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FINAL

GENERAL WORK PLAN ADDENDUM

DOT&PF Statewide PFAS Addendum 023-SCC-01 Deadhorse Water Supply Sampling

DEADHORSE, ALASKA

SHANNON & WILSON

January 2023

Shannon & Wilson No: 102219-012

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Subject: FINAL GENERAL WORK PLAN ADDENDUM, DOT&PF STATEWIDE PFAS ADDENDUM 023-SCC-01 DEADHORSE WATER SUPPLY SAMPLING, DEADHORSE, ALASKA

Shannon & Wilson has prepared this Work Plan Addendum on behalf of the Alaska Department of Transportation & Public Factifies (DOT&PF). This Addendum is a supplement to the *DOT&PF Statewide PFAS General Work Plan* (GWP), dated July 2020. The services proposed in this GWP Addendum, 023-SCC-01, describe the DOT&PF planned activities for water supply well (WSW) search and sampling for per- and polyfluoroalkyl substances (PFAS) associated with the Deadhorse Airport (SCC).

The scope of services was specified in our proposal dated June 16, 2022 and authorized by a notice to proceed (NTP) on August 26, 2022 by DOT&PF under Professional Services Agreement Number 25-19-013 *Per- and Polyfluorinated Substances (PFAS) Related Environmental & Engineering Services*.

This GWP Addendum was prepared and reviewed by:

Kristen Freiburger

Kristen Freiburger
Associate, Statewide Project Manager

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ACRONYMS

°C	degrees Celsius
AAC	Alaska Administrative Code
AFFF	aqueous film forming foam
ARFF	Airport Rescue and Firefighting
bgs	below ground surface
COPC	contaminant of potential concern
CSM	Conceptual Site Model
DEC	Alaska Department of Environmental Conservation
DoD	Department of Defense
DOT&PF	Alaska Department of Transportation & Public Facilities
DRO	diesel range organics
DVPP	Data-Validation Program Plan
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
GRO	gasoline range organics
GWP	*DOT&PF Statewide PFAS General Work Plan – Revision 1*
IDW	investigative-derived waste
LHA	lifetime health advisory
mm	millimeter
ng/L	nanograms per liter
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid
POC	point of contact
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QSM	Quality Systems Manual Version 5.3
RL	reporting limit
SCC	Deadhorse Airport
SSHP	Site Safety and Health Plan
TBD	to be determined
USGS	United States Geological Survey
WSW	water supply well

1 INTRODUCTION

This Addendum, 023-SCC-01, is a supplement to the *DOT&PF Statewide PFAS General Work Plan – Revision 1* (GWP). This Addendum, in collaboration with the GWP, provides guidance to conduct a water supply well (WSW) search and sampling event for per- and polyfluoroalkyl substances (PFAS) near the Deadhorse Airport (SCC) in Deadhorse, Alaska (Figure 1, Exhibit 1-1).

Shannon & Wilson has prepared the GWP and this Addendum in accordance with Alaska Department of Environmental Conservation's (DEC) March 2017 *Site Characterization Work Plan and Reporting Guidance for Investigation of Contaminated Sites* (DEC, 2017) and January 2022 *Field Sampling Guidance* document (DEC, 2022a). If additional activities are required that are not covered in the GWP or deviations are made to the GWP, they will be described in this Addendum.

The SCC is a state-owned airport managed by the Alaska Department of Transportation and Public Facilities (DOT&PF). Additional information regarding the SCC is listed in Exhibit 1-1 below.

Exhibit 1-1: Airport Information

Airport Name:	Port Heiden Airport
Airport Code:	SCC
DEC File No. / Hazard ID:	300.38.327
Airport Address:	1 Airport Way, Prudhoe Bay, Alaska 99734
DOT&PF Region:	Northern
DOT&PF Regional POC:	Daniel Phillips
DOT&PF PFAS POC:	Sammy Cummings
Airport Type:	Current Part 139 Airport
Airport Coordinates (Lat/Long):	70.1960, -148.4638

POC = point of contact

1.1 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 SCC is detailed below.

DOT&PF Aircraft Rescue and Firefighting (ARFF) services has used aqueous film forming foam (AFFF) for training and systems testing for many years. Part 139 Airports are required

to conduct annual AFFF systems testing to maintain their certification through the Federal Aviation Administration (FAA). Prior to 2019, FAA inspections required the release of AFFF to the ground surface.

Perfluorooctanesulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) are two PFAS commonly found at sites where AFFF were used. Due to their persistence, toxicity, and bioaccumulative potential, these compounds are of increasing concern to environmental and health agencies. In May 2016 the U.S. Environmental Protection Agency (EPA) published a recommended Lifetime Health Advisory (LHA) level of 70 nanograms per liter (ng/L) for the sum of PFOS and PFOA in drinking water. In June 2022 the EPA published Interim LHAs of 0.004 ng/L for PFOA and 0.02 ng/L PFOS, and Final LHAs of 2,000 ng/L for perfluorobutanesulfonic acid, and 10 ng/L for hexafluoropropylene oxide dimer acid and its ammonium salt (together referred to as "GenX chemicals").

The DEC Contaminated Sites Program published groundwater-cleanup levels of 400 ng/L 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 amending the April 9, 2019, Technical Memorandum to include additional PFAS analytes to the testing requirements. Per DEC guidance, the current drinking water action level remains 70 ng/L for the sum of PFOS and PFOA. A summary of the changes to action levels and regulatory requirements is described in Section 1.1 of the GWP.

1.1.1 Previous Environmental Investigations

The following sections summarize various environmental investigations that may be of interest to understand PFAS contamination at and near the SCC. Additional environmental investigations are reported in the DEC Contaminated Sites database near the SCC; however, due to their distance from the ARFF building and lack of PFAS-containing contaminants (i.e. AFFF releases), it is unlikely these sites have contributed to PFAS contamination at or from the SCC.

1.1.1.1 Investigations at SCC

DOT&PF Deadhorse Blk 700 Lots 7A & 8

Gasoline- and diesel-range organics (GRO and DRO) contamination was identified in soil beneath DOT&PF's former Deadhorse Maintenance Facility in 1993 (DEC, 2013). The facility was used to conduct vehicle maintenance, airport services, and heavy equipment storage until the construction of a new shop building; it is currently used for warm storage

and light maintenance. Available site documents did not indicate the type of airport services (e.g., AFFF storage) the former maintenance building was used for.

Contamination is believed to have originated from leaks and spills to the facility's gravel floor that occurred as part of routine maintenance activities. An exposure pathway evaluation determined that potential receptor exposure via applicable pathways was either insignificant or incomplete. As such, the site was issued a Cleanup Complete designation if the following institutional controls were followed:

- Report changes in site use or ownership once every five years or as soon as DOT&PF becomes aware of it, if earlier;
- Characterize and manage contaminated soil with a DEC approved plan when site buildings are decommissioned; and
- Movement or use of contaminated material in a way that violates 18 Alaska Administrative Code (AAC) 70 water quality standard is prohibited.

1.1.1.2 Investigations and Incidents Near the SCC

Alaska Interstate Construction Lease Tract 68

A thermal soil treatment facility operated at 1 Lake Colleen Road for "many years" (DEC, 2022b), although available site information does not indicate exactly when or for how long. Site characterization activities completed in 2014 identified GRO, DRO, and residual-range organics contamination at the site. During remedial actions undertaken in 2016, drums, metal, and lead battery debris were also found. The exact number of drums and their contents were not noted in available documents. As of December 2021 (the most recent time for which information is available) the site is still undergoing remediation.

Halliburton Geophysical - Deadhorse

Contamination resulting from tank cleaning and truck rinsate was identified at DOT&PF Low 2, Block 2300, approximately 0.6 miles south-southeast of the SCC and adjacent to the western bank of the Sagavanirktok River. Numerous spills of lead, selenium, pesticides, solvents, petroleum hydrocarbons, and semi-volatile compounds were documented, although all types of spills and the full extent of contamination are not currently known (DEC, 2022c). Spills are believed to have occurred since Deadhorse was founded in the late 1960s. Following cleanup actions in the early 1990's DEC issued a No Further Action designation for the site in 1997. However, an additional cleanup was performed in 1999 and 2000. The site is currently listed as 'Cleanup Completed' on the DEC Contaminated Sites Program website (DEC, 2022d).

Drum Storage

Two drum storage areas were identified within the WSW search area, Colville Inc. and Forward Alaska. Colville Inc. is approximately 1½ miles northeast of the SCC on the west side of Sag River Road and is currently and was historically used as a fueling station. Approximately 14,000 unlabeled, leaky drums were stored at the site in the early 1980s (DEC, 2022e). Forward Alaska is approximately 1.2 miles northeast of the SCC on the east side of Spine Road and due west of a drinking water reservoir. Over 400 drums were present onsite in 1988 and, while the contents of some were identified (e.g., volatile organic compounds and metals), the full extent of contamination is not known (DEC, 2022f).

Tank Farms

In addition to airports, AFFF was also historically used at tank farms for fire suppression. Two tank farms were identified within the proposed WSW search area. The Colville Tank Farm is approximately 1.4 miles northeast of the SCC at 100 Sag River Road (DEC, 2022g). A former tank farm called Crazy Horse Pad, which was developed in the 1970's, was located approximately one mile east of the SCC (DEC, 2022h).

1.1.2 Climate

Climate conditions in Deadhorse are characterized by, "…long cold winters, short cool summers, low annual rainfall, and persistent wind." (USGS, 1995). Average monthly temperatures range from approximately -31 degrees Celsius (°C) to 7 °C, average annual snowfall is approximately 942 millimeters (mm), and average annual precipitation is approximately 114 mm.

Due to Deadhorse being 250 miles north of the Arctic Circle, daylight hours vary widely throughout the year; the sun remains below the horizon for 55 days between November and January and above it for 65 days between May and July. Long summer days increase air temperature and permafrost thawing rates, which in turn increases evaporation and transpiration. Long winter nights lower air temperature and result in sublimation becoming a significant climatological factor.

1.1.3 Vegetation

Most of the vegetation in and around Deadhorse (approximately 75 percent) are sedges (USGS, 1995), a grass-like plant that typically grows in wet ground. Moss, low shrubs, and lichens grow beneath the sedges. Cotton grass, lousewort, and buttercup can be found in wetter areas while heather and purple mountain saxifrage tend to grow on drier raised ridges.

1.1.4 Geology and Soils

Deadhorse and SCC are located on the north edge of the Arctic Coastal Plain. In general, the area is underlain by unconsolidated Quaternary sediments, followed by Tertiary and Cretaceous sandstone, siltstone, conglomerates, and shales. This sequence is followed by strata of Paleozoic shales, oil-bearing sandstones, limestones, and weakly metamorphosed sedimentary rock (USGS, 1995).

The area is also home to thick, continuous permafrost, which extends up to 660 meters below the ground surface (bgs). Permafrost in Deadhorse ranges in temperature from -9 °C at 50 meters bgs to 0 °C at 600 meters bgs. The active layer (the layer above permafrost that thaws and freezes during the year) is typically between 0.5 and 1 meter thick. Most structures in Deadhorse are built on man-made gravel pads that insulate the soil and keep it frozen year-round to reduce freeze thawing. Liquids spilled on these pads are expected to infiltration down to the frost table.

Local soils tend to be poorly drained and composed of loamy, nonacid, and calcareous sediment. However, soil immediately east of Deadhorse, near the Sagavanirktok River, are gravelly. Area soils tend to have a high organic content due to persistently cold temperatures that prevent biodegradation of organic material, and act as an insulating layer above permafrost. The annual cycle of freezing and thawing churns the soil and often eliminates distinct soil layer boundaries. It also causes contraction cracks to form which, over time, form patterned ground (a.k.a., ice-wedge polygons).

Damage to the soil layer (e.g., compaction from vehicle traffic or disturbances from construction) can change the thermal regime in the soil and potentially increase the depth of seasonal thawing. This, in turn, may lead to surface subsidence and changes in surface drainage patterns. The soil is also limited in its ability to naturally attenuate soil and near-surface water contamination because low soil temperatures slow microorganism activity and biodegradation.

1.1.5 Hydrology

The Arctic Coastal Plain is characterized by low relief, numerous lakes and ponds, beaded drainage, and thaw gullies and depressions (USGS, 1995). Near Deadhorse these shallow, freshwater lakes tend to be elongated and oriented from north-northwest to south-southeast. These lakes are susceptible to a phenomenon called freeze concentration, in which impurities remain in unfrozen water as ice forms and become more concentrated. This leads to water quality deteriorating during winter and spring as ice cover increases. Additionally, a large amount of the area's annual runoff (a major source of freshwater)

occurs when lakes are still covered in ice, thus preventing mixing with the unfrozen water beneath.

The Sagavanirktok River flows to the east of the SCC, but USGS maps from 1955 and 1975 indicate natural river processes (e.g., deposition and erosion) are moving the river channel westward towards the airport. The SCC and surrounding area are in the 100-year flood plain of the Sagavanirktok River, but its flood hazard is considered low due to it being constructed on elevated gravel pads.

Near-surface groundwater may be able to flow during the summer, but most of the year it is frozen. Because permafrost is virtually impermeable and restricts downward flow of both groundwater and any liquid hazardous wastes. Permafrost also isolates near-surface water flow from deeper intra- and sub-permafrost aquifers. Sub-permafrost aquifers tend of have high salinity levels (e.g., several thousand parts per million)

Drinking water for Deadhorse comes from the Sagavanirktok River. Alternative sources exist but are limited to rivers or lakes with depths greater than two meters. The lateral and vertical extent of permafrost in the area limits the potential for using groundwater for drinking water.

1.2 Project Objectives and Scope

The project objective is to evaluate the potential for human exposure to PFAS in water supply at and near the SCC; and understand the extent of PFAS contamination, if present, resulting from the historic use of AFFF by the DOT&PF at the SCC. This Addendum describes methods used to identify PFAS and evaluate the lateral extent of contamination in water supply at and near the SCC, where such sources exist. Refer to Section 2.3 for contaminants of potential concern (COPCs) and Exhibit 4-1 for proposed samples and analyses.

The scope of this initial WSW search and sampling effort includes:

- conducting a WSW search to confirm if groundwater or surface water is the source of drinking water near and downgradient of the SCC;
- sampling identified water sources for PFAS, where access is provided; and
- discussing potential AFFF release sites at the SCC through interviews with airport personnel.

The proposed well search area for the WSW search area is presented in Figure 2.

2 SITE AND PROJECT DESCRIPTION

The following sections provide a site and project description.

2.1 Site Location and Boundaries

The SCC is located at the southern end of the town of Deadhorse, Alaska. Deadhorse is at the southern end of Prudhoe Bay in the North Slope Borough. The airfield's address is 1 Airport Way, Prudhoe Bay, Alaska 99734. The SCC consists of a paved 6,500-feet long by 150-feet wide runway. The facility is located south of Colleen Lake and west of the Sagavanirktok River and opened in 1970.

Deadhorse is an unincorporated community along the North Slope south of the Arctic Ocean. It is approximately 6 miles south of Prudhoe Bay and consists mainly of facilities to support oil extraction, initial refinement, and transport at the Prudhoe Bay Oil Field. The geographic coordinates of the SCC terminal are latitude 70.1960 and longitude -148.4638.

2.2 Potential Sources of PFAS Contamination

General information regarding potential sources of contamination at DOT&PF sites to be covered under GWP is included in Section 2.1 of the GWP. Specific potential sources of contamination at the SCC and in the WSW search area are listed below:

- Four known AFFF release areas (Figure 2) where annual FAA certification testing of fire suppression systems and/or firefighting training events took place. Exact quantities of AFFF released are unknown due to various testing requirements the FAA inspector(s) outlined during certification or training events. Additionally, training event documentation was not required and available information on AFFF volumes and release frequency may not be representative.
- Potential leaks or spills from potential AFFF storage areas like the DOT&PF's former Deadhorse Maintenance Facility.
- Potential use of AFFF at tank farms.
- Potential disposal of AFFF drums or contaminated soil at DEC contaminated sites.
- Potential AFFF rinsate disposal in the WSW search area.

2.3 Contaminants of Potential Concern and Regulatory Levels

General information regarding COPCs and regulatory levels is included in Section 2.2 of the GWP. The primary COPCs for this project are PFAS compounds, specifically PFOS and PFOA. DEC's *Field Sampling Guidance* also identifies GRO, DRO, residual range organics,

benzene, toluene, ethylbenzene, and xylenes, and polynuclear aromatic hydrocarbons as COPCs at ARFF training areas. However, we note this is outside the scope of this Addendum.

Groundwater and surface water samples will be compared to Alaska's 18 AAC 75.341 Table C, Groundwater Human Health Cleanup Level and the DEC drinking water action level. The current cleanup levels and analytical reporting limits for the site COPCs are summarized below in Exhibit 2-1.

Exhibit 2-1: COPCs, Regulatory and Laboratory Reporting Limits

Method	Analyte	Regulatory Limit[a] (ng/L)	DEC Drinking Water Action Level (ng/L)	Laboratory RLs[b] (ng/L)
DoD QSM Table B-15[c]	PFOS	400	70	2.00
	PFOA	400		2.00

Notes:

a. 18 AAC 75 *Table C. Groundwater Cleanup Levels*.

b. Current RLs from Eurofins Environment Testing for PFAS analyses.

c. All available PFAS analytes will be requested for analytical reports. However, only PFOS and PFOA have DEC Cleanup Levels and are reported in this table.

DoD = Department of Defense, DEC = Alaska Department of Environmental Conservation, ng/L = nanogram per liter, PFOA = perfluorooctanoic acid, PFOS = perfluorooctanesulfonic acid, QSM= Quality Systems Manual, RL = reporting limit

2.4 Conceptual Site Models and Site Safety and Health Plans

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. A DEC *Human Health Conceptual Site Model Graphic Form* and a *Human Health Conceptual Site Model Scoping Form* were completed based on the preliminary understanding of site conditions. These forms are included in Appendix A of this Addendum.

Very little is known about potential PFAS-affected media at and beneath the SCC. The draft CSM will be revised and presented in the final report following the receipt of analytical data. Potentially affected media include contaminated soil, groundwater, surface water, sediment, and biota. Potential human exposure pathways include:

- Incidental soil ingestion;
- Dermal absorption of contaminants from soil, groundwater, or surface water;
- Inhalation of fugitive dust;
- Ingestion of groundwater (e.g., WSWs) or surface water; and
- Direct contact with sediment.

2.5 Project Team

Chris Darrah will be Shannon & Wilson's Principal-in-Charge and Kristen Freiburger will serve as the overall Statewide Project Manager. A site Project Manager will be selected if additional PFAS investigative efforts are needed following this first round of sampling. Shannon & Wilson's project team also includes other State of Alaska Qualified Environmental Professionals to support the various field and reporting tasks required to achieve the project objectives. The project team and their associated responsibilities are summarized in Exhibit 2-2 below.

Exhibit 2-2: Project Team

Affiliation	Responsibility	Representative	Contact Number
DOT&PF	Client – Regional POC	Daniel Phillips	(907) 451-2926
	Client – Statewide PFAS POC	Sammy Cummings	(907) 888-5671
DEC	Regulatory agency POC	Bill O'Connell	(907) 269-3057
Shannon & Wilson	Principal-in-charge	Christopher Darrah	(907) 458-3143
	Statewide Project Manager	Kristen Freiburger	(907) 458-3146
	Project Manager	TBD	TBD
Eurofins/ TestAmerica, Inc.	PFAS analytical laboratory services	David Alltucker	(916) 374-4383

POC = point of contact, TBD = to be determined

2.6 Project Schedule and Submittals

Section 2.5 of the GWP provides general information regarding project schedules (i.e., the general order of occurrence of site characterization activities) and associated submittals.

Once DEC approval is received for the proposed scope of services outlined in this Addendum, Shannon & Wilson will coordinate with DOT&PF staff to collect samples from WSWs at and near the SCC. Field activities are anticipated to occur during January or February 2023, weather permitting. Laboratory analysis will be requested on a standard 15-business-day turn-around time. Following receipt of the analytical results, we will provide DOT&PF and DEC with a map and table of the results. Results letters will also be prepared and mailed to the sampled WSW owner/user.

The following is the anticipated schedule:

- DEC comments addressed; approval received – January 2023
- Mail Initial Letter to properties near SCC – January 2023
- Field activities – January or February 2023

- Analytical summary of data reported to DOT&PF and DEC – within two business days of data receipt
- Analytical data table and map reported to DOT&PF and DEC – within three business days of data receipt
- WSW owner/user notification of results – following delivery of results to DEC

Seasonal factors, including depth to groundwater and freezing conditions, may impact Shannon & Wilson's ability to perform the field effort outlined in this document. We will inform DOT regarding any scheduling changes.

3 WATER SUPPLY WELL SAMPLING ACTIVITIES

The following sections describe the WSW sampling activities to be conducted at and near the SCC. Sampling procedures and analytical methods are described in Section 4. A Quality Assurance Program Plan (QAPP) is included in Section 5. A Site Safety and Health Plan is provided as Appendix B. Proposed well search and sampling area is presented in Figure 2.

3.1 Water Supply Well Search

Available information indicates groundwater is unlikely to be a drinking water source near the SCC. However, to ensure a thorough investigation, Shannon & Wilson will review utility-connection and property ownership records for information on water sources in Deadhorse (where information is available) prior to mobilization. Additionally, a survey will be mailed to identified locations within the search area (Figure 2) to notify them of our intent to collect groundwater samples in the area, where possible. We understand that water used in buildings in Deadhorse is generally supplied by the Sagavanirktok River. Our letter will serve to determine if groundwater wells exist either as a primary or secondary water source for the location. This letter/survey will be approved by DOT&PF and the public relations team prior to being mailed. About half of the well search area is outside of DOT&PF property (Figure 2). After reviewing available area maps and property-ownership records for Deadhorse, where available, Shannon & Wilson will prepare detailed maps for the well search field effort.

If responses to the survey are not received, we will assume groundwater wells are not being used for household/drinking water use. We will coordinate with DOT&PF and DEC to determine if mobilization to the site is necessary.

During our visit, field staff will visit parcels in the well search area to identify structures that may use groundwater for drinking water (e.g., residences and public buildings). We will

make a reasonable attempt to contact the owners or occupants to inquire about their water source and obtain permission to collect samples. Shannon & Wilson will collect PFAS samples from any identified WSWs in the search area for which permission to sample has been given by the owner(s) or occupant(s).

Where a well is discovered that is not connected to plumbing, a sample will be collected using a battery-operated peristaltic pump and new, PFAS-free silicone tubing. Samples will be collected following stabilization of parameters (pH, temperature, conductivity, dissolved oxygen, and redox potential). Groundwater parameters will be measured with a multiprobe water quality meter (YSI model 600XL or equivalent) to determine when sampling can begin. Parameters and stabilization criteria will be documents on a Monitoring Well Sampling Log (Appendix B of the GWP).

4 SAMPLING AND ANALYSIS PLAN

This section describes the analytical sampling approach for investigating PFAS contamination associated with the SCC. A DEC-qualified sampler will collect and handle the samples for projects covered under the GWP and this Addendum and collect required quality control (QC) samples in accordance with DEC's *Field Sampling Guidance*. A general Sampling and Analysis Plan is included as Section 4 of the GWP. Sample containers, preservation methods, and holding times are included in Section 4.4. Sample custody, storage, and transport will be followed as described in Section 4.5. Investigative-derived waste (IDW) management is described in Section 4.7.

4.1 Analytical Sample Summary

We estimate there are approximately 100 structures in the WSW search area. We further estimate that approximately 5 percent of those locations will have a well or water source and we will be allowed to collect a sample from.

An analytical sample summary is detailed in Exhibit 4-1 below.

Exhibit 4-1: Analytical Sample Summary

Number of Samples	Matrix	PFAS (DoD QSM 5.3 Table B-15)
	Groundwater	5 + 1 DUP

Notes:
DoD = Department of Defense; DUP = field-sample duplicate; QSM = Quality Systems Manual

4.2 Special Considerations for PFAS Sampling

Special considerations for PFAS sampling are outlined in Section 4.10 of the GWP.

4.3 Analytical Laboratories and Methods

PFAS samples will be submitted to Eurofins Environment Testing of West Sacramento, California. Based on the DEC Technical Memorandum issued on October 2, 2019, PFAS analysis will report the 18 approved PFAS compounds as listed in EPA 537 Modified Method that complies with the Department of Defense (DoD) Quality Systems Manual (QSM) Version 5.3 Table B-15. Upon receipt of the samples, authorized personnel will store and prepare the samples for analysis, taking into consideration sample holding times for the analysis.

4.4 Sample Containers, Preservation, and Holding Times

General information regarding sample containers, preservation, and holding times is described in Section 4.12 of the GWP. This information is provided in Exhibit 4-2, below, for the analytical methods employed for this project.

Exhibit 4-2: Sample Containers, Preservation, and Holding Time Requirements

Analyte	Method	Media	Container and Sample Volume	Preservation	Holding Time
PFAS	DOD QSM 5.3, Table B-15	Water	2 X 250 mL HDPE	0 °C to 6 °C	14 days to extraction, analyzed within 40 days of extraction

NOTES:
DoD = Department of Defense, PFAS = per- and polyfluoroalkyl substances, QSM = Quality Systems Manual

4.5 Sample Custody, Storage, and Transport

Sample custody, storage, and transport procedures are described in Section 4.13 of the GWP.

4.6 Equipment Decontamination

Equipment decontamination procedures are described in Section 4.14 of the GWP. We note that disposable sampling equipment is typically used to collect WSW samples and equipment decontamination is not likely to be needed for this project.

4.7 Investigative Derived Waste Management

IDW will generally consist of purge water generated during WSW sampling. Purge water will be disposed of to the ground surface or using the septic disposal method utilized at the property. Where a submersible pump is used to collect a water sample from a well not connected to indoor plumbing, purge water will be filtered using a granulated activated carbon filter and then discharged to the ground surface.

Other IDW will primarily consist of disposable sampling equipment (nitrile gloves, transfer cups, etc.) and will be disposed of at the nearest landfill.

4.8 Deviations from the General Work Plan

No deviations to the GWP are planned at this time.

5 QUALITY ASSURANCE PROJECT PLAN

This QAPP is intended to guide activities during assessment and review of resulting data. Shannon & Wilson will be responsible for conducting data reduction, evaluation, and reporting under this QAPP. A general QAPP is provided as Section 5 of the GWP. Additionally, a Data-Validation Program Plan (DVPP), which describes the procedures for qualifying analytical data in a consistent manner, has been prepared and is included as Appendix C to the GWP. We note an updated DVPP was submitted to DEC in June 2022. The following sections describe specific procedures to be followed during sampling at the SCC so that sampling and documentation are effective, laboratory data are usable, and the information acquired is of high quality and reliable.

5.1 Quality Assurance Objectives

Data quality objectives are detailed in Section 5.1 of the GWP. Numeric QA objectives for this project are presented in Exhibit 5-1 below.

Exhibit 5-1: Quality Assurance Objectives for Analytical Samples

Analyte	Method	Matrix	Precision	Accuracy	Completeness
PFAS	DoD QSM 5.3 Table B-15	Water	±30%	(analyte dependent)	85%

NOTES:
PFAS = per- and polyfluoroalkyl substances

5.2 Field Documentation

Field documentation is described in Section 5.2 of the GWP. Field forms to be used for this project are included in Appendix B of the GWP.

5.3 Field Instrument Calibration

Field instrument calibration (e.g., YSI) is discussed in Section 5.3 of the GWP.

5.4 Field Quality Control Samples

The field quality assurance (QA)/QC program for this project includes the collection of the QA/QC samples described in the following sections.

5.4.1 Field Duplicate Sample

Field duplicate sample collection procedures are described in Section 5.4.1 of the GWP. One field duplicate will be collected for every 10 primary samples. Refer to Exhibit 4-1 for the planned number of field duplicates.

5.4.2 Equipment Blank Samples

Equipment blank sample collection procedures are described in Section 5.4.4 of the GWP. We note it is unlikely equipment blanks will be needed for WSW sampling.

5.4.3 Temperature Blank Samples

Temperature blanks are described in Section 5.4.6 of the GWP.

5.5 Laboratory Quality Control Samples

Laboratory quality control samples are described in Section 5.5 of the GWP.

5.6 Laboratory Data Deliverables

Laboratory data deliverables are described in Section 5.6 of the GWP.

5.7 Data Reduction, Evaluation, and Reporting

Data reduction, evaluation, and reporting requirements are discussed in Section 5.7 of the GWP.

6 REFERENCES

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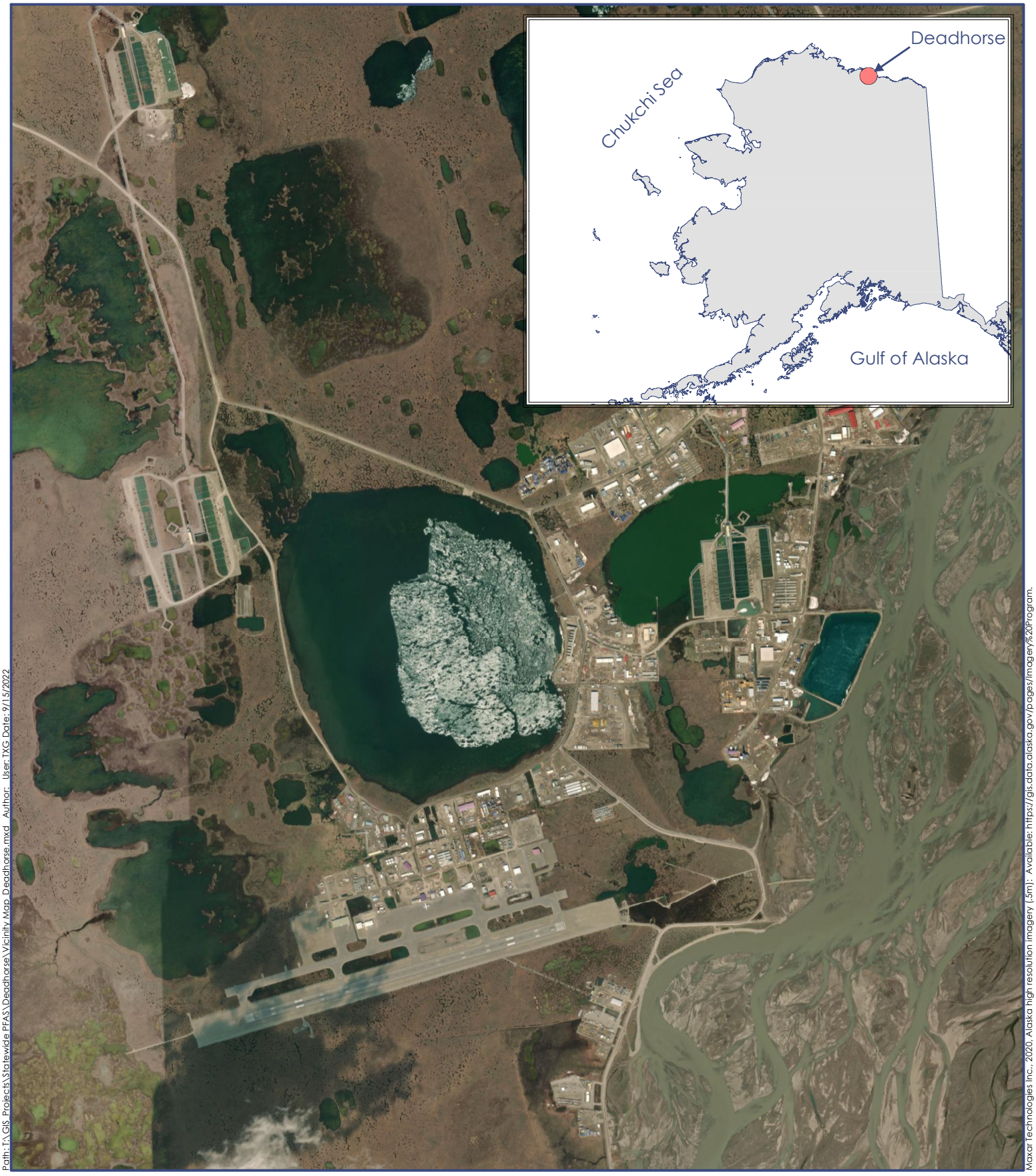

N

0 0.5

Miles

January 2023

VICINITY MAP

Figure 1

N

0 0.5

Miles

Notes:
1. AFFF: Aqueous Film Foarming Foam
2. Search area is approximate

January 2023

SITE MAP

Figure 2

APPENDIX A: CONCEPTUAL SITE MODEL

Appendix A

Conceptual Site Model

Scoping and Graphics Forms

CONTENTS

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: ADOT&PF Deadhorse Airport Sitewide PFAS

File Number: 300.38.327

Completed by: Morgen Donohue, Shannon & Wilson, Inc.

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: Aqueous Film Forming Foam (AFFF) releases

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:

S&W is aware of soil PFAS contamination present at the SCC.

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:

According to the Alaska Department of Health and Social Services, PFOS and PFOA are not appreciably absorbed through the skin. However, Appendix B of the 2017 Guidance on Developing Conceptual Site Models lists both PFOS and PFOA.

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 ground-water 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 Deadhorse; however, the potential exists and we consider this pathway potentially complete.

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: Complete

Comments:

The Sagavanirktok River is used as a drinking water source for Deadhorse. The river is directly east of the runway.

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:

PFAS are not included in Appendix D. If volatile organic compounds are reported during site characterization activities, this section will be updated with the new information.

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:

See comments for 3.c.1.

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:

According to the Alaska Department of Health and Social Services, PFOS and PFOA are not appreciably absorbed through the skin. However, Appendix B of the 2017 Guidance on Developing Conceptual Site Models lists both PFOS and PFOA. We consider dermal exposure to these compounds to be insignificant for the purposes of this CSM.

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:

PFAS are not included in Appendix D.

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:

S&W is aware of PFAS contamination present in surface soil at the SCC.

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:

No sediment samples have been collected at the SCC. However, AFFF was likely release to the ground surface in unpaved and/or lightly graveled areas are open to DOT&PF employees and the public.

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

This initial CSM will be revised following the receipt of analytical data.

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: ADOT&PF Tom Madsen Airport Sitewide PFAS
File Number TBD

Completed By: Kristen Freiburger, Shannon & Wilson, Inc.
Date Completed: January 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	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Dermal Absorption of Contaminants from Soil	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F	C/F	C/F	
☑ groundwater	☑ Ingestion of Groundwater	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Dermal Absorption of Contaminants in Groundwater	C/F	C/F	C/F	C/F	C/F	C/F	
	☐ Inhalation of Volatile Compounds in Tap Water							
☐ air	☐ Inhalation of Outdoor Air							
	☐ Inhalation of Indoor Air							
	☐ Inhalation of Fugitive Dust							
☑ surface water	☑ Ingestion of Surface Water	C/F	C/F	C/F	C/F	C/F	C/F	
	☑ Dermal Absorption of Contaminants in Surface Water	C/F	C/F	C/F	C/F	C/F	C/F	
	☐ 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	

APPENDIX B: SITE SAFETY AND HEALTH PLAN

Appendix B

Site Safety and Health Plan

CONTENTS

APPENDIX B: SITE SAFETY AND HEALTH PLAN

SITE SAFETY AND HEALTH PLAN

Shannon & Wilson prepared this Site Safety and Health Plan (SSHP) for the water supply well (WSW) well search and sampling activities at and near the Deadhorse Airport (SCC). The purpose of this SSHP is to protect the health and safety of field personnel from physical and chemical hazards associated with work at this site.

The provisions of this plan apply to Shannon & Wilson personnel who will potentially be exposed to safety and/or health hazards during this investigation. Shannon & Wilson employees are covered under its Corporate Safety and Health Program. General safety and health requirements described in that program will be met. Each Shannon & Wilson employee on the site will complete the personal acknowledgement form documenting they have read and understand this SSHP and agree to abide by its requirements. A copy of this SSHP will be kept on-site throughout the duration of sampling operations.

B.1. SITE HAZARD ANALYSIS

There are two categories of hazards that may occur during the field work: potential chemical exposure hazards and physical hazards associated with site characterization activities. These hazards are discussed below.

B.1.1 Chemical-Exposure Hazards

Contaminated water may be encountered during site exploration activities. PFAS are believed to be the primary contaminants of potential concern and may be encountered in water at unknown concentrations.

Shannon & Wilson personnel will implement skin protection when they are to contact potentially contaminated soil or water. Field personnel will wear work gloves or nitrile gloves as needed. Field personnel will not require respiratory protection based on the current understanding of site conditions and scope of services.

B.1.2 Physical Hazards

Primary physical hazards associated with site characterization activities include temperature stress; lifting, slipping, tripping, falling; and risk of eye injuries. In addition, wildlife may be a hazard in forested areas around the airport. The best means of protection against accidents related to physical hazards are careful control of equipment activities in the planned work area and use of experienced and safety- and health-trained field personnel.

Field personnel will not enter confined spaces for site characterization activities, nor will they enter trenches or excavations greater than four feet in depth.

B.1.2.1 Temperature Stress

Wearing personal protective equipment (PPE) may put a worker at risk of developing heat stress; however, since the field work will be conducted during cooler months the risk of heat stress is considered low. Cold stress or injury due to hypothermia will be guarded against by wearing appropriate clothing, having warm shelter available, scheduling rest periods, adequate hydration, and self-monitoring physical and mental conditions.

B.1.2.2 Lifting Hazards

Moving coolers of water samples or other heavy objects presents a lifting hazard. Personnel will use proper lifting techniques and obtain assistance when lifting objects weighing more than 40 pounds.

B.1.2.3 Slips, Trips, and Falls

The most common hazards on a job site are typically slips, trips, and falls. These hazards will be reduced through the following practices:

- Personnel will stay alert.
- All access-ways will be kept free of materials, supplies, and obstructions.
- Tools and other materials will be located so as not to cause tripping or other hazards.
- Personnel should be aware of potential tripping hazards associated with vegetation, debris, and uneven ground.
- Personnel should be aware of limitations imposed by work clothing and PPE.

The project site may be inherently hazardous due to the potential presence of rain, snow, and ice, which can alter the character of the ground surface. The risk for slips, trips, and falls by site workers is increased due to wet or icy surfaces; therefore, workers will use caution when walking at the site.

B.1.2.4 Insects and Animals

During the summer months in Alaska, mosquitoes and other insects are common in areas predominantly covered with vegetation. Wearing PPE should be sufficient to protect site workers. Animals such as moose and bears are also commonly seen in Alaska. If a large animal approaches the site, workers should keep their distance or seek shelter in their vehicles.

B.1.2.5 Congested Areas

The site investigation may at times require field personnel to work adjacent to or in roadways. Field personnel will observe the speed and frequency of traffic proximal to the work site. Appropriate cones, barricades, or signs to secure the work area will be used when required.

B.1.3 Other Hazards

Biological, ionizing radiation, and other hazards are not expected to be present. However, be aware of the surroundings and maintain safe work practices in accordance with Shannon & Wilson's Corporate Health & Safety Plan.

B.2. PERSONAL RESPONSIBILITIES, TRAINING, AND MEDICAL SURVEILLANCE

Below is a summary of the assignment of responsibilities, training requirements, and medical surveillance information for Shannon & Wilson personnel.

B.2.1 Assignment of Responsibilities

Shannon & Wilson is responsible for understanding and complying with the requirements of this SSHP. Following is a list of responsibilities of all Shannon & Wilson personnel working on the site:

- Review and follow this SSHP.
- Attend and participate in safety meetings.
- Take appropriate action as described in this SSHP regarding accidents, fires, or other emergency situations.
- Take all reasonable precautions to prevent injury to themselves and their fellow workers.
- Perform only those tasks they believe they can do safely, and immediately report any accidents or unsafe conditions to Shannon & Wilson's Project Manager or Office Health and Safety Manager.
- Halt work, by themselves or by others, when they observe an unsafe act or potentially unsafe working condition.
- Report accidents, illnesses, and near-misses to the local contact and to Shannon & Wilson's Fairbanks office Health and Safety Manager.

B.2.2 Personal Training

Shannon & Wilson personnel performing activities on this site and under this plan have completed the appropriate training requirements specified in 29 CFR 1910.120(e). Each individual has completed an annual eight-hour refresher-training course and/or initial 40-hour training course within the last year.

A personal acknowledgement form will be completed by field personnel prior to commencing field activities. This acknowledgment form will document that they have read and understand this SSHP.

B.2.3 Medical Surveillance Program

All field personnel performing activities on this site covered by this SSHP have undergone baseline and annual physical/medical examinations as part of Shannon & Wilson's Corporate Health and Safety Program. All field personnel are active participants in Shannon & Wilson's Medical Monitoring Program or in a similar program, which complies with 29 CFR 1910.120(f).

B.3. PERSONAL PROTECTIVE EQUIPMENT

PPE will be required during the course of the field work. PPE selection will be based primarily on work-task requirements and potential exposure. Personnel may wear the following, depending on the area of sampling:

- standard work clothes;
- reflective, high-visibility safety vest;
- safety-toe boots;
- safety glasses;
- hearing protection;
- gloves; and,
- hard hat.

Disposable nitrile gloves will be worn during any activity that may require dermal contact with potentially contaminated media.

B.4. DECONTAMINATION PROCEDURES

Equipment decontamination procedures are necessary for any reusable equipment that comes into contact with contaminated soil and/or water. Decontamination procedures will consist of a rinse with non-phosphate-based detergent, a second rinse with plain tap water, and a final rinse with distilled water. Sampling equipment and PPE that is expendable will be disposed of at the site or in a landfill off-site.

Shannon & Wilson will conduct all site characterization activities in Level D PPE. For this reason, personnel will not be decontaminated when leaving the work site unless gross visual contamination of protective clothing is present.

B.5. ACCIDENTS AND EMERGENCIES

Shannon & Wilson field personnel are current in first aid and cardiopulmonary resuscitation (CPR) training. At a minimum, the following site safety equipment and first aid supplies shall be available in the field:

- PPE and clothing specialized for known site hazards;
- first aid kit, including first aid booklet;
- portable eye wash;
- clean water in portable containers; and
- other decontamination supplies.

The primary emphasis of any health and safety plan is accident prevention. If an injury or illness occurs during the course of field work, the severity of the problem will dictate the level of response. Minor injuries or illness will be addressed with basic first aid measures as recommended by a registered nurse through Shannon & Wilson's corporate Medcor service (1-800-775-5866). More serious injuries will require assistance from the medical staff at the Beacon Occupational Health and Safety Services (Deadhorse) located at 1 Spine Road, Prudhoe Bay, Alaska. The telephone number for the clinic is (907) 659-2699. Field phones will be kept easily accessible in the case of an emergency.

Exhibit B-1: Beacon Occupational Health and Safety (Deadhorse)

Shannon & Wilson's Corporate Health and Safety Program requires accident reporting when there is a site-related accident, near-miss incident, or medical emergency. If an employee is treated by medical personnel, the medical attendant will complete an Incident Medical Treatment Documentation form. Completion of an Alaska Department of Labor Report of Occupational Injury or Illness is also required within 10 days for any work-related injury or illness.

B.6. GENERAL SITE SAFETY REQUIREMENTS

The following measures are designed to augment the specific health and safety guidelines provided in this plan:

- Field personnel should avoid contact with potentially contaminated surfaces such as: walking through puddles or pools of liquid; kneeling on the ground; or leaning, sitting, or placing equipment on contaminated soil or containers.
- Field personnel will be familiar with procedures for initiating an emergency response.
- Hazard assessment is a continual process; personnel must be aware of their surroundings and any chemical/physical hazards present.
- Personnel in the exclusion area shall be the minimum number necessary to perform work tasks in a safe and efficient manner.
- The use of contact lenses is prohibited; soft lenses may absorb irritants, and all lenses concentrate irritants.
- Equipment contacting potentially contaminated soil or water must be decontaminated or properly discarded before leaving the site.

Field personnel will be familiar with the physical characteristics of the work site including wind direction, site access, and location of communication devices and safety equipment.

SITE SAFETY AND HEALTH PLAN PERSONAL ACKNOWLEDGEMENT FORM

DOT&PF STATEWIDE GENERAL WORK PLAN
ADDENDUM 023-SCC-01: DEADHORSE AIRPORT WSW INITIAL SAMPLING

I have reviewed this document and understand its contents and requirements. A copy of the above-referenced document has been made available to me. I agree to abide by the requirements of this Site Safety and Health Plan.

_____	_____
Signature	Name (printed)
_____	_____
Date	Representing

IMPORTANT INFORMATION

Important Information

About Your Geotechnical/Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining

IMPORTANT INFORMATION

your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

IMPORTANT INFORMATION

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