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FINAL

CONTAMINATED SOILS MANAGEMENT PLAN
Ralph Wien Memorial Airport Improvements Project
KOTZEBUE, ALASKA

SHANNON & WILSON

April 2023

Shannon & Wilson No: 109531-003

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Submitted To: Alaska Department of Transportation & Public Facilities
2301 Peger Road
Fairbanks, Alaska 99709
Attn: William Sexton

Subject: FINAL CONTAMINATED SOILS MANAGEMENT PLAN, RALPH WIEN MEMORIAL AIRPORT
IMPROVEMENTS PROJECT, KOTZEBUE, ALASKA

Shannon & Wilson has prepared this Contaminated Soils Management Plan (CSMP) 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, authorized by DOT&PF via notice to proceed (NTP) on November 15, 2022, under Professional Services Agreement Number 25-19-013 *Per- and Polyfluorinated Substances (PFAS) Related Environmental & Engineering Services*.

This CSMP shall be used as guidance for contractors handling, transporting, and storing potentially contaminated materials related to the Ralph Wien Memorial Airport (OTZ) Runway 18/36 (crosswind runway) Improvements Project in Kotzebue, and was prepared by the undersigned.

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

Sincerely,

SHANNON & WILSON, INC.

Justin Risley
Engineering Staff

Kristen Freiburger
Associate

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ACRONYMS

°F	degree Fahrenheit
AAC	Alaska Administrative Code
DEC	Alaska Department of Environmental Conservation
AFFF	aqueous film forming foam
ARFF	aircraft rescue and firefighting
BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	Code of Federal Regulations
COPC	contaminants of potential concern
CSMP	Contaminated Soils Management Plan
cy	cubic yards
DOT&PF	Alaska Department of Transportation & Public Facilities
DRO	diesel range organics
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
GRO	gasoline range organics
ISM	Incremental Sampling Methodology
MTGW	Migration to Groundwater
OTZ	Ralph Wien Memorial Airport
PAH	polynuclear aromatic hydrocarbon
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
PID	photoionization detector
ppm	parts per million
QEP	qualified environmental professional
QS	qualified sampler
S&W	Shannon & Wilson, Inc.

1 INTRODUCTION

This Contaminated Soils Management Plan (CSMP) provides direction for managing contaminated soils during the Alaska Department of Transportation and Public Facilities (DOT&PF) Ralph Wien Memorial Airport (OTZ) Improvements Project in Kotzebue, Alaska. Where a conflict exists between this CSMP and project plans and specifications, the requirements of the plans and specifications shall prevail.

The Runway Improvement Project includes upgrades to runway lighting on Runway 18/36 (crosswind runway). Based on our understanding of the project, ground-disturbing activities are limited to areas immediately surrounding the old runway lights and the new runway lights to be installed. We also understand the only materials that will be disturbed are soils; this plan does not address concrete or asphalt disturbance.

2 SCOPE

This CSMP includes procedures for the handling and storage of per- and polyfluoroalkyl substances (PFAS) and petroleum contaminated material from soil excavated for the proposed upgrades. This CSMP details transport and stockpiling of potentially contaminated media, equipment decontamination, health and safety, and reporting procedures. The procedures contained in this CSMP do not preclude additional site- or project-specific requirements required to protect the health and safety of workers. The Contractor is responsible for performing due diligence to ensure the safety of their employees.

This CSMP applies to areas with known contamination at OTZ, as identified in Shannon & Wilson's (S&W's) report titled *DOT&PF Statewide PFAS Kotzebue Crosswind Runway 18/36 Site Characterization Report,* dated April 2023. A copy of this report is attached (Appendix A). If additional information regarding PFAS or other contamination is provided to DOT&PF during the project, DOT&PF will inform the Contractor of the new information. No changes will be made to this CSMP nor implemented in the field without first notifying and obtaining approval from the Alaska Department of Environmental Conservation (DEC).

Due to the presence of PFAS- and fuel-contaminated soils present within the project area, the Contractor will have environmental field activities performed by a Qualified Environmental Professional (QEP) or Qualified Sampler (QS), as defined by Alaska Administrative Code (AAC) 18 AAC 75.333. The selected Contractor that will be conducting

the airport upgrades will provide DOT&PF and DEC a list of names and qualifications for the project QEP and/or QS prior to the start of the project.

3 SITE DESCRIPTION

Kotzebue is on northwestern coast of Alaska. The OTZ is located at 100 Airport Access Road in Kotzebue, Alaska. The geographic coordinates of the OTZ are 66.8907° North and 162.6024° West (Appendix A – Figure 1). The airport is state-owned and operated by DOT&PF.

The OTZ is located within the arctic zone, which is underlain by a continuous permafrost layer that acts as a barrier to prevent downward migration of surface water to groundwater. The active layer of seasonally frozen surficial soil ranges from 0.5 to 4 feet thick.

Kotzebue lies within the Baldwin Peninsula section of the Kobuk-Selawik Lowland physiographic province of Alaska. The section is a rolling, lake-dotted lowland containing hills as high as 350 feet. Typical land features include thaw lakes, sluggish meandering streams with side sloughs, and pingos, which are domed shaped mounds that consist of a layer of soil over a core of ice that only occur in permafrost areas. The Baldwin Peninsula section is underlain by morainal, stream, and lake deposits of unknown thickness (Wahrhaftig 1965).

4 SUMMARY OF KNOWN CONTAMINATION

The OTZ is a Title 14, Code of Federal Regulations (CFR), Part 139 certified airport. Part 139 certification is administrated by the Federal Aviation Administration (FAA) and serves to ensure air transportation safety by requiring, among other things, the provision of aircraft rescue and firefighting (ARFF) services.

Aqueous film forming foam (AFFF) is an FAA-approved extinguishing agent for ARFF response at Part 139 airports. AFFF is a surfactant known to contain PFAS that effectively and rapidly suppresses flammable-liquid fires. PFAS are persistent in the environment and human body, causing potential adverse health effects. Historical use of AFFF during ARFF training and/or emergency response activities at OTZ may have led to the known PFAS contamination of environmental media at and near these locations (Appendix A).

Based on information provided by DOT&PF for the initial PFAS investigation, there is one known AFFF release area at the southern end of the crosswind runway. PFOS and PFOA

were detected in the groundwater north of the OTZ main runway; therefore, additional ARFF releases are suspected (Appendix A – Figure 5). The DEC contaminated sites website (visited February 8, 2023) lists several "active" contaminated sites near the airport terminal. However, these identified sites are located over 1,000 feet away and due to the distance between these sites and the planned excavations, these sites are unlikely to affect the crosswind runway improvements.

In December 2022, S&W performed a preliminary investigation to characterize soil for PFAS and additional Contaminants of Potential Concern (COPCs). These efforts were conducted to provide analytical results to the Contractor prior to the improvement project at the OTZ. S&W's areas of investigation focused near the crosswind runway lighting areas where excavation is planned. S&W identified multiple PFAS in the surface soil in these investigation areas, including perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA). PFOS and/or PFOA were detected in several locations at concentrations exceeding the current DEC soil Migration to Groundwater (MTGW) Cleanup Levels (Figure 1). S&W also identified diesel range organics (DRO), residual range organics (RRO), benzene, and toluene in soil samples at concentrations below the DEC MTGW Cleanup Levels (Appendix A – Figure 4). Many of these locations also exceeded the DEC MTGW Cleanup Level for PFOS. Due to the presence of the continuous permafrost layer, transport of contaminants to groundwater is unlikely, although we note that surface water may mobilize contaminants in Kotzebue.

While the current DEC MTGW Cleanup Levels will be used in this CSMP to classify and segregate varying levels of PFAS contamination present in soils at the OTZ, the DEC Technical Memorandum *Establishing Arctic Zone Cleanup Levels* dated April 4, 2019, states that the current MTGW Cleanup Levels are not enforced in areas of the state where the continuous permafrost layer acts as a barrier to prevent downward migration of contaminants to groundwater. Thus, the analytical soil results were also compared to and found to be below the current DEC Arctic Zone – Human Health Cleanup Levels. However, we note that DEC is currently in the process of revising the PFAS Cleanup Levels for both soil and groundwater. Due to this pending change, soils with detectable PFAS should either be returned to the excavation it was removed from or an area with similar PFAS concentrations (as described in Section 6 below), or temporarily stockpiled with the understanding that re-use or disposal will require DEC approval and may require offsite disposal. Further discussion regarding stockpiles with regards to surface water drainage is provided in Section 6.

The S&W analytical report provided as Appendix A compares results to both the DEC MTGW and Arctic Zone – Human Health Cleanup Levels. The analytical report provides

preliminary information to help the Contractor develop an approach to segregating contaminated media during construction. It is the Contractor's responsibility to adequately characterize soil generated during this project for waste-disposal purposes. Our report includes maps that display the analytical results from the December 2022 preliminary sampling.

5 CONTAMINANTS OF POTENTIAL CONCERN

Based on the information available for this project, the primary COPCs for the site are PFOS, DRO, and RRO. However, this CSMP includes sampling for fuel analyses gasoline range organics (GRO), benzene, toluene, ethylbenzene, and xylenes (BTEX), and polynuclear aromatic hydrocarbons (PAHs) as well as the full list of PFAS analytes for the given analytical method. We note that part of the improvement project will include ground disturbances at a known AFFF training area.

Soils identified as potentially contaminated with COPCs (refer to Section 6.1 for determination of potentially contaminated soils) will be stockpiled based on the sections below; samples collected from the stockpile/s will be analyzed for GRO, DRO, RRO, BTEX, PAH, and PFAS to understand disposal and/or treatment requirements. The analytical results will be compared to the DEC 18 AAC 75.341 Table B1. Method Two and Table B2. Method Two Arctic Zone – Human Health Cleanup Levels to determine if the soils will require removal from the site or if the soils can be stockpiled at the site.

6 SEGREGATION OF CONTAMINATED SOIL

Design plans for the airport improvements project describe replacing the crosswind runway lights, including removal of the old lights. The design plans assume some of the excavated material will be reused in the areas they were obtained. Excess soils that are not planned for reuse will be segregated based on criteria defined in this section.

Soil classification/segregation is necessary to avoid spreading excess soils from areas with higher levels of contaminants to areas of lower contaminant concentrations or areas where contaminants have not been detected. Furthermore, segregation assists with preventing the comingling of contaminated and non-contaminated soils.

Field screening for volatile fuel contaminants will be limited to areas along the crosswind runway within 100 feet of soils with visual staining or fuel odor and 100 feet from the southernmost excavation where petroleum contaminants were detected. Excavated soils

within these buffer areas will be field screened with a photoionization detector (PID) to assess the presence of volatile fuel contaminants for soil segregation purposes. Additional details regarding the field screening method are provided in the following section.

Unlike fuel-contaminated soil, field-screening methods are not available for PFAS-contaminated soil to assist in stockpile segregation. Therefore, the excavation areas will be classified based the initial PFAS analytical results (Appendix A – Figure 3). Figure 1, attached, presents three levels of PFAS contamination at the site: (1) PFOS/PFOA detected above the MTGW Cleanup Level, (2) PFAS/PFOA detected below the MTGW Cleanup Level, and (3) PFOS/PFOA not detected. We note that for locations where PFOS and PFOA were not detected, other PFAS were detected; however, regulatory levels have not been promulgated for these analytes.

If excess soils do not indicate the presence of fuels, the soils will be used as fill in areas with similar PFOS/PFOA classification/contamination. Excess soils, and soils that indicate the presence of fuel, will be stockpiled in accordance with Section 9. Soils from areas where PFOS and/or PFOA were detected previously should be segregated and stockpiled separately from soils from areas where PFOS and PFOA were not detected. Stockpiles of excess soils with detectable PFAS concentrations will require the approval of DEC for re-use or disposal and may require offsite disposal. This should be taken into consideration if fuel-contaminated soils are encountered in different areas and stockpiling is required. Stockpiles will be built and maintained in accordance with Section 9.

6.1 Field Screening for Fuel Contaminants

The preliminary S&W investigation for this project included collecting analytical samples from soils located within a known ARFF training area. The results from the investigation identified five samples that contained detectable quantities of RRO and/or other fuel components. Based on this information, field screening for fuel contaminants will be limited to earth disturbing activities within 100 feet from the southernmost excavation and within 100 feet of soils with visual staining or fuel odor.

The Contractor will provide a QEP/QS to field screen excavated soils. The QEP/QS will use a hand-held PID equipped with a 10.6 electron volt lamp to detect volatile fuel compounds. The PID measures total volatile compounds present as vapors, which is a semi-quantitative indication of hydrocarbons present. The PID will be calibrated daily, or more often as needed, to 100 parts per million (ppm) isobutylene standard according to the manufacturer's instructions. The QEP/QS will be trained and experienced in the calibration, operation, routine maintenance, and troubleshooting of the PID, as well as interpreting PID results.

The QEP/QS will collect field screening samples at a frequency of 1 for every 10 cubic yards (cy) of excavated soil. Field screening samples will be collected using a clean, stainless-steel spoon from freshly uncovered soil (directly from the excavator bucket or side-cast material). The soil will be placed in a clean, resealable plastic bag, filling it one-third to one-half full and quickly sealing it closed. The field screening samples will be analyzed using the heated-headspace method defined below.

The QEP/QS will allow the headspace to develop in the bag by warming it to at least 40 degrees Fahrenheit (°F) for 10 minutes to one hour and shaking the bag for 15 seconds at the beginning and end of the period to assist volatilization. The QEP/QS will open the bag just enough to allow insertion of the PID probe about one-half the headspace depth, taking care to avoid uptake of water droplets and soil particles. The QEP/QS will record the maximum PID reading obtained, noting any erratic meter response at high organic-vapor concentrations or conditions of elevated headspace moisture.

With respect to fuel contaminants, soils will be categorized as potentially clean or potentially contaminated based on the following criteria.

- Potentially clean: soil that does not exhibit visible staining or fuel odor, and headspace field-screening results are less than 10 ppm.
- Potentially contaminated: soils with visible staining, fuel odor, or headspace field-screening results greater than 10 ppm.

Potentially clean soils can be reused in the originating excavation area or in another area with similar PFOS/PFOA concentrations (Figure 1). Potentially fuel-contaminated soils will be stockpiled and sampled in accordance with Section 9.

In the unlikely event that petroleum product is observed on water (i.e. a sheen), the Contractor must remove the sheen using sorbent pads or containment booms, to the extent practicable.

7 EXCAVATED SOIL STORAGE AND CHARACTERIZATION

Potentially clean soils that require temporary storage prior to replacement in the excavation or transportation to the designated stockpile area will be placed on a liner near the excavation origin. Soil shall be returned to the excavation area or transported to the designated stockpile area within 24 hours of completing work at the specific excavation.

Excess potentially fuel-contaminated soils will be stockpiled as described in Section 9. The staging areas identified in Appendix B were selected by the project team and will be used to stockpile excess material. Contractors shall document the quantity of soil returned to each excavation area, used as fill for project drainage upgrades, or stockpiled/spread.

The analytical results included in Appendix A are not to be used for final waste characterization purposes. The Contractor shall perform additional analytical sampling of the stockpiles for waste-characterization purposes in accordance with Section 10. The Contractor shall provide the stockpile analytical results to DOT&PF and DEC. Materials exceeding regulatory limits for any analyte shall require DEC approval to transport to a disposal or treatment facility. Soils with analytical results below the regulatory limits may be used as fill or stockpiled in the staging areas defined in Appendix B, pending DEC approval. The Contractor shall contact DEC to request the current regulatory limits at the time the project occurs.

8 EXCAVATION PROCEDURES FOR SOILS

1. Excavation activities shall be performed in a manner that minimizes worker exposure to contaminants in soil and does not result in a release of contamination or unacceptable exposure risk to human health and/or the environment.
2. A designated work area shall be established around the known PFAS contamination excavation areas. Potentially clean soil that cannot be backfilled at the original excavation area will be transported to the designated fill area. Trucks will enter and exit the work area through a single-entry point.
3. If excavated soil needs to be temporarily stored prior to returning the soil to the original excavation, it will be placed on a liner near the excavation origin. Soil shall be returned to the excavation area or be transported to the appropriate storage site within 24 hours of completing work at the specific excavation.
4. Equipment leaving work areas where potentially fuel-contaminated soils are present will be decontaminated before driving to the stockpile area. If equipment contacts contaminated soil in the stockpile area, it will also be decontaminated prior to leaving the stockpile area. See the decontamination procedures below for a description of procedures in Section 11.
5. No contaminated soil will be moved into a zone of lesser contamination unless the contaminated soil is placed on a suitable liner (see Exhibit 9-1).
6. If dewatering is required, the Contractor is responsible for obtaining the necessary permits and approval for dewatering and/or temporary water use from DEC and Alaska

Department of Natural Resources. The Contractor shall include best management practices for dewatering PFAS contaminated groundwater, if encountered.

7. Operators will work from the safety of their respective equipment cabs. Manual labor to excavate soil is not expected but installing the buried fence fabric does require handwork. Personnel will wear proper personal protective equipment and follow decontamination procedures defined in Section 11.

9 STOCKPILE PROCEDURES

This section describes the stockpile general handling requirements listed in 18 AAC 75.370.

1. Stockpiles will be located within staging areas, or other areas approved by the OTZ Airport Manager, DOT&PF, and DEC.
2. Stockpiles must be at least 100 feet from surface waters and should not be placed within the DEC Drinking Water Program – Drinking Water Protection Zones.
3. Excavated material must be segregated based on the criteria established in Section 6.
4. Incremental Sampling Methodology (ISM) soil samples shall be collected from the base of each stockpile prior to liner installation. ISM soil samples shall also be collected after stockpile decommissioning. ISM samples will be collected by dividing the stockpile footprint into equivalent subunits, collecting incremental samples from each subunit, and compositing the sample into laboratory provided sample containers. Refer to the Interstate Technology Regulatory Council *Technical/Regulatory Guidance – Incremental Sampling Methodology (ISM) Update*, dated October 2020, for additional information regarding ISM sampling. Samples should be submitted for the following analyses:
   - PFAS by Environmental Protection Agency (EPA) Method 537M, or another method required by DEC at the time of sampling. We note that EPA Method 1633 may be finalized at the time the construction activities occur.
   - GRO by AK101
   - DRO by AK102
   - RRO by AK103
   - BTEX by EPA Method 8260
   - PAHs by EPA Method SW8270-SIM.
5. Contractor shall report the post-stockpile ISM sample results to DOT&PF and DEC.
6. Stockpiles will be constructed according to the diagram in Appendix C.
7. Stockpiles must be constructed using bottom and top impermeable liners. The bottom liner will meet the general strength and thickness requirements as described in Table D found in 18 AAC 75.370 and summarized in Exhibit 9-1 below. The top liner will be a minimum 11-mil product or equivalent.

8. Wattles (dry straw or similar commercial or locally constructed absorbents) will be placed at the base of each stockpile directly in contact with the soil. Wattles will be overlapped by two feet and tied together. Edges of the bottom liner will fold back up and over the wattle and stockpile base by a minimum of five feet to contain any settlement and potential leaks from within. The top liner will overlap the bottom liner's edge by at least three feet.
9. During periods of inactivity or when excavation is complete, stockpile liners and covers will be lashed down with ropes and anchored with 60-pound sandbags, replaced as needed. Efforts shall be made to minimize precipitation from entering the stockpile.
10. Stockpiles shall be adequately marked. Traffic safety cones or candlestick bollards are required around the perimeter of the stockpiles. Four Public Health and Safety Signs (one per side) will be placed around the perimeter of each stockpile at equidistant spacing. The signs will have a durable backboard and be weatherproof with letters readable from 20 feet away showing the following: contaminant/s of concern, point of contact for the Contractor (name and phone number), point of contact for the DOT&PF (name and phone number), state project number, and generation date. Signs will be maintained in readable condition and shall remain in place for the duration of stockpile storage use. Contractors shall use the signage template included in Appendix C.
11. Stockpiles will be regularly inspected and maintained to ensure the covers remain intact, excessive water does not accumulate, wattles remain in place, signs are legible and in place, and safety warning devices (traffic cones or bollards) are present and upright. The Contractor will inspect the stockpiles daily during daily during accumulation. Once stockpile accumulation is complete, the DOT&PF Project Inspector shall approve the stockpile construction specifications and site security. Once approval is given by the inspector, stockpile inspections will occur once weekly. After the project's completion, the stockpile will be inspected by Deadhorse DOT&PF staff twice a month and after storm/wind events. Inspections will be documented, and records sent biannually to the DOT&PF Statewide Aviation PFAS Program Manager, as described in the Reporting Procedures in Section 13. Any access openings made to the liner (e.g., accidental tears, etc.) shall be immediately sealed off to prevent wind and rain intrusion.
12. DOT&PF does not anticipate leachate will be generated at the stockpile during rain events because contaminated material will be securely covered. In the unlikely event that leachate does occur, it will be pumped into containers within the immediate stockpile area. DEC will be notified of any leachate accumulation.

Exhibit 9-1: 18 AAC 75 Table D, Bottom Liner Specifications; Long-term Storage of Petroleum-Contaminated Solids (180 days to two years)

Method	Coated Fabric	Extruded Fabric
Cold Crack (ASTM D 2136-02(2012), updated 2012)	-60°F	-60°F
Black carbon content (ASTM D 1603-12, updated May 2012)	two percent or greater	two percent or greater
Tensile strength (ASTM D 751-06(2011), updated 2011)	300 pounds (warp)	N/A
Mullen burst (ASTM D 751-06(2011), updated May 2011)	500 pounds per square inch (psi)	N/A
One-inch tensile strength (ASTM D 882- 12, updated August 2012)	N/A	45 pounds (warp)
One inch elongation MD (machine direction)	N/A	625 percent
Nominal thickness	20 mil	20 mil
Oil resistance (ASTM D 471-12a, updated December 2012)	No signs of deteriorate and more than 80 percent retention of tensile and seam strength after immersion for 30 days at 73°F	No signs of deteriorate and more than 80 percent retention of tensile and seam strength after immersion for 30 days at 73°F

10 DISPOSAL OF CONTAMINATED MEDIA

The analytical results included in the S&W Report (Appendix A) are not to be used for final waste-characterization purposes. That preliminary sampling was conducted to assist with project planning and to support development of this CSMP. Potentially fuel-contaminated soil shall undergo additional sampling for waste characterization. Discrete samples will be collected from the stockpiles in accordance with the DEC *Field Sampling Guidance* (January 2022). The frequency of field screening samples and analytical samples to be collected will be consistent with Table 2A of the DEC *Field Sampling Guidance*. Analytical samples will be analyzed by the methods described in Section 9 of this plan. The Contractor shall seek approval from DEC prior to transporting the media to a waste disposal facility or to spread the soils.

If stockpile characterization analytical results show PFOS, PFOA, or other COPCs above the associated DEC regulatory limits at the time the project is completed, the soil will be disposed of at an environmental waste disposal facility or treated at an environmental treatment facility. The Contractor will coordinate approval to transport and disposal of contaminated media with DEC, DOT&PF, and the approved facility.

If stockpile analytical results show PFOS, PFOA, and other COPCs below the DEC regulatory limits at the time the project is completed, the Contractor and/or DOT&PF shall seek approval from DEC prior to spreading the material, noting the volume and final destination. The Contractor shall submit a report to DEC with the stockpile characterization analytical results. As mentioned above, soils must be spread in areas of equal or greater PFAS or other COPC concentrations.

11 DECONTAMINATION PROCEDURES

Contractors will adhere to the following decontamination guidelines to minimize cross-contamination.

1. The excavation of soils contaminated with PFOS above the MTGW Cleanup Level will be performed last to reduce cross-contamination risks.
2. Heavy equipment or hand tools that come in contact with contaminated material will be brushed to remove visible soil before leaving the stockpile storage site or work area boundaries. At the conclusion of work in each area, Contractors will decontaminate equipment by using a brush to remove as much soil from the equipment or tooling, as practicable.
3. The Contractor will decontaminate the dump truck bed after the final load from each contaminated-media excavation area before moving into an area known to be free of contaminants or contain contaminants of lesser concentration.
4. If the Contractor identifies evidence of additional contamination, such as fuel odors or staining, the Contractor will report this to DOT&PF and decontaminate heavy equipment prior to leaving the work area. The Contractor shall adhere to field screening procedures described in Section 6.
5. Decontaminated equipment will be visually inspected for residual soil periodically to ensure decontamination procedures are effective.

12 HEALTH AND SAFETY PROCEDURES

DOT&PF Environmental Staff or the DOT&PF Regional Environmental Manager will provide training to personnel working on or near the project site. The Contractor will keep a log of trained personnel. The training will cover an introduction to PFAS compounds, potential exposure pathways, and human health/ecological effects.

Contractors will provide a Health and Safety plan that will identify the minimum requirements for working with PFAS and fuel contaminated soils.

13 REPORTING PROCEDURES

When project work is complete, the Contractor will submit a report to the DOT&PF and DEC. The report will include the following items.

1. A summary of soil movement including the quantity and location of materials returned to each of their excavations, transported to the designated stockpile areas (Appendix B), and stockpiled material.
2. Date and time of daily stockpile inspections during active construction to describe the condition of the stockpile and photographs. The Contractor shall note any accumulation of leachate within liners.
3. Condition of the Stockpile Storage Sites before and after construction activities.
4. Stockpile characterization analytical results and copies of the approved DEC Transport, Treatment or Disposal Approval Form.

The Contractor shall provide DOT&PF with the stockpile inspection information collected during the project. DOT&PF staff will submit documentation of the stockpile inspections, including a log of date, time, and any necessary notes such as accidental tears, flooding in the area, leachate, etc. to DEC. The report should also include photos.

14 REFERENCES

Alaska Department of Environmental Conservation, *Contaminated Sites Search*, State of Alaska (2022a), accessed 12 October 2022 on <https://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search/>.

Alaska Department of Environmental Conservation, *Drinking Water Protection Areas Map*, State of Alaska (2022b), accessed 12 October 2022 on <https://dec.alaska.gov/eh/dw/dwp/protection-areas-map/>.

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Alaska Department of Environmental Conservation, 4 April 2019, *Technical Memorandum – Establishing Arctic Zone Cleanup Levels*, accessible on <https://dec.alaska.gov/spar/csp/guidance-forms>.

Interstate Technology Regulatory Council, October 2020, *Technical/Regulatory Guidance – Incremental Sampling Methodology (ISM) Update*, accessible on <https://ism-2.itrcweb.org/wp-content/uploads/2020/11/itrc_ism_compiled_508_011921.pdf>.

Wahrhaftig, Clyde, 1965, Physiographic divisions of Alaska: U.S. Geological Survey Professional Paper 482.

Path: T:\GIS Projects\Statewide PFAS\Kotzebue\CSMP Results Map.mxd Author: User: JKR Date: 3/2/2023

Maxar Technologies Inc., 2020. Alaska high resolution imagery (.5m): Available: https://gis.data.alaska.gov/pages/imagery%20program.

N

0 500

Feet

April 2023

SURFACE SOIL PFOS & PFOA RESULTS

Figure 1

APPENDIX A: S&W PRELIMINARY PFAS INVESTIGATION REPORT

Appendix A

S&W Preliminary PFAS Investigation Report

SUBMITTED TO:
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FINAL

SITE CHARACTERIZATION REPORT

DOT&PF Statewide PFAS
Kotzebue Crosswind Runway 18/36

KOTZEBUE, ALASKA

SHANNON & WILSON

April 2023

Shannon & Wilson No: 109531-004

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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AAC	Alaska Administrative Code
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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

ACRONYMS

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:	OTZ
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 (µg/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)
EPA 537M	PFOS	2.2	400
	PFOA	2.2	400
AK101	GRO	1,400	NS
AK102	DRO	12,500	NS
AK103	RRO	13,700	NS
EPA 8021	Benzene	16	NS
	Toluene	200	NS
	Ethylbenzene	72	NS
	Xylenes (total)	57	NS
EPA 8270D-SIM	PAH (analyte dependent)	2.0 to 31,000	NS

Notes:

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

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.

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 µg/kg. PFOS was detected in 26 project samples at concentrations up to 82 µg/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 re-evaluated, 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 Method	Analyte	DEC Regulatory Limit	Units	*22OTZ-SS01*	*22OTZ-SS02*	*22OTZ-SS03*	*22OTZ-SS04*	*22OTZ-SS05*	*22OTZ-SS06*	*22OTZ-SS07*	*22OTZ-SS08*	*22OTZ-SS09*	*22OTZ-SS10*
EPA 537(Mod)	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
	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
	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 (9Cl-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

Analytical Method	Analyte	DEC Regulatory Limit	Units	22OTZ-SS11		22OTZ-SS13	22OTZ-SS14	22OTZ-SS15	22OTZ-SS16	22OTZ-SS17	22OTZ-SS18	22OTZ-SS19	22OTZ-SS20
				Primary	Duplicate								
EPA 537(Mod)	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
	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
	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 (9Cl-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 (11Cl-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 Method	Analyte	DEC Regulatory Limit	Units	22OTZ-SS21		22OTZ-SS23	22OTZ-SS24	22OTZ-SS25	22OTZ-SS26	22OTZ-SS27	22OTZ-SS28	22OTZ-SS29	
				Primary	Duplicate							Primary	Duplicate
EPA 537(Mod)	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
	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*
	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 (9Cl-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 (11Cl-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	*22OTZ-SS31*	*22OTZ-SS32*	*22OTZ-SS33*	*22OTZ-SS34*	*22OTZ-SS35*	*22OTZ-SS36*	*22OTZ-SS37*	*22OTZ-SS38*	*22OTZ-SS39*
EPA 537(Mod)	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
	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
	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

Analytical Method	Analyte	DEC Regulatory Limit	Units	22OTZ-SS40		22OTZ-SS42	22OTZ-SS43	22OTZ-SS44	22OTZ-SS45	22OTZ-SS46	
				Primary	Duplicate					Primary	Duplicate
EPA 537(Mod)	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
	Perfluorohexanoic acid (PFHxA)	N/A	µg/Kg	0.035J	<0.23	<0.22	0.14J	0.062J	0.079J	<0.22	<0.21
	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 (9Cl-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 (11Cl-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 Method	Analyte	Regulatory Limit	Units	22OTZ-SS26	22OTZ-SS27	22OTZ-SS28	22OTZ-SS29		22OTZ-SS32	22OTZ-SS33	22OTZ-SS34
							Primary	Duplicate			
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
SW8021B (BTEX)	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
	m,p-xylenes	57	mg/kg	<0.0675	<0.0505	<0.0620	<0.0690	<0.0625	<0.0484	<0.0630	<0.0479
	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
8270D SIM (PAH)	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
	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
	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

			Sample Name	*MW10-04*	*MW110-04*	*MW10-09*
			Sample Date	12/3/2022		12/3/2022
Analyte	DEC Regulatory Limit	Units		Field Duplicate 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 (9Cl-PF3ONS)	N/A	ng/L		<2.1	<2.0	<2.2
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-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. (*)

N

0 0.5

Miles

April 2023

VICINITY MAP

Figure 1

N

0 1,000

Feet

April 2023

SITE MAP

Figure 2

N
0 500
Feet

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

Figure 3

Path: \\fbx-fs1\GIS\GIS_Projects\Statewide PFAS\Kotzebue\Figure 4. POL Results.mxd Author: User: DHF Date: 2/15/2023

MaxarTechnologies Inc., 2020. Alaska high resolution imagery (.5m): Available: https://gis.data.alaska.gov/pages/imagery%20Program.

N

0 200

Feet

Notes:

1. Sample name and sample result, in milligrams per kilogram (mg/kg).
2. 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

Path: \\fbx-fs1\GIS\GIS_Projects\Statewide PFAS\Kotzebue\Figure 5_MW Results.mxd Author: User: DHF Date: 2/15/2023

MaxarTechnologies Inc., 2020. Alaska high resolution imagery (.5m): Available: https://gs.data.alaska.gov/pages/imagery%20Program.

N

0 500

Feet

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.
3. See Table 3 for complete analytical results.

April 2023

MONITORING WELL PFOS & PFOA RESULTS

Figure 5

APPENDIX A: FIELD FORMS

Appendix A

Field Forms

CONTENTS

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT Travel day DATE 11/28/22
BY APW CHK'D SHEET 1 of 1

0400 - Adam Wyborny (APW) and Justin Risley (JKR) arrived at the S&W Fairbanks office and consolidated gear.
0430 - APW and JKR got a cab to FAI.
0600 - APW and JKR departed FAI on Alaska Airlines for ANC.
0650 - APW and JKR arrived in ANC. The connecting flight to OTZ was delayed due to a maintenance issue.
1330 - APW and JKR departed ANC for OTZ on Alaska Airlines.
1430 - APW and JKR arrived at OTZ. APW contacted DOT&PF to ask about the driver training. Alvin the airport manager informed us that he and his office staff were out sick. The traing would need to wait until 11/29. APW and JKR collected personal bags and went to the hotel.
1630 - APW and JKR went to the Alaska Air Cargo desk to pick up sampling gear.
1730 - End of Day

-23°F wind ~10 mph windchill factor ≈ -31°F

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT & PF JOB NO. 109531
SUBJECT Weather hold DATE 11/29/22
BY APW CHK'D SHEET 1 of 1

1000 - Adam Wyborny (APW) and Justin Risley (JKR) went to DOT & PF to meet Alvin Wernecke. Alvin informed us that he had a pull-behind generator thawing in the shop that we could use to run the rotary hammer. Alvin also warned 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.

1100 - APW and JKR completed the Airport familiarization training. Alvin 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 difficult to travel. Alvin strongly advised against working overnight.

1230 - APW and JKR departed the site. APW decided that a weather hold was the most prudent choice.

1600 - JKR contacted Alvin to ask about any known wells near the airport. Alvin said that he was aware of two test wells but that he was leaving the office soon.

1620 - APW and JKR arrived at DOT & PF to meet Alvin but were informed he had already left.

1700 - End of day.

Air temp: -2°F wind 28 mph with moderate snowfall

Storm warning issued by the National Weather Service

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT Crosswind Runway Sampling DATE 11/30/22
BY APW CHK'D SHEET 1 of 1

1000 - Adam Wyborny (APW) and Justin Risley (JKR) went to DOT&PF 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 during plowing over the years.

1100 - Alvin took us to two stickup monitoring wells secured with Masterlocks. The first well was damaged such that the lid could be removed. A barologger was present in the monument and a datalogger was in the well casing. APW and JKR confirmed the presence of liquid water.

1130 - All personnel returned to the DOT shop. The generator still wouldn't fire up so Alvin said he would have someone look at it.

1200 - APW and JKR departed the site to report findings to the PM.

1400 - After following up with DOT&PF the PM confirmed that sampling of the two monitoring wells 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. APW and JKR returned to DOT&PF to pick up the generator.

1700 - APW and JKR returned to the hotel to await runway closure.

2000 - APW and JKR went to the crosswind runway to begin sample collection. APW and JKR started at the north end of the 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 6°F wind ≤10 mph

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT Crosswind Runway Sampling DATE 12/01/22
BY APW CHK'D SHEET 1 of 1

1200 - After corresponding with the project team, the wells located on 11/30 were identified as MW10-04 and MW10-09 installed in 2010 as part of an SSW site characterization.

1400 - Adam Wyborny (APW) and Justin Risley (JKR) went to Alaska air Cargo to pick up water sampling gear. APW and JKR then drove around to try and locate additional wells from the 2010 installation. None of the other wells were visible.

1500 - APW and JKR went to refuel the car and the generator then stopped at the hardware store.

1600 - APW and JKR returned to the hotel to await runway closure. APW followed up with the PM about monitoring well sampling.

2000 - APW and JKR went to the crosswind runway high winds and blowing snow made for low visibility. The runway lights were still on so JKR contacted Alvin. 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 cautioned 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. APW 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. APW 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 DOT&PF shop. APW determined that it was not feasible to continuing working in the storm without getting the vehicle stranded.

2330 - APW and JKR returned to the hotel to complete paperwork a shipping documentation.

2430 - End of day

Air temperature: 18°F wind 25 mph with freezing rain and drifting snow.

Storm warning issued by the National Weather Service.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT DATE 12/02/22
BY APW CHK'D SHEET 1 of 1

1130 - Adam Wyborny (APW) and Justin Risley (JKR) contacted Alvin Werneke to check on the status of the airport. Alvin informed us that the airport was closed and all incoming and outgoing flights were cancelled. DOT personnel were focused on clearing the main runway amid the ongoing storm.

1200 - Temperatures warmed to 33°F with heavy rainfall. Black ice formed on the road and runway surfaces. Alvin advised extreme caution while on the roads.

2000 - APW and JKR drove out to the crosswind runway. Ice on the runway surface made driving and operating the rotary hammer challenging. Sampling commenced near the south end of the runway working north along the eastern edge.

2100 - Alvin arrived onsite looking into an issue with the runway lights. He then departed shortly after checking in with us.

2300 - APW and JKR collected the last of the runway samples then proceeded to treat the decon water with granular activated carbon (GAC).

2330 - APW and JKR departed the site and returned to the hotel where the sampling gear was packed for transport.

2430 - APW and JKR completed paperwork and prepared the daily report.

Air temp: 32°F wind 15 mph black ice on road and runway surfaces

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT Monitoring well sampling DATE 12/03/22
BY APW CHK'D SHEET 1 of 1

0900- Adam Wyborny (APW) and Justin Risley (JKR) pack up the samples and got JKR organized for his noon departure.
1030 - JKR Learned that his flight had been delayed.
1200 - JKR Learned that the morning flight was cancled. JKR was subsequently rebooked on the evening flight.
1400 - APW and JKR learned that the cargo plane had arrived in the morning but reported unsafe runway conditions due to the ice cover. The evening passenger flight was also canceled.
1430 - APW and JKR returned the generator borrowed from DOT&PF. APW spoke with Alvin about plowing the location of MW10-01. Alvin claimed that he had never seen a well there and the the location was most likely buried during construction of the current SREB / ARFF building. Regardless, Alvin said that he did not have any spare personnel to commit to the task.
1500 - APW and JKR went to the Alaska Air Cargo desk and picked up the much waylaid sample cooler.
1600 - After getting JKR checked back into the hotel, APW and JKR went to sample MW10-04 and MW10-09. 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 cycles.
2000 - Dinner break
2100 - APW and JKR QC'd and packed all the samples and prepared the chain of custody records.
2200 - APW prepared the daily report.
2230 - End of day

Air temp: 20°F wind 26 mph light snowfall.

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT Travel Day DATE 12/04/2022
BY APW CHK'D SHEET 1 of 1

1030 - Adam Wyborny (APW) packed up the samples and checked out of the hotel.
1100 - Alaska Air Cargo does not operate on Sunday in Kotzebue. The samples and gear had to be checked as excess baggage.
1230 - APW departed Kotzebue for Anchorage. Justin Risley (JKR) had been rebooked on the evening flight following flight cancellations on the prior days. The evening flight was subsequently cancelled due to weather.
1420 - APW arrived in Anchorage to await the connecting flight.
1830 - The connecting flight was delayed but APW eventually departed for FAI.
1930 - APW arrived at FAI and collected the samples and gear. An SHW staff member shuttled APW to the office.
2000 - APW stored the samples for shipment on 12/5.
2030 - End of day

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME Kotzebue DOT&PF JOB NO. 109531
SUBJECT MW10-09 DATE 12/03/2022
BY APW CHK'D SHEET 1 of 1

Total Well Depth: 7.35' size of Casing: 2" PVC

Depth to water: 6.75' Gallons of water in Well: 0.102

Top of Casing to Top of Monument: 0.02

Top of Monument to Ground surface: deep snow cover

Sample ID: MW10-09 @ 1740

Time	Temperature	DO	Conductivity	pH	ORP	Clarity
16:40	purge start well purged dry almost immediately					
	No parameters. Well recharges up to 100 mL every 10 min.					

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME _____ JOB NO. _____
SUBJECT MW10-04 DATE 12/03/22
BY APW CHK'D _____ SHEET 1 of 1

Total Well Depth: 11.75'

Size of Casing: 2" PVC

Depth to water: 8.37'

Gallons of water in Well: 0.57

Top of Casing to Top of Monument: 0.5'

Top of Monument to Ground surface: 3.0'

Sample ID: MW10-04 @ 1840 Dup: MW110-04 @ 1830

Purge start @ 1808. well purged dry @ 1813 and allowed to recharge.

SHANNON & WILSON, INC.

SAMPLE COLLECTION LOG

Project Number: 109531 Location: Ralph Wien Memorial Airport - Kotzebue, AK Page 1 of 2

Date: 11/30/22 - 12/01/22

Sampler: APW / JKR

	Sample Number	Location	Sample Time	Depth Interval (ft) top	Depth Interval (ft) bottom	Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses	
11/30	22OTZ-SS01		2045	0.2	0.5	SS	G	ES	N/A	PFAS	EPA 537M
	22OTZ-SS02		2110								
	22OTZ-SS03		2130								
	22OTZ-SS04		2145								
	22OTZ-SS05		2200								
	22OTZ-SS06		2210								
	22OTZ-SS07		2225								
	22OTZ-SS08		2240								
	22OTZ-SS09		2255								
	22OTZ-SS10		2305								
	22OTZ-SS11		2325								
	22OTZ-SS12	Field duplicate of SS11	2315					FD			
	22OTZ-SS13		2340					ES			
	22OTZ-SS14		2355								
12/1	22OTZ-SS15		0010								
	22OTZ-SS16		0025								
	22OTZ-SS17		0040								
	22OTZ-SS18		0055								
	22OTZ-SS19		0105								
	22OTZ-SS20		0125								
	22OTZ-SS21		0145								
	22OTZ-SS22	Duplicate of sample SS21	0135					FD			
	22OTZ-SS23		0155					ES			
	22OTZ-SS24		0216								
	22OTZ-SS25		0225								

All sample locations marked with EOS Arrow in ArcCollector.

Matrix Type	
AR	Air
GW	Groundwater
PR	Product
SB	Subsurf. soil
SE	Sediment
SG	Sludge
SS	Surface soil
SW	Surface water
WR	Water

Sampling Method	
B	Bailer/Coliwas
D	Drill cuttings
G	Grab sampling
H	Hand auger
L	Tube liner
P	Pump (liquid)
SS	Split spoon
T	Shelby tube
V	Vacuum (gas)
W	Wipe sampling

Sample Type	
ES	Environmental sample
ER	Equipment rinsate
FB	Field blank
FD	Field duplicate
FM	Field measurement
FR	Field replicate
MD	Matrix spike duplicate
MS	Matrix spike duplicate
TB	Trip blank

SHANNON & WILSON, INC.

SAMPLE COLLECTION LOG

Project Number: 109531 Location: Ralph Wien Memorial Airport - Kotzebue, AK Page 2 of 2

Date: 12/01/22 - 12/02/22

Sampler: APW / JKR

	Sample Number	Location	Sample Time	Depth Interval (ft) top	Depth Interval (ft) bottom	Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
12/1	22OTZ-SS26		2040	0.2	0.5	SS	G	ES		PFAS EPA 537M POCs
	22OTZ-SS27		2050							
	22OTZ-SS28		2110							
	22OTZ-SS29		2130					ES		
	22OTZ-SS30	Field duplicate of SS29	2120					FD		
	22OTZ-SS31		2150					ES		
	22OTZ-SS32		2200							
	22OTZ-SS33		2220							
	22OTZ-SS34		2240							
	22OTZ-SS35		2255							
12/2	22OTZ-SS36		2050							
	22OTZ-SS37		2100							
	22OTZ-SS38		2110							
	22OTZ-SS39		2120							
	22OTZ-SS40		2130							
	22OTZ-SS41	Field duplicate of SS40	2120					FD		
	22OTZ-SS42		2145					ES		
	22OTZ-SS43		2155							
	22OTZ-SS44		2205							
	22OTZ-SS45		2215							
	22OTZ-SS46		2230							
	22OTZ-SS47	Field duplicate of SS46	2220	↓	↓	↓	↓	FD		

Matrix Type

AR	Air
GW	Groundwater
PR	Product
SB	Subsurf. soil
SE	Sediment
SG	Sludge
SS	Surface soil
SW	Surface water
WR	Water

Sampling Method

B	Bailer/Coliwas
D	Drill cuttings
G	Grab sampling
H	Hand auger
L	Tube liner
P	Pump (liquid)
SS	Split spoon
T	Shelby tube
V	Vacuum (gas)
W	Wipe sampling

Sample Type

ES	Environmental sample
ER	Equipment rinsate
FB	Field blank
FD	Field duplicate
FM	Field measurement
FR	Field replicate
MD	Matrix spike duplicate
MS	Matrix spike duplicate
TB	Trip blank

APPENDIX B: PERMITTING

Appendix B

Permitting

CONTENTS

Federal Aviation Administration
222 West 7th Ave., Box 14
Anchorage, AK 99513-7587

Venus Larson AAL-624

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 LDRCS

Appendix C

Laboratory Reports and Laboratory Data Review Checklists

CONTENTS

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
2022.12.21
14:04:21 -09'00'

Jennifer Dawkins Date
Project Manager
Jennifer.Dawkins@sgs.com

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

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.

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Report of Manual Integrations

Laboratory ID	Client Sample ID	Analytical Batch	Analyte	Reason
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.

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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/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
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.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
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	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

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Detectable Results Summary

Client Sample ID: **22OTZ-SS26**
Lab Sample ID: 1227130001

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	3.59J	mg/kg

Client Sample ID: **22OTZ-SS27**
Lab Sample ID: 1227130002

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	2.70J	mg/kg

Client Sample ID: **22OTZ-SS28**
Lab Sample ID: 1227130003

	Parameter	Result	Units
Semivolatile Organic Fuels	Residual Range Organics	50.2J	mg/kg
Volatile Fuels	Gasoline Range Organics	3.32J	mg/kg

Client Sample ID: **22OTZ-SS29**
Lab Sample ID: 1227130004

	Parameter	Result	Units
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: **22OTZ-SS30**
Lab Sample ID: 1227130005

	Parameter	Result	Units
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: **22OTZ-SS32**
Lab Sample ID: 1227130006

	Parameter	Result	Units
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: **22OTZ-SS33**
Lab Sample ID: 1227130007

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	152	mg/kg
	Residual Range Organics	314	mg/kg
Volatile Fuels	Gasoline Range Organics	3.49J	mg/kg

Client Sample ID: **22OTZ-SS34**
Lab Sample ID: 1227130008

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	2.59J	mg/kg

Client Sample ID: **Trip Blank**
Lab Sample ID: 1227130009

	Parameter	Result	Units
Volatile Fuels	Gasoline Range Organics	1.46J	mg/kg

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Results of **22OTZ-SS26**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS26**

Client Sample ID: **22OTZ-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**

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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS26**

Client Sample ID: **22OTZ-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	DL	Units	DF	Allowable 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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

J flagging is activated

Results of **22OTZ-SS27**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS27**

Client Sample ID: **22OTZ-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	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	11.7	U	23.3	10.5	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS27**

Client Sample ID: **22OTZ-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	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.70	J	5.03	1.51	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

J flagging is activated

Results of **22OTZ-SS28**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS28**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS28**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

J flagging is activated

Results of **22OTZ-SS29**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS29**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable 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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS29**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.94	J	6.92	2.08	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS30**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS30**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable 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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS30**

Client Sample ID: **22OTZ-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	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.76	J	6.27	1.88	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

J flagging is activated

Results of **22OTZ-SS32**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS32**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	66.4		22.6	10.2	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

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

J flagging is activated

Results of **22OTZ-SS32**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.58	J	4.84	1.45	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS33**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS33**

Client Sample ID: **22OTZ-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	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	152		22.5	10.1	mg/kg	1		12/14/22 19:36
Surrogates								
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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS33**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.49	J	6.32	1.90	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS34**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS34**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Results of **22OTZ-SS34**

Client Sample ID: **22OTZ-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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.59	J	4.79	1.44	mg/kg	1		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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	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

Method Blank

Blank ID: MB for HBN 1849538 [SPT/11696]
Blank Lab ID: 1699071

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008

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

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Duplicate Sample Summary

Original Sample ID: 1227130001
Duplicate Sample ID: 1699072

Analysis Date: 12/09/2022 17:42
Matrix: Soil/Solid (dry weight)

QC for Samples:

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

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	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

Method Blank

Blank ID: MB for HBN 1849544 [VXX/39524]
Blank Lab ID: 1699092

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008, 1227130009

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
Analytical Method: AK101
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
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	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

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Method Blank

Blank ID: MB for HBN 1849544 [VXX/39524]
Blank Lab ID: 1699092

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130001, 1227130002, 1227130003, 1227130004, 1227130005, 1227130006, 1227130007, 1227130008, 1227130009

Results by **SW8021B**

Parameter	Results	LOQ/CL	DL	Units
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
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

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Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	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

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Matrix Spike Summary

Original Sample ID: 1699105
MS Sample ID: 1699106 MS
MSD Sample ID: 1699107 MSD

Analysis Date: 12/07/2022 22:52
Analysis Date: 12/07/2022 23:11
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**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	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

Method Blank

Blank ID: MB for HBN 1849509 [XXX/47404]
Blank Lab ID: 1699024

Matrix: Soil/Solid (dry weight)

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

Results by **8270D SIM (PAH)**

Parameter	Results	LOQ/CL	DL	Units
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
Prep Initial Wt./Vol.: 22.5 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

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)**

Blank Spike (mg/kg)

Parameter	Spike	Result	Rec (%)	CL
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:

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Matrix Spike Summary

Original Sample ID: 1227130006
MS Sample ID: 1699026 MS
MSD Sample ID: 1699027 MSD

Analysis Date: 12/14/2022 22:32
Analysis Date: 12/14/2022 22:48
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)**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	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										
2-Methylnaphthalene-d10 (surr)		0.126	0.114	91	0.127	0.118	93	58-103	2.70	
Fluoranthene-d10 (surr)		0.126	0.110	87	0.127	0.116	91	54-113	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

Method Blank

Blank ID: MB for HBN 1849510 [XXX/47405]
Blank Lab ID: 1699028

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130001, 1227130002, 1227130003, 1227130004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	9.00	mg/kg
Surrogates				
5a Androstane (surr)	89.4	60-120		%

Batch Information

Analytical Batch: XFC16423
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: HMW
Analytical Date/Time: 12/13/2022 11:47:00AM

Prep Batch: XXX47405
Prep Method: SW3550C
Prep Date/Time: 12/9/2022 4:47:47PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	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

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Method Blank

Blank ID: MB for HBN 1849510 [XXX/47405]
Blank Lab ID: 1699028

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130001, 1227130002, 1227130003, 1227130004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	50.0U	100	43.0	mg/kg
Surrogates				
n-Triacontane-d62 (surr)	79.7	60-120		%

Batch Information

Analytical Batch: XFC16423
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: HMW
Analytical Date/Time: 12/13/2022 11:47:00AM

Prep Batch: XXX47405
Prep Method: SW3550C
Prep Date/Time: 12/9/2022 4:47:47PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

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Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	667	516	77	667	531	80	(60-120)	2.90	(< 20)
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

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Method Blank

Blank ID: MB for HBN 1849740 [XXX/47410]
Blank Lab ID: 1699316

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130005, 1227130006, 1227130007, 1227130008

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	9.00	mg/kg
Surrogates				
5a Androstane (surr)	97	60-120		%

Batch Information

Analytical Batch: XFC16424
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: HMW
Analytical Date/Time: 12/14/2022 6:46:00PM

Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/2022 12:42:30PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

SGS North America Inc.
200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	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

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Method Blank

Blank ID: MB for HBN 1849740 [XXX/47410]
Blank Lab ID: 1699316

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130005, 1227130006, 1227130007, 1227130008

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	50.0U	100	43.0	mg/kg
Surrogates				
n-Triacontane-d62 (surr)	89.5	60-120		%

Batch Information

Analytical Batch: XFC16424
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: HMW
Analytical Date/Time: 12/14/2022 6:46:00PM

Prep Batch: XXX47410
Prep Method: SW3550C
Prep Date/Time: 12/14/2022 12:42:30PM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

SGS North America Inc.
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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Blank Spike Summary

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**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	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

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Method Blank

Blank ID: MB for HBN 1849775 [XXX/47415]
Blank Lab ID: 1699496

Matrix: Soil/Solid (dry weight)

QC for Samples:
1227130007, 1227130008

Results by **8270D SIM (PAH)**

Parameter	Results	LOQ/CL	DL	Units
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

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Blank Spike Summary

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)

Parameter	Spike	Result	Rec (%)	CL
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:

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Matrix Spike Summary

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

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)

QC for Samples: 1227130007, 1227130008

Results by **8270D SIM (PAH)**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	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)
Phenanthrene	0.0124J	0.125	0.109	77	0.123	0.106	76	49-113	2.70	(< 20)
Pyrene	0.0140U	0.125	0.0998	80	0.123	0.0952	77	55-117	4.70	(< 20)
Surrogates										
2-Methylnaphthalene-d10 (surr)		0.125	0.114	92	0.123	0.110	89	58-103	3.30	
Fluoranthene-d10 (surr)		0.125	0.0983	79	0.123	0.0938	76	54-113	4.60	

Batch Information

Analytical Batch: XMS13493
Analytical Method: 8270D SIM (PAH)
Instrument: Agilent GC 7890B/5977A SWA
Analyst: NGG
Analytical Date/Time: 12/15/2022 9:24:00PM

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

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
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

SGS North America Inc.
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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

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

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Jeb Dawkins

Turn Around Time:	Quote No:
☑ Normal ☐ Rush	J-Flags: ☑ Yes ☐ No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	GRO/BTEX MeOH	DRO/RRO/PAH	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTZ-5526	1AB	2040	12/1/22			2	Soil
22OTZ-5527	2AB	2050					
22OTZ-5528	3AB	2110					
22OTZ-5529	4AB	2130					
22OTZ-5530	5AB	2120					
22OTZ-5532	6AB	2200					
22OTZ-5533	7AB	2220					
22OTZ-5534	8AB	2240					
Trip Blank	9A	2000				1	MeOH trip blank

Project Information	
Number:	109531
Name:	OTZ PFAS
Contact:	KRF
Ongoing Project?	Yes ☑ No ☐
Sampler:	APW/JKR

Sample Receipt	
Total No. of Containers:	17
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	2.3°C #DSO
Temp:	ANC: -1.9°C DGS
Delivery Method:	Hand

Notes:

MSA: SGS-2016

Profile #385367 QM

ned to Shannon & Wilson w/ laboratory report
onsignee files
job file

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1310	Signature: Time: 15:00	Signature: Time:
Printed Name: Date: 1215	Printed Name: Date: 12/5/22	Printed Name: Date:
Adam Wyborny	Justin A. Nelson	
Company: Shannon & Wilson, Inc.	Company: SGS	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 1310	Signature: Time:	Signature: Time: 0900
Printed Name: Date: 12/5/22	Printed Name: Date:	Printed Name: Date: 12/6/22
Justin A. Nelson		Alexandra Johnston-Carnes
Company: SGS	Company:	Company: SGS

1227130

No. 411781

e-Sample Receipt Form FBK

SGS Workorder #: **S&W**

Review Criteria	Condition (Yes, No, N/A	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	
COC accompanied samples?	YES	
DOD: Were samples received in COC corresponding coolers?	YES	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	YES	Cooler ID: 1 @ 2.3 °C Therm. ID: d50
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	YES	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were samples in good condition (no leaks/cracks/breakage)?	YES	
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	YES	
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	
For Rush/Short Hold Time, was RUSH/Short HT email sent?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

SGS Profile # **385367**

e-Sample Receipt Form

SGS Workorder #:	1227130	1227130

Review Criteria	Condition (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)*		
Holding Time / Documentation / Sample Condition Requirements	*Note:* Refer to form F-083 "Sample Guide" for specific holding times and sample containers.	
Were samples received within analytical holding time?	Yes	
Do sample labels match COC? Record discrepancies.	Yes	
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? *(i.e. method is specified for analyses with multiple option for method (Eg, BTEX 8021 vs 8260, Metals 6020 vs 200.8)*	Yes	
Were proper containers (type/mass/volume/preservative)used? Note: Exemption for metals analysis by 200.8/6020 in water.	Yes	
Volatile Analysis Requirements (VOC, GRO, LL-Hg, etc.)		
Were 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?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	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	OK			
1227130004-A	No Preservative Required	OK			
1227130004-B	Methanol field pres. 4 C	OK			
1227130005-A	No Preservative Required	OK			
1227130005-B	Methanol field pres. 4 C	OK			
1227130006-A	No Preservative Required	OK			
1227130006-B	Methanol field pres. 4 C	OK			
1227130007-A	No Preservative Required	OK			
1227130007-B	Methanol field pres. 4 C	OK			
1227130008-A	No Preservative Required	OK			
1227130008-B	Methanol field pres. 4 C	OK			
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.

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.

ADEC Contaminated Sites Program Laboratory Data Review Checklist

Completed By:	Dana Fjare	**CS Site Name:**	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 No box checked must have an explanation in the comments box.*

1. **Laboratory**

   a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
   Yes ☒ No ☐ N/A ☐
   Comments: Analyses were performed by SGS North America, Inc. in Anchorage, Alaska.

   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 Custody (CoC)**

   a. Is the CoC information completed, signed, and dated (including released/received by)?
   Yes ☒ No ☐ N/A ☐
   Comments:

   b. Were the correct analyses requested?
   Yes ☒ No ☐ N/A ☐
   Analyses requested: GRO (AK101), BTEX (8021), DRO (AK102), RRO (AK103), and PAH (8270-SIM)
   Comments:

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 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 ☐ No ☐ N/A ☒
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 Narrative

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

b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes ☐ No ☐ N/A ☒
Comments: The 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 ☒ No ☐ N/A ☐
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 associated project samples include *22OTZ-SS26, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS29, 22OTZ-SS30, 22OTZ-SS32, 22OTZ-SS33, 22OTZ-SS34,* and the *Trip Blank*.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?
Yes ☒ No ☐ N/A ☐
Comments: The GRO concentrations detected in the associated project samples *22OTZ-SS26, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS29, 22OTZ-SS30, 22OTZ-SS32, 22OTZ-SS33, 22OTZ-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. 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: 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 ☐ 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; 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. 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: 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 or 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 ☒ No ☐ N/A ☐
Comments:

vi. If %R or RPD is outside of acceptable limits, what samples are affected?
Comments: The project samples *22OTZ-SS33* and *22OTZ-SS34* are associated with the MS/MSD pair 1699498/1699499.

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. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC, and laboratory samples?
Yes ☒ No ☐ N/A ☐
Comments:

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)
Yes ☒ No ☐ N/A ☐
Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?
Yes ☐ No ☐ N/A ☒
Comments: 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 Blanks

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

ii. Are all results less than LoQ or RL?
Yes ☒ No ☐ N/A ☐

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 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 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. Decontamination 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 Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

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

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ANALYTICAL REPORT

PREPARED FOR

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

Generated 12/19/2022 4:52:29 PM

JOB DESCRIPTION

ADQT&PP Statewide

JOB NUMBER

320-94968-1

Eurofins Sacramento
880 Riverside Parkway
West Sacramento CA 95605

See page two for job notes and contact information.

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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12/19/2022 4:52:29 PM

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Table of Contents

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

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 3.4º 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.

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	1		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.

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

Job ID: 320-94968-1

Client Sample ID: MW110-04

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

Lab Sample ID: 320-94968-1

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**15**		2.0	0.57	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluoroheptanoic acid (PFHpA)	**7.5**		2.0	0.25	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorooctanoic acid (PFOA)	**10**		2.0	0.84	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorononanoic acid (PFNA)	**24**		2.0	0.27	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorodecanoic acid (PFDA)	**2.3**		2.0	0.31	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.72	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorobutanesulfonic acid (PFBS)	**0.78**	**J**	2.0	0.20	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorohexanesulfonic acid (PFHxS)	**9.5**		2.0	0.56	ng/L		12/12/22 06:38	12/14/22 12:55	1
Perfluorooctanesulfonic acid (PFOS)	**150**		2.0	0.53	ng/L		12/12/22 06:38	12/14/22 12:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.9	1.2	ng/L		12/12/22 06:38	12/14/22 12:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.9	1.3	ng/L		12/12/22 06:38	12/14/22 12:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/12/22 06:38	12/14/22 12:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		12/12/22 06:38	12/14/22 12:55	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.32	ng/L		12/12/22 06:38	12/14/22 12:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.39	ng/L		12/12/22 06:38	12/14/22 12:55	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*97*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C4 PFHpA	*97*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C4 PFOA	*94*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C5 PFNA	*99*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C2 PFDA	*91*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C2 PFUnA	*97*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C2 PFDoA	*85*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C2 PFTeDA	*96*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C3 PFBS	*101*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
18O2 PFHxS	*98*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C4 PFOS	*94*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
d3-NMeFOSAA	*79*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
d5-NEtFOSAA	*75*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*
13C3 HFPO-DA	*91*		*50 - 150*	*12/12/22 06:38*	*12/14/22 12:55*	*1*

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

Job ID: 320-94968-1

Client Sample ID: MW10-04

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

Lab Sample ID: 320-94968-2

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.3	1.3	ng/L		12/12/22 06:38	12/14/22 13:06	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.3	1.4	ng/L		12/12/22 06:38	12/14/22 13:06	1
9-Chlorohexadecafluoro-3-oxanonane-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	1.6	ng/L		12/12/22 06:38	12/14/22 13:06	1
11-Chloroeicosafluoro-3-oxaundecane-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*
18O2 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: Shannon & Wilson, Inc
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

Client Sample ID: MW10-09

Date Collected: 12/03/22 17:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94968-3

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**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 (PFBS)	**7.9**		2.2	0.22	ng/L		12/12/22 06:38	12/14/22 13:36	1
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.5	1.3	ng/L		12/12/22 06:38	12/14/22 13:36	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.5	1.4	ng/L		12/12/22 06:38	12/14/22 13:36	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*	*1*
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*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
13C2 PFTeDA	*39*	**5-*	*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
13C3 PFBS	*56*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
18O2 PFHxS	*64*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
13C4 PFOS	*62*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
d3-NMeFOSAA	*43*	**5-*	*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
d5-NEtFOSAA	*43*	**5-*	*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*
13C3 HFPO-DA	*54*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:36*	*1*

Isotope Dilution Summary

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

Matrix: Water

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDoA (50-150)	PFTDA (50-150)
320-94968-1	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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)		
320-94968-1	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		
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

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

Analyte	MB Result	MB 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
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/12/22 06:38	12/14/22 11:34	1
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		12/12/22 06:38	12/14/22 11:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		12/12/22 06:38	12/14/22 11:34	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MB %Recovery*	*MB 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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	40.0	40.7		ng/L		102	71 - 129
Perfluoroundecanoic acid (PFUnA)	40.0	42.8		ng/L		107	69 - 133
Perfluorododecanoic acid (PFDoA)	40.0	43.8		ng/L		110	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	42.8		ng/L		107	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	40.3		ng/L		101	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	35.7		ng/L		101	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	35.6		ng/L		98	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	37.6		ng/L		101	65 - 140
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	40.6		ng/L		102	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	38.8		ng/L		97	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	36.8		ng/L		98	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	39.9		ng/L		100	72 - 132
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.8	37.0		ng/L		98	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	37.8		ng/L		100	81 - 141

Isotope Dilution	*LCS %Recovery*	*LCS 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*
18O2 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
Analysis Batch: 640016

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 639072

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	40.4		ng/L		101	72 - 129	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	39.9		ng/L		100	72 - 130	10	30
Perfluorooctanoic acid (PFOA)	40.0	42.9		ng/L		107	71 - 133	2	30

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			40.0	42.0		ng/L		105	65 - 136	3	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			40.0	38.3		ng/L		96	61 - 135	1	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*LCSD %Recovery*	*LCSD 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*
18O2 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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		36.1	37.7		ng/L		104	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		36.1	34.9		ng/L		97	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MS %Recovery*	*MS 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*
18O2 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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorodecanoic acid (PFDA)	2.7		37.8	42.0		ng/L		104	71 - 129	2	30
Perfluoroundecanoic acid (PFUnA)	ND		37.8	38.1		ng/L		101	69 - 133	5	30
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		37.8	37.7		ng/L		100	65 - 136	0	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		37.8	39.2		ng/L		103	61 - 135	11	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MSD %Recovery*	*MSD 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*
18O2 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
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

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
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

Client Sample ID: MW110-04
Date Collected: 12/03/22 18:30
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94968-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			253.3 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 12:55	RS1	EET SAC

Client Sample ID: MW10-04
Date Collected: 12/03/22 18:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94968-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			237 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 13:06	RS1	EET SAC

Client Sample ID: MW10-09
Date Collected: 12/03/22 17:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94968-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			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
Project/Site: ADQT&PP Statewide

Job ID: 320-94968-1

Laboratory: Eurofins Sacramento

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

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

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

Protocol References:

EPA = US Environmental Protection Agency

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

Laboratory References:

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

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: 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

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Page 1 of 1

Laboratory Eurofins
Attn: David Alltucker

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x18	QSM B-15						Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
MW110-04		1830	12/3/22	X							2	Groundwater Grab Sample
MW10-04		1840	↓	X							2	↓
MW10-09		1740	↓	X							2	↓

320-94968 Chain of Custody

Project Information	
Number:	102219
Name:	ADOT&PF Statewide
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

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

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Adam Wyborny Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Adam Wyborny Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 13:36	Signature: Time:	Signature: Time:
Printed Name: N. Cahill Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: EETSAC	Company:	Company:

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

3,4

No. _____

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-94968-1

Login Number: 94968
List Number: 1
Creator: Cahill, Nicholas P

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	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	
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:	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 checked must have an explanation in the comments box.*

1. **Laboratory**

   a. Did an ADEC Contaminated Sites Laboratory Approval Program (CS-LAP) approved laboratory receive and perform all of the submitted sample analyses?
   Yes ☒ No ☐ N/A ☐
   Comments: The 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. 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: Sample analyses were not subcontracted or transferred to another laboratory.

2. **Chain of Custody (CoC)**

   a. Is the CoC information completed, signed, and dated (including released/received by)?
   Yes ☒ No ☐ N/A ☐
   Comments:

   b. Were the correct analyses requested?
   Yes ☒ No ☐ N/A ☐
   Analyses requested: Per- and polyfluorinated substances (PFAS) compliant with the Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories version 5.3 Table B-15.
   Comments:

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 ☒ No ☐ N/A ☐
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 ☒ No ☐ N/A ☐
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 ☐ No ☐ N/A ☒
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 Narrative

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

b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes ☒ No ☐ N/A ☐
Comments:
The isotope dilution analyte (IDA) recovery associated with the sample *MW10-09* 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.

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 ☒ No ☐ N/A ☐
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 ☒ 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: 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 ☒ No ☐ N/A ☐
Comments:

e. Is the data quality or usability affected?
Yes ☐ No ☒ N/A ☐
Comments: See above.

6. QC Samples

a. Method Blank

i. Was one method blank reported per matrix, analysis, and 20 samples?
Yes ☒ No ☐ N/A ☐
Comments:

ii. Are all method blank results less than LOQ (or RL)?
Yes ☒ No ☐
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

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: 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 ☐ No ☐ N/A ☒
Comments: See above.

vii. Is the data quality or usability affected?
Yes ☐ No ☒ N/A ☐
Comments: See above.

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

i. Organics – Are one MS/MSD reported per matrix, analysis and 20 samples?
Yes ☒ No ☐ N/A ☐
Comments: MS/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

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 ☐

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

e. Trip Blanks

i. Is one trip blank reported per matrix, analysis, and for each cooler containing volatile samples? Yes ☐ No ☐ N/A ☒
Comments: PFAS are not volatile compounds; therefore, a trip blank is not required.

ii. Are all results less than LOQ or RL?
Yes ☐ No ☐ N/A ☒
Comments: A trip blank is not required.

iii. If above LOQ or RL, what samples are affected?
Comments: None; a trip blank is not required.

iv. Is the data quality or usability affected?
Yes ☐ No ☐ N/A ☒
Comments: See above.

f. Field Duplicate

i. Are one field duplicate submitted per matrix, analysis, and 10 project samples?
Yes ☒ No ☐ N/A ☐
Comments:

Was the duplicate submitted blind to lab?
Yes ☒ No ☐ N/A ☐
Comments: Field duplicate samples *MW10-04* and *MW110-04* was submitted with this work order.

ii. 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

Yes ☒ No ☐ N/A ☐
Comments: RPD are within project DQOs, where calculable.

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

Yes ☐ No ☒ N/A ☐
Comments: See above.

g. Decontamination or Equipment Blanks

i. Were decontamination or equipment blanks collected?
Yes ☐ No ☐ N/A ☒
Comments: Reusable equipment was not used; 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 Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Are they defined and appropriate?
Yes ☐ No ☐ N/A ☒
Comments: There are no other data flags/qualifiers.

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ANALYTICAL REPORT

PREPARED FOR

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

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JOB DESCRIPTION

Kotzenue DOT&PF

JOB NUMBER

320-94972-1

Eurofins Sacramento
880 Riverside Parkway
West Sacramento CA 95605

See page two for job notes and contact information.

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
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(916)374-4383

Table of Contents

Qualifiers

LCMS

Qualifier	Qualifier Description
*5-	Isotope dilution analyte is outside acceptance limits, low biased.
B	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
H	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)
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

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 4.9º 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. 22OTZ-SS01 (320-94972-1), 22OTZ-SS02 (320-94972-2), 22OTZ-SS03 (320-94972-3), 22OTZ-SS04 (320-94972-4), 22OTZ-SS05 (320-94972-5), 22OTZ-SS06 (320-94972-6), 22OTZ-SS07 (320-94972-7), 22OTZ-SS08 (320-94972-8), 22OTZ-SS09 (320-94972-9), 22OTZ-SS10 (320-94972-10), 22OTZ-SS11 (320-94972-11), 22OTZ-SS12 (320-94972-12), 22OTZ-SS13 (320-94972-13), 22OTZ-SS14 (320-94972-14), 22OTZ-SS15 (320-94972-15), 22OTZ-SS17 (320-94972-17), 22OTZ-SS18 (320-94972-18), 22OTZ-SS19 (320-94972-19), 22OTZ-SS20 (320-94972-20), (CCV 320-643841/15), (CCV 320-643841/27), (CCV 320-643841/33), (CCVIS 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.

Job ID: 320-94972-1 (Continued)

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.

Detection Summary

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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	1	☼	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: 22OTZ-SS02 — Lab Sample ID: 320-94972-2

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: 22OTZ-SS03 — Lab Sample ID: 320-94972-3

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 — Lab Sample ID: 320-94972-4

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 — Lab Sample ID: 320-94972-5

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: 22OTZ-SS06 — Lab Sample ID: 320-94972-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.042	J	0.21	0.032	ug/Kg	1	☼	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 — Lab Sample ID: 320-94972-7

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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Client Sample ID: 22OTZ-SS07 (Continued) — Lab Sample ID: 320-94972-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorooctanesulfonic acid (PFOS)	1.3	I	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	1	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	0.034	J I	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	I	0.22	0.048	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-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: 22OTZ-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	1	☼	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: 22OTZ-SS12 — Lab Sample ID: 320-94972-12

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorohexanoic acid (PFHxA)	0.048	J I	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

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Client Sample ID: 22OTZ-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	J I	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	1	☼	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	1	☼	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	I	0.22	0.048	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-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	1	☼	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.

Detection Summary

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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	1	☼	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: 320-94972-18

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorodecanoic acid (PFDA)	0.19	J	0.24	0.058	ug/Kg	1	☼	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	I	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: 22OTZ-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: 22OTZ-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	I	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	I	0.23	0.049	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins Sacramento

Detection Summary

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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: 22OTZ-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	I	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: 22OTZ-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	10	☼	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: 22OTZ-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	J I	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

This Detection Summary does not include radiochemical test results.

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Detection Summary

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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	J I	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

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	1	☼	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: 22OTZ-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 Sample ID: 22OTZ-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) - DL	30		1.1	0.24	ug/Kg	5	☼	EPA 537(Mod)	Total/NA

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	1	☼	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: 22OTZ-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: 22OTZ-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.

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 — Lab Sample ID: 320-94972-36

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: 22OTZ-SS37 — Lab Sample ID: 320-94972-37

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluoroundecanoic acid (PFUnA)	0.12	J	0.20	0.042	ug/Kg	1	☼	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: 22OTZ-SS38 — Lab Sample ID: 320-94972-38

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: 320-94972-39

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: 22OTZ-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.

Detection Summary

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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	1	☼	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	B	0.22	0.046	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.080	J B	0.22	0.023	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.19	J H	0.22	0.047	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	2.4	H I	0.22	0.048	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-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	J B	0.24	0.050	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.025	J B	0.24	0.025	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.090	J H	0.23	0.048	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	2.5	H I	0.23	0.049	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-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	B	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	J B	0.24	0.025	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.29	H	0.23	0.049	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	1.5	H I	0.23	0.050	ug/Kg	1	☼	EPA 537(Mod)	Total/NA

Client Sample ID: 22OTZ-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	J B	0.23	0.049	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.070	J B	0.23	0.025	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.3	I B	0.23	0.050	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.20	J H	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 Sample ID: 22OTZ-SS45 (Continued) — Lab Sample ID: 320-94972-45

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

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	J B	0.22	0.047	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.052	J B	0.22	0.023	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.18	J H	0.22	0.046	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.31	H I	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	B	0.21	0.043	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorotridecanoic acid (PFTriA)	0.13	J B	0.21	0.022	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	0.34	I B	0.21	0.044	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluoroundecanoic acid (PFUnA) - RE	0.16	J H	0.21	0.045	ug/Kg	1	☼	EPA 537(Mod)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - RE	0.30	H I	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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS01
Date Collected: 11/30/22 20:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-1
Matrix: Solid
Percent Solids: 86.2

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		0.21	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
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
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.049	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.036	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 04:50	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*78*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*
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*	*1*
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*	*1*
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*	*1*
18O2 PFHxS	*65*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*
13C4 PFOS	*67*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*
d3-NMeFOSAA	*113*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*
d5-NEtFOSAA	*135*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*
13C3 HFPO-DA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:50*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.8**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**86.2**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS02

Date Collected: 11/30/22 21:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-2

Matrix: Solid
Percent Solids: 86.2

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	☼	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	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 05:21	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 05:21	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 05:21	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		0.22	0.034	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*
18O2 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*	*12/07/22 19:13*	*01/02/23 05:21*	*1*
d5-NEtFOSAA	*126*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:21*	*1*
13C3 HFPO-DA	*76*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:21*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.8**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**86.2**		0.1	0.1	%			12/07/22 12:40	1

Client Sample ID: 22OTZ-SS03

Date Collected: 11/30/22 21:30
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-3

Matrix: Solid
Percent Solids: 89.0

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		0.21	0.033	ug/Kg	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 05:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	☼	12/07/22 19:13	01/02/23 05:31	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.037	ug/Kg	☼	12/07/22 19:13	01/02/23 05:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 05:31	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.033	ug/Kg	☼	12/07/22 19:13	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	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

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS04

Date Collected: 11/30/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-4

Matrix: Solid
Percent Solids: 84.1

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		0.24	0.037	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluoroheptanoic acid (PFHpA)	ND		0.24	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorooctanoic acid (PFOA)	**0.080**	**J**	0.24	0.063	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorononanoic acid (PFNA)	**0.17**	**J**	0.24	0.026	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorodecanoic acid (PFDA)	**0.086**	**J**	0.24	0.057	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluoroundecanoic acid (PFUnA)	**0.32**		0.24	0.050	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorododecanoic acid (PFDoA)	ND		0.24	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorotridecanoic acid (PFTriA)	**0.063**	**J**	0.24	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.034	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.24	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.24	0.027	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.24	0.057	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.037	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 05:41	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*78*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C4 PFOA	*81*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C5 PFNA	*88*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C2 PFDA	*87*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C2 PFUnA	*93*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C2 PFDoA	*85*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C2 PFTeDA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C3 PFBS	*67*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
18O2 PFHxS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C4 PFOS	*65*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
d3-NMeFOSAA	*114*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
d5-NEtFOSAA	*119*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*
13C3 HFPO-DA	*78*		*50 - 150*	*12/07/22 19:13*	*01/02/23 05:41*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**15.9**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**84.1**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS05

Date Collected: 11/30/22 22:00
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-5

Matrix: Solid
Percent Solids: 84.1

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)	**0.040**	**J**	0.22	0.034	ug/Kg	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 05:51	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 05:51	1
9-Chlorohexadecafluoro-3-oxanonane-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	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 05:51	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:13	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*
18O2 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	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**15.9**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**84.1**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS06

Date Collected: 11/30/22 22:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-6

Matrix: Solid
Percent Solids: 85.9

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)	**0.042**	**J**	0.21	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorooctanoic acid (PFOA)	**0.075**	**J**	0.21	0.055	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorononanoic acid (PFNA)	**0.12**	**J**	0.21	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorodecanoic acid (PFDA)	**0.052**	**J**	0.21	0.050	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluoroundecanoic acid (PFUnA)	**0.093**	**J**	0.21	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.031	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorotridecanoic acid (PFTriA)	ND		0.21	0.022	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.030	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.21	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.036	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 06:01	1

Isotope Dilution	*%Recovery*	*Qualifier*	*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*
18O2 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

Client Sample ID: 22OTZ-SS07

Date Collected: 11/30/22 22:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-7

Matrix: Solid
Percent Solids: 87.6

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		0.21	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.057	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorononanoic acid (PFNA)	**0.62**		0.21	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorodecanoic acid (PFDA)	**0.070**	**J**	0.21	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluoroundecanoic acid (PFUnA)	**0.056**	**J**	0.21	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorotridecanoic acid (PFTriA)	**0.026**	**J**	0.21	0.022	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.031	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Perfluorooctanesulfonic acid (PFOS)	**1.3**	**I**	0.21	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.037	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 06:31	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*77*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
13C4 PFHpA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
13C4 PFOA	*86*		*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 06:31*	*1*
13C2 PFDA	*91*		*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 06:31*	*1*
13C2 PFDoA	*90*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
13C2 PFTeDA	*94*		*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 06:31*	*1*
18O2 PFHxS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
13C4 PFOS	*66*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
d3-NMeFOSAA	*122*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
d5-NEtFOSAA	*130*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*
13C3 HFPO-DA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:31*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS08

Date Collected: 11/30/22 22:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-8

Matrix: Solid
Percent Solids: 88.8

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**1.1**		0.20	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluoroheptanoic acid (PFHpA)	**0.067**	**J**	0.20	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorooctanoic acid (PFOA)	**0.79**		0.20	0.054	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorononanoic acid (PFNA)	**0.028**	**J**	0.20	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorodecanoic acid (PFDA)	ND		0.20	0.049	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluoroundecanoic acid (PFUnA)	**0.16**	**J**	0.20	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorododecanoic acid (PFDoA)	**0.058**	**J**	0.20	0.031	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorotridecanoic acid (PFTriA)	**0.048**	**J**	0.20	0.021	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorohexanesulfonic acid (PFHxS)	**1.5**		0.20	0.030	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Perfluorooctanesulfonic acid (PFOS)	**8.4**		0.20	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	**0.034**	**J I**	0.20	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.049	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.036	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.20	0.040	ug/Kg	☼	12/07/22 19:13	01/02/23 06:42	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C4 PFOA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C5 PFNA	*96*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C2 PFDA	*89*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C2 PFUnA	*95*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C2 PFDoA	*89*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C2 PFTeDA	*85*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C3 PFBS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
18O2 PFHxS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C4 PFOS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
d3-NMeFOSAA	*116*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
d5-NEtFOSAA	*136*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*
13C3 HFPO-DA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:42*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**11.2**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**88.8**		0.1	0.1	%			12/07/22 12:40	1

Client Sample ID: 22OTZ-SS09

Date Collected: 11/30/22 22:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-9

Matrix: Solid
Percent Solids: 87.2

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	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorononanoic acid (PFNA)	**0.11**	**J**	0.22	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorodecanoic acid (PFDA)	**0.062**	**J**	0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluoroundecanoic acid (PFUnA)	**0.12**	**J**	0.22	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorotridecanoic acid (PFTriA)	**0.026**	**J**	0.22	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Perfluorooctanesulfonic acid (PFOS)	**1.9**	**I**	0.22	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 06:52	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*69*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C4 PFHpA	*74*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C4 PFOA	*77*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C5 PFNA	*81*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C2 PFDA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C2 PFUnA	*85*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C2 PFDoA	*82*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C2 PFTeDA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C3 PFBS	*55*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
18O2 PFHxS	*63*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C4 PFOS	*60*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
d3-NMeFOSAA	*111*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
d5-NEtFOSAA	*116*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*
13C3 HFPO-DA	*72*		*50 - 150*	*12/07/22 19:13*	*01/02/23 06:52*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**12.8**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**87.2**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS10

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

Lab Sample ID: 320-94972-10

Matrix: Solid
Percent Solids: 87.6

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)	**0.051**	**J**	0.22	0.034	ug/Kg	☼	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	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 07:02	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 07:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:13	01/02/23 07:02	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 07:02	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:13	01/02/23 07:02	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	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*
18O2 PFHxS	*61*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:02*	*1*
13C4 PFOS	*62*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:02*	*1*
d3-NMeFOSAA	*109*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:02*	*1*
d5-NEtFOSAA	*124*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:02*	*1*
13C3 HFPO-DA	*73*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:02*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS11

Date Collected: 11/30/22 23:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-11

Matrix: Solid
Percent Solids: 89.8

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)	**0.078**	**J**	0.21	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
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	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorotridecanoic acid (PFTriA)	**0.058**	**J**	0.21	0.022	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.039	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
9-Chlorohexadecafluoro-3-oxanonane-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	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 07:12	1
11-Chloroeicosafluoro-3-oxaundecane-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*
18O2 PFHxS	*66*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:12*	*1*
13C4 PFOS	*68*		*50 - 150*	*12/07/22 19:13*	*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	1
Percent Solids (ASTM D 2216)	**89.8**		0.1	0.1	%			12/07/22 12:40	1

Client Sample ID: 22OTZ-SS12

Date Collected: 11/30/22 23:15
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-12

Matrix: Solid
Percent Solids: 83.9

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)	**0.048**	**J I**	0.22	0.034	ug/Kg	☼	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	1
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	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
Perfluoroundecanoic acid (PFUnA)	**0.36**		0.22	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
Perfluorododecanoic acid (PFDoA)	**0.064**	**J**	0.22	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
Perfluorotridecanoic acid (PFTriA)	**0.048**	**J**	0.22	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
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	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
9-Chlorohexadecafluoro-3-oxanonane-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	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 07:22	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*45*	**5-*	*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C4 PFHpA	*69*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C4 PFOA	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C5 PFNA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C2 PFDA	*82*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C2 PFUnA	*88*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C2 PFDoA	*86*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C2 PFTeDA	*83*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C3 PFBS	*63*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
18O2 PFHxS	*71*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C4 PFOS	*73*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
d3-NMeFOSAA	*112*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
d5-NEtFOSAA	*121*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*
13C3 HFPO-DA	*42*	**5-*	*50 - 150*	*12/07/22 19:13*	*01/02/23 07:22*	*1*

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	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS13

Date Collected: 11/30/22 23:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-13

Matrix: Solid
Percent Solids: 87.7

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)	**0.058**	**J I**	0.22	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluoroheptanoic acid (PFHpA)	**0.047**	**J**	0.22	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorooctanoic acid (PFOA)	**0.076**	**J**	0.22	0.060	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorononanoic acid (PFNA)	**0.37**		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorodecanoic acid (PFDA)	**0.27**		0.22	0.054	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluoroundecanoic acid (PFUnA)	**0.62**		0.22	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorododecanoic acid (PFDoA)	**0.12**	**J**	0.22	0.034	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorotridecanoic acid (PFTriA)	**0.16**	**J**	0.22	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorotetradecanoic acid (PFTeA)	**0.043**	**J**	0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Perfluorooctanesulfonic acid (PFOS)	**2.3**		0.22	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.054	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 07:32	1

Isotope Dilution	*%Recovery*	*Qualifier*	*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*
18O2 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 Chemistry

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 Sample ID: 22OTZ-SS14

Date Collected: 11/30/22 23:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-14

Matrix: Solid
Percent Solids: 87.3

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)	**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 (PFOS)	**1.4**	**I**	0.22	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:13	01/02/23 07:42	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS15

Date Collected: 12/01/22 00:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-15

Matrix: Solid
Percent Solids: 88.6

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	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorooctanoic acid (PFOA)	ND		0.22	0.059	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorononanoic acid (PFNA)	**0.028**	**J**	0.22	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorodecanoic acid (PFDA)	**0.11**	**J**	0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluoroundecanoic acid (PFUnA)	**0.33**		0.22	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorododecanoic acid (PFDoA)	**0.054**	**J**	0.22	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorotridecanoic acid (PFTriA)	**0.11**	**J**	0.22	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
Perfluorooctanesulfonic acid (PFOS)	**0.27**	**I**	0.22	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 07:53	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	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-oxaundecane-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*	*1*
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*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
13C2 PFDoA	*91*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
13C2 PFTeDA	*90*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
13C3 PFBS	*64*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
18O2 PFHxS	*69*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
13C4 PFOS	*72*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
d3-NMeFOSAA	*119*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
d5-NEtFOSAA	*133*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*
13C3 HFPO-DA	*74*		*50 - 150*	*12/07/22 19:13*	*01/02/23 07:53*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**11.4**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**88.6**		0.1	0.1	%			12/07/22 12:40	1

Client Sample ID: 22OTZ-SS16

Date Collected: 12/01/22 00:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-16

Matrix: Solid
Percent Solids: 91.6

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		0.20	0.031	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluoroheptanoic acid (PFHpA)	ND		0.20	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorooctanoic acid (PFOA)	ND		0.20	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorononanoic acid (PFNA)	ND		0.20	0.022	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorodecanoic acid (PFDA)	**0.049**	**J**	0.20	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluoroundecanoic acid (PFUnA)	**0.35**		0.20	0.042	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorododecanoic acid (PFDoA)	**0.040**	**J**	0.20	0.030	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorotridecanoic acid (PFTriA)	**0.054**	**J**	0.20	0.021	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.20	0.037	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.20	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.20	0.029	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.20	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.035	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.041	ug/Kg	☼	12/07/22 19:13	01/02/23 08:03	1
11-Chloroeicosafluoro-3-oxaundecane-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*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
13C3 PFBS	*62*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
18O2 PFHxS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
13C4 PFOS	*70*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
d3-NMeFOSAA	*108*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
d5-NEtFOSAA	*124*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*
13C3 HFPO-DA	*76*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:03*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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 Sample ID: 22OTZ-SS17

Date Collected: 12/01/22 00:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-17

Matrix: Solid
Percent Solids: 86.1

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		0.23	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	0.024	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
Perfluorooctanesulfonic acid (PFOS)	**2.7**		0.23	0.050	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.055	ug/Kg	☼	12/07/22 19:13	01/02/23 08:33	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
13C2 PFTeDA	*83*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
13C3 PFBS	*61*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
18O2 PFHxS	*67*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
13C4 PFOS	*68*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
d3-NMeFOSAA	*110*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
d5-NEtFOSAA	*121*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*
13C3 HFPO-DA	*74*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:33*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.9**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**86.1**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS18

Date Collected: 12/01/22 00:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-18

Matrix: Solid
Percent Solids: 78.2

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		0.24	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
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	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
Perfluorododecanoic acid (PFDoA)	**0.044**	**J**	0.24	0.037	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.24	0.028	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.24	0.058	ug/Kg	☼	12/07/22 19:13	01/02/23 08:43	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		0.24	0.038	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	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**21.8**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**78.2**		0.1	0.1	%			12/07/22 12:40	1

Client Sample ID: 22OTZ-SS19

Date Collected: 12/01/22 01:05
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-19

Matrix: Solid
Percent Solids: 79.7

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		0.25	0.039	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluoroheptanoic acid (PFHpA)	ND		0.25	0.048	ug/Kg	☼	12/07/22 19:13	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	0.053	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorododecanoic acid (PFDoA)	**0.058**	**J**	0.25	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorotridecanoic acid (PFTriA)	**0.11**	**J**	0.25	0.026	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.25	0.046	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.25	0.048	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.25	0.029	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.25	0.060	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.25	0.044	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.25	0.051	ug/Kg	☼	12/07/22 19:13	01/02/23 08:54	1
11-Chloroeicosafluoro-3-oxaundecane-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*
18O2 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*	*12/07/22 19:13*	*01/02/23 08:54*	*1*
d5-NEtFOSAA	*119*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:54*	*1*
13C3 HFPO-DA	*75*		*50 - 150*	*12/07/22 19:13*	*01/02/23 08:54*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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 Sample ID: 22OTZ-SS20

Date Collected: 12/01/22 01:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-20

Matrix: Solid
Percent Solids: 82.8

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	☼	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	0.033	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 (PFOS)	**6.8**		0.22	0.047	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:13	01/02/23 09:04	1
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-oxaundecane-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*
18O2 PFHxS	*69*		*50 - 150*	*12/07/22 19:13*	*01/02/23 09:04*	*1*
13C4 PFOS	*70*		*50 - 150*	*12/07/22 19:13*	*01/02/23 09:04*	*1*
d3-NMeFOSAA	*104*		*50 - 150*	*12/07/22 19:13*	*01/02/23 09:04*	*1*
d5-NEtFOSAA	*118*		*50 - 150*	*12/07/22 19:13*	*01/02/23 09:04*	*1*
13C3 HFPO-DA	*77*		*50 - 150*	*12/07/22 19:13*	*01/02/23 09:04*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS21

Date Collected: 12/01/22 01:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-21

Matrix: Solid
Percent Solids: 88.1

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		0.21	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 (PFUnA)	**0.41**		0.21	0.045	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorododecanoic acid (PFDoA)	**0.057**	**J**	0.21	0.032	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorotridecanoic acid (PFTriA)	**0.12**	**J**	0.21	0.022	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.031	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
Perfluorooctanesulfonic acid (PFOS)	**0.26**	**I**	0.21	0.046	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.025	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	☼	12/07/22 19:17	01/01/23 10:32	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		0.21	0.033	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*
18O2 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
Percent Moisture (ASTM D 2216)	**11.9**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**88.1**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS22

Date Collected: 12/01/22 01:35
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-22

Matrix: Solid
Percent Solids: 85.2

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		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/01/23 10:42	1
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	0.034	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:17	01/01/23 10:42	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.055	ug/Kg	☼	12/07/22 19:17	01/01/23 10:42	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.040	ug/Kg	☼	12/07/22 19:17	01/01/23 10:42	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.047	ug/Kg	☼	12/07/22 19:17	01/01/23 10:42	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.035	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*	*1*
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*
18O2 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*	*12/07/22 19:17*	*01/01/23 10:42*	*1*

General Chemistry

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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS23

Date Collected: 12/01/22 01:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-23

Matrix: Solid
Percent Solids: 87.1

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	0.035	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
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	0.047	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	0.048	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.054	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	☼	12/07/22 19:17	01/01/23 10:52	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.035	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*	*1*
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*	*1*
13C2 PFTeDA	*79*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
13C3 PFBS	*65*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
18O2 PFHxS	*68*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
13C4 PFOS	*65*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
d3-NMeFOSAA	*106*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
d5-NEtFOSAA	*119*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*
13C3 HFPO-DA	*78*		*50 - 150*	*12/07/22 19:17*	*01/01/23 10:52*	*1*

General Chemistry

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

Client Sample ID: 22OTZ-SS24

Date Collected: 12/01/22 02:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-24

Matrix: Solid
Percent Solids: 85.1

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	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:17	01/01/23 11:02	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

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

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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

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

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	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:17	01/01/23 11:13	1
11-Chloroeicosafluoro-3-oxaundecane-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*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C4 PFHpA	*72*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C4 PFOA	*79*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C5 PFNA	*77*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C2 PFDA	*80*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C2 PFUnA	*83*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C2 PFDoA	*77*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C2 PFTeDA	*76*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C3 PFBS	*63*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
18O2 PFHxS	*65*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C4 PFOS	*56*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
d3-NMeFOSAA	*98*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
d5-NEtFOSAA	*111*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*
13C3 HFPO-DA	*71*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:13*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.5**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**86.5**		0.1	0.1	%			12/07/22 12:40	1

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
Percent Solids: 87.2

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	**1.2**	**J**	2.2	0.35	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluoroheptanoic acid (PFHpA)	ND		2.2	0.42	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorooctanoic acid (PFOA)	ND		2.2	0.59	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorononanoic acid (PFNA)	**2.7**		2.2	0.25	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorodecanoic acid (PFDA)	**10**		2.2	0.54	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorododecanoic acid (PFDoA)	**7.2**		2.2	0.34	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorotridecanoic acid (PFTriA)	**98**		2.2	0.23	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorotetradecanoic acid (PFTeA)	**3.1**		2.2	0.41	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorobutanesulfonic acid (PFBS)	ND		2.2	0.42	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorohexanesulfonic acid (PFHxS)	**0.81**	**J**	2.2	0.32	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Perfluorooctanesulfonic acid (PFOS)	**82**		2.2	0.48	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.2	0.26	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.2	0.54	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.2	0.39	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		2.2	0.46	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.2	0.35	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.2	0.44	ug/Kg	☼	12/07/22 19:17	01/05/23 21:44	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*74*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C4 PFHpA	*82*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C4 PFOA	*83*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C5 PFNA	*90*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C2 PFDA	*83*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C2 PFDoA	*77*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C2 PFTeDA	*61*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C3 PFBS	*75*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
18O2 PFHxS	*76*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C4 PFOS	*76*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
d3-NMeFOSAA	*85*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
d5-NEtFOSAA	*89*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*
13C3 HFPO-DA	*81*		*50 - 150*	*12/07/22 19:17*	*01/05/23 21:44*	*10*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**240**		4.5	0.94	ug/Kg	☼	12/07/22 19:17	01/08/23 00:54	20

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*103*		*50 - 150*	*12/07/22 19:17*	*01/08/23 00:54*	*20*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**12.8**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

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
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	1

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

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)	**0.21**		0.21	0.033	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluoroheptanoic acid (PFHpA)	**0.20**	**J**	0.21	0.041	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorooctanoic acid (PFOA)	**0.32**		0.21	0.057	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorononanoic acid (PFNA)	**0.50**		0.21	0.024	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorodecanoic acid (PFDA)	**4.1**		0.21	0.051	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorododecanoic acid (PFDoA)	**0.87**		0.21	0.032	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorotridecanoic acid (PFTriA)	**5.3**		0.21	0.023	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorotetradecanoic acid (PFTeA)	**0.28**		0.21	0.040	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.041	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Perfluorohexanesulfonic acid (PFHxS)	**0.11**	**J I**	0.21	0.031	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.025	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.051	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.038	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.044	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.033	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.042	ug/Kg	☼	12/07/22 19:17	01/01/23 11:33	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*76*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C4 PFOA	*84*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C5 PFNA	*89*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C2 PFDA	*87*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C2 PFUnA	*88*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C2 PFDoA	*87*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C2 PFTeDA	*82*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C3 PFBS	*71*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
18O2 PFHxS	*75*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C4 PFOS	*66*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
d3-NMeFOSAA	*105*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
d5-NEtFOSAA	*105*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*
13C3 HFPO-DA	*82*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:33*	*1*

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

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*

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

Job ID: 320-94972-1

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

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

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS28

Date Collected: 12/01/22 21:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-28

Matrix: Solid
Percent Solids: 87.7

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)	**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**	**J I**	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:17	01/01/23 11:43	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	☼	12/07/22 19:17	01/01/23 11:43	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.036	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-oxaundecane-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	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*77*		*50 - 150*	*12/07/22 19:17*	*01/01/23 11:43*	*1*
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*
18O2 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

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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS29

Date Collected: 12/01/22 21:30
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-29

Matrix: Solid
Percent Solids: 80.6

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)	**0.30**		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluoroheptanoic acid (PFHpA)	**0.21**	**J**	0.23	0.043	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorooctanoic acid (PFOA)	**0.63**		0.23	0.060	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorononanoic acid (PFNA)	**1.4**		0.23	0.025	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorodecanoic acid (PFDA)	**2.6**		0.23	0.054	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluoroundecanoic acid (PFUnA)	**9.3**		0.23	0.047	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorododecanoic acid (PFDoA)	**0.62**		0.23	0.034	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorotridecanoic acid (PFTriA)	**2.5**		0.23	0.024	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorotetradecanoic acid (PFTeA)	**0.21**	**J**	0.23	0.042	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Perfluorooctanesulfonic acid (PFOS)	**15**		0.23	0.048	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.054	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.039	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.046	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/01/23 12:13	1
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*
13C3 HFPO-DA	*81*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:13*	*1*

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

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS30

Date Collected: 12/01/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-30

Matrix: Solid
Percent Solids: 83.2

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)	**0.15**	**J**	0.23	0.035	ug/Kg	☼	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 (PFUnA)	**3.8**		0.23	0.048	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorododecanoic acid (PFDoA)	**0.23**		0.23	0.034	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorotridecanoic acid (PFTriA)	**0.76**		0.23	0.024	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorotetradecanoic acid (PFTeA)	**0.065**	**J**	0.23	0.042	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Perfluorooctanesulfonic acid (PFOS)	**8.7**		0.23	0.049	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.055	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.040	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.047	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.045	ug/Kg	☼	12/07/22 19:17	01/01/23 12:24	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*80*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:24*	*1*
13C4 PFHpA	*85*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:24*	*1*
13C4 PFOA	*80*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:24*	*1*
13C5 PFNA	*89*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:24*	*1*
13C2 PFDA	*85*		*50 - 150*	*12/07/22 19:17*	*01/01/23 12:24*	*1*
13C2 PFUnA	*88*		*50 - 150*	*12/07/22 19:17*	*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*
18O2 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	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**16.8**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**83.2**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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

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)	**0.58**		0.23	0.035	ug/Kg	☼	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	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 12:34	1
Perfluorotridecanoic acid (PFTriA)	**1.3**		0.23	0.024	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:44	01/01/23 12:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.054	ug/Kg	☼	12/07/22 19:44	01/01/23 12:34	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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 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*
18O2 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) - PFAS 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	☼	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*

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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

General Chemistry

Analyte	Result	Qualifier	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

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

Job ID: 320-94972-1

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
Percent Solids: 86.1

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)	**0.090**	**J**	0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluoroheptanoic acid (PFHpA)	**0.077**	**J**	0.22	0.041	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorooctanoic acid (PFOA)	**0.11**	**J**	0.22	0.058	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorononanoic acid (PFNA)	**0.64**		0.22	0.024	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorodecanoic acid (PFDA)	**0.40**		0.22	0.052	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluoroundecanoic acid (PFUnA)	**1.1**		0.22	0.046	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorododecanoic acid (PFDoA)	**0.065**	**J**	0.22	0.033	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorotridecanoic acid (PFTriA)	**0.29**		0.22	0.023	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.040	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Perfluorooctanesulfonic acid (PFOS)	**8.9**		0.22	0.047	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 12:44	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*80*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C4 PFOA	*84*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C5 PFNA	*91*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C2 PFDA	*86*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C2 PFUnA	*94*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C2 PFDoA	*83*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C2 PFTeDA	*85*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C3 PFBS	*74*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
18O2 PFHxS	*76*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C4 PFOS	*73*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
d3-NMeFOSAA	*117*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
d5-NEtFOSAA	*125*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*
13C3 HFPO-DA	*78*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:44*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.9**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**86.1**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS33

Date Collected: 12/01/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-33

Matrix: Solid
Percent Solids: 83.7

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)	**0.061**	**J**	0.23	0.036	ug/Kg	☼	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 (PFUnA)	**3.4**		0.23	0.049	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorododecanoic acid (PFDoA)	**0.40**		0.23	0.035	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorotridecanoic acid (PFTriA)	**0.52**		0.23	0.024	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorotetradecanoic acid (PFTeA)	**0.058**	**J**	0.23	0.043	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.044	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
Perfluorooctanesulfonic acid (PFOS)	**1.4**	**I**	0.23	0.050	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.056	ug/Kg	☼	12/07/22 19:44	01/01/23 12:54	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C4 PFHpA	*78*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C4 PFOA	*80*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C5 PFNA	*89*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C2 PFDA	*84*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C2 PFUnA	*89*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C2 PFDoA	*85*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C2 PFTeDA	*82*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C3 PFBS	*69*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
18O2 PFHxS	*71*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
13C4 PFOS	*68*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
d3-NMeFOSAA	*105*		*50 - 150*	*12/07/22 19:44*	*01/01/23 12:54*	*1*
d5-NEtFOSAA	*119*		*50 - 150*	*12/07/22 19:44*	*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	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**16.3**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**83.7**		0.1	0.1	%			12/07/22 12:40	1

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

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)	**0.073**	**J**	0.22	0.034	ug/Kg	☼	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	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:44	01/01/23 13:04	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*	*12/07/22 19:44*	*01/01/23 13:04*	*1*
18O2 PFHxS	*72*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:04*	*1*
13C4 PFOS	*67*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:04*	*1*
d3-NMeFOSAA	*115*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:04*	*1*
d5-NEtFOSAA	*125*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:04*	*1*
13C3 HFPO-DA	*88*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:04*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	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

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

Job ID: 320-94972-1

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
Percent Solids: 90.3

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)	**0.20**	**J**	0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 13:14	1
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	0.041	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 13:14	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:44	01/01/23 13:14	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:44	01/01/23 13:14	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:44	01/01/23 13:14	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:44	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*	*12/07/22 19:44*	*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 for QSM 5.3, Table B-15 - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**93**		2.2	0.46	ug/Kg	☼	12/07/22 19:44	01/05/23 21:54	10
Perfluorooctanesulfonic acid (PFOS)	**29**		2.2	0.47	ug/Kg	☼	12/07/22 19:44	01/05/23 21:54	10

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*94*		*50 - 150*	*12/07/22 19:44*	*01/05/23 21:54*	*10*
13C4 PFOS	*76*		*50 - 150*	*12/07/22 19:44*	*01/05/23 21:54*	*10*

Client Sample Results

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

Job ID: 320-94972-1

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
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

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS36
Date Collected: 12/02/22 20:50
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-36
Matrix: Solid
Percent Solids: 87.9

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		0.21	0.032	ug/Kg	☼	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	0.022	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.038	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	0.030	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.050	ug/Kg	☼	12/07/22 19:44	01/01/23 13:25	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*	*12/07/22 19:44*	*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	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**12.1**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**87.9**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

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

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		0.20	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**	**I**	0.20	0.043	ug/Kg	☼	12/07/22 19:44	01/01/23 13:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg	☼	12/07/22 19:44	01/01/23 13:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg	☼	12/07/22 19:44	01/01/23 13:35	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.20	0.035	ug/Kg	☼	12/07/22 19:44	01/01/23 13:35	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.20	0.041	ug/Kg	☼	12/07/22 19:44	01/01/23 13:35	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.20	0.031	ug/Kg	☼	12/07/22 19:44	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*
18O2 PFHxS	*69*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:35*	*1*
13C4 PFOS	*70*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:35*	*1*
d3-NMeFOSAA	*104*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:35*	*1*
d5-NEtFOSAA	*116*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:35*	*1*
13C3 HFPO-DA	*81*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:35*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**6.4**		0.1	0.1	%			12/07/22 12:40	1
Percent Solids (ASTM D 2216)	**93.6**		0.1	0.1	%			12/07/22 12:40	1

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

Job ID: 320-94972-1

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

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	☼	12/07/22 19:44	01/01/23 13:45	1
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 13:45	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.052	ug/Kg	☼	12/07/22 19:44	01/01/23 13:45	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		0.22	0.034	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*
18O2 PFHxS	*73*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:45*	*1*
13C4 PFOS	*71*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:45*	*1*
d3-NMeFOSAA	*107*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:45*	*1*
d5-NEtFOSAA	*123*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:45*	*1*
13C3 HFPO-DA	*85*		*50 - 150*	*12/07/22 19:44*	*01/01/23 13:45*	*1*

General Chemistry

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

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

Job ID: 320-94972-1

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
Percent Solids: 86.9

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		0.23	0.035	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorooctanoic acid (PFOA)	**0.15**	**J**	0.23	0.060	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorononanoic acid (PFNA)	**0.073**	**J**	0.23	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.054	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.047	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.024	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.23	0.048	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.054	ug/Kg	☼	12/07/22 19:44	01/01/23 14:15	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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*
18O2 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	Result	Qualifier	RL	MDL	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 Sample ID: 22OTZ-SS40

Date Collected: 12/02/22 21:30
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-40

Matrix: Solid
Percent Solids: 86.3

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)	**0.035**	**J**	0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluoroheptanoic acid (PFHpA)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorooctanoic acid (PFOA)	**0.11**	**J**	0.22	0.058	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorononanoic acid (PFNA)	**0.091**	**J**	0.22	0.024	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorodecanoic acid (PFDA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluoroundecanoic acid (PFUnA)	ND		0.22	0.046	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorotridecanoic acid (PFTriA)	ND		0.22	0.023	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.047	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.038	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:44	01/01/23 14:25	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*79*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C4 PFOA	*78*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C5 PFNA	*95*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C2 PFDA	*90*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C2 PFUnA	*91*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C2 PFDoA	*87*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C2 PFTeDA	*81*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C3 PFBS	*71*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
18O2 PFHxS	*73*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C4 PFOS	*73*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
d3-NMeFOSAA	*110*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
d5-NEtFOSAA	*112*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*
13C3 HFPO-DA	*85*		*50 - 150*	*12/07/22 19:44*	*01/01/23 14:25*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**13.7**		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	**86.3**		0.1	0.1	%			12/07/22 11:38	1

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS41

Date Collected: 12/02/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-41

Matrix: Solid
Percent Solids: 81.6

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		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluoroheptanoic acid (PFHpA)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorooctanoic acid (PFOA)	**0.12**	**J**	0.23	0.060	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorononanoic acid (PFNA)	**0.087**	**J**	0.23	0.025	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorodecanoic acid (PFDA)	ND		0.23	0.055	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluoroundecanoic acid (PFUnA)	ND		0.23	0.048	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorododecanoic acid (PFDoA)	ND		0.23	0.034	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorotridecanoic acid (PFTriA)	ND		0.23	0.024	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.23	0.042	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.23	0.043	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.23	0.033	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.23	0.049	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.026	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.055	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.040	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.047	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.035	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.23	0.044	ug/Kg	☼	12/07/22 19:17	01/02/23 10:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*78*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C4 PFHpA	*80*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C4 PFOA	*84*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C5 PFNA	*95*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C2 PFDA	*87*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C2 PFUnA	*95*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C2 PFDoA	*87*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C2 PFTeDA	*89*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C3 PFBS	*77*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
18O2 PFHxS	*77*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C4 PFOS	*75*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
d3-NMeFOSAA	*112*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
d5-NEtFOSAA	*122*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*
13C3 HFPO-DA	*83*		*50 - 150*	*12/07/22 19:17*	*01/02/23 10:05*	*1*

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	**18.4**		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	**81.6**		0.1	0.1	%			12/07/22 11:38	1

Client Sample ID: 22OTZ-SS42

Date Collected: 12/02/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-42

Matrix: Solid
Percent Solids: 86.7

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	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluoroheptanoic acid (PFHpA)	**0.042**	**J**	0.22	0.042	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorooctanoic acid (PFOA)	**0.17**	**J**	0.22	0.059	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorononanoic acid (PFNA)	**0.15**	**J**	0.22	0.024	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorodecanoic acid (PFDA)	**0.057**	**J**	0.22	0.053	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluoroundecanoic acid (PFUnA)	**0.27**	**B**	0.22	0.046	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorododecanoic acid (PFDoA)	ND		0.22	0.033	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorotridecanoic acid (PFTriA)	**0.080**	**J B**	0.22	0.023	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.048	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.025	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.053	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.045	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.034	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:17	01/09/23 02:55	1

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*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.19**	**J H**	0.22	0.047	ug/Kg	☼	01/10/23 19:43	01/11/23 15:28	1
Perfluorooctanesulfonic acid (PFOS)	**2.4**	**H I**	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*

Client Sample Results

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS42
Date Collected: 12/02/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-42
Matrix: Solid
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
Project/Site: Kotzenue DOT&PF

Job ID: 320-94972-1

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

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)	**0.14**	**J**	0.24	0.037	ug/Kg	☼	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**	**J B**	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**	**J B**	0.24	0.025	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.044	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.045	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.034	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.24	0.051	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.24	0.027	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.24	0.057	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.041	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.048	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.037	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.046	ug/Kg	☼	12/07/22 19:17	01/09/23 03:05	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*88*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C4 PFHpA	*85*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C4 PFOA	*82*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C5 PFNA	*93*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C2 PFDA	*90*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C2 PFUnA	*96*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C2 PFDoA	*82*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C2 PFTeDA	*96*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C3 PFBS	*77*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
18O2 PFHxS	*84*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C4 PFOS	*75*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
d3-NMeFOSAA	*115*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
d5-NEtFOSAA	*125*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*
13C3 HFPO-DA	*80*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:05*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.090**	**J H**	0.23	0.048	ug/Kg	☼	01/10/23 19:43	01/11/23 15:38	1
Perfluorooctanesulfonic acid (PFOS)	**2.5**	**H I**	0.23	0.049	ug/Kg	☼	01/10/23 19:43	01/11/23 15:38	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*82*		*50 - 150*	*01/10/23 19:43*	*01/11/23 15:38*	*1*
13C4 PFOS	*71*		*50 - 150*	*01/10/23 19:43*	*01/11/23 15:38*	*1*

Client Sample Results

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

Job ID: 320-94972-1

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

General Chemistry

Analyte	Result	Qualifier	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 Sample ID: 22OTZ-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

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)	**0.062**	**J**	0.24	0.037	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluoroheptanoic acid (PFHpA)	**0.062**	**J**	0.24	0.046	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorooctanoic acid (PFOA)	**0.25**		0.24	0.063	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorononanoic acid (PFNA)	**0.30**		0.24	0.026	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorodecanoic acid (PFDA)	**0.14**	**J**	0.24	0.057	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluoroundecanoic acid (PFUnA)	**0.39**	**B**	0.24	0.050	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorododecanoic acid (PFDoA)	**0.036**	**J**	0.24	0.036	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorotridecanoic acid (PFTriA)	**0.086**	**J B**	0.24	0.025	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.24	0.044	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.24	0.046	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.24	0.035	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.24	0.051	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.24	0.028	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.24	0.057	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.24	0.042	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.24	0.049	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.24	0.037	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.24	0.047	ug/Kg	☼	12/07/22 19:17	01/09/23 03:15	1

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*
18O2 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*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.29**	**H**	0.23	0.049	ug/Kg	☼	01/10/23 19:43	01/11/23 15:48	1
Perfluorooctanesulfonic acid (PFOS)	**1.5**	**H I**	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*

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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

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

Client Sample ID: 22OTZ-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

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)	**0.079**	**J**	0.23	0.036	ug/Kg	☼	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**	**J B**	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**	**J B**	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**	**I B**	0.23	0.050	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.23	0.027	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.23	0.056	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.23	0.041	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.23	0.048	ug/Kg	☼	12/07/22 19:17	01/09/23 03:25	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.23	0.036	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

Isotope 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*
18O2 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*	*12/07/22 19:17*	*01/09/23 03:25*	*1*
d5-NEtFOSAA	*116*		*50 - 150*	*12/07/22 19:17*	*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 for QSM 5.3, Table B-15 - RE

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.20**	**J H**	0.23	0.049	ug/Kg	☼	01/10/23 19:43	01/11/23 15:58	1
Perfluorooctanesulfonic acid (PFOS)	**8.4**	**H I**	0.23	0.050	ug/Kg	☼	01/10/23 19:43	01/11/23 15:58	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*85*		*50 - 150*	*01/10/23 19:43*	*01/11/23 15:58*	*1*
13C4 PFOS	*76*		*50 - 150*	*01/10/23 19:43*	*01/11/23 15:58*	*1*

Client Sample Results

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture (ASTM D 2216)	16.4		0.1	0.1	%			12/07/22 11:38	1
Percent Solids (ASTM D 2216)	83.6		0.1	0.1	%			12/07/22 11:38	1

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

Job ID: 320-94972-1

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
Percent Solids: 88.5

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	0.035	ug/Kg	☼	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**	**J B**	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**	**J B**	0.22	0.023	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.22	0.041	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.22	0.042	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.22	0.032	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
Perfluorooctanesulfonic acid (PFOS)	ND		0.22	0.048	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.22	0.026	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.22	0.054	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.22	0.039	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.22	0.046	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.22	0.035	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.22	0.043	ug/Kg	☼	12/07/22 19:17	01/09/23 03:35	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*85*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C4 PFHpA	*90*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C4 PFOA	*84*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C5 PFNA	*95*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C2 PFDA	*91*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C2 PFUnA	*101*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C2 PFDoA	*96*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C2 PFTeDA	*92*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C3 PFBS	*76*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
18O2 PFHxS	*82*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C4 PFOS	*74*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
d3-NMeFOSAA	*106*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
d5-NEtFOSAA	*123*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*
13C3 HFPO-DA	*81*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:35*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.18**	**J H**	0.22	0.046	ug/Kg	☼	01/10/23 19:43	01/11/23 16:08	1
Perfluorooctanesulfonic acid (PFOS)	**0.31**	**H I**	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*	*1*
13C4 PFOS	*78*		*50 - 150*	*01/10/23 19:43*	*01/11/23 16:08*	*1*

Client Sample Results

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

Job ID: 320-94972-1

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
Percent Solids: 88.5

General Chemistry

Analyte	Result	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 Sample ID: 22OTZ-SS47
Date Collected: 12/02/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-47
Matrix: Solid
Percent Solids: 91.1

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		0.21	0.032	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluoroheptanoic acid (PFHpA)	ND		0.21	0.039	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorooctanoic acid (PFOA)	ND		0.21	0.054	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorononanoic acid (PFNA)	**0.025**	**J**	0.21	0.023	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorodecanoic acid (PFDA)	ND		0.21	0.049	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluoroundecanoic acid (PFUnA)	**0.29**	**B**	0.21	0.043	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorododecanoic acid (PFDoA)	ND		0.21	0.031	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorotridecanoic acid (PFTriA)	**0.13**	**J B**	0.21	0.022	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		0.21	0.038	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		0.21	0.039	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		0.21	0.030	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Perfluorooctanesulfonic acid (PFOS)	**0.34**	**I B**	0.21	0.044	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.21	0.024	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.21	0.049	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		0.21	0.036	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		0.21	0.042	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		0.21	0.032	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		0.21	0.040	ug/Kg	☼	12/07/22 19:17	01/09/23 03:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*75*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C4 PFHpA	*81*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C4 PFOA	*75*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C5 PFNA	*81*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C2 PFDA	*80*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C2 PFUnA	*88*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C2 PFDoA	*70*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C2 PFTeDA	*88*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C3 PFBS	*62*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
18O2 PFHxS	*64*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C4 PFOS	*66*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
d3-NMeFOSAA	*91*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
d5-NEtFOSAA	*102*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*
13C3 HFPO-DA	*72*		*50 - 150*	*12/07/22 19:17*	*01/09/23 03:46*	*1*

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluoroundecanoic acid (PFUnA)	**0.16**	**J H**	0.21	0.045	ug/Kg	☼	01/10/23 19:43	01/11/23 16:18	1
Perfluorooctanesulfonic acid (PFOS)	**0.30**	**H I**	0.21	0.046	ug/Kg	☼	01/10/23 19:43	01/11/23 16:18	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*84*		*50 - 150*	*01/10/23 19:43*	*01/11/23 16:18*	*1*
13C4 PFOS	*70*		*50 - 150*	*01/10/23 19:43*	*01/11/23 16:18*	*1*

Client Sample Results

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS47
Date Collected: 12/02/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-47
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

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-EB

Date Collected: 12/03/22 21:17
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-48

Matrix: Water

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

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		2.0	0.57	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.84	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorodecanoic acid (PFDA)	ND		2.0	0.31	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluoroundecanoic acid (PFUnA)	ND		2.0	1.1	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorododecanoic acid (PFDoA)	ND		2.0	0.54	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorotridecanoic acid (PFTriA)	ND		2.0	1.3	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorotetradecanoic acid (PFTeA)	ND		2.0	0.72	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.56	ng/L		12/12/22 06:38	12/14/22 13:46	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.53	ng/L		12/12/22 06:38	12/14/22 13:46	1
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		4.9	1.2	ng/L		12/12/22 06:38	12/14/22 13:46	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		4.9	1.3	ng/L		12/12/22 06:38	12/14/22 13:46	1
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	ND		2.0	0.24	ng/L		12/12/22 06:38	12/14/22 13:46	1
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	ND		3.9	1.5	ng/L		12/12/22 06:38	12/14/22 13:46	1
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	ND		2.0	0.31	ng/L		12/12/22 06:38	12/14/22 13:46	1
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.0	0.39	ng/L		12/12/22 06:38	12/14/22 13:46	1

Isotope Dilution	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*99*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:46*	*1*
13C4 PFHpA	*93*		*50 - 150*	*12/12/22 06:38*	*12/14/22 13:46*	*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

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDoA (50-150)	PFTDA (50-150)
320-94972-1	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	22OTZ-SS10	74	74	81	88	80	88	82	86
320-94972-11	22OTZ-SS11	75	80	81	92	89	90	91	91
320-94972-12	22OTZ-SS12	45 *5-	69	80	86	82	88	86	83
320-94972-13	22OTZ-SS13	76	80	82	93	90	94	89	89
320-94972-14	22OTZ-SS14	74	77	77	89	81	85	84	80
320-94972-15	22OTZ-SS15	72	79	81	93	88	94	91	90
320-94972-16	22OTZ-SS16	75	79	81	91	85	92	90	89
320-94972-17	22OTZ-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	22OTZ-SS35						94		
320-94972-36	22OTZ-SS36	80	82	84	89	85	90	86	82
320-94972-37	22OTZ-SS37	79	85	81	93	84	89	85	86
320-94972-38	22OTZ-SS38	78	83	85	94	92	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	89

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 (Continued)

Matrix: Solid

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDoA (50-150)	PFTDA (50-150)
320-94972-42	22OTZ-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	22OTZ-SS44	86	88	81	98	94	105	90	94
320-94972-44 - RE	22OTZ-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	22OTZ-SS47						84		
320-94972-47 MS	22OTZ-SS47	78	78	77	85	80	88	87	82
320-94972-47 MS - RE	22OTZ-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)							
Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)		
320-94972-1	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		

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 (Continued)

Matrix: Solid

Prep Type: Total/NA

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)		
320-94972-22	22OTZ-SS22	71	72	72	114	120	80		
320-94972-23	22OTZ-SS23	65	68	65	106	119	78		
320-94972-24	22OTZ-SS24	70	78	72	120	131	87		
320-94972-25	22OTZ-SS25	63	65	56	98	111	71		
320-94972-26	22OTZ-SS26	75	76	76	85	89	81		
320-94972-26 - DL	22OTZ-SS26								
320-94972-27	22OTZ-SS27	71	75	66	105	105	82		
320-94972-27 - DL	22OTZ-SS27			75					
320-94972-28	22OTZ-SS28	69	74	69	107	115	79		
320-94972-29	22OTZ-SS29	70	76	74	115	128	81		
320-94972-30	22OTZ-SS30	71	72	72	105	125	80		
320-94972-31	22OTZ-SS31	70	72	71	109	124	77		
320-94972-31 - DL	22OTZ-SS31			75					
320-94972-32	22OTZ-SS32	74	76	73	117	125	78		
320-94972-33	22OTZ-SS33	69	71	68	105	119	77		
320-94972-34	22OTZ-SS34	69	72	67	115	125	88		
320-94972-35	22OTZ-SS35	67	72	66	109	80	84		
320-94972-35 - DL	22OTZ-SS35			76					
320-94972-36	22OTZ-SS36	69	72	70	107	127	86		
320-94972-37	22OTZ-SS37	69	69	70	104	116	81		
320-94972-38	22OTZ-SS38	69	73	71	107	123	85		
320-94972-39	22OTZ-SS39	63	69	67	108	112	77		
320-94972-40	22OTZ-SS40	71	73	73	110	112	85		
320-94972-40 MS	22OTZ-SS40	72	77	71	104	116	87		
320-94972-40 MSD	22OTZ-SS40	71	75	74	115	126	90		
320-94972-41	22OTZ-SS41	77	77	75	112	122	83		
320-94972-42	22OTZ-SS42	73	79	70	102	120	79		
320-94972-42 - RE	22OTZ-SS42			71					
320-94972-43	22OTZ-SS43	77	84	75	115	125	80		
320-94972-43 - RE	22OTZ-SS43			71					
320-94972-44	22OTZ-SS44	80	84	79	114	132	81		
320-94972-44 - RE	22OTZ-SS44			78					
320-94972-45	22OTZ-SS45	73	79	72	104	116	75		
320-94972-45 - RE	22OTZ-SS45			76					
320-94972-46	22OTZ-SS46	76	82	74	106	123	81		
320-94972-46 - RE	22OTZ-SS46			78					
320-94972-47	22OTZ-SS47	62	64	66	91	102	72		
320-94972-47 - RE	22OTZ-SS47			70					
320-94972-47 MS	22OTZ-SS47	64	62	64	93	104	70		
320-94972-47 MS - RE	22OTZ-SS47			70					
320-94972-47 MSD	22OTZ-SS47	64	68	67	92	105	78		
320-94972-47 MSD - RE	22OTZ-SS47			71					
LCS 320-638274/2-A	Lab Control Sample	65	72	71	105	108	73		
LCS 320-638277/2-A	Lab Control Sample	81	81	77	113	114	82		
LCS 320-638278/2-A	Lab Control Sample	80	82	79	106	103	80		
LCS 320-646043/2-A	Lab Control Sample			79					
MB 320-638274/1-A	Method Blank	80	79	76	114	116	81		
MB 320-638277/1-A	Method Blank	77	79	76	117	125	83		
MB 320-638278/1-A	Method Blank	72	75	77	99	108	77		
MB 320-646043/1-A	Method Blank			81					

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**

		Percent Isotope Dilution Recovery (Acceptance Limits)							
Lab Sample ID	Client Sample ID	PFHxA (50-150)	C4PFHA (50-150)	PFOA (50-150)	PFNA (50-150)	PFDA (50-150)	PFUnA (50-150)	PFDoA (50-150)	PFTDA (50-150)
320-94972-48	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

		Percent Isotope Dilution Recovery (Acceptance Limits)					
Lab Sample ID	Client Sample ID	C3PFBS (50-150)	PFHxS (50-150)	PFOS (50-150)	d3NMFOS (50-150)	d5NEFOS (50-150)	HFPODA (50-150)
320-94972-48	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

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

Analyte	MB Result	MB 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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:13	01/02/23 04:30	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFHxA	*75*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C4 PFHpA	*82*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C4 PFOA	*84*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C5 PFNA	*92*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C2 PFDA	*87*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C2 PFUnA	*89*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C2 PFDoA	*89*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C2 PFTeDA	*87*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C3 PFBS	*80*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
18O2 PFHxS	*79*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C4 PFOS	*76*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
d3-NMeFOSAA	*114*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
d5-NEtFOSAA	*116*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*1*
13C3 HFPO-DA	*81*		*50 - 150*	*12/07/22 19:13*	*01/02/23 04:30*	*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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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

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

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 638274

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	2.00	2.11		ug/Kg		105	69 - 133
Perfluoroundecanoic acid (PFUnA)	2.00	2.10		ug/Kg		105	64 - 136
Perfluorododecanoic acid (PFDoA)	2.00	2.20		ug/Kg		110	69 - 135
Perfluorotridecanoic acid (PFTriA)	2.00	2.18		ug/Kg		109	66 - 139
Perfluorotetradecanoic acid (PFTeA)	2.00	2.10		ug/Kg		105	69 - 133
Perfluorobutanesulfonic acid (PFBS)	1.78	1.96		ug/Kg		111	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.77		ug/Kg		97	67 - 130
Perfluorooctanesulfonic acid (PFOS)	1.86	1.91		ug/Kg		103	68 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	2.13		ug/Kg		107	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	2.06		ug/Kg		103	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.87	1.93		ug/Kg		103	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.00		ug/Kg		100	77 - 137
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.89	1.98		ug/Kg		105	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.89	2.14		ug/Kg		114	79 - 139

Isotope Dilution	*LCS %Recovery*	*LCS 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*
18O2 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
Matrix: Solid
Analysis Batch: 643841

Client Sample ID: 22OTZ-SS01
Prep Type: Total/NA
Prep Batch: 638274

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanoic acid (PFHxA)	ND		2.14	2.26		ug/Kg	☼	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

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: 22OTZ-SS01
Prep Type: Total/NA
Prep Batch: 638274

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.14	2.15		ug/Kg	☼	100	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.14	2.21		ug/Kg	☼	103	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MS %Recovery*	*MS 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*
18O2 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
Analysis Batch: 643841

Client Sample ID: 22OTZ-SS01
Prep Type: Total/NA
Prep Batch: 638274

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	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

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

Lab Sample ID: 320-94972-1 MSD
Matrix: Solid
Analysis Batch: 643841

Client Sample ID: 22OTZ-SS01
Prep Type: Total/NA
Prep Batch: 638274

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorooctanoic acid (PFOA)	ND		2.15	2.14		ug/Kg	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.15	2.40		ug/Kg	☼	112	63 - 144	11	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.15	2.10		ug/Kg	☼	98	61 - 139	5	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		2.03	2.11		ug/Kg	☼	104	76 - 136	5	30
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.03	2.59		ug/Kg	☼	128	79 - 139	4	30

Isotope Dilution	*MSD %Recovery*	*MSD Qualifier*	*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*
18O2 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
Analysis Batch: 643816

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 638277

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanoic acid (PFHxA)	ND		0.20	0.031	ug/Kg		12/07/22 19:17	01/01/23 10:12	1

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

Analyte	MB Result	MB 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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/01/23 10:12	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MB %Recovery*	*MB 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*
18O2 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 HFPO-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

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 638277

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroundecanoic acid (PFUnA)	2.00	1.94		ug/Kg		97	64 - 136
Perfluorododecanoic acid (PFDoA)	2.00	2.18		ug/Kg		109	69 - 135
Perfluorotridecanoic acid (PFTriA)	2.00	2.11		ug/Kg		105	66 - 139
Perfluorotetradecanoic acid (PFTeA)	2.00	2.09		ug/Kg		105	69 - 133
Perfluorobutanesulfonic acid (PFBS)	1.78	1.77		ug/Kg		100	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.72		ug/Kg		94	67 - 130
Perfluorooctanesulfonic acid (PFOS)	1.86	2.01		ug/Kg		108	68 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	2.04		ug/Kg		102	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	2.13		ug/Kg		107	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.87	2.02		ug/Kg		108	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.16		ug/Kg		108	77 - 137
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.89	1.99		ug/Kg		106	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.89	2.18		ug/Kg		116	79 - 139

Isotope Dilution	*LCS %Recovery*	*LCS 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*
18O2 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
Analysis Batch: 643816

Client Sample ID: 22OTZ-SS40
Prep Type: Total/NA
Prep Batch: 638277

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorodecanoic acid (PFDA)	ND		2.23	2.63		ug/Kg	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.23	2.45		ug/Kg	☼	110	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.23	2.27		ug/Kg	☼	102	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MS %Recovery*	*MS 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*
18O2 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

Client Sample ID: 22OTZ-SS40
Prep Type: Total/NA
Prep Batch: 638277

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	0.035	J	2.26	2.27		ug/Kg	☼	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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorononanoic acid (PFNA)	0.091	J	2.26	2.20		ug/Kg	☼	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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.26	2.29		ug/Kg	☼	102	63 - 144	7	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.26	2.19		ug/Kg	☼	97	61 - 139	3	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MSD %Recovery*	*MSD 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*
18O2 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 Batch: 638278

Analyte	MB Result	MB 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

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 Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 638278

Analyte	MB Result	MB 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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		0.20	0.023	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		0.20	0.048	ug/Kg		12/07/22 19:17	01/02/23 09:44	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MB %Recovery*	*MB 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*
18O2 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
Prep Type: Total/NA
Prep Batch: 638278

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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 (PFUnA)	2.00	2.01		ug/Kg		100	64 - 136

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorododecanoic acid (PFDoA)	2.00	2.13		ug/Kg		106	69 - 135
Perfluorotridecanoic acid (PFTriA)	2.00	2.09		ug/Kg		105	66 - 139
Perfluorotetradecanoic acid (PFTeA)	2.00	1.97		ug/Kg		99	69 - 133
Perfluorobutanesulfonic acid (PFBS)	1.78	1.75		ug/Kg		98	72 - 128
Perfluorohexanesulfonic acid (PFHxS)	1.82	1.73		ug/Kg		95	67 - 130
Perfluorooctanesulfonic acid (PFOS)	1.86	1.94		ug/Kg		104	68 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	2.00	2.06		ug/Kg		103	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	2.00	2.04		ug/Kg		102	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	1.87	1.88		ug/Kg		101	75 - 135
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	2.00	2.02		ug/Kg		101	77 - 137
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	1.89	1.88		ug/Kg		99	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	1.89	2.09		ug/Kg		110	79 - 139

Isotope Dilution	*LCS %Recovery*	*LCS 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*
18O2 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 Sample ID: 22OTZ-SS47
Prep Type: Total/NA
Prep Batch: 638278

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorohexanoic acid (PFHxA)	ND		2.13	2.03		ug/Kg	☼	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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluoroundecanoic acid (PFUnA)	0.29	B	2.13	2.27		ug/Kg	☼	93	64 - 136
Perfluorododecanoic acid (PFDoA)	ND		2.13	2.26		ug/Kg	☼	106	69 - 135
Perfluorotridecanoic acid (PFTriA)	0.13	J B	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	I B	1.98	2.40		ug/Kg	☼	104	68 - 136
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.13	2.10		ug/Kg	☼	99	63 - 144
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.13	2.10		ug/Kg	☼	98	61 - 139
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-1-sulfonic acid	ND		2.01	2.41		ug/Kg	☼	120	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	ND		2.01	2.40		ug/Kg	☼	119	79 - 139

Isotope Dilution	*MS %Recovery*	*MS 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*
18O2 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
Analysis Batch: 645416

Client Sample ID: 22OTZ-SS47
Prep Type: Total/NA
Prep Batch: 638278

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	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

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: 22OTZ-SS47
Prep Type: Total/NA
Prep Batch: 638278

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorodecanoic acid (PFDA)	ND		2.06	2.24		ug/Kg	☼	109	69 - 133	2	30
Perfluoroundecanoic acid (PFUnA)	0.29	B	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	J B	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	I B	1.92	2.30		ug/Kg	☼	102	68 - 136	4	30
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		2.06	2.18		ug/Kg	☼	106	63 - 144	4	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		2.06	2.08		ug/Kg	☼	101	61 - 139	1	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MSD %Recovery*	*MSD 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*
18O2 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

Analyte	MB Result	MB 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

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

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

Analyte	MB Result	MB 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	1
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		5.0	1.2	ng/L		12/12/22 06:38	12/14/22 11:34	1
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		5.0	1.3	ng/L		12/12/22 06:38	12/14/22 11:34	1
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MB %Recovery*	*MB 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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%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

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

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Perfluorododecanoic acid (PFDoA)	40.0	43.8		ng/L		110	72 - 134
Perfluorotridecanoic acid (PFTriA)	40.0	42.8		ng/L		107	65 - 144
Perfluorotetradecanoic acid (PFTeA)	40.0	40.3		ng/L		101	71 - 132
Perfluorobutanesulfonic acid (PFBS)	35.5	35.7		ng/L		101	72 - 130
Perfluorohexanesulfonic acid (PFHxS)	36.5	35.6		ng/L		98	68 - 131
Perfluorooctanesulfonic acid (PFOS)	37.2	37.6		ng/L		101	65 - 140
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	40.0	40.6		ng/L		102	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	40.0	38.8		ng/L		97	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	37.4	36.8		ng/L		98	77 - 137
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	40.0	39.9		ng/L		100	72 - 132
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	37.8	37.0		ng/L		98	76 - 136
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	37.8	37.8		ng/L		100	81 - 141

Isotope Dilution	*LCS %Recovery*	*LCS 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*
18O2 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
Analysis Batch: 640016

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 639072

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluorohexanoic acid (PFHxA)	40.0	40.4		ng/L		101	72 - 129	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	39.9		ng/L		100	72 - 130	10	30
Perfluorooctanoic acid (PFOA)	40.0	42.9		ng/L		107	71 - 133	2	30
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

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

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)			40.0	42.0		ng/L		105	65 - 136	3	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)			40.0	38.3		ng/L		96	61 - 135	1	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*LCSD %Recovery*	*LCSD 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*
18O2 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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		36.1	37.7		ng/L		104	65 - 136
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		36.1	34.9		ng/L		97	61 - 135
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MS %Recovery*	*MS 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*
18O2 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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	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

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

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroundecanoic acid (PFUnA)	ND		37.8	38.1		ng/L		101	69 - 133	5	30
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-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ND		37.8	37.7		ng/L		100	65 - 136	0	30
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ND		37.8	39.2		ng/L		103	61 - 135	11	30
9-Chlorohexadecafluoro-3-oxanonane-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-oxaundecane-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

Isotope Dilution	*MSD %Recovery*	*MSD 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*
18O2 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

Analyte	MB Result	MB 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

Isotope Dilution	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
13C2 PFUnA	*85*		*50 - 150*	*01/10/23 19:43*	*01/11/23 15:08*	*1*

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

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

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	81		50 - 150	01/10/23 19:43	01/11/23 15:08	1

Lab Sample ID: LCS 320-646043/2-A
Matrix: Solid
Analysis Batch: 646180

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 646043

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Perfluoroundecanoic acid (PFUnA)			2.00	2.26		ug/Kg		113	64 - 136		
Perfluorooctanesulfonic acid (PFOS)			1.86	2.03		ug/Kg		109	68 - 136		

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
13C2 PFUnA	85		50 - 150
13C4 PFOS	79		50 - 150

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

Lab Sample ID: 320-94972-47 MS
Matrix: Solid
Analysis Batch: 646180

Client Sample ID: 22OTZ-SS47
Prep Type: Total/NA
Prep Batch: 646043

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Perfluoroundecanoic acid (PFUnA) - RE	0.16	J H	2.09	2.59		ug/Kg	☼	116	64 - 136		
Perfluorooctanesulfonic acid (PFOS) - RE	0.30	H I	1.95	2.45		ug/Kg	☼	110	68 - 136		

Isotope Dilution	MS %Recovery	MS Qualifier	Limits
13C2 PFUnA - RE	88		50 - 150
13C4 PFOS - RE	70		50 - 150

Lab Sample ID: 320-94972-47 MSD
Matrix: Solid
Analysis Batch: 646180

Client Sample ID: 22OTZ-SS47
Prep Type: Total/NA
Prep Batch: 646043

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Perfluoroundecanoic acid (PFUnA) - RE	0.16	J H	2.02	2.36		ug/Kg	☼	109	64 - 136	9	30
Perfluorooctanesulfonic acid (PFOS) - RE	0.30	H I	1.88	2.29		ug/Kg	☼	106	68 - 136	7	30

Isotope Dilution	MSD %Recovery	MSD Qualifier	Limits
13C2 PFUnA - RE	89		50 - 150
13C4 PFOS - RE	71		50 - 150

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

Job ID: 320-94972-1

Method: D 2216 - Percent Moisture

Lab Sample ID: 320-94983-A-30 DU
Matrix: Solid
Analysis Batch: 638015

Client Sample ID: Duplicate
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	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
Matrix: Solid
Analysis Batch: 638112

Client Sample ID: 22OTZ-SS01
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	13.8			12.3		%				12	20
Percent Solids	86.2			87.7		%				2	20

Lab Sample ID: 320-94972-20 DU
Matrix: Solid
Analysis Batch: 638113

Client Sample ID: 22OTZ-SS20
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Percent Moisture	17.2			16.3		%				5	20
Percent Solids	82.8			83.7		%				1	20

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	

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	22OTZ-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

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	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-41	22OTZ-SS41	Total/NA	Solid	EPA 537(Mod)	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	Prep Batch
320-94972-26	22OTZ-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

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	22OTZ-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	

General Chemistry (Continued)

Analysis Batch: 638015 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-94972-47	22OTZ-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 Batch
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	22OTZ-SS11	Total/NA	Solid	D 2216	
320-94972-12	22OTZ-SS12	Total/NA	Solid	D 2216	
320-94972-13	22OTZ-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	22OTZ-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	22OTZ-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	
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	

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS01
Lab Sample ID: 320-94972-1
Date Collected: 11/30/22 20:45
Matrix: Solid
Date Received: 12/06/22 13:36

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.63 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 04:50	D1R	EET SAC

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.27 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
Lab Sample ID: 320-94972-3
Date Collected: 11/30/22 21:30
Matrix: Solid
Date Received: 12/06/22 13:36

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS03
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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 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
Lab Sample ID: 320-94972-4
Date Collected: 11/30/22 21:45
Matrix: Solid
Date Received: 12/06/22 13:36

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS04
Date Collected: 11/30/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-4
Matrix: Solid
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			5.03 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

Client Sample ID: 22OTZ-SS05
Date Collected: 11/30/22 22:00
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-5
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS05
Date Collected: 11/30/22 22:00
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-5
Matrix: Solid
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
Date Collected: 11/30/22 22:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-6
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS06
Date Collected: 11/30/22 22:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-6
Matrix: Solid
Percent Solids: 85.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.59 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
Date Collected: 11/30/22 22:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-7
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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
Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 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: 22OTZ-SS08
Lab Sample ID: 320-94972-8
Date Collected: 11/30/22 22:40
Matrix: Solid
Date Received: 12/06/22 13:36

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.50 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 06:42	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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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
Matrix: Solid
Date Received: 12/06/22 13:36
Percent Solids: 87.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.18 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: 22OTZ-SS10
Lab Sample ID: 320-94972-10
Date Collected: 11/30/22 23:05
Matrix: Solid
Date Received: 12/06/22 13:36

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS10
Date Collected: 11/30/22 23:05
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-10
Matrix: Solid
Percent Solids: 87.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.22 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: 22OTZ-SS11
Date Collected: 11/30/22 23:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-11
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS11
Date Collected: 11/30/22 23:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-11
Matrix: Solid
Percent Solids: 89.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.28 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 07:12	D1R	EET SAC

Client Sample ID: 22OTZ-SS12
Date Collected: 11/30/22 23:15
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-12
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS12
Date Collected: 11/30/22 23:15
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-12
Matrix: Solid
Percent Solids: 83.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.36 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: 22OTZ-SS13
Date Collected: 11/30/22 23:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-13
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS13
Date Collected: 11/30/22 23:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-13
Matrix: Solid
Percent Solids: 87.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 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: 22OTZ-SS14
Date Collected: 11/30/22 23:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-14
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS14
Date Collected: 11/30/22 23:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-14
Matrix: Solid
Percent Solids: 87.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.32 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 07:42	D1R	EET SAC

Client Sample ID: 22OTZ-SS15
Date Collected: 12/01/22 00:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-15
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS15
Date Collected: 12/01/22 00:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-15
Matrix: Solid
Percent Solids: 88.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.11 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 07:53	D1R	EET SAC

Client Sample ID: 22OTZ-SS16
Date Collected: 12/01/22 00:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-16
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS16
Date Collected: 12/01/22 00:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-16
Matrix: Solid
Percent Solids: 91.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.45 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 08:03	D1R	EET SAC

Client Sample ID: 22OTZ-SS17
Date Collected: 12/01/22 00:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-17
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS17
Date Collected: 12/01/22 00:40
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-17
Matrix: Solid
Percent Solids: 86.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.04 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 08:33	D1R	EET SAC

Client Sample ID: 22OTZ-SS18
Date Collected: 12/01/22 00:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-18
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS18
Date Collected: 12/01/22 00:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-18
Matrix: Solid
Percent Solids: 78.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 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 08:43	D1R	EET SAC

Client Sample ID: 22OTZ-SS19
Date Collected: 12/01/22 01:05
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-19
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638112	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS19
Date Collected: 12/01/22 01:05
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-19
Matrix: Solid
Percent Solids: 79.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.00 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

Client Sample ID: 22OTZ-SS20
Date Collected: 12/01/22 01:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-20
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS20
Date Collected: 12/01/22 01:25
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-20
Matrix: Solid
Percent Solids: 82.8

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.53 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
Date Collected: 12/01/22 01:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-21
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS21
Date Collected: 12/01/22 01:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-21
Matrix: Solid
Percent Solids: 88.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.31 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
Date Collected: 12/01/22 01:35
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-22
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS22
Date Collected: 12/01/22 01:35
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-22
Matrix: Solid
Percent Solids: 85.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.15 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 10:42	S1M	EET SAC

Client Sample ID: 22OTZ-SS23
Date Collected: 12/01/22 01:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-23
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS23
Date Collected: 12/01/22 01:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-23
Matrix: Solid
Percent Solids: 87.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 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 10:52	S1M	EET SAC

Client Sample ID: 22OTZ-SS24
Date Collected: 12/01/22 02:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-24
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS24
Date Collected: 12/01/22 02:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-24
Matrix: Solid
Percent Solids: 85.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.29 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 11:02	S1M	EET SAC

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.23 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-26
Matrix: Solid
Percent Solids: 87.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.24 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 11:33	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: 22OTZ-SS28
Date Collected: 12/01/22 21:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-28
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS28
Date Collected: 12/01/22 21:10
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-28
Matrix: Solid
Percent Solids: 87.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.48 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 ID: 320-94972-29
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-29
Matrix: Solid
Percent Solids: 80.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.50 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 12:13	S1M	EET SAC

Client Sample ID: 22OTZ-SS30
Date Collected: 12/01/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-30
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS30
Date Collected: 12/01/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-30
Matrix: Solid
Percent Solids: 83.2

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.26 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

Lab Sample ID: 320-94972-31
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.35 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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
Percent Solids: 86.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.34 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 12:44	S1M	EET SAC

Client Sample ID: 22OTZ-SS33
Date Collected: 12/01/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-33
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS33
Date Collected: 12/01/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-33
Matrix: Solid
Percent Solids: 83.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.13 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.17 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	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
Percent Solids: 90.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.09 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: 22OTZ-SS36
Date Collected: 12/02/22 20:50
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-36
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Client Sample ID: 22OTZ-SS36
Date Collected: 12/02/22 20:50
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-36
Matrix: Solid
Percent Solids: 87.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.47 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 13:25	S1M	EET SAC

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638113	12/07/22 12:40	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.33 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.25 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: 22OTZ-SS39
Date Collected: 12/02/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-39
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared 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
Percent Solids: 86.9

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.11 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

Lab Sample ID: 320-94972-40
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

Client Sample ID: 22OTZ-SS40
Date Collected: 12/02/22 21:30
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-40
Matrix: Solid
Percent Solids: 86.3

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.29 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
Date Collected: 12/02/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-41
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-SS41
Date Collected: 12/02/22 21:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-41
Matrix: Solid
Percent Solids: 81.6

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.38 g	10.0 mL	638278	12/07/22 19:17	FX	EET SAC
Total/NA	Analysis	EPA 537(Mod)		1	1 mL	1 mL	643847	01/02/23 10:05	D1R	EET SAC

Client Sample ID: 22OTZ-SS42
Date Collected: 12/02/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-42
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-SS42
Date Collected: 12/02/22 21:45
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-42
Matrix: Solid
Percent Solids: 86.7

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.22 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
Date Collected: 12/02/22 21:55
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-43
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.05 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: 22OTZ-SS44
Date Collected: 12/02/22 22:05
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-44
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.16 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: 22OTZ-SS45
Date Collected: 12/02/22 22:15
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-45
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.10 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

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Lab Chronicle

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

Job ID: 320-94972-1

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
Percent Solids: 88.5

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.07 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
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-47
Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	D 2216		1			638015	12/07/22 11:38	TCS	EET SAC

Client Sample ID: 22OTZ-SS47
Date Collected: 12/02/22 22:20
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-47
Matrix: Solid
Percent Solids: 91.1

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	SHAKE			5.35 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: 22OTZ-EB
Date Collected: 12/03/22 21:17
Date Received: 12/06/22 13:36

Lab Sample ID: 320-94972-48
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			254 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	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24

The following analytes are included in this report, but the laboratory is not certified by the governing authority. This list may include analytes for which the agency does not offer certification.

Analysis Method	Prep Method	Matrix	Analyte
D 2216		Solid	Percent Moisture
D 2216		Solid	Percent Solids

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

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	11/30/22 23:40	12/06/22 13:36
320-94972-14	22OTZ-SS14	Solid	11/30/22 23:55	12/06/22 13:36
320-94972-15	22OTZ-SS15	Solid	12/01/22 00:10	12/06/22 13:36
320-94972-16	22OTZ-SS16	Solid	12/01/22 00:25	12/06/22 13:36
320-94972-17	22OTZ-SS17	Solid	12/01/22 00:40	12/06/22 13:36
320-94972-18	22OTZ-SS18	Solid	12/01/22 00:55	12/06/22 13:36
320-94972-19	22OTZ-SS19	Solid	12/01/22 01:05	12/06/22 13:36
320-94972-20	22OTZ-SS20	Solid	12/01/22 01:25	12/06/22 13:36
320-94972-21	22OTZ-SS21	Solid	12/01/22 01:45	12/06/22 13:36
320-94972-22	22OTZ-SS22	Solid	12/01/22 01:35	12/06/22 13:36
320-94972-23	22OTZ-SS23	Solid	12/01/22 01:55	12/06/22 13:36
320-94972-24	22OTZ-SS24	Solid	12/01/22 02:10	12/06/22 13:36
320-94972-25	22OTZ-SS25	Solid	12/01/22 02:25	12/06/22 13:36
320-94972-26	22OTZ-SS26	Solid	12/01/22 20:40	12/06/22 13:36
320-94972-27	22OTZ-SS27	Solid	12/01/22 20:50	12/06/22 13:36
320-94972-28	22OTZ-SS28	Solid	12/01/22 21:10	12/06/22 13:36
320-94972-29	22OTZ-SS29	Solid	12/01/22 21:30	12/06/22 13:36
320-94972-30	22OTZ-SS30	Solid	12/01/22 21:20	12/06/22 13:36
320-94972-31	22OTZ-SS31	Solid	12/01/22 21:50	12/06/22 13:36
320-94972-32	22OTZ-SS32	Solid	12/01/22 22:00	12/06/22 13:36
320-94972-33	22OTZ-SS33	Solid	12/01/22 22:20	12/06/22 13:36
320-94972-34	22OTZ-SS34	Solid	12/01/22 22:40	12/06/22 13:36
320-94972-35	22OTZ-SS35	Solid	12/01/22 22:55	12/06/22 13:36
320-94972-36	22OTZ-SS36	Solid	12/02/22 20:50	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	12/06/22 13:36
320-94972-39	22OTZ-SS39	Solid	12/02/22 21:20	12/06/22 13:36
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	12/06/22 13:36
320-94972-43	22OTZ-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

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory Eurofins
Attn: David Alltucker

Turn Around Time: [X] Normal [ ] Rush
Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x18 QSM B15	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTZ-SS01		2045	11/30	X	1	Soil Grab Sample
22OTZ-SS02		2110		X	1	
22OTZ-SS03		2130		X	1	
22OTZ-SS04		2145		X	1	
22OTZ-SS05		2200		X	1	
22OTZ-SS06		2210		X	1	
22OTZ-SS07		2225		X	1	
22OTZ-SS08		2240		X	1	
22OTZ-SS09		2255		X	1	
22OTZ-SS10		2305		X	1	

Project Information	
Number:	109531-003
Name:	Kotzebue DOT & PF
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	4.9°C
Delivery Method:	AK Air Cargo

Notes:

320-94972 Chain of Custody

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Date: 12/5	Printed Name: Date:	Printed Name: Date:
Adam Wyborny		
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 13:36	Signature: Time:	Signature: Time:
Printed Name: Date: 12/6	Printed Name: Date:	Printed Name: Date:
N. Cahill		
Company: EETSAC 4.9c	Company:	Company:

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

No.

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CHAIN-OF-CUSTODY RECORD

Laboratory Eurofins
Attn: David Alltucker

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x18 QSM B-5							Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTZ-SS11		2325	11/30/22	X							1	Soil Grab Sample
22OTZ-SS12		2315		X							1	
22OTZ-SS13		2340		X							1	
22OTZ-SS14		2355		X							1	
22OTZ-SS15		0010	12/1/22	X							1	
22OTZ-SS16		0025		X							1	
22OTZ-SS17		0040		X							1	
22OTZ-SS18		0055		X							1	
22OTZ-SS19		0105		X							1	
22OTZ-SS20		0125		X							1	

Project Information	
Number:	109531-003
Name:	Kotzebue DOT&PF
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	4.9°C
Delivery Method:	AK Air Cargo

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Adam Wyborny Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 13:36	Signature: Time:	Signature: Time:
Printed Name: N. Cahill Date: 12/6/22	Printed Name: Date:	Printed Name: Date:
Company: EETSAC 4.9c	Company:	Company:

Notes:

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

No.

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CHAIN-OF-CUSTODY RECORD

Laboratory Eurofins
Attn: David Alltucker

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS x18	QSM B-15						Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTZ-SS 21		0145	12/1/22	X							1	Soil Grab Sample
22OTZ-SS 22		0135		X							1	
22OTZ-SS 23		0155		X							1	
22OTZ-SS 24		0210		X							1	
22OTZ-SS 25		0225		X							1	
22OTZ-SS 26		2040		X							1	
22OTZ-SS 27		2050		X							1	
22OTZ-SS 28		2110		X							1	
22OTZ-SS 29		2130		X							1	
22OTZ-SS 30		2120		X							1	

Project Information

Number:	109531-003
Name:	Kotzebue DOT&PF
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

Sample Receipt

Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	4.9°C
Delivery Method:	AK Air Cargo

Notes:

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Adam Wyborny Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Adam Wyborny Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 13:36	Signature: Time:	Signature: Time:
Printed Name: N. Cahill Date: 12/6/22	Printed Name: Date:	Printed Name: Date:
Company: EETSAC 4.9c	Company:	Company:

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

No.

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CHAIN-OF-CUSTODY RECORD

Laboratory Eurofins
Attn: David Alltucker

Turn Around Time: [X] Normal [ ] Rush — Please Specify

Quote No:

J-Flags: [X] Yes [ ] No

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS +18	GSM 8.15						Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTz-SS31		2150	12/1/22	X							1	Soil Grab Sample
22OTz-SS32		2200		X							1	
22OTz-SS33		2220		X							1	
22OTz-SS34		2240		X							1	
22OTz-SS35		2255		X							1	
22OTz-SS36		2050	12/2/22	X							1	
22OTz-SS37		2100		X							1	
22OTz-SS38		2110		X							1	
22OTz-SS39		2120		X							1	
22OTz-SS40		2130		X							1	

Project Information	
Number:	109531-003
Name:	Kotzebue DOT&PF
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	4.9°C
Delivery Method:	AK Air Cargo

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Adam Wyborny Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Adam Wyborny Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 13:35	Signature: Time:	Signature: Time:
Printed Name: N. Cahill Date: 12/6/22	Printed Name: Date:	Printed Name: Date:
Company: EETSAC 4.9c	Company:	Company:

Notes:

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

No.

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory: Eurofins
Attn: David Alltucker

Turn Around Time:	Quote No:
[X] Normal [ ] Rush	J-Flags: [X] Yes [ ] No
Please Specify	

Analytical Methods (include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	PFAS +18 GSM B-15	Total Number of Containers	Remarks/Matrix Composition/Grab? Sample Containers
22OTZ-SS41		2120	12/2/22	X	1	Soil Grab Sample
22OTZ-SS42		2145		X	1	
22OTZ-SS43		2155		X	1	
22OTZ-SS44		2205		X	1	
22OTZ-SS45		2215		X	1	
22OTZ-SS46		2230		X	1	
22OTZ-SS47		2220		X	1	
22OTZ-EB		2117	12/3/22	X	2	Distilled water blank

Project Information	
Number:	109531-003
Name:	Kotzebue DOT&PF
Contact:	Kristen Freiburger
Ongoing Project?	Yes [X] No [ ]
Sampler:	APW / JKR

Sample Receipt	
Total No. of Containers:	49
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	4.9°C
Delivery Method:	Alt Air Cargo

Notes:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 1200	Signature: Time:	Signature: Time:
Printed Name: Adam Wyborny Date: 12/5	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Time: 13:36	Signature: Time:	Signature: Time:
Printed Name: N. Cahill Date: 12-6-22	Printed Name: Date:	Printed Name: Date:
Company: EETSAC 4.9c	Company:	Company:

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

No.

Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-94972-1

Login Number: 94972
List Number: 1
Creator: Cahill, Nicholas P

List Source: Eurofins Sacramento

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	Seal
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	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**

   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.

   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 Custody (CoC)**

   a. Is the CoC information completed, signed, and dated (including released/received by)?
   Yes ☒ No ☐ N/A ☐
   Comments:

   b. Were the correct analyses requested?
   Yes ☒ No ☐ N/A ☐
   Analyses requested: PFAS by DoD QSM 5.3 Table B-15 compliant method, EPA 537 (Modified)
   Comments:

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 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 ☒ 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 ☐ No ☐ N/A ☒
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 Narrative

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

b. Are there discrepancies, errors, or QC failures identified by the lab?
Yes ☒ No ☐ N/A ☐
Comments: The 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.

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 *22OTZ-SS07, 22OTZ-SS08, 22OTZ-SS09, 22OTZ-SS11, 22OTZ-SS12, 22OTZ-SS13, 22OTZ-SS14, 22OTZ-SS15*, *22OTZ-SS18*, *22OTZ-SS21, 22OTZ-SS22, 22OTZ-SS24, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS33*, *22OTZ-SS37, 22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-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 *22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-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 *22OTZ-SS26, 22OTZ-SS27, 22OTZ-SS31*, and *22OTZ-SS35* were reported from the analysis of a diluted extract due to high concentrations of the target analytes in the undiluted extract.

Sample *22OTZ-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 *22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-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

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 *22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-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:

d. Are the reported limits of quantitation (LoQ) or limits of detections (LOD), or reporting limits (RL) less than the Cleanup Level or the action level for the project?
Yes ☒ No ☐ N/A ☐
Comments:

e. Is the data quality or usability affected?
Yes ☐ No ☒ N/A ☐
Comments: 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: 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 *22OTZ-SS41, 22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-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 *22OTZ-SS41,* so qualification of this sample was not required.

PFUnA was detected at estimated concentrations, less than the RL, in samples *22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-SS47*. The detected concentrations are within 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).

PFTriA was detected at estimated concentrations, less than the RL, in samples *22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, 22OTZ-SS45, 22OTZ-SS46*, and *22OTZ-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.

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

22OTZ-SS42, 22OTZ-SS43, 22OTZ-SS44, and *22OTZ-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 ☒

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. 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. 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: Sample *22OTZ-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 ☒ No ☐ N/A ☐
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 Blanks

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.

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

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

R_2 = 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 *22OTZ-SS29/22OTZ-SS30*. The results for these analytes are considered estimated with no direction of bias and are qualified "J".

PFOS was detected in *22OTZ-SS47* but not in its duplicate *22OTZ-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 order.

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 *22OTZ-SS7, 22OTZ-SS9, 22OTZ-SS11, 22OTZ-SS12, 22OTZ-SS14, 22OTZ-SS15, 22OTZ-SS18, 22OTZ-SS21, 22OTZ-SS22, 22OTZ-SS24, 22OTZ-SS27, 22OTZ-SS28, 22OTZ-SS33, 22OTZ-SS37, 22OTZ-SS45*, and *22OTZ-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 *22OTZ-SS11, 22OTZ-SS12, 22OTZ-SS45,* and *22OTZ-SS47* were previously qualified and did not require further qualification.

APPENDIX D: QUALITY ASSURANCE AND QUALITY CONTROL

Appendix D

Quality Assurance and Quality Control

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 22*OTZ-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

Appendix E

Conceptual Site Model

CONTENTS

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: DOT&PF Kotzebue Airport - Sitewide PFAS

File Number: N/A

Completed by: Shannon & Wilson - Note: assessed for PFAS contamination

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Firefighting training activities

Release Mechanisms *(check potential release mechanisms at the site)*

- ☒ Spills
- ☒ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☒ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☒ Sediment
- ☒ Groundwater
- ☒ Surface water
- ☒ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☒ Subsistence harvester (i.e. gathers wild foods)
- ☒ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☐ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

PFOS and PFOA were detected in surface soil near the OTZ Crosswind Runway at concentrations less than the DEC Human Health - Arctic Zone cleanup levels but greater than the most stringent DEC migration-to-groundwater cleanup levels.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Contaminants 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, human exposure via this route is considered insignificant.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

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 Kotzebue; however, the potential exists and we consider this pathway potentially complete. PFOS and PFOA were detected less than the DEC groundwater cleanup level in MW10-04 and MW10-09, near the OTZ, but exceeded the DEC drinking water action level for PFOS and PFOA in MW10-04.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, 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 harvesting of wild or farmed foods? ☒

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☒

Are site contaminants located where they would have the potential to be taken up into 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 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. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☒

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☐

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 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.
- Climate permits exposure to groundwater during activities, such as construction.
- 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.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

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 - PM_{10}). Particles of this size are called 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: ☒

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.
- The community has identified subsistence or recreational activities that would result in exposure to the 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.

Check the box if further evaluation of this pathway is needed: ☒

Comments:

Sediment has not been assessed at the site.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: DOT&PF Kotzebue Airport Sitewide PFAS

Completed By: Shannon & Wilson

Date Completed: February 2023

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *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.*

Media	Transport Mechanisms
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil
	☑ Migration to subsurface — check soil
	☑ Migration to groundwater — check groundwater
	☐ Volatilization — check air
	☑ Runoff or erosion — check surface water
	☑ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Subsurface Soil (2-15 ft bgs)	☑ Direct release to subsurface soil — check soil
	☑ Migration to groundwater — check groundwater
	☐ Volatilization — check air
	☑ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Ground-water	☑ Direct release to groundwater — check groundwater
	☐ Volatilization — check air
	☑ Flow to surface water body — check surface water
	☑ Flow to sediment — check sediment
	☑ Uptake by plants or animals — check biota
	☐ Other (list):
☐ Surface Water	☐ Direct release to surface water — check surface water
	☐ Volatilization — check air
	☐ Sedimentation — check sediment
	☐ Uptake by plants or animals — check biota
	☐ Other (list):
☑ Sediment	☑ Direct release to sediment — check sediment
	☑ Resuspension, runoff, or erosion — check surface water
	☑ Uptake by plants or animals — check biota
	☐ Other (list):

(3) *Check all exposure media identified in (2).*

(4) *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.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Current & Future Receptors

Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ soil	☑ Incidental Soil Ingestion		I	I	I			
	☑ Dermal Absorption of Contaminants from Soil		I	I	I			
	☑ Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F	C/F	C/F	
☑ groundwater	☑ Ingestion of Groundwater	F	I	I	I			
	☑ Dermal Absorption of Contaminants in Groundwater	I	I	I	I			
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ air	☐ Inhalation of Outdoor Air							
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust	I	I	I	I	I	I	
☑ surface water	☐ Ingestion of Surface Water							
	☐ Dermal Absorption of Contaminants in Surface Water							
	☐ Inhalation of Volatile Compounds in Tap Water							
☑ sediment	☑ Direct Contact with Sediment	C/F	C/F	C/F	C/F	C/F	C/F	
☑ biota	☑ Ingestion of Wild or Farmed Foods	C/F	C/F	C/F	C/F	C/F	C/F	

Revised, 10/01/2010

IMPORTANT INFORMATION

Important Information

About Your Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent

IMPORTANT INFORMATION

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.

IMPORTANT INFORMATION

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

APPENDIX B: STAGING AREAS

Appendix B

Staging Areas

Figure supplied by Alaska Department of Transportation and Public Facilities

Legend
Preliminary APE:
Runway:
Staging areas:

1.
2.
3.
4.

N
W
E
S

Proposed Project Description:

1. Rehabilitate Runway 18-36
2. Reconstruct Runway Lighting
3. Apply Dust Palliative
4. Improve Drainage

NOTE: Imagery acquired July 12, 2022.

0 320 640 1,280 Feet

STATE OF ALASKA
Department of Transportation and Public Facilities
2301 Peger Road Fairbanks, AK 99709

DATE: October 2022

Figure 2

NFAPT00600 - Kotzebue Airport Crosswind Runway Improvements

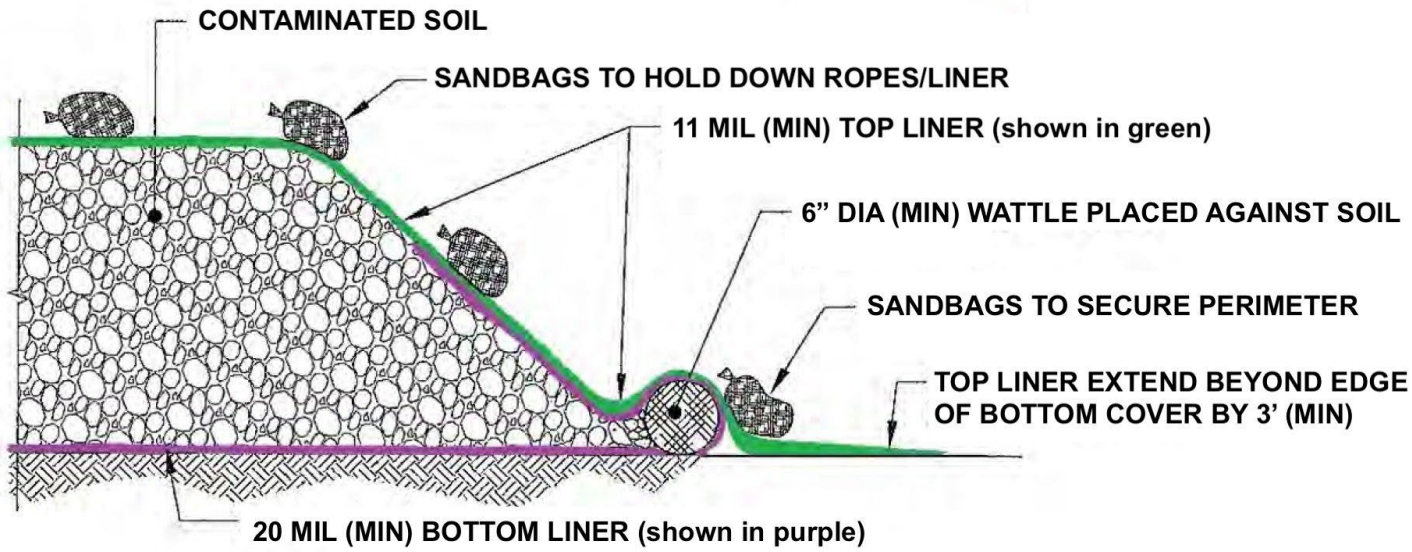
Document Path: H:\Projects\Communities\Kotzebue\75224_Kotz_Crosswind_Runway\10 Reports\Environmental\crosswind.aprx

APPENDIX C: STOCKPILE MANAGEMENT GUIDE

Appendix C

Stockpile Management Guide

Example of a Cross-Section Diagram of Proper Stockpile Storage:



Example of a Stockpile from Eielson AFB Restoration Program's Stockpiling Contaminated Soils Standard Operating Procedure:

PFAS-CONTAMINATED MATERIAL
DO NOT DISTURB

[CONTRACTOR COMPANY NAME]

[POC NAME] [POC PHONE #]

DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

[POC NAME] [POC PHONE #]

STATE PROJECT NO.

SFAPT00144

GENERATION DATE: MONTH/DATE/YEAR

POTENTIAL PFAS-CONTAMINATED MATERIAL DO NOT DISTURB

[CONTRACTOR COMPANY NAME]

[POC NAME] [POC PHONE #]

DEPARTMENT OF TRANSPORTATION & PUBLIC FACILITIES

[POC NAME] [POC PHONE #]

STATE PROJECT NO.

SFAPT00144

GENERATION DATE: MONTH/DATE/YEAR