841 01/02/23 08:33 D1R **EET SAC**

Client Sample ID: 220TZ-SS18 Lab Sample ID: 320-94972-18 Date Collected: 12/01/22 00:55 **Matrix: Solid**

Date Received: 12/06/22 13:36

Dil Initial Final Batch **Prepared** Batch Batch Prep Type Type Method **Factor** Amount Amount Number or Analyzed Run Analyst Lab Total/NA Analysis D 2216 638112 12/07/22 12:40 TCS EET SAC 1

Client Sample ID: 220TZ-SS18 Lab Sample ID: 320-94972-18

Date Collected: 12/01/22 00:55 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 78.2

Batch Batch Dil Initial Final **Batch** Prepared **Prep Type** Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA SHAKE 638274 12/07/22 19:13 AM Prep 5.25 g 10.0 mL **EET SAC** Total/NA Analysis 643841 01/02/23 08:43 D1R EPA 537(Mod) 1 1 mL 1 ml **EET SAC**

Client Sample ID: 220TZ-SS19 Lab Sample ID: 320-94972-19

Date Collected: 12/01/22 01:05 Matrix: Solid Date Received: 12/06/22 13:36

Dil Batch Batch Initial Final Batch Prepared Method **Factor** Amount Amount Number or Analyzed Prep Type Type Run Analyst Lab 12/07/22 12:40 EET SAC D 2216 638112 TCS Total/NA Analysis

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS19

Lab Sample ID: 320-94972-19 Date Collected: 12/01/22 01:05 **Matrix: Solid**

Percent Solids: 79.7

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.00 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 08:54	D1R	EET SAC

Lab Sample ID: 320-94972-20 Client Sample ID: 22OTZ-SS20

Date Collected: 12/01/22 01:25

Matrix: Solid

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Sample ID: 320-94972-20 Client Sample ID: 22OTZ-SS20

Date Collected: 12/01/22 01:25

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 82.8

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.53 g	10.0 mL	638274	12/07/22 19:13	AM	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643841	01/02/23 09:04	D1R	EET SAC

Client Sample ID: 22OTZ-SS21 Lab Sample ID: 320-94972-21

Date Collected: 12/01/22 01:45 Date Received: 12/06/22 13:36

Matrix: Solid

Dil Initial Final Batch Batch Batch Prepared Number **Prep Type** Type Method Run **Factor** Amount Amount or Analyzed Analyst Lab D 2216 638113 12/07/22 12:40 TCS Total/NA Analysis EET SAC

Client Sample ID: 220TZ-SS21 Lab Sample ID: 320-94972-21

Date Collected: 12/01/22 01:45

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 88.1

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.31 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 10:32	S1M	EET SAC

Client Sample ID: 22OTZ-SS22 Lab Sample ID: 320-94972-22 Date Collected: 12/01/22 01:35 **Matrix: Solid**

Date Received: 12/06/22 13:36

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216					638113	12/07/22 12:40	TCS	EET SAC

10

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Date Received: 12/06/22 13:36

Client Sample ID: 22OTZ-SS22

Lab Sample ID: 320-94972-22 Date Collected: 12/01/22 01:35 Matrix: Solid

Percent Solids: 85.2

Batch Batch Batch Dil Initial Final Prepared Method Factor Number or Analyzed **Prep Type** Type Run **Amount** Amount Analyst Lab Total/NA SHAKE 638277 12/07/22 19:17 EET SAC Prep 5.15 g 10.0 mL Total/NA Analysis EPA 537(Mod) 643816 01/01/23 10:42 S1M **EET SAC** 1 1 mL 1 mL

Client Sample ID: 22OTZ-SS23 Lab Sample ID: 320-94972-23

Date Collected: 12/01/22 01:55 Matrix: Solid

Date Received: 12/06/22 13:36

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Method Run **Amount Amount** Number or Analyzed Type **Factor** Analyst Lab Total/NA Analysis D 2216 638113 12/07/22 12:40 TCS **EET SAC**

Client Sample ID: 220TZ-SS23 Lab Sample ID: 320-94972-23

Date Collected: 12/01/22 01:55 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 87.1

Batch Batch Dil Initial Final **Batch Prepared** Method Factor Number or Analyzed **Prep Type** Type Run **Amount** Amount Analyst Lab Total/NA Prep SHAKE 638277 12/07/22 19:17 EET SAC 5.13 g 10.0 mL FX Total/NA Analysis EPA 537(Mod) 1 1 mL 1 mL 643816 01/01/23 10:52 S1M **EET SAC**

Client Sample ID: 220TZ-SS24 Lab Sample ID: 320-94972-24

Date Collected: 12/01/22 02:10 **Matrix: Solid**

Date Received: 12/06/22 13:36

Dil Initial Final Batch **Prepared** Batch Batch Prep Type Type Method **Factor** Amount Amount Number or Analyzed Run Analyst Lab Total/NA Analysis D 2216 638113 12/07/22 12:40 TCS EET SAC 1

Client Sample ID: 220TZ-SS24 Lab Sample ID: 320-94972-24

Date Collected: 12/01/22 02:10 **Matrix: Solid**

Date Received: 12/06/22 13:36 Percent Solids: 85.1

Batch Batch Dil Initial Final **Batch** Prepared **Prep Type** Type Method Run Factor Amount Amount Number or Analyzed Analyst Lab Total/NA SHAKE 638277 12/07/22 19:17 FX Prep 5.29 g 10.0 mL **EET SAC** Total/NA Analysis 643816 01/01/23 11:02 S1M EPA 537(Mod) 1 1 mL 1 ml **EET SAC**

Client Sample ID: 220TZ-SS25 Lab Sample ID: 320-94972-25

Date Collected: 12/01/22 02:25 **Matrix: Solid** Date Received: 12/06/22 13:36

Dil Final Batch Batch Initial Batch Prepared

Method **Factor** Amount Amount Number or Analyzed Prep Type Type Run Analyst Lab D 2216 12/07/22 12:40 638113 TCS EET SAC Total/NA Analysis

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS25

Date Collected: 12/01/22 02:25 Date Received: 12/06/22 13:36 Lab Sample ID: 320-94972-25

Matrix: Solid

Percent Solids: 86.5

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.23 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 11:13	S1M	EET SAC

Client Sample ID: 22OTZ-SS26

Date Collected: 12/01/22 20:40 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-26

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS26

Date Collected: 12/01/22 20:40

Lab Sample ID: 320-94972-26

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 87.2

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		10	1 mL	1 mL	644845	01/05/23 21:44	D1R	EET SAC
Total/NA	Prep	SHAKE	DL		5.13 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)	DL	20	1 mL	1 mL	645221	01/08/23 00:54	K1S	EET SAC

Client Sample ID: 22OTZ-SS27

Date Collected: 12/01/22 20:50

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-27 **Matrix: Solid**

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS27

Date Collected: 12/01/22 20:50

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-27 **Matrix: Solid** Percent Solids: 89.0

Prep Type Total/NA	Batch Type Prep	Batch Method SHAKE	Run	Dil Factor	Initial Amount 5.24 g	Final Amount 10.0 mL	Batch Number 638277	Prepared or Analyzed 12/07/22 19:17	Analyst FX	Lab EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 11:33	S1M	EET SAC
Total/NA	Prep	SHAKE	DL		5.24 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)	DL	5	1 mL	1 mL	644845	01/05/23 21:24	D1R	EET SAC

Client Sample ID: 220TZ-SS28

Date Collected: 12/01/22 21:10

Date Received: 12/06/22 13:36

Lab Sample ID	: 320-94972-28
	Matrix: Solid

Analyst	Lab	

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Lab Sample ID: 320-94972-28

Matrix: Solid

Percent Solids: 87.7

Client Sample ID: 22OTZ-SS28

Date Collected: 12/01/22 21:10 Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.48 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 11:43	S1M	EET SAC

Client Sample ID: 22OTZ-SS29

Date Collected: 12/01/22 21:30 Date Received: 12/06/22 13:36

Lab Sample I	D: 320-94972-29	
	Matrix: Solid	

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS29

Date Collected: 12/01/22 21:30

Lab Sample ID: 320-94972-29 **Matrix: Solid**

Lab Sample ID: 320-94972-30

Lab Cample ID: 200 04070 20

Lab Sample ID: 320-94972-31

Matrix: Solid

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 80.6

		Batch	Batch		Dil	Initial	Final	Batch	Prepared		
	Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
	Total/NA	Prep	SHAKE			5.50 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
l	Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 12:13	S1M	EET SAC

Client Sample ID: 22OTZ-SS30

Date Collected: 12/01/22 21:20

Date Received: 12/06/22 13:36

_										
	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 220T7 9920

Client Sample ID: 22012-5530	Lab Sample ID: 320-94972-30
Date Collected: 12/01/22 21:20	Matrix: Solid
Date Received: 12/06/22 13:36	Percent Solids: 83.2

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.26 g	10.0 mL	638277	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 12:24	S1M	EET SAC

Client Sample ID: 22OTZ-SS31

Date Collected: 12/01/22 21:50

Date Received: 12/06/22 13:36

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ı		Batch	Batch		Dil	Initial	Final	Batch	Prepared		
	Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
١	Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS31

Date Collected: 12/01/22 21:50 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-31

Matrix: Solid

Percent Solids: 82.7

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.35 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 12:34	S1M	EET SAC
Total/NA	Prep	SHAKE	DL		5.35 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)	DL	5	1 mL	1 mL	644845	01/05/23 21:34	D1R	EET SAC

Client Sample ID: 22OTZ-SS32

Date Collected: 12/01/22 22:00

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-32

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS32

Date Collected: 12/01/22 22:00

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-32 Matrix: Solid

Lab Sample ID: 320-94972-33

Percent Solids: 86.1

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Method Amount Amount Number or Analyzed Type Run **Factor** Analyst Lab Total/NA Prep SHAKE 5.34 g 10.0 mL 638277 12/07/22 19:44 FX EET SAC Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643816 01/01/23 12:44 S1M **EET SAC**

Client Sample ID: 22OTZ-SS33

D

Date Collected: 12/01/22 22:20	Matrix: Solid
Date Received: 12/06/22 13:36	

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS33

Lab Sample ID: 320-94972-33 Date Collected: 12/01/22 22:20 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 83.7

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 12:54	S1M	EET SAC

Client Sample ID: 22OTZ-SS34

Date Collected: 12/01/22 22:40

Date Received: 12/06/22 13:36

Lab Sample	ID:	320-94972-34
		Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

10

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS34

Date Collected: 12/01/22 22:40 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-34

Matrix: Solid

Percent Solids: 87.4

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.17 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 13:04	S1M	EET SAC

Client Sample ID: 22OTZ-SS35

Date Collected: 12/01/22 22:55 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-35

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Sample ID: 320-94972-35 Client Sample ID: 220TZ-SS35

Date Collected: 12/01/22 22:55

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 90.3

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.09 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 13:14	S1M	EET SAC
Total/NA	Prep	SHAKE	DL		5.09 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)	DL	10	1 mL	1 mL	644845	01/05/23 21:54	D1R	EET SAC

Client Sample ID: 220TZ-SS36 Lab Sample ID: 320-94972-36

Date Collected: 12/02/22 20:50 Date Received: 12/06/22 13:36

Matrix: Solid

Matrix: Solid

	Ва	atch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Ty	уре Ту	pe	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/N	A An	nalysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS36 Lab Sample ID: 320-94972-36

Date Collected: 12/02/22 20:50 Date Received: 12/06/22 13:36

Matrix: Solid Percent Solids: 87.9

Batch Batch Dil Initial Final Batch Prepared **Prep Type** Type Method **Factor** Amount Amount Number or Analyzed Run Analyst Lab Total/NA SHAKE 638277 12/07/22 19:44 FX Prep 5.47 g 10.0 mL EET SAC Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643816 01/01/23 13:25 S1M **EET SAC** 1

Client Sample ID: 220TZ-SS37 Lab Sample ID: 320-94972-37

Date Collected: 12/02/22 21:00 Date Received: 12/06/22 13:36

Dil Initial Final Batch Batch **Batch** Prepared Run **Prep Type** Type Method **Factor** Amount Amount Number or Analyzed Analyst Lab Analysis D 2216 12/07/22 12:40 TCS Total/NA 638113 EET SAC

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS37

Date Collected: 12/02/22 21:00 Date Received: 12/06/22 13:36 Lab Sample ID: 320-94972-37

Matrix: Solid

Percent Solids: 93.6

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.33 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 13:35	S1M	EET SAC

Client Sample ID: 22OTZ-SS38

Date Collected: 12/02/22 21:10 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-38

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS38

Date Collected: 12/02/22 21:10 Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-38

Matrix: Solid Percent Solids: 87.1

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 13:45	S1M	EET SAC

Client Sample ID: 220T7 9920

Silent Sample ID: 22012-5539	Lab Sample ID: 320-94972-39
Date Collected: 12/02/22 21:20	Matrix: Solid
Date Received: 12/06/22 13:36	

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-SS39

Date Collected: 12/02/22 21:20

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-39 Matrix: Solid

Lab Sample ID: 320-94972-40

Percent Solids: 86.9

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.11 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 14:15	S1M	EET SAC

Client Sample ID: 22OTZ-SS40

Date Collected: 12/02/22 21:30

Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216					638015	12/07/22 11:38	TCS	EET SAC

10

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 220TZ-SS40

Lab Sample ID: 320-94972-40 Date Collected: 12/02/22 21:30

Matrix: Solid

Matrix: Solid

Matrix: Solid

Date Received: 12/06/22 13:36 Percent Solids: 86.3

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.29 g	10.0 mL	638277	12/07/22 19:44	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643816	01/01/23 14:25	S1M	EET SAC

Client Sample ID: 22OTZ-SS41 Lab Sample ID: 320-94972-41 **Matrix: Solid**

Date Collected: 12/02/22 21:20 Date Received: 12/06/22 13:36

Batch Batch Dil Initial Final Batch Prepared Method Number or Analyzed **Prep Type** Type **Amount Amount** Run **Factor** Analyst Lab Total/NA Analysis D 2216 638015 12/07/22 11:38 TCS **EET SAC**

Client Sample ID: 220TZ-SS41 Lab Sample ID: 320-94972-41

Date Collected: 12/02/22 21:20 **Matrix: Solid** Date Received: 12/06/22 13:36 Percent Solids: 81.6

Batch Batch Batch Dil Initial Final **Prepared Prep Type** Method Factor **Amount** Amount Number or Analyzed Type Run Analyst Lab Total/NA Prep SHAKE 5.38 g 638278 12/07/22 19:17 FX EET SAC 10.0 mL Total/NA Analysis EPA 537(Mod) 1 mL 1 mL 643847 01/02/23 10:05 D1R **EET SAC**

Client Sample ID: 220TZ-SS42 Lab Sample ID: 320-94972-42

Date Collected: 12/02/22 21:45

Date Received: 12/06/22 13:36

Dil Batch Initial Final Batch Prepared Batch **Prep Type** Type Method Run **Factor** Amount Amount Number or Analyzed Analyst Lab 638015 12/07/22 11:38 TCS Total/NA Analysis D 2216 EET SAC

Client Sample ID: 22OTZ-SS42 Lab Sample ID: 320-94972-42

Date Collected: 12/02/22 21:45 Matrix: Solid Date Received: 12/06/22 13:36 Percent Solids: 86.7

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.22 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 02:55	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.19 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 15:28	K1S	EET SAC

Client Sample ID: 22OTZ-SS43 Lab Sample ID: 320-94972-43

Date Collected: 12/02/22 21:55 Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

2

Job ID: 320-94972-1

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Client Sample ID: 22OTZ-SS43

Date Collected: 12/02/22 21:55 Date Received: 12/06/22 13:36 Lab Sample ID: 320-94972-43

Matrix: Solid

Percent Solids: 83.8

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.05 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 03:05	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.22 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 15:38	K1S	EET SAC

Client Sample ID: 220TZ-SS44

Date Collected: 12/02/22 22:05 Date Received: 12/06/22 13:36 Lab Sample ID: 320-94972-44

Matrix: Solid

Batch Batch Dil Initial Batch Final Prepared Method Number or Analyzed **Prep Type** Type Run **Factor Amount** Amount Analyst Lab 638015 12/07/22 11:38 TCS Total/NA Analysis D 2216 **EET SAC**

Client Sample ID: 220TZ-SS44

Date Collected: 12/02/22 22:05 Date Received: 12/06/22 13:36 Lab Sample ID: 320-94972-44 Matrix: Solid

Percent Solids: 80.9

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 03:15	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.31 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 15:48	K1S	EET SAC

Client Sample ID: 220TZ-SS45

Date Collected: 12/02/22 22:15

Date Received: 12/06/22 13:36

Sample ID: 320-94972-45

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 220TZ-SS45

Date Collected: 12/02/22 22:15

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-45

Matrix: Solid

Percent Solids: 83.6

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 03:25	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.13 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 15:58	K1S	EET SAC

Client Sample ID: 22OTZ-SS46

Date Collected: 12/02/22 22:30

Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-46

Matrix: Solid

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Eurofins Sacramento

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Lab Chronicle

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS46

Lab Sample ID: 320-94972-46

Matrix: Solid

Date Collected: 12/02/22 22:30 Date Received: 12/06/22 13:36

Percent Solids: 88.5

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Туре	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 03:35	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.17 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 16:08	K1S	EET SAC

Client Sample ID: 22OTZ-SS47 Date Collected: 12/02/22 22:20

Lab Sample ID: 320-94972-47

Matrix: Solid

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Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 220TZ-SS47

Lab Sample ID: 320-94972-47 **Matrix: Solid**

Date Collected: 12/02/22 22:20 Date Received: 12/06/22 13:36

Percent Solids: 91.1

_	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.35 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	645416	01/09/23 03:46	RS1	EET SAC
Total/NA	Prep	SHAKE	RE		5.17 g	10.0 mL	646043	01/10/23 19:43	PV	EET SAC
Total/NA	Analysis	EPA 537(Mod)	RE	1	1 mL	1 mL	646180	01/11/23 16:18	K1S	EET SAC

Client Sample ID: 220TZ-EB

Lab Sample ID: 320-94972-48

Matrix: Water

Date Collected: 12/03/22 21:17 Date Received: 12/06/22 13:36

	Batch	Batch		Dil	Initial	Final	Batch	Prepared		
Prep Type	Type	Method	Run	Factor	Amount	Amount	Number	or Analyzed	Analyst	Lab
Total/NA	Prep	3535			254 mL	10.0 mL	639072	12/12/22 06:38	EJR	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	640016	12/14/22 13:46	RS1	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: Kotzenue DOT&PF

Job ID: 320-94972-1

Laboratory: Eurofins Sacramento

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

Authority	Pro	ogram	Identification Number	Expiration Date	
Alaska (UST)	Sta	ate	17-020	02-20-24	
the agency does not	•	rt, but the laboratory is r	not certified by the governing authority.	This list may include analyte	s for whi
,	•	rt, but the laboratory is r Matrix	not certified by the governing authority. Analyte	I his list may include analyte	s for whi
the agency does not o	offer certification.	•	, , ,	This list may include analyte	s for whi

Method Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF Job ID: 320-94972-1

Method	Method Description	Protocol	Laboratory
EPA 537(Mod)	PFAS for QSM 5.3, Table B-15	EPA	EET SAC
D 2216	Percent Moisture	ASTM	EET SAC
3535	Solid-Phase Extraction (SPE)	SW846	EET SAC
SHAKE	Shake Extraction with Ultrasonic Bath Extraction	SW846	EET SAC

Protocol References:

ASTM = ASTM International

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

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Sample Summary

Client: Shannon & Wilson, Inc Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	
320-94972-1	22OTZ-SS01	Solid	11/30/22 20:45	12/06/22 13:36	
320-94972-2	22OTZ-SS02	Solid	11/30/22 21:10	12/06/22 13:36	
320-94972-3	22OTZ-SS03	Solid	11/30/22 21:30	12/06/22 13:36	
320-94972-4	22OTZ-SS04	Solid	11/30/22 21:45	12/06/22 13:36	
320-94972-5	22OTZ-SS05	Solid	11/30/22 22:00	12/06/22 13:36	
320-94972-6	22OTZ-SS06	Solid	11/30/22 22:10	12/06/22 13:36	
320-94972-7	22OTZ-SS07	Solid	11/30/22 22:25	12/06/22 13:36	
320-94972-8	22OTZ-SS08	Solid	11/30/22 22:40	12/06/22 13:36	
320-94972-9	22OTZ-SS09	Solid	11/30/22 22:55	12/06/22 13:36	
320-94972-10	22OTZ-SS10	Solid	11/30/22 23:05	12/06/22 13:36	
320-94972-11	22OTZ-SS11	Solid	11/30/22 23:25	12/06/22 13:36	
320-94972-12	22OTZ-SS12	Solid	11/30/22 23:15	12/06/22 13:36	
320-94972-13	22OTZ-SS13	Solid		12/06/22 13:36	
320-94972-14	22OTZ-SS14	Solid	11/30/22 23:55		
320-94972-15	22OTZ-SS15	Solid	12/01/22 00:10		
320-94972-16	22OTZ-SS16	Solid		12/06/22 13:36	
320-94972-17	22OTZ-SS17	Solid	12/01/22 00:40		
320-94972-18	22OTZ-SS18	Solid	12/01/22 00:40		
320-94972-19	220TZ-SS19	Solid	12/01/22 00:05		
320-94972-19	220TZ-SS20	Solid	12/01/22 01:05		
320-94972-21	220TZ-SS21	Solid	12/01/22 01:25		
320-94972-21	220TZ-SS21		12/01/22 01:45		
		Solid			
320-94972-23	220TZ-SS23	Solid	12/01/22 01:55		
320-94972-24	220TZ-SS24	Solid	12/01/22 02:10		
320-94972-25	220TZ-SS25	Solid	12/01/22 02:25		
320-94972-26	220TZ-SS26	Solid	12/01/22 20:40		
320-94972-27	22OTZ-SS27	Solid	12/01/22 20:50		
320-94972-28	22OTZ-SS28	Solid	12/01/22 21:10		
320-94972-29	22OTZ-SS29	Solid	12/01/22 21:30		
320-94972-30	22OTZ-SS30	Solid	12/01/22 21:20		
320-94972-31	22OTZ-SS31	Solid	12/01/22 21:50		
320-94972-32	22OTZ-SS32	Solid	12/01/22 22:00		
320-94972-33	22OTZ-SS33	Solid	12/01/22 22:20		
320-94972-34	22OTZ-SS34	Solid	12/01/22 22:40		
320-94972-35	22OTZ-SS35	Solid	12/01/22 22:55		
320-94972-36	22OTZ-SS36	Solid		12/06/22 13:36	
320-94972-37	22OTZ-SS37	Solid	12/02/22 21:00	12/06/22 13:36	
320-94972-38	22OTZ-SS38	Solid	12/02/22 21:10		
320-94972-39	22OTZ-SS39	Solid	12/02/22 21:20		
320-94972-40	22OTZ-SS40	Solid	12/02/22 21:30	12/06/22 13:36	
320-94972-41	22OTZ-SS41	Solid	12/02/22 21:20	12/06/22 13:36	
320-94972-42	22OTZ-SS42	Solid	12/02/22 21:45		
320-94972-43	220TZ-SS43	Solid	12/02/22 21:55	12/06/22 13:36	
320-94972-44	22OTZ-SS44	Solid	12/02/22 22:05	12/06/22 13:36	
320-94972-45	22OTZ-SS45	Solid	12/02/22 22:15	12/06/22 13:36	
320-94972-46	22OTZ-SS46	Solid	12/02/22 22:30	12/06/22 13:36	
320-94972-47	22OTZ-SS47	Solid	12/02/22 22:20	12/06/22 13:36	
320-94972-48	22OTZ-EB	Water	12/03/22 21:17	12/06/22 13:36	

2355 Hill Road Fairbanks, AK 99709	2355 Hill Road Fairbanks, AK 99709 (907) 479-0600					AIN-OF-CUSTODY RECORD Laboratory Eurofins Analytical Methods (include preservative if used)								
www.shannonwilson.con	n				/		Allalytical Mi	ethous (inc	ciude preserv	7 7	/	7		
Turn Around Time:	Quote No:					2		/ /			ainer's			
Normal Rush	J-Flags: 🔀	Yes	No		as of					Tog Hurtog de	Strike /			
Please Specify				/	5*/					Mr.	Remark	s/Matrix		
Sample Identity	Lab No.	Time	Date Sample							1/200	Composit Sample C	ion/Grab? Containers		
22 OTZ - SSØI		2045	3 11/.	30 X						1 Soil	Grab	Sample		
22 OTZ - SSØ2		2110		X						\				
220TZ - SS 03		2130		×						1				
POZ-SSO4		2145		×						1				
2207Z-SS@5		2200		*						1				
220TZ -SS 06		2210		×						1				
220TZ -SS 07		22 25		X						1				
22072-SS08		2240		×						1				
22072 - 5509		2255		X						1				
22 OTZ - SS 10		2305	•	X						١	1	/		
Project Information	Sample	Receipt		Reliqu	ished By:	1.	Reliq	uished B	By: 2.	Reli	quished	By: 3.		
Number: 109531 - 003	Total No. of Containe	ers: Y	Si	gnature:	Tir	ne: \200	Signature:		Time:	Signature:		Time:		
Name: Kotzebue DOT & PF	COC Seals/Intact?	Y/N/NA		adam	ayleur									
Contact: Kristen Freiburger	Received Good Con-			inted Name:		te: \2/5	Printed Name:		Date:	Printed Name	9 :	Date:		
Ongoing Project? Yes No	Temp:	4.900		Adom u	Jyborny		Company:			Company:				
Sampler: APW / JKR	Delivery Method: A	k Air Cor	50 11		4 Wilson	Lac.	Jonipany.			Company.				
No	too				ived By:	1.	Rec	eived By	: 2.	Re	ceived E	By: 3.		
			Si	gnature;	hat Tin	ne: 13736	Signature:		Time:	Signature:		Time:		
320-94972 Chain of Cu	stody		Pı	inted Name:		ite: 12/6	Printed Name:		Date:	Printed Name	e:	Date:		
Distribution: White - w/shipment - returned Yellow - w/shipment - for con Pink - Shannon & Wilson - jol	signee files	w/ laboratory	report C	EETS	AC "	1.90	Company:			Company:				
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SHANNON & WILSO GEOTECHNICAL AND ENVIRONMENTAL 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 www.shannonwilson.co		CH	AIN	I-O	F-C	CUST	FODY			ORD		Attn:	ratory Eurof David All e if used)	tucker	5
Turn Around Time: Normal Rush	Quote No:					/	Ser Jan		/	/ /	/ /	/	da kuribe d Collare	\$	
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Please Specify			Da	ıte.	/	2/							No R	emarks/Matrix	
Sample Identity	Lab No.	Time	Sam		/ 0							/ ^	Sa	mposition/Grab? mple Containers	
22 072 - 55 11		23 25	11/30	0/22	X							1	Soil Gr	ab Sample	
22 072 - 55 12		2315			X							1			
22 OTZ - 55 13		2340			X							1			
220TZ-SS 14		2355	1	,	X							1			
22 OTZ-SS IS		0010	12/1	/22	X							1			
220TZ - SS 16		00 25			×							1			
22 OTZ - SS 17		0040			X							1			
22 OTZ - SS 18		0055			×							1			
22 OTZ - \$5 19		0105			X							1			
220TZ - SS 20		0125	J		×							1			
Project Information	Sample	Receipt			Reliqu	ished By	: 1.		Reliqu	uished E	3y: 2		Reliquis	hed By: 3.	7 1
Number: 109531 - 003	Total No. of Contain	ners: 4	9	Signatu	ле:		Time: 1200	Signa	ture:		Time:		Signature:	Time:	
Name: Kotzebue DOT&PF	COC Seals/Intact?	Y/N/NA				ayles		1							
Contact: Kristen Freiburger	Received Good Cor			Printed			Date: 12/5	- Printe	d Name:		Date:		Printed Name:	Date:	
Ongoing Project? Yes No		4,90		Compa		My born	Y	Comp	any:				Commonw		
Sampler: APW /JKR	Delivery Method: A	IK AIT COL	50		,	& Wilso	o, Inc.	Comp	arry.				Company:		
No	tes:				-	ivea By:	Name - Alle State		Rece	eived By	/: 2 .		Receiv	ed By: 3.	
				Signatu	ire:	Chit	Time: 13736	Signa	ture:		Time:		Signature:	Time:	
				Printed N_t	Name: Cahi	ill	Date: 12/6/2	14 Printe	d Name:		Date:		Printed Name:	Date:	
Distribution: White - w/shipment - returned Yellow - w/shipment - for con Pink - Shannon & Wilson - jo	signee files	n w/ laboratory	report	Compa	ny:	EETSA	+(4.90	Comp	any:				Company:		

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SHANNON & WILSO 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 www.shannonwilson.cc		CH	lAll	N-C	F-C	CUST		REC			Attn:	7	Hucker	of <u>5</u>
Turn Around Time:	Quote No:			1			25		/ /	/ /			(E)	
Normal Rush	J-Flags:	Yes	No No]		80 05 T	/	/ /				de hurded Cond		
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220TZ-SS 21		0145	13	/1/22	X						1	Soil G	reab Som	ole
22 OTZ - SS 22		@135			X						1			1
22 OTZ - SS 23		@155			X						1			
22 OTZ -SS 24		0218			×						1			
22 OTZ - 55 25		0229			X						1			
22 OTZ - SS 26		2048			×						1			
22 OTZ - SS 27		2050			×						1			
22 OTZ - SS 28		2110			X						1			
22 OTZ - 55 29		2130			×						1			
22-570 EX		2120		•	X						1		1	
Project Information	Sample	Receip	t		Reliqu	ished By:	1.	Relic	quished l	By: 2		Reliqui	shed By:	3.
Number: 109531 - 003	Total No. of Contain	ers:	49	Signat	ure:	ī	ime: 1200	Signature:		Time:		Signature:	Time	
Name: Kotzebue DoT&PF	COC Seals/Intact?	Y/N/NA				aylan								
Contact: Kristen Freiburger	Received Good Cor			1	Name:		Date: \2/5	Printed Name	: :	Date:		Printed Name:	Date	:
Ongoing Project? Yes No	Temp:	4.9		Compa		Aporth		Company:				Company:		
Sampler: APW / JKR	Delivery Method:	k Air Co	org o	11	•	4 Wilso	O. Inc.	Company.				Company:		
No	ites:				AND RESIDENCE	ived By:	1.	Red	ceived B	y: 2.		Recei	ved By:	3.
				Signat		Chart T	ime: 13'136	Signature:		Time:		Signature:	Time	:
					Name:	С	Date: 12/6/22	Printed Name	: :	Date:		Printed Name:	Date	0
Distribution: White - w/shipment - returne Yellow - w/shipment - for co Pink - Shannon & Wilson - jo	nsignee files	n w/ labora	tory repor	Compa	any:	AC	4.9c	Company:				Company:		

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SHANNON & WILSO 2355 Hill Road Fairbanks, AK 99709 (907) 479-0600 www.shannonwilson.co		CH	AIN	-OF-	CUST	FODY	REC		At	7	Alltucker
Turn Around Time: Normal Rush	Quote No:	Yes	No			2,5				/ /s ^c	S. Laines
Please Specify Sample Identity	Lab No.	Time	Dat Samp	te de	Sta Only					Cod Muride do	Remarks/Matrix Composition/Grab? Sample Containers
220TE-SS 31		2150	12/1/								Grab Sample
22072 - 55 32		2200		X						1	Jernyte
22 OTZ - 55 33		2220		×						1	
22 OTZ - SS 34		2240		X						1	
25 22 - 570 66		2255	4	X						1	
22 OTZ -55 36		2050	12/2	/22 X						1	
22 OT2 -SS 37		2100		×						1	
22 OTZ - SS 38		2110		X						1	
220TZ-SS 39		2120		X						1	
22 OTZ - SS 40		2130	V	X						1	V
Project Information	Sample	Receipt		Reliq	uished By	y: 1.	Reliq	uished B	y: 2.	Relic	quished By: 3.
Number: 109531 - 003 Name: Kotestus DOT 1 PF Contact: Kristen Freiburger Ongoing Project? Yes No	Total No. of Contain COC Seals/Intact? Received Good Col Temp:	Y/N/NA		Printed Name:	wyborn.	Time: 1200 Date: 12/5	Signature: Printed Name:		Time:	Signature: Printed Name	Time:
Sampler: APW / JKR	Delivery Method:			Company:	00 00.11	/	Company:			Company:	
	tes:			Shennor	1 & Wils	on, Inc.					
140	163.				eived By:		Rec	eived By:	2.	Red	ceived By: 3.
				Signature: Orinted Name: N. (a)	Ghat	Time: 19/20	Signature: Printed Name:		Time:	Signature: Printed Name	Time:
Distribution: White - w/shipment - returne Yellow - w/shipment - for cor Pink - Shannon & Wilson - jo	nsignee files	on w/ laboratory	report	Company:	SA(4.9c	Company:			Company:	

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SHANNON & WILSO	ON INC		AINI	OF 4	2110	TODY	/ 5	E04	200				Page <u>5</u> of <u>5</u>
2355 Hill Road		CHA	AIN-	OF-C	505	TOD	r R	ECC	JRD			ratory <u>Luco</u>	FLAS
Fairbanks, AK 99709 (907) 479-0600							Anal	ytical Me	ethods (ir	nclude pre	:Attn servativ	Dowld All e if used)	tucker
www.shannonwilson.co	m							/			/	///	
Turn Around Time:	Quote No:				/	5/		/ /	/ /	/		, ains	§ /
Normal Rush	J-Flags:	Yes	No		18 0 m	25.5						da kunta da Colda K	
Please Specify				/	5 9							A AUTO	emarks/Matrix
Sample Identity	Lab No.	Time	Date Sampled	/ 0							/1	Co. Sa	mposition/Grab? mple Containers
220TZ - SS 41		2120	12/2/2	X							1	Soil Gro	b Sample
220TZ-5542		2145		Χ							1		,
22 OTZ -55 43		2155		Х							1		
22 - SS 44		2205		X							1		
220TZ - SS 45		2215		X							1		
220TZ - 55 46		2230		X							1		
220TZ-SS 47		3330	1	X							1		+
22 OTZ - EB		2117	12/3/2	X							2	Distilled w	ater blank
Project Information	Sample	Receipt		Reliqu	uished B	v: 1.		Relia	uished l	By: 2		Peliquis	shed By: 3.
Number: \@9531 - @03	Total No. of Contain		Sign	ature:		Time: \200	Sign	nature:		Time:		Signature:	Time:
Name: Kotzebue DOTAPF	COC Seals/Intact?		, II ,		- unle	nes		Turur or				Oiginatare.	Time.
Contact: Kristen Freiburger	Received Good Co	nd./Cold		ted Name:		Date: 17/5	Prin	ted Name:		Date:_		Printed Name:	Date:
Ongoing Project? Yes No	Temp:	4,900			Wybor	ny	_						
Sampler: APW / JKR	Delivery Method:	IK Air Cars	Con	npany:			- 1	npany:				Company:	
No	tes:				eived By	Ison, In	·	Received By: 2.			Received By: 3.		
			Sign	ature:	tut	Time: 13/3	Sign	nature:		Time:_		Signature:	Time:
			Prin	Printed Name: Date: 12-6-27		Prin	Printed Name: Date:			Printed Name:	Date:		
Distribution: White - w/shipment - returne Yellow - w/shipment - for cor Pink - Shannon & Wilson - ic	nsignee files	on w/ laboratory	report Con	pany:	EETSA	c 490	Con	npany:				Company:	

1 α **1** α

Client: Shannon & Wilson, Inc

Job Number: 320-94972-1

Login Number: 94972 List Source: Eurofins Sacramento

List Number: 1

Creator: Cahill, Nicholas P

Creator. Carrill, Nicriolas P		
Question	Answer	Comment
Radioactivity wasn't checked or is = background as measured by a survey meter.</td <td>N/A</td> <td></td>	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?	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:	Dana Fjare	CS Site Name:	N/A	Lab Name:	Eurofins Environment Testing				
Title:	Environmental Scientist	ADEC File No.:	N/A	Lab Report No.:	320-94972-1				
Consulting Firm:	Shannon & Wilson, Inc.	Hazard ID No.:	N/A	Lab Report Date:	1/18/2023				
Note: Any N/A or No box checked must have an explanation in the comments box. 1. Laboratory									
app Yes Con	 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: Analyses were performed by Eurofins Environment Testing in Sacramento, California. 								
to a app Yes Con	 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 contracted to another "network" laboratory or sub-contracted to an alternate laboratory. 								
2. Chain of C	ustody (CoC)								
rele Yes	 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 DoD QSM 5.3 Table B-15 compliant method, EPA 537 (Modified) Comments: 									

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3. Laboratory Sample Receipt Documentation

	a.	Is the sample/cooler temperature documented and within range at receipt (0° to 6° C)?
		Yes \boxtimes No \square N/A \square Cooler temperature(s): Cooler temperature was not reported by the laboratory. Sample temperature(s): A temperature blank was included with the samples in the cooler and is used to assess sample temperature. The temperature blank was reported at 4.9 °C upon arrival at the Eurofins Environment Testing laboratory. Comments:
	b.	Is the sample preservation acceptable – acidified waters, methanol preserved soil (GRO, BTEX, VOCs, etc.)? Yes ⊠ No □ N/A □ Comments: Samples submitted for PFAS analysis do not require chemical
		preservation.
	C.	Is the sample condition documented – broken, leaking, zero headspace (VOA vials); canister vacuum/pressure checked and no open valves, etc.? Yes \boxtimes No \square N/A \square
		Comments: The laboratory receipt form noted that samples were received in acceptable condition.
	d.	If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.? Yes \square No \square N/A \boxtimes Comments: The laboratory did not report any sample handling discrepancies.
	e.	Is the data quality or usability affected? Yes □ No ☒ N/A □ Comments: Data quality and usability are not affected; see above.
4.	Case I	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 \boxtimes No \square N/A \square Comments: The continuing calibration verification (CCV) standard associated with batch 320-643841 recovered d3-NMeFOSAA above the upper control limit. However, the analyte was not detected in the corresponding field samples, so there was no adverse impact to the data.

Lab Report No.: 320-94972-1

The CCV associated with batch 320-643847 recovered d3-NMeFOSAA and d5-NEtFOSAA above their upper control limits. The samples associated with this CCV were non-detects for the affected isotope dilution analytes (IDAs); therefore, the data have been reported. The associated project sample is 22OTZ-SS41.

The "I" qualifier means the transition mass ratio for the indicated analyte was below the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty and analyst judgement was used to positively identify the analyte in project samples 220TZ-SS07, 220TZ-SS08, 220TZ-SS09, 220TZ-SS11, 220TZ-SS12, 220TZ-SS13, 220TZ-SS14, 220TZ-SS15, 220TZ-SS18, 220TZ-SS21, 220TZ-SS22, 220TZ-SS24, 220TZ-SS27, 220TZ-SS28, 220TZ-SS33, 220TZ-SS37, 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47, and in the laboratory matrix spike duplicate (MSD) sample 320-94972-A-1-C MSD.

Perfluoroundecanoic acid (PFUnA) and Perfluorooctanesulfonic acid (PFOS) were detected above the half reporting limit in the method blank associated with preparation batch 320-638278 and analytical batch 320-643847 as well as in the project samples 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47. All affected samples were re-extracted outside of holding time. Both sets of data have been reported.

The MSD recoveries for perfluorobutanesulfonic acid (PFBS) in preparation batch 320-639072 and analytical batch 320-640016 were outside control limits. Sample matrix interference is suspected because the associated laboratory control sample (LCS) recovery was within acceptance limits.

The IDA recovery in sample 22OTZ-SS12 is below the method recommended limit.

Results for samples 220TZ-SS26, 220TZ-SS27, 220TZ-SS31, and 220TZ-SS35 were reported from the analysis of a diluted extract due to high concentrations of the target analytes in the undiluted extract.

Sample 220TZ-SS36 exhibited matrix interference for PFOS causing elevation of the reporting limit. The reporting limit for the affected analyte has been raised to be equal to the matrix interferences, and a "G" qualifier applied.

The laboratory reported that samples 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47, and matrix spike (MS)/MSD pair 320-94972-A-47, were re-prepared outside of method required holding time due to a method blank detection of PFTrDA and PFUnA. However, the laboratory report did not contain a method blank detection for PFTrDA. The method blank detection for PFUnA was previously referenced in the case narrative. These

CS Site Name: N/A Lab Report No.: 320-94972-1 samples were re-extracted outside of hold time for PFOS and PFUnA method blank detections: see Section 5.b. c. Were all the corrective actions documented? Yes ⊠ No □ N/A □ Comments: For diluted samples, the dilution factor was applied to the labeled internal standard area counts and these area counts were within laboratory acceptance limits. d. What is the effect on data quality/usability according to the case narrative? Comments: The laboratory mentioned that the data quality is not considered affected if the IDA signal-to-noise ratio is greater than 10:1, which was achieved for all IDA in the samples. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. Analyst judgement was used to positively identify the analyte in project samples 22OTZ-SS08 and 22OTZ-SS13. 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: Samples 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 22OTZ-SS46, and 22OTZ-SS47 were re-prepared outside of preparation holding time due to a method blank detection of PFTrDA and PFUnA. We evaluated only the in-hold data. Qualification due to the holding time exceedance is not required. c. Are all soils reported on a dry weight basis? Yes ⊠ No □ N/A □ Comments:

Comments: Data quality and usability were not affected; see above.

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?

Comments:

Yes ⊠ No □ N/A □

Yes □ No ⋈ N/A □

e. Is the data quality or usability affected?

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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 \square No \boxtimes Comments: PFUnA was detected in method blank 320-6382781/1-A at 0.332 µg/kg, above the RL of 0.2 µg/kg. In addition, PFTriA and PFOS were detected at estimated concentrations below the RL of 0.0990 µg/kg and 0.130 µg/kg, respectively. This method blank was prepared with batch 638278.
iii.	If above LoQ or RL, what samples are affected? Comments: Preparation batch 638278 includes project samples 220TZ-SS41, 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47.
iv.	Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes No N/A Comments: The analytes PFUnA, PFTriA, and PFOS were not detected in project sample 220TZ-SS41, so qualification of this sample was not required.
	PFUnA was detected at estimated concentrations, less than the RL, in samples 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47. The detected concentrations are within

PFTriA was detected at estimated concentrations, less than the RL, in samples 220TZ-SS42, 220TZ-SS43, 220TZ-SS44, 220TZ-SS45, 220TZ-SS46, and 220TZ-SS47. The detected concentrations are within ten times that of the method blank detection. These results are considered false-positives and are qualified "UB" at the reporting limit.

ten times that of the method blank detection. The results are considered false positives due to the method blank detection and are qualified "UB"

at the reporting limit or sample result (whichever is greater).

PFOS was detected in sample 22OTZ-SS47 at a concentration within ten times the concentration detected in the method blank. The result is considered a false-positive and is qualified "UB" at the sample result. PFOS was detected at a concentration greater than ten times the method blank detection in sample 22OTZ-SS45 and was not detected in samples

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220TZ-SS42, 220TZ-SS43, 220TZ-SS44, and 220TZ-SS46. Consequently, the results are unaffected by the method blank detection and do not require qualification. v. Data quality or usability affected? Yes ⊠ No □ N/A □ Comments: Data quality is affected. The affected results are considered usable with the qualifiers detailed 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: Click or tap here to enter text. ii. Metals/Inorganics – Are one LCS and one sample duplicate reported per matrix, analysis and 20 samples? Yes □ No □ N/A ⊠ Comments: Metals/inorganic 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: N/A; method accuracy and precision were within laboratory control limits. vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes □ No □ N/A ⊠

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Comments: Accuracy and precision were within laboratory control limits; flags were not required. vii. Is the data quality or usability affected? Yes □ No ⊠ N/A □ Comments: Data quality and usability are not affected; 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: Click or tap here to enter text. 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 with 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 □ iv. Comments: The recovery of PFBS exceeded the laboratory limit in MSD sample 320-94998-A-1-C, associated with preparation batch 639072 and analysis batch 640016. v. 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: vi. If %R or RPD is outside of acceptable limits, what samples are affected? Comments: The project sample 22OTZ-EB is associated with the MSD 320-94998-A-1-C. vii. Do the affected sample(s) have data flags? If so, are the data flags clearly defined? Yes □ No ⋈ N/A □ Comments: Failures in MS/MSD accuracy or precision are considered to only affect the parent sample used to prepare the MS/MSD. The parent

sample for the MS/MSD is not a sample from this work order.

the high analyte recovery.

Consequently, the project sample results are considered unaffected by

CS Site Name: N/A Lab Report No.: 320-94972-1

viii. Is the data quality or usability affected?

	VIII.	Yes □ No ⊠ N/A □ Comments: Data quality and usability are not affected; see above.
d.	_	ates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution ds Only
	i.	Are surrogate/IDA recoveries reported for organic analyses – field, QC, and laboratory samples? Yes \boxtimes No \square N/A \square 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 \square No \boxtimes N/A \square Comments: Sample 220TZ-SS12 exhibited low IDA recovery for 13C2 PFHxA and 13C3 HFPO-DA.
	iii.	Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined? Yes \boxtimes No \square N/A \square Comments: IDA recovery outside of laboratory control limits suggests matrix effects on analyte recovery in the project sample. PFHxA was detected and HFPODA was not detected in $22OTZ$ -SS12. The results are considered estimated, with the detected result qualified "J" and the not-detected result qualified "UJ" for reporting purposes.
	iv.	Is the data quality or usability affected? Yes ⊠ No □ N/A □ Comments: The data quality is affected. The affected results are considered usable with the qualifiers detailed above.
e.	Trip BI	anks
	i.	Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes □ No □ N/A ⊠ Comments: A trip blank was not submitted with this work order because volatile analyses were not requested.
	ii.	Are all results less than LoQ or RL? Yes □ No □ N/A ⊠ Comments: Volatile analyses were not requested with this work order.

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Comments: N/A; volatile analyses were not requested with this work order.

iv. Is the data quality or usability affected?

Yes □ No □ N/A ⊠

Comments: Click or tap here to enter text.

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: Field duplicate sample pairs 22OTZ-SS11/22OTZ-SS12, 22OTZ-SS21/22OTZ-SS22, 22OTZ-SS29/22OTZ-SS30, 22OTZ-SS46/22OTZ-SS47, and 22OTZ-SS40/22OTZ-SS41 were submitted "blind" to the laboratory.

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

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

Where R_1 = Sample Concentration

R₂ = Field Duplicate Concentration

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

Yes ⊠ No □ N/A □

Comments: Field-duplicate sample RPDs were generally within the project objective for soil of 50%, where calculable, except for:

PFDA and PFOS were detected in 22OTZ-SS11 but were not detected in its duplicate 22OTZ-SS12. The results for these analytes in the field duplicate samples are considered estimated with no direction of bias and are qualified "J".

The PFHxA, PFUnA, PFDoA, and PFTriA RPD exceeded 50% in duplicate pair 220TZ-SS29/220TZ-SS30. The results for these analytes are considered estimated with no direction of bias and are qualified "J".

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PFOS was detected in *220TZ-SS47* but not in its duplicate *220TZ-SS46*. This PFOS result was previously qualified due to a method blank detection and does not require further qualification for the RPD failure.

g. Decontamination or Equipment Blanks

i.	Were decontamination or equipment blanks collected?
	Yes ⊠ No □ N/A □
	Comments: The equipment blank 22OTZ-EB was submitted with this
work o	rder.
ii.	Are all results less than LoQ or RL?
	Yes ⊠ No □ N/A □
	Comments: Click or tap here to enter text.
iii.	If above LoQ or RL, specify what samples are affected. Comments: N/A, target analytes were not detected in the equipment blank.
iv.	Are data quality or usability affected?
	Yes □ No □ N/A X
	Comments: Data quality and usability were not affected, see above.

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

a. Are they defined and appropriate?

Yes ⊠ No □ N/A □

Comments: The laboratory applied an "I" flag to the PFOS and/or PFHxS results in project samples 220TZ-SS7, 220TZ-SS9, 220TZ-SS11, 220TZ-SS12, 220TZ-SS14, 220TZ-SS15, 220TZ-SS18, 220TZ-SS21, 220TZ-SS22, 220TZ-SS24, 220TZ-SS27, 220TZ-SS28, 220TZ-SS33, 220TZ-SS37, 220TZ-SS45, and 220TZ-SS47 because the PFOS or PFHxS results were manually integrated. We replaced the lab's "I" flag with our own "J" flag to qualify these data as estimated. Samples 220TZ-SS11, 220TZ-SS12, 220TZ-SS45, and 220TZ-SS47 were previously qualified and did not require further qualification.

Appendix D

Quality Assurance and Quality Control

QUALITY ASSURANCE AND QUALITY CONTROL

Quality Assurance (QA) and Quality Control (QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results provided by SGS North America Inc. (SGS) and Eurofins Environment Testing (Eurofins) for laboratory QC samples and conducted our own QC assessment for the project. We reviewed chain-of-custody (COC) records and laboratory sample receipt forms to check that we followed proper custody procedures, met sample holding times, and kept samples properly chilled (between 0 degrees Celsius [°C] and 6 °C) until analysis. Our QA review procedures allow us to document accuracy and precision of the analytical data and check that analyses were sufficiently sensitive to detect analytes below regulatory standards.

For this report, we reviewed the groundwater report for Eurofins work order (WO) 320-94968-1 and the soil reports for Eurofins WO 320-94972-1 and SGS WO 1227130. The Eurofins and SGS laboratory reports include the case narrative and sample-receipt forms, appended to this report. Details regarding our QA analysis are presented below.

SAMPLE HANDLING

The coolers contained temperature blanks to measure whether samples were kept appropriately cold. In addition, the coolers containing sample jars for volatile analysis contained a trip blank. SGS and Eurofins personnel measured the temperature blanks at the time that samples arrived at their facilities; the temperature blanks were within the proper temperature range upon arrival at the laboratories. The sample receipt form indicated that all samples arrived in acceptable condition.

We hand-delivered one cooler containing soil samples intended for petroleum analysis to the SGS Fairbanks sample receiving facility on December 5, 2022. SGS Fairbanks shipped the samples to their Anchorage laboratory to preform analyses by methods specified on the COC records and received the samples on December 6, 2022.

We shipped the coolers with soil and groundwater samples intended for per- and polyfluoroalkyl substances (PFAS) analysis to Eurofins in Sacramento on December 5, 2022 and the laboratory received them on December 6, 2022. The Eurofins laboratory dated the COC for the groundwater samples as received on December 5, but this was an error as the laboratory report confirmed in their report that samples were received on December 6, 2022.

ANALYTICAL SENSITIVITY

We compared groundwater-sample limits of quantitation (LOQs) to Alaska Department of Environmental Conservation (DEC) Table C. Groundwater-Cleanup Levels and soil samples to DEC Table B1. Method Two - Soil Cleanup Levels Table (Arctic Zone Human Health). LOQs were less than DEC-established cleanup levels, where applicable. See the laboratory data review checklist (LDRC) for additional details.

We submitted a trip blank with our samples to be analyzed for volatile constituents (gasoline range organics [GRO], benzene, toluene, ethylene, xylenes [BTEX]) to determine if cross-contamination among samples or contamination from outside sources may have occurred during shipment or storage. GRO was detected in the trip blank submitted with WO 1227130. All of the associated samples contained similar GRO detections and are considered artifacts of external contamination. These results were flagged 'UB' in the summary table.

The laboratory analyzed a method blank with each sample batch and analytical method to detect analyte carryover during analysis. PFUnA, PFTriA, and PFOS were detected in a method blank associated with WO 320-94972-1. Samples 22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46, and 22OTZ-SS47 had detections of PFUnA at concentrations within ten times that of the method blank detection. PFTriA was detected at an estimated concentration, less than the reporting limit, in samples 22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46, and 22OTZ-SS47. PFOS was detected in sample 22OTZ-SS47 at a concentration within ten times the concentration detected in the method blank. GRO were detected in the method blank associated with samples 22OTZ-SS26, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS29, 22OTZ-SS30, 22OTZ-SS31, 22OTZ-SS32, 22OTZ-SS33, 22OTZ-SS34, and the trip blank. The GRO concentrations detected in these samples were reported below the LOQ. The affected results are assumed to be artifacts of laboratory contamination and are flagged 'UB' at the detected result of reporting limit (whichever is greater). Other samples associated with the method blank detections were unaffected; see the LDRCs for additional details.

Additionally, we submitted an equipment blank with WO 320-94972-1 to determine if cross-contamination from our soil sampling procedure may have occurred. There were no detections in the equipment blank.

ACCURACY

The laboratory assessed the accuracy of its analytical procedures by analyzing laboratory control samples (LCS) and LCS duplicates (LCSD). LCS/LCSD analysis allows the laboratory

to evaluate their ability to recover analytes added at a known concentration in clean aqueous matrices. LCS/LCSD samples were reported for GRO, BTEX, DRO, and RRO, but only an LCS for PAHs analysis in WO 1227130. An LCS/LCSD was submitted for PFAS analysis in WO 320-94972-1 and WO 320-94968-1. Laboratory accuracy was also measured for each sample by assessing the recovery of surrogates or isotope dilution analytes (IDA) added to individual project samples. The laboratory assessed accuracy and precision of the BTEX and PAH analyses in WO 1227130 and PFAS in WO 320-94972-1 and WO 320-94968-1 using a matrix spike (MS) and matrix spike duplicate (MSD) samples. These samples allow the laboratory to assess whether the matrix of the samples is impacting the performance of the method. Failures in MS/MSD detection accuracy or precision only affect data in the associated matrix parent sample.

The LCS/LCSD recoveries were within laboratory control limits in each work order.

IDA and surrogate recoveries were in range for each reported analyte except 13C2 PFHxA and 13C3 HFPO-DA in sample 22OTZ-SS12 in WO 320-94972-1. The corresponding analyte PFHxA was detected in the sample while HFPODA was not. The results are considered estimated, with the detected result qualified 'J' and the not-detected result qualified 'UJ' for reporting purposes. IDA recovery was below the acceptable range for 13C2-PFDoA, 13C2-PFTeDA, d3-NMeFOSAA, and d5-NEtFOSAA in sample MW10-09 from WO 320-94968-1. The analytes PFDoA, PFTriA, PFTeA, NMeFOSAA, and NEtFOSAA are considered estimated and have been flagged 'UJ'. see the associated LDRC for further details.

MS/MSD recoveries were reported for all three WOs. There were some recoveries outside of the control limits, however he parent samples used to conduct the MS/MSD analyses were not part of our project sample set and therefore the results are not affected by the recovery failures. See the associated LDRC for additional details.

PRECISION

We collected field duplicate samples to evaluate data precision and reproducibility of our sampling techniques. We calculated the relative percent difference (RPD) between the respective field duplicates, where RPD is the difference between the primary sample results and those of its field duplicate, divided by the mean of the two.

The RPD for PFHxA, PFUnA, PFDoA, and PFTriA exceeded the 50% limit in duplicate pair 22OTZ-SS29/22OTZ-SS30 in WO 320-94972-1. The results for these analytes are considered estimated and are qualified 'J'. PFDA and PFOS were detected in sample 22OTZ-SS11 but not in its duplicate 22OTZ-SS12. The results are considered estimated and are flagged 'J'. Additionally, PFOS was detected in sample 22OTZ-SS47 but not in its duplicate 22OTZ-

SS46. This PFOS result was previously flagged due to a method blank detection, so it does not require further qualification.

We also used RPD calculations to evaluate laboratory analytical precision. The LCS/LCSDs provide information regarding the reproducibility of laboratory procedures and are therefore a measure of the laboratory's analytical precision. The MS/MSDs provide information regarding the reproducibility of laboratory procedures in the sample matrix, and therefore measure the analytical precision in the field samples.

The RPD results for the LCS/LCSD and MS/MSD samples were within laboratory QC limits.

DATA QUALITY SUMMARY

By working in accordance with our proposed scope of services, we consider the samples we collected to be representative of site conditions at the locations and times they were obtained. Based on our QA review, we did not reject any data due to QC failures. For this project, the quality of the analytical data does not appear to have been compromised, and those results affected by QC anomalies are qualified with appropriate flags.

Appendix E

Conceptual Site Model

CONTENTS

- Scoping Form
- Graphic Form

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name:	DOT&PF Kotzebue Airport - Sitewide PF	AS		
File Number:	N/A			
Completed by:	Shannon & Wilson - Note: assessed for P	FAS contamina	tion	
about which expo summary text about characterization v	be used to reach agreement with the osure pathways should be further involut the CSM and a graphic depicting work plan and updated as needed in	vestigated du g exposure pa later reports.	ring site charact tthways should b	erization. From this information
	ions: Follow the italicized instruct	ions in each	section below.	
1. General In Sources (check p	formation: potential sources at the site)			
☐ USTs ☐ ASTs ☐ Dispensers/fue		☐ Vehicles ☐ Landfill ☐ Transfor	rmers	
Drums		⊠ Other:	Firefighting training	ng activities
Release Mechan	isms (check potential release mech	anisms at the	site)	
⊠ Spills	· -	⊠ Direct d	ischarge	
⊠ Leaks		☐ Burning		
		☐ Other:		
Impacted Media	(check potentially-impacted media	at the site)		
Surface soil (0		⊠ Groundy	water	
Subsurface so	<u> </u>	Surface Surface		
□ Air	· · · · · · · · · · · · · · · · · · ·	⊠ Biota		
Sediment		Other:		
Receptors (check	k receptors that could be affected by	contaminati	on at the site)	
Residents (adu	alt or child)	⊠ Site visi	tor	
	r industrial worker	⊠ Trespass	ser	
	worker	☐ Recreati	onal user	
⊠ Subsistence ha	arvester (i.e. gathers wild foods)	☐ Farmer		
⊠ Subsistence co	onsumer (i.e. eats wild foods)	Other:		

	Exposure Pathways: (The answers to the following quexposure pathways at the site. Check each box where t	_	
/	Direct Contact - 1. Incidental Soil Ingestion		
	Are contaminants present or potentially present in surface soil b Contamination at deeper depths may require evaluation on a sit	e ground surface?	
	If the box is checked, label this pathway complete:	Complete	
	Comments:		
	PFOS and PFOA were detected in surface soil near the OTZ Crosswind Rur than the DEC Human Health - Arctic Zone cleanup levels but greater than migration-to-groundwater cleanup levels.		
	2. Dermal Absorption of Contaminants from Soil		
	Are contaminants present or potentially present in surface soil b (Contamination at deeper depths may require evaluation on a sit		e ground surface?
	Can the soil contaminants permeate the skin (see Appendix B in	the guidance document)?	X
	If both boxes are checked, label this pathway complete:	Complete	
	Comments:		
	Contaminants in soil and groundwater are less than the applicable DEC cl These levels are assumed to be protective of human health. As a result, he considered insignificant.	•	
-	ngestion - 1. Ingestion of Groundwater		
	Have contaminants been detected or are they expected to be determined or are contaminants expected to migrate to groundwater in the f		X
	Could the potentially affected groundwater be used as a current source? Please note, only leave the box unchecked if DEC has dwater is not a currently or reasonably expected future source of to 18 AAC 75.350.	determined the ground-	X
	If both boxes are checked, label this pathway complete:	Complete	
	Comments:		
	We note it is unlikely groundwater is used as a drinking water source in Kepotential exists and we consider this pathway potentially complete. PFOS than the DEC groundwater cleanup level in MW10-04 and MW10-09, near DEC drinking water action level for PFOS and PFOA in MW10-04.	and PFOA were detected less	

2. Ingestion of Surface Water Have contaminants been detected or are they expected to be detected in surface water, \overline{X} or are contaminants expected to migrate to surface water in the future? Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). If both boxes are checked, label this pathway complete: Incomplete Comments: Surface water bodies are often used as a drinking water source for the northern villages in Alaska. However, we note the surface water bodies used by the City of Kotzebue for water distribution are unlikely to be affected by AFFF use at the airport due to elevation and distance. 3. Ingestion of Wild and Farmed Foods Is the site in an area that is used or reasonably could be used for hunting, fishing, or $\overline{\times}$ harvesting of wild or farmed foods? Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance $\overline{\times}$ document)? Are site contaminants located where they would have the potential to be taken up into \overline{X} biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) If all of the boxes are checked, label this pathway complete: Complete Comments: c) Inhalation-1. Inhalation of Outdoor Air Are contaminants present or potentially present in surface soil between 0 and 15 feet below the \overline{X} ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) Are the contaminants in soil volatile (see Appendix D in the guidance document)? If both boxes are checked, label this pathway complete: Incomplete Comments:

2. Innalation of Indoor Air		
Are occupied buildings on the site or reasonably expected to be the site in an area that could be affected by contaminant vapors or vertical feet of petroleum contaminated soil or groundwater; non-petroleum contaminted soil or groundwater; or subject to ' which promote easy airflow like utility conduits or rock fracture	s? (within 30 horizontal ; within 100 feet of 'preferential pathways,"	×
Are volatile compounds present in soil or groundwater (see Apdocument)?	pendix D in the guidance	
If both boxes are checked, label this pathway complete:	Incomplete	
Comments:		

3.	Additional Exposure Pathways:	(Although there are no	definitive questions provided in this section,
	these exposure pathways should also be	considered at each site.	Use the guidelines provided below to
	determine if further evaluation of each p	pathway is warranted.)	

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- o Climate permits exposure to groundwater during activities, such as construction.
- o Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

	ck the box if further evaluation of this pathway is needed:	\boxtimes
Comm	ents:	1
 Inhalat	ion of Volatile Compounds in Tap Water	
	lation of volatile compounds in tap water may be a complete pathway if:	
0	The contaminated water is used for indoor household purposes such as showering, l washing.	laundering, and dish
0	The contaminants of concern are volatile (common volatile contaminants are listed guidance document.)	in Appendix D in the
_	oundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway becaus luring normal household activities is incorporated into the groundwater exposure equat	
Che	ck the box if further evaluation of this pathway is needed:	
Comm	ents:	

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter PM10). Particles of this size are called 0 respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the

inhalation of particulates is incorporated into the soil exposure equation.	
Check the box if further evaluation of this pathway is needed:	X
Comments:	_
PFAS have been detected in surface soil near the OTZ Crosswind Runway.	
Direct Contact with Sediment	

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

Climate permits recreational activities around sediment. 0

Check the box if further evaluation of this pathway is needed:

The community has identified subsistence or recreational activities that would result in exposure to the 0 sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct

contact with sediment.			

Comments:	
ediment has not been assessed at the site.	

 $\overline{\times}$

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: DOT&PF Kotzebue Airport Sitewide PFAS	Instructions: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.									
Completed By: Shannon & Wilson		use controls when describing pat	iiways	•					_	
Date Completed: February 2023				(5) Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors,						
(1)	(3)	(4)	"F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure. Current & Future Receptors							
Check the media that could be directly affected by the release. For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.	Check all exposure media identified in (2).	Check all exposure Check all pathways that could be complete. The pathways identified in this column must agree with Sections 2 and 3 of the Human Health CSM Scoping Form.								
Media Transport Mechanisms	Exposure Media	Exposure Pathway/Route		ldren) or rkers	or recreations, trespasses Construction workers Farmers or subsistence			Sonsume		
Surface Soil V Migration to subsurface check soil Soil (0-2 ft bgs) Check soil V Migration to groundwater check groundwater Check air			Residents	Commercial or Site visitors	Constructional users	Farmers or subsist	Subsistence cong.	Other		
Volume Volume		Incidental Soil Ingestion		1 1	1					
Uptake by plants or animals check biota	soil V	Dermal Absorption of Contaminants from Soil		1 1	ı					
Other (list):		Inhalation of Fugitive Dust	C/F	C/F C/F	C/F	C/F	C/F			
✓ Direct release to subsurface soil check soil Subsurface ✓ Migration to groundwater check groundwater Soil Volatilization check air		Ingestion of Groundwater	F	1 1	1					
(2-15 ft bgs) Uptake by plants or animals check biota	groundwater .	Dermal Absorption of Contaminants in Groundwater	I	1 1	I					
Other (list):	Inhalation of Volatile Compounds in Tap Water									
Ground- Direct release to groundwater check groundwater Check air		Inhalation of Outdoor Air								
water ✓ Flow to surface water body check surface water ✓ Flow to sediment check sediment	air	Inhalation of Indoor Air								
✓ Uptake by plants or animals check biota		Inhalation of Fugitive Dust	I	I I	I	I	I			
Other (list):		ngestion of Surface Water								
Direct release to surface water check surface water Volatilization check air					+					
Surface Volatilization check air Volatilization check sediment		Dermal Absorption of Contaminants in Surface Water			-					
Uptake by plants or animals check biota Other (list):		nhalation of Volatile Compounds in Tap Water								
Direct release to sediment check sediment	sediment / [Direct Contact with Sediment	C/F	C/F C/F	C/F	C/F	C/F			
Sediment V Resuspension, runoff, or erosion check surface water V Uptake by plants or animals check biota Other (list):		Ingestion of Wild or Farmed Foods	C/F	C/F C/F	C/F	C/F	C/F			

Important Information About Your Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent

such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland