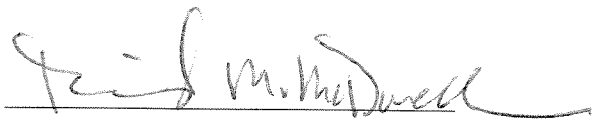
LUST SITES CLEANUP MANAGEMENT PLAN - FY03
ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION MAINTENANCE STATIONS, ALASKA

Developed By:

SHANNON & WILSON, INC.
2355 Hill Road
Fairbanks, Alaska 99709
(907) 479-0600

Principal-in-Charge: David McDowell



Developed For:

Alaska Department of Transportation and Public Facilities
2301 Peger Road
Fairbanks, Alaska

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1.0 INTRODUCTION

This management plan (MP) has been prepared to assist field personnel in performing LUST (leaking underground storage tank) site cleanup services at ten Alaska Department of Transportation and Public Facilities (ADOT&PF) maintenance stations in the Northern Region. The scope of the LUST sites cleanup program is to conduct release investigations and cleanup by excavation; petroleum hydrocarbon impacted soils associated with former underground storage tanks (USTs) will be removed to the extent practicable. The maintenance stations included under this MP are located in Cordova, Valdez, Ernestine, Chitina, Tazlina, Nelchina, Tok, Jim River, Coldfoot, and Sag River. This MP summarizes previous tank removals and site investigations and describes procedures for conducting cleanup and sampling activities at the LUST sites.

The LUST sites cleanup activities will comply with the Alaska Department of Environmental Conservation (ADEC) UST Regulations, 18 AAC 78, as amended through January 30 2003, and the current ADEC UST Procedures Manual dated November 7, 2002. Our work will also be performed in compliance with the terms of our ADOT&PF Professional Services Term Agreement P22011.

2.0 SITE AND PROJECT DESCRIPTION

The subject LUST sites are along the road system within the ADOT&PF Northern Region with the exception of Cordova, which is only accessible by boat or airplane. Detailed site information and the project objectives are described in the following subsections. Site plans showing the former location of the USTs and other pertinent site features are included in Appendix A.

2.1 Site Descriptions

2.1.1 Cordova Maintenance Station

In August 1997, Shannon & Wilson closed two tanks by removal, including a 3,000-gallon diesel UST and a 1,000-gallon used-oil UST. The diesel UST excavation measured approximately 11 feet by 20 feet by 10 feet deep, and the used-oil UST excavation measured 9 feet by 16 feet by 7 feet deep. A dispensing island was located above the diesel tank. Soil at the site was described as slightly-silty to silty, sandy gravel to 3 feet below the ground surface (bgs), underlain by interbedded silt, sand, and gravelly sand. Groundwater was encountered at 10 feet bgs. Thirty-five yards of diesel-contaminated soil excavated during the closure activities were placed in a long-term storage stockpile; approximately 50 cubic yards were placed in temporary stockpiles adjacent to the excavations and then returned to the excavations. A 3,000-gallon gasoline UST was reportedly removed from a location adjacent to the diesel UST in the late 1980s; no analytical results are available. A water well is located on the site but is not used as a drinking-water supply. Wetlands are presumed to be within one quarter mile of the site, which is within the Copper River Delta State Critical Habitat area.

Confirmation sampling in the excavations indicated diesel range organics (DRO) were present up to 22 milligrams per kilogram (mg/kg) at the diesel tank and less than the detection limit at the used-oil tank. Residual range organics (RRO) (up to 67 mg/kg), arsenic, and chromium were also detected in the used-oil tank excavation, though only the metals exceeded ADEC soil cleanup levels. Temporarily excavated soils (later returned to the excavations) contained up to 2,100 mg/kg DRO and 3,200 mg/kg RRO. The extent of contamination appears to be limited to the temporarily stockpiled soil that was placed back in both excavations.

A 20,000-gallon, partially buried, tanker car containing used oil is currently located at the Cordova facility. This tank site has not been characterized.

2.1.2 Valdez Maintenance Station

In August 1994, Dames & Moore, Inc., removed two 15,000-gallon diesel USTs and one 550-gallon diesel UST from the Alaska Department of Health and Social Services Valdez facility (adjacent to and operated by the ADOT&PF facility). Approximately 1,800 cubic yards of contaminated soil were removed from the 45 feet by 50 feet by13- to 14-foot-deep excavation. Samples collected at the limits of the excavation were below ADEC soil cleanup levels, with the exception of one sample that contained 2,000 mg/kg DRO. Five test pits were excavated to the

water table, 35 feet from the edge of the excavation. No contamination was noted in the test pits; however, no analytical samples were collected to verify this. Groundwater was noted at 14 feet bgs, well below the normal late-summer level of about 5 feet. Dames & Moore recommended that monitoring wells be installed to assess the groundwater quality in the area of the excavation. As of July 2003 the stockpiled soil is no longer on the site. The facility is connected to the municipal water system.

In August 1997, Shannon & Wilson observed the removal of two 1,500-gallon diesel USTs, one 2,000-gallon gasoline UST, and one 2,000-gallon used-oil UST from excavations at the Valdez Maintenance Station. The diesel USTs were removed from a single location (22 feet by 19 feet in area), and the gasoline and used-oil USTs were taken from separate excavations (each approximately 13 feet by 15 feet). Dispensers for the diesel fuel were located about 40 feet from the USTs, and the gasoline dispenser was directly above a UST. Approximately 30 cubic yards of contaminated soil from the used-oil excavation were stockpiled on the site. Groundwater was encountered at about 5 feet bgs in all the UST excavations. Excavated soil was characterized as silty, sandy gravel.

Verification samples did not exceed soil hydrocarbon cleanup levels at the soil/water interface at the gasoline and used-oil USTs. Soil removed from the used-oil UST excavation exceeded Method One, Category C cleanup levels for RRO (at 3,800 mg/kg), DRO (at 3,400 mg/kg) and GRO (at 900 mg/kg) and was stockpiled on the site. The stockpiled soils are no longer at the site. Soils removed from the gasoline UST excavation did not exceed soil cleanup levels. Soils at the limits of the diesel UST excavation at the soil/water interface exceeded cleanup levels, averaging about 21,000 mg/kg DRO. Contaminated soil removed at the diesel dispenser and piping did not exceed soil cleanup levels.

A 3,000-gallon out-of-use diesel UST remains in the ground at the State of Alaska Combined-Use Facility in downtown Valdez. The ADOT&PF is responsible for maintaining this building. This UST will be closed by removal as part of this scope of work.

2.1.3 Ernestine Maintenance Station

In August 1997, Shannon & Wilson observed the removal of two USTs from a single excavation (a 2,144-gallon diesel tank and a 2,100-gallon gasoline tank and associated piping). The fuel dispensers were located about 25 feet from the USTs. The UST excavation was approximately 18 feet by 25 feet in area, and the dispenser island excavation measured about 5 feet by 10 feet. Upon removal, the USTs were observed to be in generally good condition with

some corrosion, though no obvious source of leaks was detected. The soils below 6 feet in the excavation were silty, sandy gravel with cobbles. Soils were placed back in the excavation after removing the USTs; no soils were stockpiled at the site. There is a well on the site; the depth to groundwater is estimated to be 40 to 50 feet bgs. ADOT&PF personnel stated an aboveground diesel tank (AST) was formerly located south of the UST excavation, and at least one large surface spill occurred from that tank.

DRO exceeding the cleanup level were observed to at least 11.5 feet bgs under the diesel UST (5,200 mg/kg) and at least 5.2 feet bgs under the diesel dispenser (3,900 mg/kg). No DRO were detected in the piping trench between the UST and dispenser. GRO were not detected above soil cleanup levels in the UST excavation, beneath the pipe to the gasoline dispenser, or under the gasoline dispenser.

A 1,000-gallon diesel UST and a 500-gallon used-oil UST are present at the site. These tanks have been taken out of service and will be closed by removal as part of this scope of work.

2.1.4 Chitina Maintenance Station

In August 1997, Shannon & Wilson observed the removal of two USTs from a single excavation at the Chitina Maintenance Station (one 2,500-gallon diesel tank and one 2,500-gallon gasoline tank). Excavated soil was characterized as gravel with trace silt and sand and an abundance of cobbles and boulders. The contaminated soil was placed back in the excavation after removing the USTs. No soils were stockpiled at the site. The water well at the site is approximately 200 feet deep, and the water level is estimated to be 40 to 50 feet bgs.

Samples beneath the diesel UST contained 5,600 to 6,400 mg/kg DRO, and samples beneath the dispenser contained DRO (up to 6,400 mg/kg) and GRO (up to 440 mg/kg). These concentrations exceed the ADEC soil cleanup levels. Petroleum contamination was observed to the maximum depth of excavation (11.5 feet bgs).

2.1.5 Tazlina Maintenance Station

In 1993 Dames & Moore removed one 8,000-gallon diesel UST and one 8,000-gallon gasoline UST from the Tazlina Maintenance Station. Approximately 2,000 cubic yards of contaminated soil were removed from a single excavation, which extended to a depth of 25 feet below the diesel UST and 32 feet below the gasoline UST. Samples at the base of the excavation contained benzene at 40 to 120 mg/kg; DRO from 63 to 960 mg/kg; and GRO from 3,100 to 7,500 mg/kg. A water well is present on the site, and two unnamed streams are within a quarter

mile of the site. A water sample collected from the on-site well did not contain benzene, toluene, ethylbenzene, and xylenes (BTEX) above the ADEC groundwater cleanup levels.

In August 1997, Shannon & Wilson observed the removal of one 2,000-gallon used-oil UST. The excavation measured 13 feet by 18 feet by 9 feet deep. Surficial soils (to 7 feet) consisted of sandy gravel with trace silt underlain by stiff clay. Approximately 10 cubic yards of contaminated soil were stockpiled at the site. Samples at the limits of excavation did not exceed applicable soil cleanup levels (Category C). DRO and RRO did not exceed Category C cleanup levels; however, benzene exceeds its Method Two cleanup level of 0.02 mg/kg in one sample collected from the base of the excavation (at 0.047 mg/kg).

The reported depth to water (90 feet) suggests that the less-stringent benzene cleanup level (9 mg/kg) may be appropriate. Arsenic and chromium also exceed current cleanup criteria, though they are probably within the naturally-occurring soil concentrations. The contaminated soil stockpiled was reportedly used in a road project.

2.1.6 Nelchina Maintenance Station

In August 1997, Shannon & Wilson observed the removal of a 2,000-gallon gasoline UST and a 2,000-gallon diesel UST, along with dispensers and associated piping. A 700-gallon used-oil UST also was removed from a separate excavation (about 150 square feet in area) at the same time. The gasoline and diesel dispensers were situated directly above the tanks. The soils beneath the USTs were observed to be gravelly clay. The depth to groundwater at the site is estimated to be 85 feet bgs. There is a well at the site; however it is not used as a drinking water supply.

Samples collected at the limits of the diesel/gasoline UST excavation did not exceed soil cleanup levels. Soil removed from the excavation near the gasoline UST did not exceed cleanup levels and was returned to the excavation along with additional clean fill material. Soil at the diesel UST was contaminated with DRO (at 8,500 mg/kg), and approximately 60 cubic yards were stockpiled at the site. Clean fill material was placed in the diesel UST portion of the excavation.

Soil samples from the limit of the used-oil UST excavation did not exceed applicable cleanup levels, but one sample collected from the excavated soil contained DRO (at 370 mg/kg). This soil was placed back in the excavation along with clean fill material. The volume of contaminated soil returned to the used-oil UST excavation was approximately 30 cubic yards.

2.1.7 Tok Maintenance Station

In August 1992, Nortech removed a 6,000-gallon heating-oil UST at the Tok Maintenance Station after it failed a tightness test in 1991. Approximately 80 cubic yards of contaminated soil were stockpiled on the site. Samples collected from the base of the excavation contained DRO ranging from 770 to 9,000 mg/kg. Water samples collected by Nortech from the on-site drinking water well in August 1992 did not contain BTEX above the groundwater cleanup levels.

In August 1998, a 3,000-gallon diesel UST, a 3,000-gallon gasoline UST, and a 2,000-gallon gasoline UST were removed from one excavation by EMCON. A 500-gallon used-oil UST (listed as 275-gallon tank on the ADEC UST database) was removed from a second excavation. Gasoline and diesel dispensers were located above the tanks. The excavation for the gasoline and diesel tanks measured 30 feet by 20 feet by 8.5 feet deep. The excavation for the used-oil tank measured 20 feet by 15 feet by 6 feet deep. Soil at the site was described as silty gravel and gravel-sand-silt mixtures. Depth to groundwater is reported to be greater than 100 feet. Approximately 60 cubic yards of soil from the used-oil tank excavation were stockpiled on site. No soil from the product tanks was stockpiled. A water well is located on the site, and the depth to water is approximately 100 feet bgs.

Contaminant concentrations remaining in the product tank excavations contained DRO in one sample at 347 mg/kg, GRO up to 5.66 mg/kg, benzene up to 0.041 mg/kg, and total BTEX up to 0.721 mg/kg. Contaminant concentrations remaining in the used-oil tank excavation included up to 11.6 mg/kg GRO, 19,100 mg/kg DRO, 59,200 mg/kg RRO, 0.041 mg/kg tetrachloroethene, 0.569 mg/kg total BTEX, and 14.2 mg/kg arsenic. Cadmium, chromium, and lead were also detected, but at concentrations below their most stringent ADEC cleanup levels. Benzene and PCBs were not detected in samples collected from the used-oil tank excavation.

In July 2000, IT Alaska performed a closure assessment for a partially-buried 10,000-gallon diesel UST. This tank along with a partially-buried, 10,000-gallon, used-oil UST were removed from the property in the 1980s, apparently with no closure assessment or documentation. IT collected three samples from the former location of the 10,000-gallon diesel UST using a backhoe. Results indicated that DRO and BTEX did not exceed ADEC soil cleanup levels. No samples were collected from the former location of the 10,000-gallon used-oil UST; this former location will be assessed as part of this scope of work.

A 3,000-gallon heating-oil UST is present at the site. This UST will be closed by removal as part of this scope of work.

2.1.8 Jim River Maintenance Station

In July 1998, a 1,000-gallon used-oil UST (listed as a 500-gallon tank on the ADEC UST database) was removed at the Jim River Maintenance Station by EMCON. The excavation was about 9 feet by 10 feet by approximately 8 feet deep. About 30 cubic yards of contaminated soil were removed during tank removal and stockpiled on the site. Groundwater was not encountered in the excavation. The soils at this site were observed to be gravel with sand and silt. The depth to groundwater at this site is about 12 feet bgs.

Samples beneath the tank exceeded ADEC soil cleanup levels. DRO ranged from 118 to 1,410 mg/kg, RRO from 626 to 5,470 mg/kg, and benzene from 0.021 to 0.373 mg/kg; other analytes were not detected above the ADEC cleanup levels. A stockpile sample contained DRO at 434 mg/kg and benzene at 0.093 mg/kg. An on-site drinking water well is located on the property.

2.1.9 Coldfoot Maintenance Station

In July 1998, one 10,000-gallon diesel UST and an adjacent dispenser island were removed by EMCON. The excavation measured 35 feet by 25 feet by 10 feet deep. Approximately 200 cubic yards of soil were segregated into clean and contaminated stockpiles. The clean material was used to backfill the excavation, while approximately 50 cubic yards of contaminated material was stockpiled on site. Groundwater was encountered at 9 feet below ground surface, with site soils characterized as gravel with sand and silt. A water well is located on the site, and Slate Creek is about a quarter mile from the site.

DRO and ethylbenzene exceeded their ADEC cleanup levels in samples collected from the base of the excavation (up to 5,650 mg/kg DRO and 19.2 mg/kg ethylbenzene).

2.1.10 Sag River Maintenance Station

In July 1998, one 2,000-gallon diesel UST and two 1,000-gallon used-oil USTs were removed by EMCON. The diesel UST had previously been filled with sand and was permanently out of service (date unknown). It was cut open and cleaned prior to its removal from the ground. An estimated 30 cubic yards of overburden and sand removed from the diesel tank were stockpiled at the site. The used-oil tanks were in separate crawlspaces beneath the concrete floor slab of the maintenance facility building. Approximately 20 gallons of sludge

were removed from each tank, which were then cleaned and cut up. The crawlspaces were not backfilled. Soils in the excavations were classified as gravel with sand and silt. Permafrost was encountered 6 inches below the used-oil tanks, but no permafrost or groundwater was encountered in the diesel tank excavation (maximum depth 6.5 feet). The site is within the Arctic zone and is likely underlain by continuous permafrost. No water well is on the site, and the depth to groundwater is unknown. Drinking water for the facility is obtained from a surface water source.

Confirmation sampling in the diesel tank excavation indicated DRO was present up to 4,530 mg/kg. Soil samples beneath both used-oil tanks exceeded cleanup criteria for DRO (up to 60,100 mg/kg), RRO (up to 33,700 mg/kg), benzene (up to 0.092 mg/kg), trichloroethene (up to 37.7 mg/kg), and tetrachloroethene (up to 0.685 mg/kg). Arsenic and chromium also exceed cleanup criteria but are likely within background concentration ranges.

In December 2000 a large diesel spill occurred at the former location of the diesel UST. Some of fuel was recovered; however the presence of frozen ground and buried utilities limited recovery efforts.

3.0 PROJECT SCOPE AND OBJECTIVES

The field activities for this project consist of UST removal, excavation, and stockpiling of contaminated soil associated with the existing and former USTs and/or a release investigation. The following table summarizes the planned field activities at each ADOT&PF maintenance station. Additional discussion of the features of each site and field activities follows.

Site	Location	Assessment	No Further Action	Additional Excavation	Water Sample
Cordova	Tank 1 (3,000-gallon diesel)		X		X
	Tank 2 (3,000-gallon gasoline)	Collect samples from former location of UST w/possible additional soil removal			
	Tank 3 (1,000-gallon used-oil) listed as diesel		X		
	stockpile (35 cubic yards)	Collect samples			
	tanker car (20,000-gallon used-oil) *in service*	X			
Valdez	Tank 1 SC-22 (1,500-gallon diesel)			X	
	Tank 2 SC-24 (1,500-gallon diesel)			X	
	Tank 3 SC-23 (2,000-gallon gasoline)		X		
	Tank 4 (15,000-gallon diesel)	Install groundwater monitoring wells			
	Tank 5 (15,000-gallon diesel)				
	Tank 6 (550-gallon diesel)				
	SC-25 (2,000-gallon used-oil)		X		
	3,000-gallon diesel *out-of-service*	remove		X	
Ernestine	Tank 1 SC-05 (2,144-gallon diesel)			X	X
	Tank 2 (1,000-gallon diesel) *out-of-service*	remove		X	
	Tank 3 SC-06 (2,100-gallon gasoline)		X		
	Tank 4 (1,500-gallon diesel) *out-of-service*	remove		X	
	dispensers			X	
	stockpile (50cy)	X			
Chitna	SC-01 (2,500-gallon diesel)			X	X
	SC-02 (2,000-gallon gasoline)			X	
	Dispenser Island			X	
Tazlina	Tank 1 (8,000-gallon diesel)	Release Investigation w/ drilling - 3 soil borings			X
	Tank 2 (8,000-gallon gasoline)				
	Tank 3 SC-19 (2,000-gallon used-oil)		X		
Nelchina	Tank 1 SC-08 (2,000-gallon diesel)		X		X
	Tank 2 SC-09 (2,000-gallon gasoline)		X		
	Tank 3 SC-10 (700-gallon used-oil)		X		
	stockpile	X (150cy)			

Site	Location	Assessment	No Further Action	Additional Excavation	Water Sample
Tok	Tank 1 (3,000-gallon diesel)		X		X
	Tank 2 (3,000-gallon gasoline)		X		
	Tank 3 (2,000-gallon gasoline)		X		
	Tank 4 (6,000-gallon diesel)			X	
	Tank 5 (3,000-gallon diesel) *out-of-service*	Remove		X	
	Tank 6 (500-gallon used-oil)			X	
	Tank 7 (10,000-gallon used-oil)	X			
	Tank 8 (10,000-gallon diesel)		X		
	stockpile	X (150cy)			
Jim River	Tank 1 (1,000-gallon used-oil)	Install three temporary well points			
Coldfoot	Tank 1 (10,000-gallon diesel)	Install three temporary well points			
Sag River	Tank 1 (1,000-gallon used-oil)	Install and sample soil borings to determine extent of contamination. Determine if soil can be removed from crawl space in area of used-oil USTs			
	Tank 2 (2,000-gallon diesel)				
	Tank 3 (1,000-gallon used-oil)				

At Valdez, Ernestine, and Tok we will close the out-of-service USTs by removal. A 3,000-gallon diesel UST will be removed from the Combined-Use Facility in Valdez. A 1,000-gallon diesel UST and a 500-gallon used-oil UST will be removed at Ernestine Maintenance Facility. A 3,000-gallon heating oil UST will be removed at Tok Maintenance Facility. We will field screen and segregate the excavated soil, prepare contaminated soil stockpiles, over-excavate contaminated soil as appropriate, and collect verification samples at the limits of the excavation. The tanks will be recycled.

At Cordova, Valdez, Ernestine, Chitina, and Tok the objective will be to excavate and stockpile contaminated soil from the former tank excavations to obtain "clean closure." To accomplish the objective, Shannon & Wilson will coordinate closely with the ADOT&PF contract and facility manager, direct earthmoving equipment and labor, conduct field screening to guide the excavation, collect and analyze confirmation samples, and prepare reports. We will not direct excavation below groundwater or building foundations. At sites with gravelly soil we plan to mechanically screen the contaminated soil to remove the 2-inch-plus material. The coarser-

grained material does not require treatment and will be placed in a non-environmentally sensitive area.

At Cordova, Tazlina, Valdez, Jim River, Coldfoot, and Sag River we will conduct release investigations to determine the extent of soil contamination and/or the groundwater quality in the area of the former USTs. Strutures or utilities limit the ability to overexcavate at these locations. At Cordova we will determine the system configuration and conduct a release investigation at the 20,000-gallon tanker car using backhoe test pits. At Valdez we will install groundwater monitoring wells to determine groundwater quality in the area of the former USTs. At Tazlina and Sag River we will drill soil borings or dig backhoe test pits to determine the extent of soil contamination. At Jim River and Coldfoot we will collect groundwater samples from temporary well points.

At Cordova, Tok, Nelchina, and Ernestine we will collect samples from the existing stockpiles to determine disposal options. If field-screening results indicate the soil contained in the stockpile likely exceeds the cleanup levels, we will mechanically screen the soil to remove the 2-inch-plus material and combine the fine fraction with any newly-generated contaminated soil.

At Cordova, Ernestine, Chitina, Tazlina, Nelchina, Tok, Jim River, and Coldfoot we will collect water samples from the on-site water supply wells.

3.1 Project Team

The owner is the ADOT&PF, and the prime contractor is Shannon & Wilson, Inc. The project team comprises the following members and responsibilities.

Member	Responsibility
Shannon & Wilson, Inc.	Prime; Environmental Consultant, Drilling Contractor
TLC General, Inc.	Site Prep., Excavation, Stockpiling
Wilson Construction (Cordova)	Site Prep., Excavation, Stockpiling
SGS	Analytical Laboratory

Shannon & Wilson personnel include David McDowell, principal-in-charge, Mark Lockwood, project manager, and Julie Keener as field engineer. Stafford Glashan of Shannon & Wilson will serve as contract manager for this project and coordinate with the ADOT&PF financial project manager. Mark Lockwood will be responsible for overseeing the day-to-day activities and

coordinating with other team members. He prepared this MP and will also help supervise field activities. Our field representatives will conduct sampling, coordinate laboratory analyses, and report preparation efforts and also serve as the site safety and health officer for this project, responsible for maintaining safe and healthy work practices.

4.0 WORK PLAN

Based on results of the UST closure reports, petroleum-hydrocarbon impacted soil remains in stockpiles or in the ground at the former UST locations at the ten ADOT&PF sites. In order to cleanup the impacted soil the following environmental assessment and cleanup activities will be conducted. Detailed procedures of each task are presented in the following subsections.

4.1 Plan Preparation

This MP has been prepared to present the purpose and objective of the program and describe the typical approach that will be used to accomplish the objective, including excavation and stockpiling procedures, sampling and analysis protocols, release investigation methods, and written communications. This MP will generally satisfy the corrective action plan requirements of 18 AAC 78.250, which require plan approval by the ADEC before site work commences.

4.2 Mobilization and Site Preparation

We will coordinate the site work schedule with Mr. Darren Mulkey, the ADOT&PF task manager, and the facility managers. Specific equipment and personnel needed to perform the site activities will be mobilized to the site. To perform the work outlined in this MP, numerous pieces of equipment may be mobilized to each site. TLC will mobilize an excavator, backhoe/loader, end dump with trailer, service truck, screen, and operators. In Cordova, Wilson Construction will supply heavy equipment and operators. Shannon & Wilson will provide instruments and equipment to field-screen the soil and collect samples. Additional equipment may be needed depending on the site conditions.

Site preparation will also include utility locates and preparing an appropriate contaminated soil stockpile location. We will rely on the facility manager to locate buried utilities on State of Alaska property. The soil stockpiles will be constructed in an area recommended by the facility manager. The stockpile area will be prepared in accordance with 18 AAC 78.

4.3 UST Closure

USTs will be closed by removal in general accordance with ADEC UST Regulations (18 AAC 78) and UST Procedures Manual. A licensed UST worker will supervise any work conducted on regulated USTs. We will prepare the ADEC pre- and post-closure notices for the regulated USTs. The UST will be disposed of/recycled in accordance with the applicable regulations. If contamination is encountered during the UST removal, overexcavation will be conducted as outlined in the following section.

4.4 Source Area Excavation and Contaminant Removal

Following site preparation, the Shannon & Wilson field team will begin site work by excavating test pits to confirm contamination in the source area and develop a preliminary sense of the lateral and vertical extent of contamination. This initial "release investigation" will enable us to evaluate whether we can accomplish the contaminant removal with the equipment on hand, and whether the soil stockpile area is of sufficient size to accommodate the projected quantity of contaminated soil.

As our crew proceeds with excavating the source area, the soils will be segregated into suspected "clean" and contaminated piles. The excavation will typically proceed from the "hot spot" near the former USTs outward, until observations or field screening results suggest that contaminant concentrations are below ADEC criteria, at which time confirmation samples will be collected. The segregated "clean" soil will be used to backfill the excavation if field screening readings in the soil are below 40 ppm for diesel contamination and 25 ppm for gasoline.

We will not excavate material from below the groundwater surface. Where contamination appears to exist beneath utilities, buildings, or other permanent site features, we will not remove the soil if it could jeopardize the integrity of the structure.

While the excavation work proceeds, the Shannon & Wilson representative will field-screen the exposed soil for hydrocarbon vapors (see Section 4.0 Sampling Procedures) and direct TLC's progress. Our representative will remain on the site through the removal action site work. Confirmation samples will be collected from the limits of excavation and the stockpiled soil. We will take photographs as the work progresses through site restoration.

4.5 Contaminated Soil Stockpiling/Mechanical Screening

Excavated soil will be segregated into suspected "clean" and contaminated soil, and the contaminated soil will be placed on a 20-mil petroleum resistant liner. The contaminated soil stockpiles will be surrounded by a native soil berm to prevent run-on/runoff of surface water and covered with a 10-mil reinforced polyethylene liner. Samples of the stockpiled soil will be collected for assessing the contaminant levels. Stockpile characterization will follow standard protocols detailed in the Sampling Procedures section unless amended procedures are approved by ADEC.

If the soil is gravelly, a gravity-fed screen will be used to remove the 2-inch-plus material. The coarser-grained material will be placed in a non-environmentally sensitive area.

Upon completion of the each contaminated soil stockpile, Shannon & Wilson will determine the stockpile volume, to provide a reliable estimate of the material quantity at each site that will need to be treated.

4.6 Equipment Decontamination

Excavation equipment will be decontaminated prior to being brought to the site. Excavator buckets and other heavy subsurface exploration equipment will be cleaned with a high-pressure hot-water wash by the excavation subcontractor. Prior to mobilization from one site to the next, the excavation equipment will be scrubbed with a stiff brush to remove the soil and prevent cross contamination.

Sampling equipment, including the stainless steel sampling spoons, will be properly decontaminated prior to sampling and between sample locations to prevent introduction of contamination into uncontaminated samples and avoid cross-contamination. At a minimum, in accordance with ADEC requirements, soil sampling tools will be scrubbed with a stiff brush in a solution of hot water and Alconox or equivalent detergent, followed by tap water and distilled water rinses. Water generated during the decontamination process will be placed on the contaminated soil stockpile or on the ground surface.

4.7 Site Restoration

After field screening readings show the soil remaining at the limits of excavation are likely below the ADEC cleanup levels, or when the site has been cleaned up to the extent practicable,

the excavation will be backfilled. The ADOT&PF will supply the backfill. We will not compact the backfill.

4.8 Soil Borings

The soil borings will be drilled using Shannon & Wilson's equipment and personnel. Borings will be advanced with a hollow-stem auger to a depth of 20 feet in Valdez and approximately 50 feet in Tazlina. Soil samples will be collected by driving a split-spoon sampler into the soil ahead of the auger at 5-foot intervals to 20 feet and 10-foot intervals below 20 feet. Portions of each sample from the split-spoon sampler will be placed in a resealable plastic bag for headspace screening with a PID, and in a laboratory sample jar with methanol preservative using a new or decontaminated stainless steel spoon.

The soil collected in the split-spoon will be classified in the field according to Unified Soil Classification System (USCS), and observations of frozen soils will be noted. In Valdez, two samples from the vadose zone in each boring will be submitted for laboratory testing based on field screening results. Up to three samples will submitted from each boring at Tazlina. Soil samples collected from the borings will be submitted to the laboratory for analysis of DRO, GRO, and BTEX.

The split-spoon sampler and other reusable sampling tools will be decontaminated between sample collection events as described in Section 3.6. Soil cuttings will be placed on the contaminated soil stockpile or in clamp-top drums if no contaminated stockpile exists.

4.9 Monitoring Well Construction and Development

Monitoring wells will be constructed of 2-inch thread-coupled, flush-joint, SCH 40 PVC pipe and machine-slotted well screen having 0.020-inch openings. Ten feet of well screen will be positioned to intersect the water table. A sand pack using #8 to #12 sand will be used as a filter pack. All wells will have a minimum 2-foot bentonite seal placed above the water table. The wells will be completed with flush-mount or aboveground metal protective monuments, as appropriate.

Following installation, the monitoring wells will be developed to remove fine-grained sediment from the screen and fluids introduced into the formation during drilling. The wells will be developed no sooner than 24 hours after installation to allow cement and bentonite grout time to set. Development will be performed using a submersible pump or surface-mounted centrifugal pump with new single-use suction hose. Each well will be pumped until relatively nonturbid

water is obtained. Development water will be discharged to the ground surface. If a sheen is noted the water will be placed in steel 55-gallon drums or discharged onto the contaminated soil stockpile.

4.10 Temporary Well Points

Temporary well points will be installed using direct-push technology. A pickup truck-mounted vibratory hammer will be used to drive a reusable, 1.5-inch-diameter, hollow steel pipe with a slotted section near the tip. Once the water table is intercepted, a peristaltic pump equipped with new rubber tubing will be used to purge the well point and collect the water sample in accordance the procedures in Section 4.4. The well points will be removed once the sampling is complete. The hole will be filled with bentonite and soil.

5.0 SAMPLING PROCEDURES

Soil and water samples will be collected and field-screened in accordance with procedures outlined in the ADEC Standard Sampling Procedures and 18 AAC 78 UST Regulations. The samples will be stored in chilled coolers and transported to SGS using chain-of-custody procedures. Carlile Enterprises Inc, Lynden Transport, or local couriers may be used to transport the samples from the sites to Fairbanks or Anchorage. SGS will analyze the samples within their standard 14-day turnaround time. The number of samples to be collected and collection procedures are described in the following subsections.

5.1 Field Screening

During soil excavation activities the Shannon & Wilson representative will monitor excavation activities and screen the soil in the excavator bucket as the soil is excavated. No one will enter an excavation that is deeper than 4 feet. A Photovac 2020 photoionization detector (PID), or equivalent instrument, will be used to screen the soil. The PID will be calibrated daily with 100 parts per million (ppm) isobutylene standard calibration gas. Direct screening will be accomplished by creating a hole or pocket in the soil of interest with a stainless steel spoon, and holding the PID probe in the hole. If the PID measurements are greater than 40 ppm for diesel or 25 ppm for gasoline, the soil will be considered contaminated. If open-air readings are below the action levels, then headspace soil screening will be accomplished by placing a soil sample in a resealable plastic bag to approximately one half of its capacity.

The samples will be placed in a heated enclosure (such as in a warm field vehicle) to warm to approximately 60 degrees Fahrenheit. Headspace readings will be taken within one hour of sampling. The plastic bag will be agitated for about 15 seconds; the seal of the bag will then be opened to allow the PID probe to enter into the air space above the soil. The maximum ionization response will be recorded as the PID draws vapor from the sample bag. The PID readings will be used to determine the location of analytical samples.

5.2 Excavation Sampling

Soil sampling will be performed when field-screening results are less the action levl or the excavation has reach the practical limits. After the loose soil has been removed from the excavation, the excavation sidewalls and bottom will be sampled to characterize the condition of the soil left in place. Samples will be collected for laboratory analysis from the areas with the highest headspace readings. The number and location of analytical samples to be collected will be based on the number of samples required by 18 AAC 78.090 (d)(2)(B) for a UST closure by removal. According to these regulations, two samples for the first 250 square feet and one sample for each additional 250 square feet of excavation surface area will be analyzed to characterize the remaining soil.

Analytical soil samples, with the exception of GRO and BTEX, will be collected by quickly and completely filling the appropriate laboratory-provided jars using a decontaminated, stainless steel spoon. The analytical samples analyzed for GRO and BTEX will be collected using the ADEC sampling procedure for Alaska Method (AK) 101. The method specifies that 25 grams of soil be placed into a laboratory-supplied, pre-weighed, 4-oz jar. Twenty-five milliliters (ml) of laboratory supplied methanol are then added to completely submerge the soil. The sampler will don a new pair of nitrile gloves prior to collecting each sample.

5.3 Stockpile Sampling

One goal of this project is to remove and stockpile contaminated soil associated with the former USTs. Contaminated soil stockpiles may be treated and disposed under a separate project. Samples of the stockpiled soil will be collected for characterizing the contaminant levels.

The segregated suspected "clean" and contaminated soil stockpiles will be field-screened for initial characterization. Under ADEC protocols, one screening sample will be collected for each 10 cubic yards of excavated soil. After screening these samples, corresponding analytical samples will be collected from suspected “hot spots.” In accordance with ADEC guidance, two

analytical samples will be collected from the first 50 cubic yards of stockpiled soil, and one analytical sample will be collected for each additional 50 cubic yards stockpiled.

We propose to scale back the number of samples from the contaminated soil stockpile if high levels of contamination are evident. These results will demonstrate that the stockpile is contaminated and should be treated. We will screen and sample segregated "clean" soil to document that it does not exceed ADEC cleanup levels and is appropriate for backfill.

5.4 Well Sampling

Water level measurements will be taken prior to purging or sampling using a decontaminated, electronic water-level sounder. The wells will be purged prior to sample collection. We estimate 5 to 10 gallons of water will be purged from each well. The actual volume will be based on stabilization of water quality parameters of pH, temperature, and conductivity. A new length of discharge tubing will be attached to the purging and sampling pump for each well. For on-site drinking water wells the water will be allowed to run for about 30 minutes to purge the system. Purge water will be discharged to the ground surface. If a sheen is noted, the water will be placed in steel 55-gallon drums or discharged onto the contaminated soil stockpile.

The groundwater parameters will then be recorded. Groundwater samples will be collected using a decontaminated, battery-powered, variable-speed submersible pump or a peristaltic pump. A new pair of disposable nitrile gloves will be worn during sampling at each sampling location. For on-site drinking-water wells the samples will be collected prior to any treatment system, if possible.

Water samples will be collected in laboratory-provided sampling containers with the appropriate preservative added. Volatile organic samples will be collected in 40-ml vials without air space. If an air bubble is trapped in the container a new vial will be filled. The sampling pump will be decontaminated between each well.

5.5 Quality Control Sampling

In addition to the project samples, quality control samples will also be collected and analyzed to document the reliability of the sampling and handling procedures. The quality control samples will include field duplicates and trip blanks. At least one field duplicate sample will be collected and analyzed for every ten project samples or each site. The ratio of the trip blanks to the project samples is one for each set of twenty project samples or at least one trip blank for each site.

6.0 SAMPLE ANALYSIS

In order to characterize the stockpiled soil and the soil remaining in the former tank excavations, the selected soil samples along with quality control samples will be submitted to SGS for analytical testing. Analytical methods will be selected based on types of known source(s) of contamination at each former UST location.

The following table presents the analytes of concern at each of the UST locations:

Site	Location	Contaminant of Concern
Cordova	Tank 2 (3,000-gallon gasoline)	GRO, DRO, BTEX
	Existing stockpile	GRO, DRO, BTEX
	20,000-gallon used-oil	GRO, DRO, RRO, BTEX, HVOC, Metals
Valdez	Tank 1 SC-22 (1,500-gallon diesel)	DRO, BTEX
	Tank 2 SC-24 (1,500-gallon diesel)	DRO, BTEX
	Tank 4 (15,000-gallon diesel)	DRO, BTEX
	Tank 5 (15,000-gallon diesel)	DRO, BTEX
	Tank 6 (550-gallon diesel)	DRO, BTEX
	3,000-gallon diesel at Combined-Use Facility	DRO, BTEX
	Existing stockpile	GRO, DRO, RRO, BTEX, HVOC, Metals
Ernestine	Tank 1 SC-05 (2,144-gallon diesel)	DRO, BTEX
	Tank 2 (1,000-gallon diesel)	DRO, BTEX
	Tank 4 (500-gallon used-oil)	GRO, DRO, RRO, BTEX, HVOC, Metals
	Dispensers	GRO, DRO, BTEX
	Existing stockpile	GRO, DRO, BTEX
Chitina	SC-01 (2,500-gallon diesel)	DRO, GRO, BTEX
	SC-02 (2,000-gallon gasoline)	DRO, GRO, BTEX
	Dispensers	DRO, GRO, BTEX
Tazlina	Tank 1 (8,000-gallon diesel)	DRO, GRO, BTEX
	Tank 2 (8,000-gallon gasoline)	DRO, GRO, BTEX
Nelchina	Existing stockpile	DRO, GRO, BTEX
Tok	Tank 4 (6,000-gallon diesel)	DRO, BTEX
	Tank 5 (3,000-gallon diesel)	DRO, BTEX
	Tank 6 (500-gallon used-oil)	GRO, DRO, RRO, BTEX, HVOC, Metals
	Tank 7 (10,000-gallon used-oil)	GRO, DRO, RRO, BTEX, HVOC, Metals
	Existing stockpile	DRO, GRO, BTEX, HVOC, Metals

Site	Location	Contaminant of Concern
Jim River	Tank 1 (1,000-gallon used-oil)	GRO, BTEX, DRO, RRO
Coldfoot	Tank 1 (10,000-gallon diesel)	DRO, BTEX
Sag River	Tank 1 (1,000-gallon used-oil)	GRO, DRO, HVOC, Metals
	Tank 2 (2,000-gallon diesel)	DRO, BTEX
	Tank 3 (1,000-gallon used-oil)	GRO, DRO, HVOC, Metals

6.2 Analytical Methods

6.2.1 Soil Samples

Soil samples to be collected from the former UST excavations and the stockpiles will be analyzed by the following analytical methods:

Contaminant	Analytical Method
GRO	Alaska Method AK 101
DRO	Alaska Method AK 102
RRO	Alaska Method AK 103
BTEX	EPA 8021
HVOCs	EPA Method 8260
UST metals	EPA 6000 series (As, Cd, Cr, Pb,)

6.2.2 Water Samples

Water samples to be collected from monitoring wells or on-site water wells will be analyzed for GRO by AK 101, BTEX by AK 101/EPA 8021, DRO by AK 102, and RRO by AK103.

6.3 Quality Control

Field duplicates of the samples will be tested by the same analyses as the associated project samples. The trip blanks will be analyzed for GRO by AK 101 and BTEX by AK 101/EPA 8021.

As part of the quality control procedures, data validation will be performed by Shannon & Wilson. The analytical sample results for this project will be presented by the project laboratory with Level I Data Deliverables. Each batch of laboratory data will be reviewed. In general this review will consist of cross-checking field-screening data against result summaries and confirming that laboratory quality control was within prescribed limits. The chain-of-custody forms for the samples will be checked to determine if analyses were performed by the requested method, and to verify that requested analyses were performed. In addition, field duplicate

samples will be compared to the corresponding project samples, and the relative percent difference (RPD) will be calculated to assess sampling precision.

The analytical data will be reviewed and compared to established criteria to check that conclusions about the sites are based on adequate sampling results. Field reports will be checked for completeness, accuracy, adherence to field procedures, and information that would impact data quality.

7.0 REPORTS

Monthly project status reports will be prepared and submitted to the ADOT&PF to keep the ADOT&PF contract manager apprised of progress of the project and committed funds.

Following the completion of our field work, individual site reports will be prepared summarizing our cleanup activities and describing the subsurface conditions at each site. The reports will include a scaled site plan showing important site features, limits of excavation, stockpile locations, boring logs, and the sample locations at each site. The legal description of the property by subdivision and township-range will be indicated in the report. Summary tables of analytical test results, and sample locations and descriptions, will support the report text. Photographs of the site excavation activities and laboratory data reports will be included in appendices to each report. If contaminants above criteria were left at the site, we will provide recommendations for appropriate follow-up work to close the site.

8.0 SAFETY AND HEALTH PLAN

This Site Safety and Health Plan (SSHP) was written for the current project; general procedures will be performed in accordance with Shannon & Wilson's Corporate Health and Safety Program.

8.1 Personnel Responsibilities and Training

All Shannon & Wilson personnel working at the site will:

- Review and follow this Safety and Health Plan.
- Obtain information specific information for each site
- Conduct safety meetings in cooperation with the subcontractors on a daily basis.

- 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 the Shannon & Wilson Project Manager.
- Halt work, by themselves or by others, when they observe an unsafe act or potential unsafe working condition.
- Report accidents, illnesses, and near-misses to the Shannon & Wilson Project Manager.

All members of Shannon & Wilson's field staff have completed the Health and Safety Training according to 29 CFR 1910.120, including the annual 8-hour updates. Field personnel have undergone baseline and annual physical/medical examinations as part of Shannon & Wilson's corporate health and safety plan. All field personnel are under a medical monitoring program.

8.2 Potential Hazards

8.2.1 Chemical Hazards

Various POL products may be encountered in soils during the project. The most likely to be encountered are diesel, gasoline, and lubricating oils. No adverse effects are expected to result from handling these contaminants at the low concentrations typically found in contaminated soil. However, contact with fuel products is possible during the sampling activities, and appropriate personal protective equipment (PPE) will be worn. Respiratory protection will be implemented if the air-monitoring action limits described in Section 7.4 are exceeded. The selection, use, and maintenance of respiratory protective equipment will meet the requirements of established procedures, and recognized consensus standards (AIHA, ANSI, NIOSH), and will comply with the requirements set forth in 29 CFR 1910.134.

Diesel has a flashpoint of 110°F to 120°F and a vapor density greater than 1. The lower explosive limit (LEL) is approximately 1 percent, with an upper explosive limit (UEL) of approximately 6 percent. Diesel can cause irritation of the skin. Inhalation of high concentrations of diesel vapors causes headaches and stupor.

The most toxic component in gasoline is benzene, which is added to gasoline at a rate of up to 5 percent to increase the octane levels in unleaded gasoline. Benzene (and related compounds

such as ethylbenzene and xylene isomers) have a characteristic "sweet" aroma. All are central nervous system depressants. Benzene has been linked with some types of cancer (specifically, leukemia) when workers have been exposed to a high (300 to 600 ppm) concentration for long periods of time (15 or more years). The Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) is 1.0 ppm, with a ceiling concentration of 5.0 ppm. The recommended exposure limit (REL) set by the National Institute for Occupational Safety and Health (NIOSH) is 0.1 ppm for an 8-hour time weighted average (TWA) or 1 ppm for a 15-minute ceiling.

8.2.2 Physical Hazards

Our personnel will be working in close contact with a backhoe excavator or other heavy equipment during the project. Personnel will exercise caution when working around heavy equipment and maintain a safe distance from moving equipment. Eye contact will be made with the operator prior to entering the work zone, and personnel within the work zone will remain within sight of the operator at all times. Hard hats, steel-toed boots, and hearing protection will be worn whenever working around heavy equipment.

Trenches and excavations greater than 4 feet in depth will not be entered by personnel, unless they are sloped or shored in accordance with OSHA regulations. In the absence of sloping or shoring, soil samples will be collected using the excavating equipment. Soil stockpiles will be located away from the edge of the excavation.

TLC will provide safety tape and will be responsible for barricading any open excavations during and after work.

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

- Staying alert.
- Keeping all access ways free of materials, supplies, and obstructions at all times.
- Placing tools and other materials so as not to cause tripping or other hazards.
- Being aware of potential tripping hazards associated with debris and uneven ground.
- Being aware of limitations imposed by clothing (i.e., hood on rain parka may block peripheral vision).

8.3 Personal Protective Equipment (PPE)

PPE will be required during the course of the field work. PPE selection will be based primarily on work task requirements. Soil sampling work by personnel potentially exposed to contaminated soil and vapors will require Level D protection, unless field monitoring indicates otherwise. Level C personal protection will be used when organic vapor monitoring indicates a concentration of total volatile organics greater than 10 ppm above background levels in the breathing zone, during intrusive work when blowing dust is present in the air, or if conditions make it advisable. Personnel are trained in the use of PPE that is, or may be, required.

8.4 Level D PPE

Working personnel will wear as a minimum: standard work clothes or cotton overalls, safety boots, safety glasses, hearing protection, and hard hats.

8.4.1 Level C PPE

When air monitoring indicates the potential for exposure to chemical or high levels of hydrocarbon vapors, personnel will upgrade to Level C protection. Level C protection will include as a minimum:

- Half-face or full-face air-purifying respirator with organic vapor cartridges and dust/mist pre-filters (NIOSH/MSHA approved)
- Neoprene outer gloves with vinyl or nitrile inner gloves
- Safety-toe chemical resistant rubber boots, or safety-toe boots with chemical-resistant disposable boot covers
- Hearing protection
- Safety glasses and hard hat

8.5 Air Monitoring

Periodic air monitoring for organic vapors in the breathing zone will be performed using the same PID used for field screening. The breathing zone is defined from the knees to the top of the head. The location and frequency of breathing zone air monitoring will be based on encountered site conditions and the detected organic vapor levels. Ambient air in working zones will be monitored with a PID for petroleum hydrocarbons, at a minimum of four times an hour, when intrusive work is being performed.

If monitoring of hydrocarbon vapors indicates hazardous concentrations, respiratory protection will be used to reduce worker exposure. Air-purifying respirators with organic vapor cartridges will be worn by field personnel if organic vapor concentrations, measured by a PID, consistently exceed 10 parts per million (ppm) on a continuous basis in the breathing zone. Under conditions where organic vapor concentrations consistently exceed 5 ppm, detector tubes specific for benzene (0.5 to 10 ppm) will be used to determine the concentration of benzene present. The location and frequency of breathing zone air monitoring will be based on the encountered site conditions and the detected organic vapor levels. For measured concentrations on the PID exceeding the background level, the following response actions will be taken:

Organic Vapor Monitoring And Response Actions

PID Concentration Above Background	Response Action
< 2.5 ppm	Intermittent readings as deemed necessary; minimum of 4 times per hour when intrusive work is being performed.
2.5 - 5 ppm	Continuous monitoring.
5 - 10 ppm (>0.5 to <1.0 ppm benzene)	Continuous monitoring (use 0.5 to 10 ppm benzene detector tubes every 30 minutes).
10 - 50 ppm (>1.0 ppm benzene)	Half-face air-purifying respirator with organic vapor cartridge. Continuous monitoring (use 0.5 to 10 ppm benzene detector tubes every 15 minutes).
>50 ppm	Work stop and site evacuation until organic vapor level subsides to safe working level.

8.6 Accidents and Emergencies

Shannon & Wilson field personnel are current in first aid and CPR training. At a minimum, the following site safety equipment and first aid supplies should be available in the field.

- Personal protective equipment and clothing specialized for known site hazards
- First aid kit, including first aid booklet
- Portable eye wash
- Clean water in portable containers
- Other decontamination supplies
- Fire extinguisher

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. **The phone number for all emergencies requiring assistance is 911.**

Assistance may also be available at local clinics or hospitals:

Cordova Community Hospital - 424-8000

Chitina Health Clinic - 823-3541

Glenallen Clinic - 822-3541

Tok Clinic - 883-5855

Valdez Community Hospital - 835-2249

Accident reporting is required by Shannon & Wilson's CHSP plan when there is a site-related accident, near-miss incident, or medical emergency. If an employee is treated by medical personnel, an Incident Medical Treatment Documentation form will be completed by the medical attendant. 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.