ON BEHALF OF:

RIDGE CONTRACTING, INC.

Certified HUBZone

DRAFT WORK PLAN

FEDERAL AVIATION ADMINISTRATION

UST DECOMMISSIONING AND SOIL REMEDIATION

FAA FORMER QUARTERS AREA AND FLIGHT SERVICE STATION

TANANA, ALASKA

AWARD NO. DTFAAL-06-R-00026

AUGUST 2, 2006

PREPARED BY:

AHTNA GOVERNMENT SERVICES CORPORATION

&

REMEDIAL ALTERNATIVES, LLC/MOBILE ENVIRONMENTAL TECHNOLOGIES JOINT VENTURE

TABLE OF CONTENTS

Section **Page**

Figures

Tables

Appendices

APPROVAL PAGE

This Work Plan for UST Decommissioning and Soil Remediation - FAA Former Quarters Area and Flight Service Station has been prepared for the Federal Aviation Administration by Ahtna Government Services Corporation and Remedial Alternatives, LLC/ Mobile Environmental Technologies Joint Venture, on behalf of Ridge Contracting, Inc.

Nancy A. Eckroth
Federal Aviation Administration
Contracting Officer

Drew McLaughlin
Ridge Contracting, Inc.
Project Director

Jamie J. Oakley
Ahtna Government Services Corporation
Project Manager/QA Coordinator

Ken Garrett
Remedial Alternatives, LLC/ Mobile Environmental Technologies Joint Venture
Project Manager/QA Coordinator

ACRONYMS

AAC	Alaska Administrative Code
ACM	asbestos containing material
ADCCED	Alaska Department of Commerce and Community Economic Development
AGSC	Ahtna Government Services Corporation
AST	above ground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CFR	Code of Federal Regulations
CO	Contracting Officer
COTR	Contracting Officer Technical Representative
yd^3	cubic yard
DRO	diesel range organics
EPA	United States Environmental Protection Agency
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
FSS	Flight Service Station
ft^2	square feet
GRO	gasoline range organics
IRT	M1-12 Infra Red Thermal
LBP	lead based paint
mg/Kg	milligrams per kilogram
mL	milliliter
OSHA	Occupational Safety and Health Administration
oz	ounce
PID	photoionization detector
PPE	personal protective equipment
RA/MET	Remedial Alternatives, LLC/ Mobile Environmental Technologies Joint Venture
RCI	Ridge Contracting, Inc.
RCRA	Resource Conservation and Recovery Act
RI	release investigation
RRO	residual range organics
SAP	Sampling and Analysis Plan
SOP	standard operating procedure
TAT	turn around time
UST	underground storage tank
WP	Work Plan

1.0 INTRODUCTION

1.1 Project Summary

The following work plan (WP) has been prepared to address continued remedial activities at the Federal Aviation Administration (FAA) Former Quarters Area and Flight Service Station (FSS) located in Tanana, Alaska. The specific remedial activities to be completed are described in the Scope of Work (SOW) (Appendix A) submitted under FAA contract DTFAAL-06-R-00026. This WP includes water well decommissioning and UST decommissioning/soil excavation activities at the FSS building, Environmental Sampling and Analysis Plan (SAP) for on-site thermal treatment activities and a Thermal Treatment Operations Plan (Appendix B). The activities detailed in this WP are being conducted in accordance with ADEC 18 AAC 75 Oil and Other Hazardous Substances Pollution Control, dated January 30, 2003 and ADEC 18 AAC 78 Underground Storage Tanks, dated January 30, 2003. In addition, the two drinking water wells will be decommissioned in accordance with ADEC Recommended Practices for Monitoring Well Design, Installation, and Decommissioning, dated April 1992. Site preparation prior to completion of the water well decommissioning and UST decommissioning/soil excavation activities will include demolition of the existing FSS building.

1.2 Background

The following information to describe the location, the predominant soil and rock types and other pertinent environmental factors at the Tanana FAA Station is primarily based on an RI report published in 1999 (CH2-OH, 1999) and the Alaska Department of Commerce and Community Economic Development website (ADCCED, 2006).

1.2.1 Location

Tanana is located in Interior Alaska about two miles west of the junction of the Tanana and Yukon Rivers and approximately 130 air miles west of Fairbanks. It lies approximately 65.17° North Latitude and -152.08° West Longitude. (Sec. 17, T004N, R022W, Fairbanks Meridian.) Tanana is located in the Ft. Gibbon Recording District. A site vicinity map is shown on Figure 1.

1.2.2 Soils

Tanana is situated in gently rolling terrain characteristic of the Yukon River Valley. Soils consist of 5 to 15 feet of inorganic silts overlying gravel sediments that extend to depth of 35 to 70 feet below ground surface (bgs).

Tanana is located in a discontinuous permafrost zone. When present, permafrost is generally 25 to 65 feet thick. Seasonal frost has been reported to depths of 20 feet bgs.

The main community area is generally elevated above the floodplain of the Yukon River, and soils are well drained. There is a wetland area north of town.

FIGURE 1

VICINITY MAP, TANANA ALASKA

UST DECOMMISSIONING AND SOIL REMEDIATION WORK PLAN

TANANA, AK

DATE:	ACTION

CAD: VALIANT D RAVARRA JR
DATE: 07/26/07
AGSC #:
TITLE: VICINITY MAP
SHT. #: FIG 1

AHTNA
Government Services Corporation
4341 B STREET, SUITE 403
ANCHORAGE, AK 99503

1.2.3 Hydrology

Near the Tanana FAA Station, groundwater occurs within unconsolidated deposits of depths ranging from 15 to 45 feet bgs. In general, the groundwater flow direction is expected to mirror surface topography. However, groundwater recharge and flow paths are influenced by the presence of discontinuous silt and clay layers that act as nearly impermeable barriers. Local silt and clay layers may create locally perched or confined aquifers in the sediments. Near the Tanana FAA Station, groundwater occurs within unconsolidated deposits of depths ranging from 15 to 45 feet bgs.

Water for the community is provided by two wells, which are located approximately 200 feet apart and less than 25 feet from the Yukon River. After treatment, water is stored in a 5,000-gallon storage tank at the city's washeteria building.

FAA formerly utilized six wells at the Tanana station: two at the FSS, which include the two to be decommissioned as part of this WP, and two at the Water Treatment and Pumphouse Building (Building 602). Due to poor water quality, both wells at Building 602 were decommissioned in 1997, and since the 1999 RI, one well at the FSS is no longer in use, and the other is used only for toilets in the FSS Building.

Surface water in the Tanana area flows toward one of three rivers: Tanana, Yukon, or Tozitna. The Tanana FAA station is along the Yukon River and may be subject to flooding. This proximity suggests that surface-water runoff from the station may enter the river.

1.2.4 Climate

Tanana experiences a cold, continental climate characterized by temperature extremes. Daily maximum temperatures in July range from 64 to 70°F, and daily minimum temperatures in January are -14 to -48°F. Average annual precipitation is 13 inches, including 50 inches of snowfall.

1.2.5 Vegetation

Vegetation at Tanana consists of upland spruce-hardwood forest. This is a fairly dense forest of white spruce, birch, aspen, and balsam poplar, with black spruce replacing white spruce in poorly drained areas and north-facing slopes. Highbush cranberries, raspberries, lingonberries, currants, grasses, and mosses are among the important plants of the area; willows, roses, and fireweed also grow there.

1.3 Site and Facility Descriptions

The Tanana FAA Station is an active air navigation station owned by the State of Alaska and operated by FAA. FAA involvement at Tanana began in 1941. At one time, the FAA Tanana Station consisted of 1,650 acres. Currently, FAA owns a total of 40 of the original 1,650 acres. No permanent FAA personnel are stationed at Tanana. A Tanana FAA Station site map is shown on Figure 2.

The sites relevant to project requirements documented in this WP include three areas of previously stockpiled of contaminated soil at the Former Quarters Area as shown on Figure 3, petroleum impacted soils previously characterized at former heating oil UST 15-C-001, and existing heating oil UST 15-C-002 currently located underneath the FSS Building as shown on Figure 4. The stockpiled soils originated from releases identified during fuel storage tank and pipeline decommissioning activities at both the FSS and Former Quarters Area. Additional contaminated soil associated with the former UST 15-C-001, and contaminated soils to be determined at the existing UST 15-C-002 remain at the FSS area and will be included in the soil stockpiles at the Former Quarters Area. The known contaminated soil and UST 15-C-002 are currently situated underneath the FSS Building, which will be removed prior to commencing soil excavation and UST decommissioning activities.

1.4 Previous Investigations

Ecology and Environment, Inc. published an environmental compliance investigation report in 1992 and recommended further cleanup action to be taken at the Tanana FAA Station. In 1997, CH2-OH decommissioned 15 USTs, seven above ground storage tanks (ASTs) and associated fuel pipelines. Petroleum contaminated soil originating from UST/AST and pipeline releases, along with surficial diesel stained areas were excavated and stockpiled at the FAA Former Quarters Area. Results from soil samples collected from the stockpiles in 1997 reported maximum diesel range organic (DRO) concentrations of 16,000 mg/Kg and showed no solvents were present (CH2-OH, 1999). The UST Decommissioning Assessment for UST 15-C-001 (CH2-OH, 1998b) reports the results of six confirmation samples collected from the limits of the UST 15-C-001 excavation. One sample collected 11 feet bgs on the south side of the excavation reported a DRO concentration of 11,000 mg/Kg. A remedial action was also conducted in 1997 to decommission three water wells at Buildings 601 and 602 and an abandoned well at the FSS, decommission the septic system at the former Quarters Area, and demolish Buildings 602 and 30 (CH2-OH, 1998a).

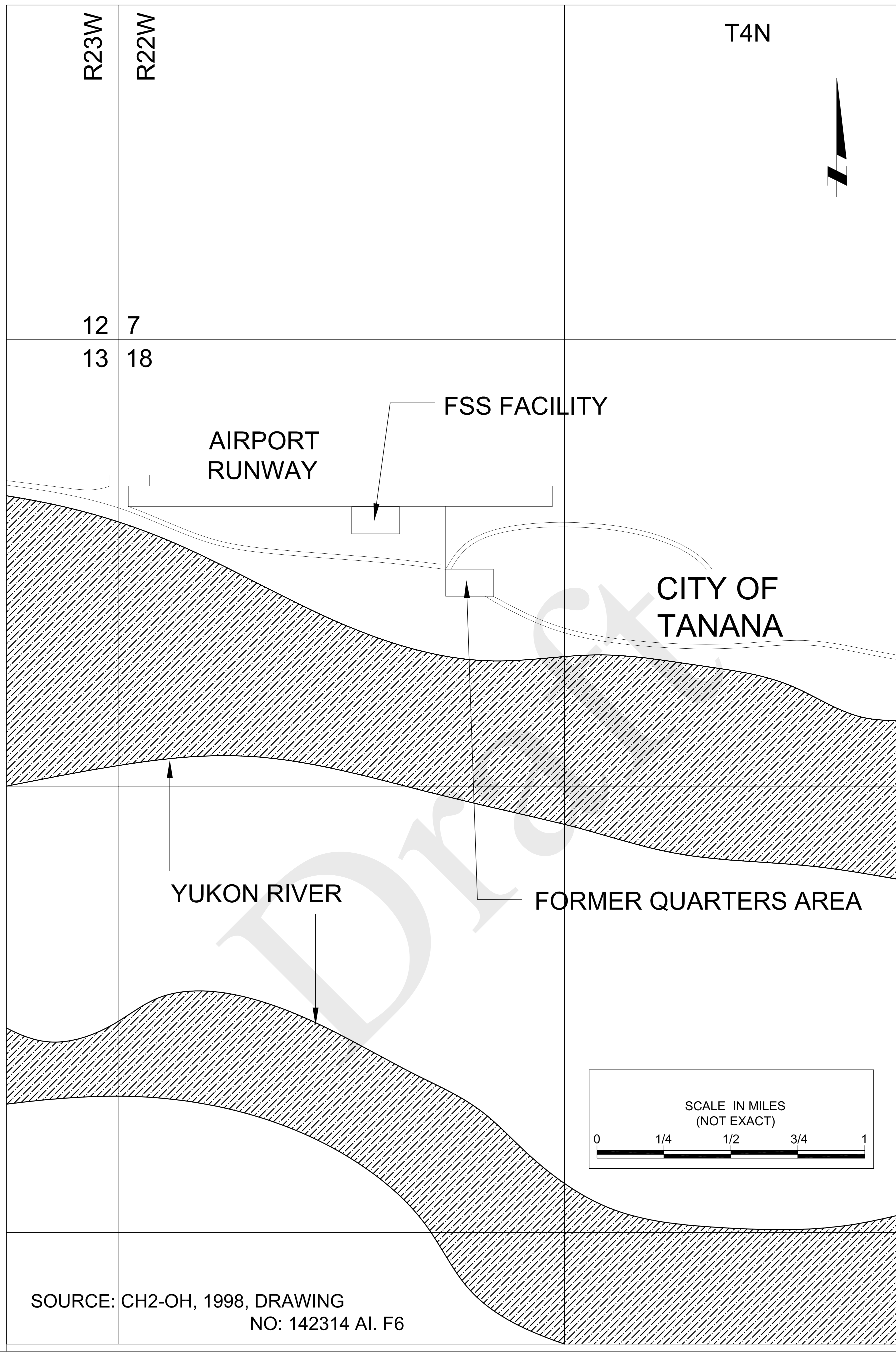


FIGURE 2

TANANA FSS FACILITY AND
FORMER QUARTERS AREA SITE MAP

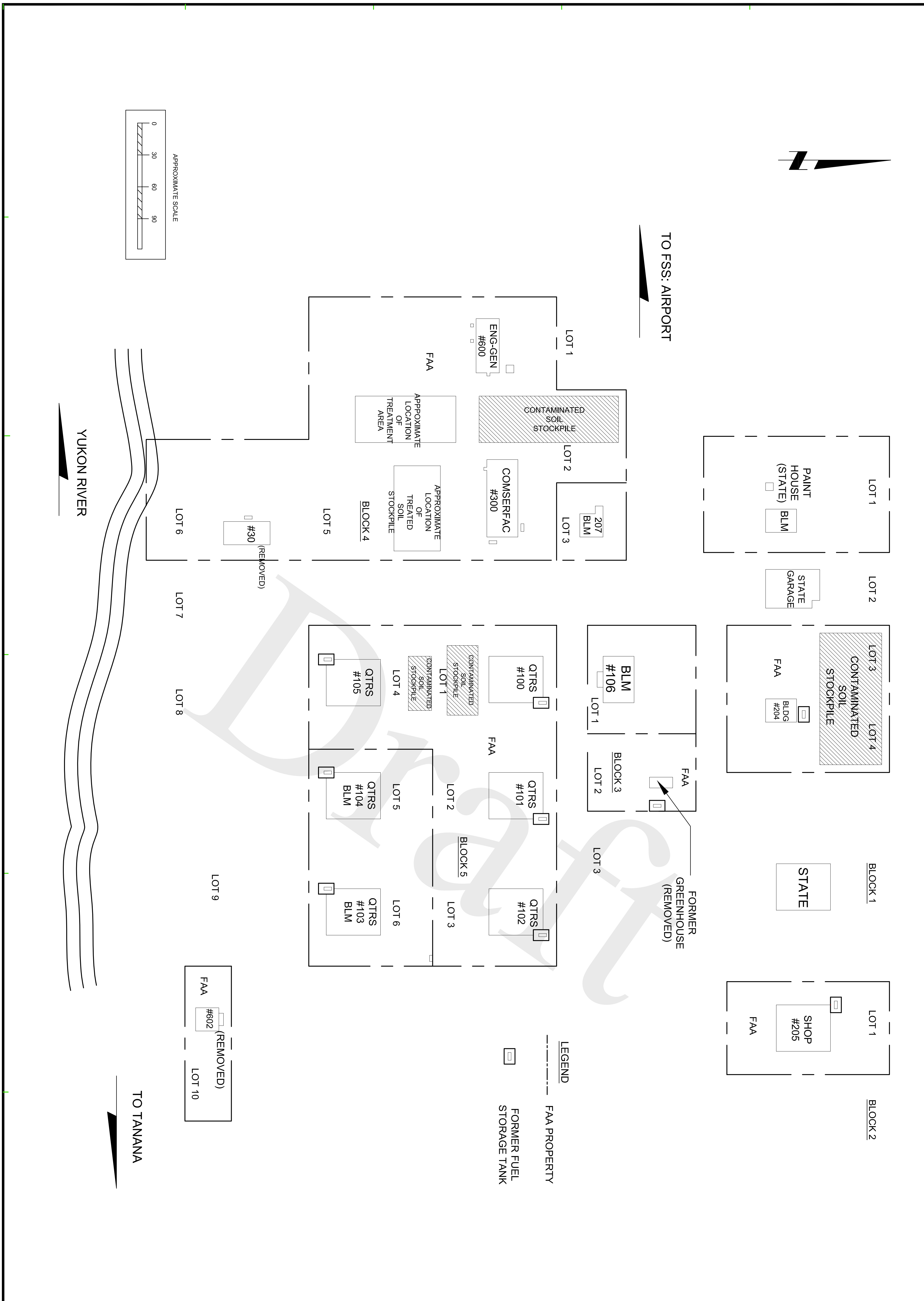
UST DECOMMISSIONING AND SOIL
REMEDIATION WORK PLAN

TANANA, AK

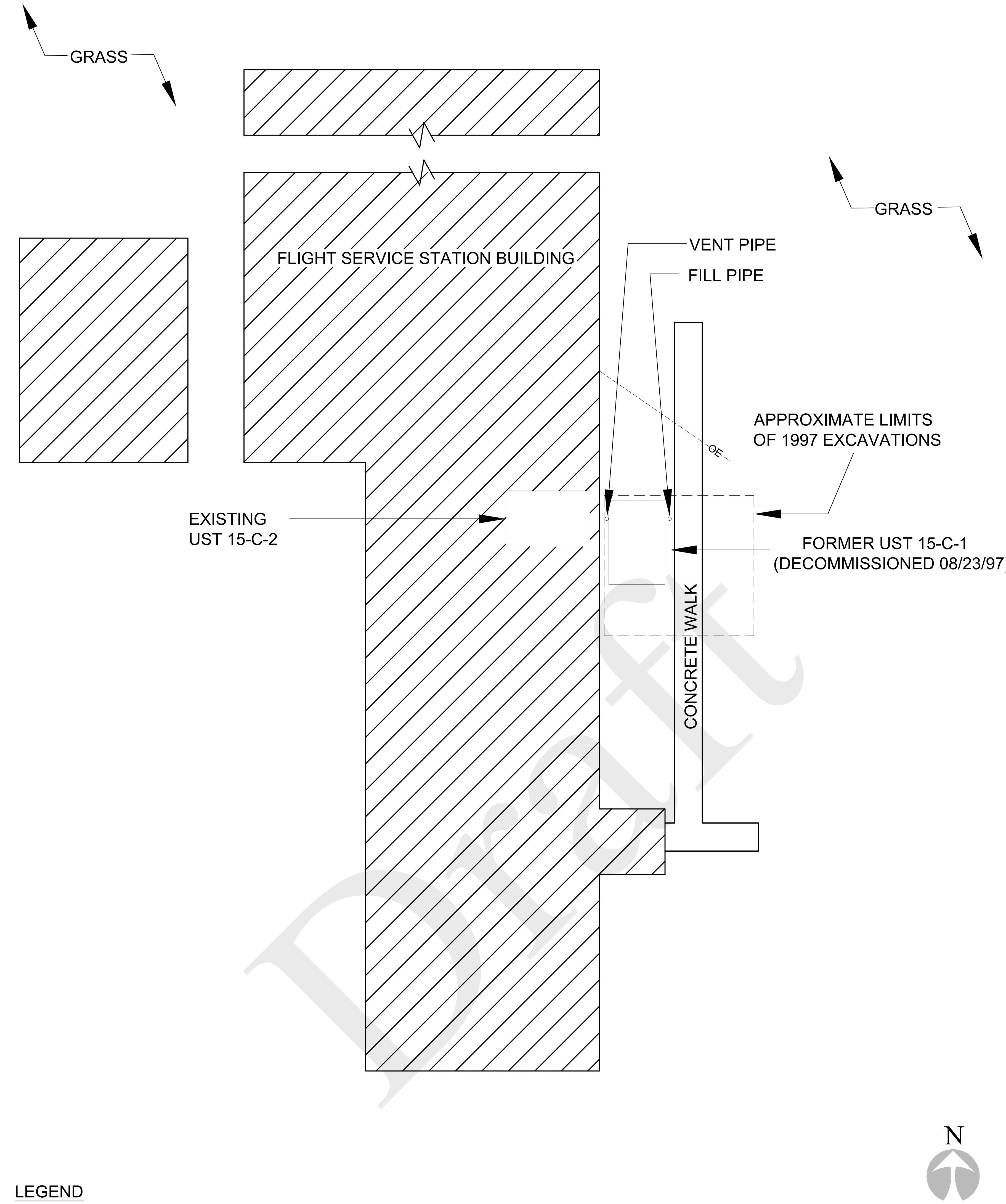
CAD:	VALIANT D RAVARRA JR
DATE:	07/26/07
AGSC #:	
TITLE:	
SHT. #:	FIG 2

DATE:	ACTION

AHTNA
Government Services Corporation
4341 B STREET, SUITE 403
ANCHORAGE, AK 99503



DATE:	ACTION	FIGURE 3 FORMER QUARTERS AREA: STOCKPILES AND TREATMENT AREA UST DECOMMISSIONING AND SOIL REMEDIATION WORK PLAN TANANA, AK		AHTNA Government Services Corporation 4341 B STREET, SUITE 403 ANCHORAGE, AK 99503	
CAD:	VALIANT D RAVARRA JR				
DATE:	07/26/07				
AGSC #:					
TITLE:					
SHT. #:					



LEGEND

OE ABOVE-GROUND POWER LINE

NOTES

* ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE

SCALE IN FEET (NOT EXACT)

10 5 0 10

CAD:	VALIANT D RAVARRA JR
DATE:	
AGSC #:	
TITLE:	
SHT. #:	FIGURE 4

DATE: ACTION

FIGURE 4

TANANA FAA FLIGHT SERVICE STATION

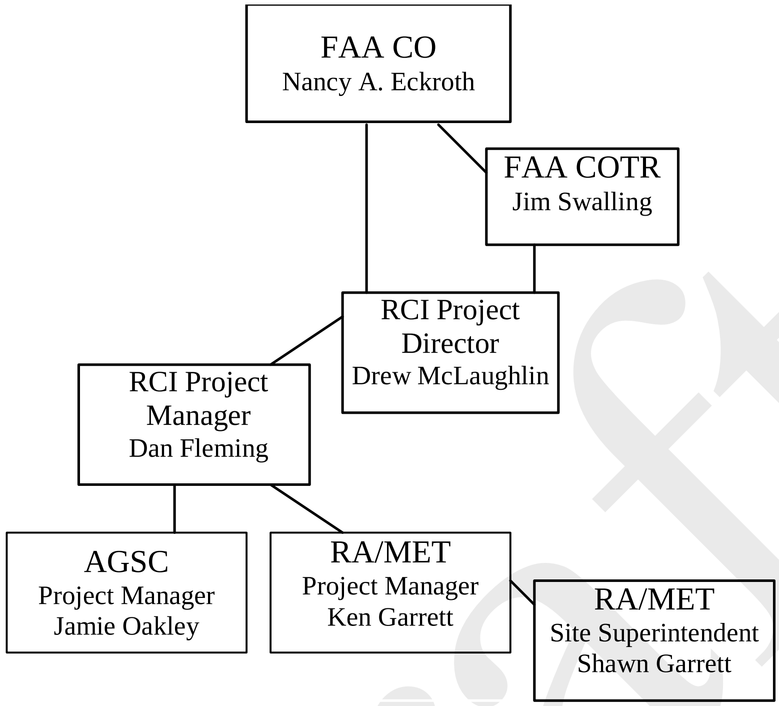
UST DECOMMISSIONING & SOIL
REMEDIATION WORK PLAN

TANANA, AK

AHTNA
Government Services Corporation
4341 B STREET, SUITE 403
ANCHORAGE, AK 99503

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Figure 5 Project Organization Chart



2.1 FAA Personnel

- Nancy A. Eckroth. Contracting Officer (CO), FAA Logistics Division, AAL-059A. 222 W. 7th Ave, Anchorage AK 99518. 907.271.5845

- Jim Swalling. Contracting Officer Technical Representative (COTR), AAL-471. 907.271.5361

2.2 Contractor Personnel

- Drew McLaughlin, Ridge Contracting, Inc. (RCI), Program Manager will oversee all project personnel and activities. Mr. McLaughlin will be the RCI point of contact for coordination of program issues with the FAA. He will oversee the development and implementation of the contract including administration, quality control, and subcontract/teaming agreements.

- Dan Fleming will serve as RCI's Project Manager, Site Superintendent, and Contractor Quality Control System Manger. Mr. Fleming will be the single point of contact for this scope of work and is responsible for the management and execution of all activities in accordance with the approved WP and specifications and applicable federal, state, and local laws and regulations. He will be onsite performing oversight on all project field activities and quality control inspections, inventorying all removed debris, documenting all steps of the tank decommissioning and soil remediation with photography, and conducting daily safety briefings for site personnel. Mr. Fleming will also prepare daily reports (Appendix C) that completely and accurately describe the field activities completed daily.

2.3 Subcontractor Personnel

- Jamie Oakley will serve as the Ahtna Government Services Corporation (AGSC) project manager/QA coordinator along with serving as the third party responsible person. Mr. Oakley will conduct all ADEC confirmation sampling and oversight of remediation and UST decommissioning activities. In addition, Mr. Oakley will assist in direction of daily safety meetings, and report and document preparation.

- Ken Garrett will serve as the Remedial Alternatives, LLC/ Mobile Environmental Technologies Joint Venture (RA/MET) project manager/QA coordinator. Mr. Garrett will manage and operate all activities associated with onsite thermal soil treatment as described in the Operations Plan (Appendix B).

2.4 Subcontractor and Vendor Services

- AGSC, 4341 B Street, Suite 403, Anchorage, AK 99503. (907) 561-2705
  - Responsible for preparing work plans, reporting documents, and Waste Profiles (Appendix D) applicable to this WP. A qualified person will perform the field screening and soil and groundwater sampling at the site.

- RA/MET, 201 E. 54th Avenue, Suite 205, Anchorage, AK 99518. (503) 887-8082
  - Owner and operator of onsite thermal remediation equipment. RA/MET will be onsite performing thermal remediation tasks as described in this WP and in the Operations Plan (Appendix B).

- TestAmerica (formerly North Creek Analytical). (907) 563-9200
  - ADEC-approved and national Environmental Laboratory Accreditation Program certified laboratory.

- Denali Borough Landfill, Milepost 282.5 on the Parks Highway. (907) 582-1330 or (907) 683-1330
  - Non-hazardous waste debris disposal facility.

- Emerald Services, 800 East Ship Creek Avenue Anchorage, AK 99501. (907) 258-1558 Emerald Services permitted processing and recycling facility, 2020 Viking Drive Anchorage, AK 99501. (907) 222-5238
  - Treatment and disposal facility for any potential regulated waste generated during UST decommissioning.

- Inland Barge, Nenana, Alaska. (820) 840-2628; (820) 832-5640

2.4 Corporate Licenses

RCI corporate licenses are provided in Appendix E.

3.0 PROJECT ACTIVITIES

The following is a list of project goals and tasks that will be accomplished to meet the project objectives described in this WP.

3.1 Project planning and preparation

- Prepare WP
- Coordinate with local utility companies as applicable regarding utility locates and disconnecting utilities from applicable structures in the project vicinity.
- Acquire appropriate permit for disposal of non-hazardous wastes associated with the soil stockpiles, soil and water sampling, and well decommissioning debris.
- Attend Preconstruction Meeting with FAA personnel.
- Prepare all necessary hazardous and non-hazardous waste manifests.

3.2 Fieldwork

This section describes the tasks/goals associated with UST decommissioning/soil excavation, water well decommissioning, and soil remediation. Additional details regarding FSS Building demolition and lead and asbestos abatement are provided in the FSS Building Demolition WP.

3.2.1 Mobilization

RCI will mobilize supervision, labor, equipment, and materials to Tanana, AK within two weeks of final ADEC authorization of this WP. A crew of three will meet the Inland Barge. RCI equipment onboard the barge includes a 50,000 pound excavator, pickup truck, debris containers, and miscellaneous small tools and consumables. A front end loader and dump truck will be rented locally as needed.

RA/MET will mobilize crew, equipment, and materials after RCI arrives to ensure that the site is adequately prepared for field personnel and activities. RA/MET equipment, including five M1-12 Infra Red Thermal (IRT) boxes, will be mobilized to the site via a chartered air cargo service. See the Thermal Treatment Operations Plan in Appendix B for further details on the soil remediation portion of this contract.

AGSC will mobilize a qualified sampler and field and sampling equipment to Tanana at four different occasions; first to obtain baseline samples for pre-project footprints and groundwater samples, second to guide the UST excavation with PID field screening, third to perform post-treatment sampling, and fourth to collect samples from post-project footprints.

3.2.2 Water Well Decommissioning

Two drinking water wells under the FSS will be decommissioned in accordance with the ADEC Recommended Practices for Monitoring Well Design, Installation, and Decommissioning, dated April 1992. The depths to the shallow groundwater table will be measured relative to the two drinking water well casing rims to the nearest 0.01 foot using an electronic water level indicator. Groundwater elevations will be calculated if sufficient data is available to calculate the well casing elevations. Groundwater samples will be collected from each well in accordance with the Sampling and Analysis Plan presented in Section 3.2.6 of this WP. The water wells will then be excavated to a depth of 10 feet below ground surface (bgs). The casing will be broken off or cut, and bentonite pellets will be placed into the casing.

3.2.3 UST Decommissioning

After the FSS Building is removed (as described in the FSS Building Demolition WP) an ADEC certified tank remover will remove UST 15-C-002 in accordance with ADEC and API regulations and practices. UST 15-C-002 contained heating oil and is therefore not regulated by the ADEC and does not require ADEC notification and approval. The UST will be cleaned and disposed of in accordance with section 3.2.10 of this WP.

3.2.4 Contaminated Soil Excavation

Contaminated soils remaining from the removal of former UST 15-C-001, and any contaminated soils generated during the proposed decommissioning of UST 15-C-002 are estimated at an additional 30 cubic yards. These soils will be included in the on-site thermal soil treatment system. Excavation of these soils will be completed after demolition of the FSS building and removal of UST 15-C-002 and after exposed aboveground cables and other utilities are removed. Excavation will be guided by an ADEC qualified sampler using photoionization detector (PID) soil headspace field screening procedures in accordance with the UST Procedures Manual (ADEC, 2002). Approximately 11 feet of clean overburden will need to be removed to access the previously determined contaminated soils from the former UST 15-C-001.

Contaminated soil removed from under and around the FSS will be directly placed into the bucket of a front end loader, covered with visqueen, and transported to the onsite thermal treatment unit. All visqueen liners used during this project will be 20 milliliters thick. The excavations will not be backfilled until analytical results confirm the complete removal of contaminated soil.

The front end loader will also be used to transport contaminated soils from the three stockpiles to the IRT boxes for treatment. The front end loader bucket will be filled to half capacity with soil extracted directly from the stockpiles. Appendix B provides further details on loading and unloading soil pre-and post-treatment.

3.2.5 Soil Remediation

Approximately 1240 cubic yards of petroleum contaminated soil will undergo on-site thermal remediation. RA/MET will furnish, transport, establish, and operate five M1-12 Infra-Red Thermal boxes to remediate petroleum contaminated soils. An Operations Plan, provided in Appendix B, has been developed to meet all requirements of 18 AAC 75.365, and it provides additional details on the thermal remediation process.

3.2.6 Sampling and Analysis Plan

Field screening and analytical samples will be collected prior to, during, and after field activities. The ADEC Method Two, Under 40 Inch Zone, Migration to Groundwater cleanup standards shall apply to this remedial action as specified in the SOW. These cleanup levels are as follows:

Residual-Range Organics (RRO)	11,000 mg/Kg
Gasoline-Range Organics (GRO)	300 mg/Kg
Diesel-Range Organics (DRO)	250 mg/Kg
Benzene	0.02 mg/Kg
Toluene	5.4 mg/Kg
Ethylbenzene	5.5 mg/Kg
Xylenes	78 mg/Kg

3.2.6.1 Collecting Soil Samples

The following steps will be taken to minimize collection errors:

- All samples will be collected with disposable or clean tools that have been decontaminated, as outlined in Section 4.7 (Decontamination of Equipment).
- Sample containers will be filled quickly.
- Containers will immediately be preserved according to procedures in Section 3.2.6.10 of this WP.
- Containers will be quickly and adequately sealed. Rims will be cleaned prior to tightening lids. Tape will only be used if known not to affect sample analysis.
- Sample containers will be labeled as outlined in Section 3.2.6.9 of this WP.

3.2.6.2 Baseline Sampling

Prior to beginning field activities, an ADEC qualified sampler will collect baseline samples from the treatment area and any other areas that will serve as staging areas for contaminated or treated soil and be covered with visqueen liners. The total treatment area includes an approximately 30 foot by 100 foot (3,000 ft^2) rectangular area where the five IRT boxes will be staged on a visqueen liner. An approximate 40 by 100 ft^2 area will be set up as described in Appendix B to receive soil as it is treated. The total area to be used for treating and staging soil will not exceed 7,000 ft^2. This area will be field screened using photoionization detector (PID) soil headspace field screening procedures in a 20 foot by 20 foot grid. The highest 5% of field screening locations will be sampled for analytical analysis.

3.2.6.3 Former Tank Sites

Excavation of contaminated soil from the former tank sites will be guided by an ADEC qualified sampler using PID soil headspace field screening procedures in accordance with the UST Procedures Manual (ADEC, 1999).

Clean overburden removed from the excavations will be field screened and temporarily stockpiled pending analysis. Field screening will be completed for each approximately 10 yd^3 removed from the excavations. Two analytical samples, submitted for DRO/RRO and GRO/BETX, will be collected from the initial 50 yd^3 removed, and one for each additional 50 yd^3. The locations of analytical samples will be determined from the field screening locations with the greatest potential for contamination. Once analytical results have been received the overburden will either be used as backfill material for the excavations or removed to the contaminated soil treatment facility.

Field screening of the excavations associated with UST 15-C-001 and 15-C-002 will be completed for every approximately 100 square feet (ft^2) of excavation. Once field screening has determined that all potential soil exceeding the applicable ADEC cleanup criteria has been removed, a minimum of three samples will be collected for field analysis of DRO using PetroFLAG® immunoassay field screening kits. PetroFLAG® immunoassay field screening kits will be used according to manufacturer's instructions. The test kits will be calibrated to approximately 187.50 mg/Kg (75 percent of the ADEC cleanup target level for DRO). Excavation and testing procedures will continue, until field screening results are estimated to be less than applicable ADEC cleanup criteria. A minimum of one final confirmation sample will be collected for every approximate 250 ft^2 of excavation, or two samples for excavations less than 250 ft^2. The samples will be submitted on 24 hour turn around times (TATs) for analysis of DRO/RRO and GRO/BTEX. In addition, two samples from beneath the former USTs will be submitted for analysis of PAHs.

Once the vertical extent of contamination has bee removed, an additional five feet of soil will be removed with the backhoe to determine if groundwater is encountered. If groundwater is encountered, the FAA will be notified to instruct RCI on further action.

3.2.6.4 Monitoring Wells

A representative groundwater sample will be collected from each of the two drinking water wells prior to decommissioning. At least three standing well volumes of groundwater will be removed from each well, or the wells will be bailed until dry and allowed to recharge prior to sampling. The wells will be bailed and sampled with a new disposable polyethylene bailer, cord, and nitrile gloves to minimize the possibility of cross-contamination. Samples shall be analyzed for DRO/RRO and GRO/BTEX as shown in Table 1.

Purge water generated during this sampling event will be contained in a 55-gallon drum, pending analytical results to determine disposal options.

A description of sample locations and frequency prior to soil treatment activities is presented in Table 1.

Table 1 Field Screening and Confirmation Samples (Pre-Treatment)

Parameter	Method	Purpose	Sample Frequency
Total Petroleum Hydrocarbons as Diesel Fuel	PID/ PetroFLAG® Kit	Soil Screening	In a 20x20 ft^2 grid to determine the location of baseline samples. As needed to direct excavation at former tank sites. Following excavation, at least three PetroFLAG® after PID indicates cleanup levels have been achieved in excavation. Choose sample locations based on visual observations showing signs of contamination. Field screen treated soil with PID to assess that cleanup criteria are met.
RRO (soil)	Alaska Method AK 102	Final Confirmation Soil Samples	2 each below soil treatment and staging area (baseline) 4 each below tank 15-C-002 2 each below former tank 15-C-001 2 each from overburden
DRO (soil)	Alaska Method AK 102		
GRO (soil)	Alaska Method AK 101		
BTEX (soil)	EPA SW-846 Method 8021B		
PAH (soil)	EPA SW-846 SW8270c		2 below tank 15-C002 2 below former tank 15-C-001
DRO (water)	Alaska Method AK 102	Final Confirmation Water Samples	2 each from each drinking water well
GRO (water)	Alaska Method AK 101		
BTEX (water)	EPA SW-846 Method 8021B		

3.2.6.5 Treated Soil Stockpile

Once treatment is complete, the final treated soil volume will be considered as one stockpile for post-treatment sampling in accordance with the ADEC UST Procedures Manual. Ten field screening samples will be collected from each batch cycle (approximately 110 yd^3). The field screening sample that exhibits the highest potential for contamination based on field screening results from each segment will be collected for laboratory analysis. Approximately one laboratory confirmation sample will be submitted for each 110 yd^3 of treated soil (approximately 11 laboratory samples total). The samples will be collected from a depth of 12 to 18 inches, and allowed to cool before field screening or placing into a laboratory container. Should any sample(s) fail to meet the required cleanup levels, ADEC will be provided with those failing test results, and ADEC approval will be obtained prior to any sorting/segregation of "clean" soil from insufficiently treated soil. For areas where confirmation soil samples fail to meet the appropriate Category A or Method Two cleanup criteria, it is proposed that the approximate 100 yd^3 of soil best represented by that sample be re-treated. However, segregation and re-treatment, other than re-treatment of the entire batch of soil, will not occur without the prior approval of ADEC.

3.2.6.6 Treated Soil Stockpile Footprint

After soil treatment has been completed and the treated soil has been transported to the Tanana dump for storage (or used as backfill material for the excavation as described in Section 3.2.8 of this WP), the soil from the stockpile footprint below where soils were temporarily stored on visqueen liners will be sampled to confirm that native soil in the lined stockpile area was not contaminated by soil that may not have been adequately treated. Soil underlying the lined treatment area will also be sampled to confirm that native soil was not contaminated during the thermal remediation process.

3.2.6.7 Former Contaminated Soil Stockpile Footprints

After contaminated soil from the stockpiles is adequately treated, the area below the formerly existing stockpiles will be field screened in grids consisting of 400 ft^2 each that are adjusted in dimensions to best fit the stockpiles. Generally, the highest 5% of field screening samples for each stockpile will be collected for laboratory analysis. Samples will be collected from soil underlying the liners of the three former stockpiles.

A description of sample locations and frequency after soil treatment activities are completed is presented in Table 2.

Table 2 Field Screening and Confirmation Samples (Post-Treatment)

Parameter	Method	Purpose	Sample Frequency
Total Petroleum Hydrocarbons as Diesel Fuel	PID	Soil Screening	In 400 ft^2 grids under contaminated soil stockpile liners to determine whether contamination spread to native soil. As needed to direct collection locations of laboratory samples from: • Treated soil stockpile • Treatment area footprint.
RRO (soil)	Alaska Method AK 102	Final Confirmation Soil Samples	11 each from treated soil stockpile. 2 each from soil underlying treatment and staging areas. 1 each below each former contaminated soil stockpile liner.
DRO (soil)	Alaska Method AK 102		
GRO (soil)	Alaska Method AK 101		
BTEX (soil)	EPA SW-846 Method 8021B		

3.2.6.8 Sample Chain-of-Custody and Documentation Procedures

Soil confirmation samples will be delivered to TestAmerica, an ADEC approved laboratory in Anchorage, AK. Chain-of-custody documentation will be obtained to track collection, shipment, laboratory receipt, custody, and disposal of the samples. All confirmation samples will be analyzed with 24 hour turn around time (TAT).

3.2.6.9 Sample Identification

All samples collected for this project will be numbered with identifiers as described in the SOW provided in Appendix A and as follows:

- A site identifier consisting of the three letters “TAL” for Tanana.
- The year (last two digits).
- A sample collection method/location identifier consisting of “SL” for surface and stockpile samples, “SS” for subsurface samples, “MW” for monitoring well, “TB” for trip blanks, followed by a location/well number.
- A facility identifier consisting of “F” for Flight Service Station and “Q” for Quarters Area.

3.2.6.10 Sample Containers and Preservation

Table 3 Sample Containers and Preservation Techniques

Parameter	Matrix	Analysis Method	Sample Container	Preservation Techniques	Maximum Holding Time
GRO	Soil	Alaska Method AK101	Pre-weighed amber 4-oz sample jar with Teflon lined lid and septum	Add 25 mL methanol to ~ 50 grams sample (submerge sample) <25°C	28 days
BTEX	Soil	EPA SW-846 Method 8021B		Add 25 mL methanol to ~ 50 grams sample (submerge sample) <25°C	14 days to analysis
DRO	Soil	Alaska Method AK102	Amber 4-oz wide-mouth glass jar with Teflon lined lid	4+/-2°C	14 days to extraction 40 days to analysis
RRO	Soil	Alaska Method AK103			
PAH	Soil	EPA SW-846 Method 8270	4-oz glass jar		
GRO	Water	Alaska Method AK101	Two amber 40-mL glass jars with Teflon lined lid and septum	No headspace, add HCl to pH<2, 4+/-2°C	14 days to analysis
BTEX	Water	EPA SW-846 Method 8021B	Two amber 40-mL glass jars with septa lids	Add HCl to pH<2, 4+/-2°C; no headspace	14 days to analysis
DRO	Water	Alaska Method AK102	Amber 1-liter glass jar with Teflon lined lid	Add HCl to pH<2, 4+/-2°C	14 days to extraction 40 days to analysis
oz	Ounce				
mL	Milliliter				
°C	degrees Celsius				

3.2.7 Survey

A survey will be conducted by swing tie or hand held GPS coordinates to document the location of the following:

- Samples collected from the contaminated soil treatment area prior to treatment to document baseline chemical concentrations in the underlying soil.
- Groundwater samples.
- Samples collected from the contaminated soil treatment area footprint after the contaminated soil is treated by thermal remediation.
- Samples collected from soil underneath the stockpile liners after the stockpiles are removed and transported to the treatment area.

3.2.8 Backfilling and Site Restoration

After the completion of excavation and decommissioning activities, the excavation at the former tank sites will be backfilled to return the excavated area to original grade. Excavations will not be backfilled until laboratory confirmation samples indicate cleanup levels have been achieved. Treated soil from the FSS site will be used as backfill material. An overlying layer of clean local soil will be added to cover the backfilled excavation. Grass seed (Fescue) will be spread over areas disturbed by project activities.

3.2.9 Site Control

Work zones will be designated at the daily site safety meetings. Fencing, barricades, and signs will be used to indicate restricted and/or closed areas.

3.2.10 Decontamination

Equipment shall be decontaminated prior to demobilization. Gross contamination and adhered dirt will be cleaned from the front end loader bucket and tires/tracks with shovels and brooms over in-place visqueen liners and/or contaminated soil stockpiles before exiting contaminated areas. If necessary, a soap solution and brushes will be used to remove remaining residues of contamination and adhered dirt. If wastewater is generated, it will be collected and mixed with contaminated soil. After UST 15-C-002 is removed, tank metal will be cleaned, and the wastewater generated will be added to contaminated soil for treatment.

3.2.11 Disposal of Project Wastes

Project wastes from activities discussed in this WP shall include tank metal from the decommissioned UST 15-C-002, water well casings, visqueen liners, cables and underground utilities removed from the site, and waste from PetroFLAG® field screening kits. Residual fluids from UST 15-C-002 and personal protective equipment (PPE) are potential project wastes. Tank metal, water well casings, visqueen liners, cables and underground utilities, and PPE, if it exists, will be disposed of at the Denali Borough landfill. The approval letter from the landfill is provided in Appendix F. Methanol waste associated with the use of PetroFLAG® field screening kits is regulated as a hazardous waste under the Resource Conservation and Recovery Act (RCRA) and will be packaged and handled in accordance with RCRA requirements or used as an additive to gasoline in the field vehicles. Any existing residual tank fluids will be pumped out and either transported to Emerald Services in Anchorage, Alaska for treatment and disposal or utilized as fuel for local oil fired furnaces.

3.3 Reporting and Close-Out

- Project Final Report
    - Include field logbooks kept by RCI and AGSC during field activities.

- An inventory of hazardous wastes will be conducted and submitted to the FAA at the close of the field project.
- Final Administrative Requirements

3.4 Project Schedule – Fieldwork

Table 4 summarizes the schedule and work sequence for all site work. Fieldwork is scheduled to begin within two weeks of final ADEC authorization of this WP.

Table 4 Project Schedule, Tasks, and Task Descriptions

Duration	Task/ Resources	Description
1 day	RCI mobilizes supervision, labor, equipment, and materials to Tanana. • RCI (3 people)	• Initial safety meeting. • RCI crew meets barge in Tanana. • Equipment on barge: 50,000 pound excavator, pickup truck, debris containers, and miscellaneous small tools and consumables. • Other equipment, including a front end loader and dump truck, will be rented locally.
1 day	AGSC mobilizes equipment and personnel to Tanana. • AGSC (1 person)	• ADEC qualified sampler collects baseline samples.
1 day	RA/MET mobilizes supervision, labor, equipment, and materials to Tanana. • RA/MET (3 people)	• RA/MET will mobilize after RCI arrives onsite. See Appendix B for additional details.
5 days	FSS Building demolition. • Lead and asbestos abatement.	• See Demolition WP.
1 day	Decommission two drinking water wells. • RCI (3 people) • AGSC (1 person)	• Daily safety meetings. • Collect groundwater samples and measure depth to groundwater. • Excavate water wells to a depth of 10 feet bgs. • Break or cut off casing. Place bentonite pellets into casing. • Backfill excavation with native material.
1 day	Decommission tank 15-C-002 • RCI (3 people) • AGSC (1 person)	• Daily safety meetings. • RCI crew removes UST 15-C-002. Cut, clean, and dispose of UST metal at approved landfill with other project debris.
1 day	Excavate contaminated soils from former UST locations. • RCI (3 people) • AGSC (1 person)	• Daily safety meetings. • RCI crew excavates contaminated soils associated with two former USTs. • Qualified sampler guides excavation with PID soil headspace field screening and collects PetroFLAG samples. Confirmation samples are collected from limits of excavation and are shipping to laboratory with rapid TAT.
~32 days	Remediate contaminated soils • RA/MET • AGSC (1 person)	• Daily safety meetings. • RA/MET crew will remediate contaminated soils in accordance with Appendix B. • AGSC collects post-treatment field screening and confirmation samples.
1 day	Site Cleanup	• Daily safety meetings. • Backfill disturbed areas with material from local borrow pits and/or treated soils. • Hydroseed the disturbed areas. • Final Site Inspection and acceptance by FAA Representative. • Dispose of all project debris: barge debris to Nenana and truck to Denali Borough landfill for disposal. Letter of Approval from the Denali Borough is provided in Appendix F.
1 day	Post-thermal treatment site “decommissioning” • AGSC (1 person)	• Qualified sampler collects field screening and confirmation samples to confirm native soils were not contaminated by field activities.

4.0 QUALITY ASSURANCE

The data quality assurance requirements that will be employed for this project comply with those specified in the FAA Standard Operating Procedures (SOP) (CH2MHill, 2006). The FAA SOP is provided in Appendix G. Test America is the ADEC approved laboratory that will be performing all analytical analyses. A formal Quality Assurance/Quality Control Program is maintained by TestAmerica, and a copy of the Quality Control Manual that outlines this program is available upon request.

The following sections describe the quality assurance objectives and qualitative data evaluation criteria that will be used to verify acceptability of field and chemical analytical data acquired in support of the tank decommissioning and soil remediation activities of this project.

4.1 Quality Assurance Objectives

Data quality will be evaluated based on their precision, accuracy, representativeness, completeness, and comparability. These parameters are defined in the FAA SOP.

4.2 Data Reduction, Validation, and Reporting

Field records will be maintained and archived in accordance with the FAA SOP (Appendix G).

TestAmerica will consolidate all laboratory analyses and results specified in the FAA SOP into a Laboratory Data Report. This project requires Level 3 Data Deliverables from TestAmerica and the Laboratory Data Report will be presented in both hard copy and electronic copy deliverables. All statements and data provided in TestAmerica Laboratory Data Reports shall be in conformance with provisions set forth by the TestAmerica Quality Assurance Program Plan and the National Environmental Laboratory Accreditation Conference, unless noted otherwise.

4.3 Internal Quality Control Checks

Laboratory quality control checks shall include at a minimum method blanks, laboratory control samples, surrogate spikes, and matrix spikes/matrix spike duplicate samples.

To verify the data quality parameters, the following items shall be reviewed:

- Preservation and technical holding times
- Initial and continuing calibration
- Field and laboratory blanks
- Field and laboratory duplicates
- Surrogates
- Matrix spikes/matrix spike duplicates

- Laboratory control samples
- Detection and quantitation limits

For GRO/BTEX soil samples, the laboratory will report between the method detection limit and the practical quantification limit if the practical quantification limit is elevated above 0.02 mg/kg for benzene.

Qualified data will be flagged appropriately and discussed in the Laboratory Data Report.

4.4 Calculation of Data Quality Indicators

The following data quality control indicators are measured to assess the state of control that prevails at the time of sample analysis:

- Target analytes are measured in method blanks to help identify and eliminate potential contamination sources in a sample batch.
- Laboratory control samples and laboratory control sample duplicate recoveries are measured and relative percent differences between recoveries are calculated to determine if corrective action must be taken.
- Relative percent differences are calculated between field duplicate and primary sample results to assess sources of variability arising from the field sampling protocol and distribution of target analytes within the sample matrix. Duplicate samples are submitted to the laboratory "blind" to assess the laboratory's precision.
- Trip blanks are analyzed to determine the magnitude and identify the likely source(s) of potential contamination problems resulting from lab and/or field activities, and to assess their contribution to measurement error.
- Surrogate recoveries are calculated as indicators of laboratory accuracy and data quality.
- Matrix spike recoveries are calculated to evaluate the effect of the sample matrix on the recovery of analytes of interest.

4.5 Preventative Maintenance

Maintenance schedules for each piece of equipment used in the field and in the laboratory will comply with the FAA SOP (Appendix G). The field manager will be responsible for ensuring that spare parts for field equipment are available at the project site to minimize equipment downtime.

4.6 Corrective Action

Laboratory corrective actions for most analytical procedures include correcting the problem, then re-preparing and reanalyzing the sample. No corrective action is necessary for matrix spikes/matrix spike duplicate samples.

In other laboratory and field situations that require corrective action, individuals directly involved in the situation will use their best judgment to address the problem.

A corrective action report will be maintained by each the field manager and the laboratory. Data uncertainty and possible limiting factors of its applicability as it applies to the site will be reviewed in the Close-Out Report.

4.7 Performance and System Audits

Annual audits of laboratory equipment are conducted by the TestAmerica Laboratory Quality Assurance Officer in accordance with the lab Quality Assurance/Quality Control Program maintained by TestAmerica. A copy of the Quality Control Manual that outlines this program is available upon request from the laboratory.

4.8 Quality Assurance Reports to Management

All laboratory data will be maintained at the laboratory and available upon request. Complete documentation of sample preparation and analysis will be maintained in accordance with the FAA SOP (Appendix G). Any deviations from these procedures will be discussed in the Site Investigation Report. AGSC Project Chemist will conduct a thorough data quality review on the prepared laboratory data package, and this data quality review report will be included in the Close-Out Report.

5.0 SITE SAFETY AND HEALTH

The RCI Health and Safety Program dated 2006 (provided in Appendix H) will be utilized for this project and will be available on site. The RA/MET Health a Safety Plan for thermal remediation activities is provided as an appendix to the Operations Plan provided in Appendix B. Local emergency information is provided in Table 5.

Table 5 Tanana Local Emergency Information

ALL EMERGENCIES CALL 911

Hospital Emergency Rooms in Community:	Tanana Health Center (907.366.7222)
Alternative Health Care:	Tanana Tribal EMS (907.366.7170) Fairbanks Memorial Hospital (907.452.8181)
Health Care Comments:	Tanana is classified as an isolated town/Sub-Regional Center. It is found in EMS Region 1C in the Interior Region. Emergency services have limited highway, river, and airport access. Emergency service is provided by 911 telephone service, volunteers, and a health aide.
Police:	Tanana Police (907.366.7158); State Troopers in Fairbanks (907.451.5100)
Fire/Rescue:	Tanana Tribal EMS (907.366.7170)
Airline Services:	Arctic Circle Air Service, Evert Air Alaska, Frontier Flying Service, Larry's Flying Service

5.1 Inspections

FAA shall retain the right to inspect all work on the project as stated in the SOW.

6.0 REFERENCES

Alaska Department of Environmental Conservation (ADEC), *18 AAC 80 Drinking Water*, January 2006.

ADEC, *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning*, April 1992.

ADEC, *Underground Storage Tanks Procedures Manual*, March 1999.

Alaska Department of Commerce and Community Economic Development (ADCCED). 2006. http://www.dced.state.ak.us/dca/commdb/CF_COMDB.htm#.

CH2MHill, *FAA Standard Operating Procedures*, January 2006.

CH2-OH, *Pre-Field Planning Document, Release Investigation Plan, Quality Assurance Program Plan, and Health and Safety Plan, Fuel Storage Management Program, Tanana, Alaska*, 1998a.

CH2-OH, *UST Decommissioning Assessment, Tank 15-C-001*, July 1998b.

CH2-OH, *Release Investigation Report, Fuel Storage Tank Management Program and Expanded Site Investigation/Interim Cleanup, Tanana*, Alaska, May 1999.

Ecology and Environment, Inc., *Environmental Compliance Investigation Report, Tanana FAA Station, Tanana, Alaska*. Prepared for the United Stated Department of Transportation, Federal Aviation Administration, Alaska Region, 1992.

Appendix A

Scope of Work

SOLICITATION, OFFER, AND AWARD *(Construction, Alteration, or Repair)*	1. SOLICITATION NO. DTFAAL-06-R-00026	2. TYPE OF SOLICITATION	3. DATE ISSUED 3/03/06	PAGE OF PAGES 1 OF 74

IMPORTANT - The "offer" section on the reverse must be fully completed by offeror.

4. CONTRACT NO.	5. REQUISITION/PURCHASE REQUEST NO. AL-06-00697 (See Part II – Section I **Clause 3.3.1-10 Availability of Funds)**	6. PROJECT NO.

7. ISSUED BY	8. ADDRESS OFFER TO
Federal Aviation Administration **Acquisition Management Branch, AAL-59A** **222 West 7th Avenue, #14** **Anchorage, AK 99513**	**Same as Block No. 7**

9. FOR INFORMATION CALL: ➔	A. NAME Nancy A. Eckroth	B. TELEPHONE NO. *(Include area code) (NO COLLECT CALLS)* (907) 271-5845

10. THE GOVERNMENT REQUIRES PERFORMANCE OF THE WORK DESCRIBED IN THESE DOCUMENTS *(Title, Identifying no., date)*:

MAGNITUDE OF CONSTRUCTION Between $500,000 and $1,000,000

SECTION	TITLE	PAGES
A	Solicitation, Offer, and Award	2
B	Supplies/Services & Price/Cost	1
C	Scope of Work	23
F	Deliveries or Performance	1
G	Contract Administration Data	1
H	Special Contract Requirements	2
I	Contract Clauses	13
J	List of Attachments	22
K	Representations, Certifications, and Other Statements of Offerors	5
L	Instructions, Conditions, and Notices to Offerors	3
M	Evaluation Factors for Award	1

Note: Reference Part I, Section H, Proposal Guarantee – 20%
Reference Part I, Section H, Performance Bond – 100%
Reference Part I, Section H, Payment Bond – 100%

11. The Contractor shall begin performance within 30 calendar days and complete it within 75 calendar days after receiving ☐ award, ☒ notice to proceed. This performance period is ☐ mandatory, ☒ negotiable.

12A. THE CONTRACTOR MUST FURNISH ANY REQUIRED PERFORMANCE AND PAYMENT BONDS? *(If "YES," indicate within how many calendar days after award in Item 12B.)* ☒ YES ☐ NO	12B. CALENDAR DAYS

13. ADDITIONAL SOLICITATION REQUIREMENTS:

A. Sealed offers in original and 0 copies to perform the work required are due at the place specified in Item 8 by **2:00PM** *(hour)* local time **March 31, 2006** *(date)*: Sealed envelopes containing offers shall be marked to show the offeror's name and address, the solicitation number, and the date and time offers are due.

B. An offer guarantee ☒ **is**, ☐ is not required.

C. All offers are subject to the (1) work requirements, and (2) other provisions and clauses incorporated in the solicitation in full text or by reference.

D. Offers providing less than 60 calendar days for Government acceptance after the date offers are due will not be considered and will be rejected.

OFFER (*Must be fully completed by offeror*)

14. NAME AND ADDRESS OF OFFEROR (*Include ZIP Code*)

15. TELEPHONE NO. (*Include area code*)

16. REMITTANCE ADDRESS (*Include only if different than Item 14*)

CODE FACILITY CODE

17. The offeror agrees to perform the work required at the prices specified below in strict accordance with the terms of this solicitation, if this offer is accepted by the Government in writing within 60 calendar days after the date offers are due. (*Offerors providing less than the calendar days indicated here for Government acceptance after the date offers are due will not be considered and offer will be rejected.*)

AMOUNTS →

REMEDIATION OF CONTAMINATED SOILS FAA FORMER QUARTERS AREA AND FLIGHT SERVICE STATION, TANANA, AK

Total Lump Sum Contract Amount $ ____________________

18. The offeror agrees to furnish any required performance and payment bonds.

19. ACKNOWLEDGEMENT OF AMENDMENTS

(*The offeror acknowledges receipt of amendments to the solicitation - give number and date of each.*)

AMENDMENT NO.										
DATE										

20A. NAME AND TITLE OF PERSON AUTHORIZED TO SIGN (*Type or print*)

20B. SIGNATURE

20C. OFFER DATE

AWARD (*To be completed by Government*)

21. ITEMS ACCEPTED:

22. AMOUNT

23. ACCOUNTING AND APPROPRIATION DATA

24. SUBMIT INVOICES TO ADDRESS SHOWN IN (*1 copies unless otherwise specified*) → ITEM 26

25. RESERVED.

26. ADMINISTERED BY

FEDERAL AVIATION ADMINISTRATION
ACQUISITION MANAGEMENT BRANCH, AAL-059A
222 W. 7TH AVENUE, #14
ANCHORAGE, AK 99513-7587

27. PAYMENT WILL BE MADE BY

FAA ACCOUNTS RECEIVABLE BRANCH
AMZ-110
PO BOX 25082
OKLAHOMA CITY, OK 73169

CONTRACTING OFFICER WILL COMPLETE ITEM 28 OR 29 AS APPLICABLE

☐ 28. NEGOTIATED AGREEMENT *Contractor is required to sign this document and return _____ copies to issuing office.)* Contractor agrees to furnish and deliver all items or perform all work requirements identified on this form and any continuation sheets for the consideration stated in this contract. The rights and obligations of the parties to this contract shall be governed by (a) this contract award, (b) the solicitation, and (c) the clauses, representations, certifications, and specifications incorporated by reference in or attached to this contract.

☐ 29. AWARD (*Contractor is not required to sign this document.*) Your offer on this solicitation is hereby accepted as to the items listed. This award consummates the contract, which consist of (a) the Government solicitation and your offer, and (b) this contract award. No further contractual document is necessary.

30A. NAME AND TITLE OF CONTRACTOR OR PERSON AUTHORIZED TO SIGN (*Type or print*)

31A. NAME OF CONTRACTING OFFICER (*Type or print*)

Nancy A. Eckroth

30B. SIGNATURE

30C. DATE

31B. UNITED STATES OF AMERICA

BY

31C. AWARD DATE

PART I - SECTION B
SUPPLIES/SERVICES & PRICE/COST

FAA ENVIRONMENTAL CLEANUP PROGRAM
REMEDIATION OF CONTAMINATED SOILS FAA FORMER QUARTERS AREA
AND FLIGHT SERVICE STATION, TANANA, AK

On-site or Off-site Thermal Remediation or Hot Air Vapor Extraction of **Approximately 1240 CY** of Contaminated Soil		Lump Sum	$_______________
On-site or Off-site Thermal Remediation or Hot Air Vapor Extraction of **Additional Soil**	Optional **(as required)**	Cost/CY	$_______________
Flight Service Station (FSS) Soil Removal and Site Preparation		Lump Sum	$_______________

1 JOB Lump Sum Amount $_______________

PART I - SECTION C
SCOPE OF WORK

The Contractor shall furnish all labor, equipment, supplies, materials and transportation necessary to perform all work delineated in this section. All work shall be performed in accordance with the terms and conditions, specifications and drawings, and attachments included and made a part of this contract.

Drawings and Attachments are included (See Section J) and will be made a part of this contract.

SCOPE OF WORK
FAA ENVIRONMENTAL CLEANUP PROGRAM
REMEDIATION OF CONTAMINATED SOIL
TANANA, ALASKA

1.0 GENERAL

1.1 SCOPE OF WORK

The purpose of this Scope of Work is to remediate petroleum contaminated soil stockpiled at the Tanana FAA Former Quarters Area and soil to be excavated from the Flight Service Station (FSS). Site preparation at the FSS includes removing one fuel tank and the building prior to removing the contaminated soil. The volume of contaminated soil to be remediated is approximately 1240 cubic yards.

1.2 SITE CONDITIONS

There are three stockpiles of contaminated soil within the FAA Former Quarters Area (stockpile numbers 1,2 & 4 on attachment 2). These soils originated from fuel storage tank and pipeline decommissioning activities and diesel stained areas at the Flight Service Station and Former Quarters Area. Fuel storage tanks decommissioned included 15 heating oil tanks, 4 diesel tanks and 1535 feet of heating oil pipeline. The stockpiles consist of approximately 1210 cubic yards. The Former Quarters Area contains flush mounted monitoring wells and probes as shown in attachment 2. These wells and probes shall be protected during the project and any wells/probes that are damaged shall be repaired or replaced.

Soil samples from the stockpiles taken in 1997 were reported to be for diesel range organics (DRO) and benzene, toluene, ethylbenzene and xylenes (BTEX), via Alaska Department of Environmental Conservation (ADEC) analytical method AK 102 and SW 846 method 8020a respectively. The maximum DRO concentration reported is 16,000 mg/Kg. The diesel stained area adjacent to building 205 was suspected to have contained solvents. Sampling of stockpiled soil from the excavation of this area showed no solvents were present.

The soils consist of inorganic silts and very fine sands. Mechanical sieve analysis was not conducted on the stockpiled soils.

At the FSS there is known contaminated soil associated with former underground heating oil tank 15-C-001 and possible contaminated soil from underground heating oil tank 15-C-002. Tank 15-C002 is underneath the FSS Building. The FSS building and tank 15-C-002 shall be removed to access the contaminated soil. There is an estimated 30 CY of contaminated soil at these two tank sites

1.3 GENERAL DESCRIPTION OF WORK

The scope of work includes, but is not limited to, the following:

1.3.1 On-site or off-site thermal remediation or hot air vapor extraction (HAVE) of approximately 1240 cubic yards of petroleum contaminated soils. On-site Thermal remediation or HAVE shall meet the requirements of section 2.0 "ON-SITE THERMAL REMEDIATION/HAVE". Off-site Thermal Remediation or HAVE of the contaminated soils shall meet section 3.0 "OFF-SITE THERMAL REMEDIATION/HAVE".

1.3.2 Removal of contaminated soil associated with former tank 15-C-001 and removal of tank 15-C-002 and associated contaminated soil at the FSS. The FSS Building needs to be removed prior to removal of tank 15-C-002 and the contaminated soil.

1.3.3 All samples shall be numbered in accordance with the FAA sample identification plan, Attachment 1. Samples shall be collected by an ADEC Qualified Sampler. The contractor shall ship all soil samples to SGS Environmental Services for analysis. The FAA will pay SGS Environmental Services directly for laboratory analysis.

1.3.4 Fieldwork is anticipated to be conducted between May 15, 2006 through September 15, 2006. The start date will be negotiated after the project's work plans/operation plan are accepted. The performance period is negotiable.

2.0 ON-SITE THERMAL REMEDIATION OR HAVE

2.1 The Contractor shall furnish, transport, establish and operate a thermal remediation or HAVE unit to remediate petroleum contaminated stockpiled soils at Tanana. The thermal remediation or HAVE system shall be set up at the Tanana Dump which is located approximately 2 miles west of the FAA Former Quarters Area. The treated soil will be stockpiled at the Tanana Dump for future cover material. The treated soil needs to meet or exceed the ADEC Method 2, Under 40 Inch Zone, Migration to Groundwater (18 AAC 75) cleanup standard. The treated soil shall be adequately wetted to minimize dust generation. The Contractor should for estimating purposes, anticipate a minimum of 1240 cubic yards. Given that final soil disposition will be for cover material, the sampling and analysis plan shall include an appropriate number of soil samples for surface placement of the treated soils (i.e. soil must meet Method 2, Under 40 Inch Zone, Migration to Groundwater, 18 AAC 75).

2.2 The price shall include costs for mobilization, demobilization, personnel, equipment necessary to handle soils, labor, providing living facilities for on-site staff, per-diem, and incidental costs and overhead.

2.3 The Contractor shall submit an "Operation Plan" to the FAA per 18 AAC 75.365. Mobilization to Tanana will not be authorized until ADEC has approved the "Operations Plan". The "Operations Plan" shall, at a minimum, meet the requirements of 18 AAC 75.365, and include;

2.3.1 The Operation Plan shall include a layout plan specifying where the Thermal Remediation/HAVE Unit, contaminated soil stockpiles, remediated stockpiles, and equipment will be staged.

2.3.2 The Operations Plan's sampling and analysis plan shall also discuss sampling locations and analysis necessary to identify any secondary contamination under the liner of the existing contaminated soil stockpiles. Include details for compliance with section 2.7.

2.3.3 The Operations Plan shall also include a Waste Management plan for handling of decontamination water, contaminated personnel protective equipment (PPE) and other potentially hazardous/non-hazardous wastes generated during the project.

2.3.4 Work plan for removal of tank 15-C-002 and contaminated soil from this tank and former tank 15-C-001 at the FSS.

2.4 The contractor shall survey the location of all baseline/post-treatment/post-stockpile samples necessary to demonstrate that secondary contamination did not take place.

2.5 The contractor shall have an EPA approved Spill Prevention, Control and Contingency (SPCC) plan if the quantity of fuel stored on site exceeds requirements of 40 CFR 112.

2.6 The contractor shall establish a decontamination "area" that is lined and designed to capture rinse water from decontamination of equipment. The pad shall be constructed in such a manner that run-off cannot enter it, and that it has enough storage to contain precipitation. The contractor shall not allow secondary contamination to result from movement of contaminated vehicles/equipment through uncontaminated areas.

2.7 The contractor shall make provisions for complete containment of the contaminated soil in the three existing stockpiles as the soil is loaded into trucks. No leachate from stockpiles shall be allowed. The stockpiles shall be covered at all times except for when they are being actively worked. Covers shall be weighted down to prevent being blown off during high winds.

2.8 Contractor shall properly dispose of all stockpile covers and liner materials. The stockpile is lined/covered with 20-mil HDPE and is surrounded by a 3-foot dike. The stockpile also has two layers of felt, one above the HDPE liner and one below.

2.9 The contractor shall provide weekly progress reports to the FAA identifying quantities of soil remediated and analytical results for remediated soils.

2.10 The contractor shall supply all submittals in accordance with Section 16, Submittals.

2.11 Not used.

3.0 OFF-SITE THERMAL REMEDIATION OR HAVE

3.1 The Contractor shall containerize and transport petroleum contaminated stockpiled soils to a State of Alaska Department of Environmental Conservation approved/permitted thermal remediation or HAVE unit. Contractor shall furnish all necessary personnel, equipment, containers and transportation. The Contractor should for estimating purposes, anticipate a minimum of 1240 cubic yards.

3.2 The price shall include costs for mobilization, demobilization, personnel, equipment necessary to handle soils, transportation, containers, , providing living facilities for on-site staff, per-diems, and incidental costs and overhead.

3.3 The contractor shall survey the location of all post-stockpile samples necessary to demonstrate that secondary contamination did not take place.

3.4 The Soil Disposal contractor shall submit a Sampling and Analysis Plan (SAP) as identified in Section 16, Submittals.

3.5 The Soil Disposal Contractor shall submit a "Work Plan" and a "Layout Plan" as identified in Section 16, Submittals.

3.6 The soils shall be transported on a Non-Hazardous Waste Manifest and/or Uniform Hazardous Waste Manifest as appropriate. Manifests shall be submitted to FAA at least one week before shipment for review and comment. FAA shall issue all Manifest numbers used for shipment of soils from Tanana.

3.7 Contractor shall properly dispose of all stockpile covers and liner materials. The stockpile is lined/covered with 20-mil HDPE and is surrounded by a 3-foot dike. The stockpile also has two layers of felt, one above the HDPE liner and one below.

3.8 The contractor shall establish a decontamination "area" that is lined and designed to capture rinse water from decontamination of equipment. The pad shall be constructed in such a manner that run-off cannot enter it, and that it has enough storage to contain precipitation. The contractor shall not allow secondary contamination to result from movement of contaminated vehicles/equipment through uncontaminated areas.

3.9 The contractor shall make provisions for complete containment of the contaminated soil in the three existing stockpiles as the soil is loaded into trucks. No leachate from stockpiles shall be allowed. The stockpiles shall be covered at all times except for when they are being actively worked. Covers shall be weighted down to prevent being blown off during high winds.

3.10 The contractor shall provide weekly progress reports to the FAA identifying quantities of soil disposed of and analytical results for any samples taken.

3.11 The contractor shall supply all submittals as identified in Section 16, Submittals.

4.0 FSS Soil Removal and Site Preparation

4.1 General: The Contractor shall remove all exposed aboveground cables and other utilities at least 2 feet below ground surface (bgs) unless stated otherwise and backfill and remove all concrete pads, steps, sidewalks, foundations, and other items in the immediate vicinity of the Flight Service Station (FSS) that may prevent future excavation of contaminated soil. All removed items and debris shall be removed and disposed off site except hazardous wastes. Hazardous wastes include lead based paint, fluorescent lights, ballasts, air conditioner and freon. The volume of lead based paint chips and debris generated shall be kept to a minimum. Hazardous wastes shall be packaged in DOT approved shipping containers and stored in the FAA's Shop Building 205 at the quarters area. An inventory of the hazardous wastes shall be submitted to the FAA at the close of the field project. Containers shall all be labeled with contents, volume, and generation date. Concrete without paint, tar, or petroleum on it may be buried near the FAA's VOR facility downriver about 2 miles along the road to the NDB. All LBP deposited on the ground during demolition and transport shall be collected, drummed, and stored in the FAA garage. Regrading of soil after building removal shall be kept to a minimum to avoid spreading petroleum contaminated soil. The work plan for the underground storage tank (UST) removal and petroleum contaminated soil (PCS) removal shall be included in the Operations Plan, if On-site Remediation is used, or the Off-site Remediation Work Plan if Off-Site Remediation is used. The final report for the FSS demolition shall not include the UST and associated PCS activities. The UST and PCS shall be included in the final report with the soil treatment.

4.2 The building has a 12 inch wooden post foundation with about 40 pilings that are assumed to extend 10 feet into the ground which shall be pulled out. The main building (Rooms 5 through 7) is 16 feet by 80 feet and the western side addition (Rooms 1 through 4) is 16 feet by 41 feet. The air conditioner, 2 refrigerators, and all fluorescent lights and ballasts (approximately 25 of each) shall be removed and stored at the FAA's garage in the quarters area. Interior debris includes metal desks, electrical equipment, file cabinets, and furnace.

4.3 The last two wooden power poles and associated lines nearest the FSS shall be removed. All former poles and tower anchors (at least 4 of each) shall be cut off at least 2 feet bgs around the building. Only sidewalks, poles, tower bases and tower anchors that will hinder contaminated soil excavation need to be removed. There are at least 80 feet of sidewalks around the building, one step, and a concrete block chimney. All holes shall be completely backfilled.

4.4 Two older leach cribs near the FSS shall be investigated by excavating a depth of 6 feet bgs at four locations. If found, they shall be removed as time and material modifications to the contract. Approximately one and a half hour of excavator time shall be expended searching for the dry wells.

4.5 Two drinking water wells under the FSS shall be decommissioned in accordance with ADEC requirements including removal of all pumps and piping inside the well casings and removal of the well casing at least 10 feet bgs and entirely filled with concrete grout or clay. The wells are approximately 38 feet deep. The wells shall be sampled in accordance with ADEC sampling requirements prior to decommissioning. The samples shall be analyzed for BTEX, GRO, and DRO. Well decommissioning shall be completed prior to soil excavation.

4.6 An abandoned underground heating oil tank (15-C-002) under the east side of the FSS shall be removed. All fuel in the tank (unknown amount but assume 50 gallons for estimating purposes) shall be removed and disposed. The removal of this tank shall be conducted in accordance with ADEC and API regulations and practices. An ADEC certified tank remover shall be employed for the removal activities. Another underground heating oil tank (15-C-001) was located east of the FSS near tank 15-C-002. Tank 15-C-001 was removed in 1997. In 1987 approximately 10-40 gallons of fuel spilled due to a backup in the inlet for tank 15-C-001. This fuel contaminated soil under the FSS above tank 15-C-002. Contaminated soil was excavated and placed in garbage bags, approximately 20, and stored under the FSS. The bags are still under the FSS and shall transported to the on-site/off-site remediation system and remediated. The area excavated in 1987 was not sampled so contaminated soil may remain on top of tank 15-C-002. The soil on top of the tank shall be field screened to determine if contaminated soil remains. Upon removal of the tank the soil under the tank shall be sampled in accordance with ADEC requirements prior to backfilling. Contaminated soil from this tank shall be removed (assume 25 CY total). The removed petroleum contaminated soil (PCS) shall be remediated at the on-site/off-site remediation system. The excavation of PCS shall be directed using a PID, qualified ADEC sampler, and the ADEC regulations (18AAC75) and guidance. When the excavated soil is thought to be clean a minimum of 3 samples shall be collected for DRO field screening by using ELISA test kits from EnSys, inc., or approved equal. The ELISA test kits shall be calibrated to 75 percent of the ADEC cleanup target level to determine whether additional excavation is necessary. The excavation and testing procedure will continue, if feasible, until field screening results are below the target level. Laboratory confirmation samples shall not be collected until field screening indicates all the contaminated soil has been removed. The laboratory confirmation samples shall be analyzed with a rapid turnaround. Do not backfill the excavation until the results of the confirmation samples have been received and are below the ADEC's method 2, under 40" zone values. Barricades to prevent unauthorized access shall be placed around the excavation until it can be backfilled. An FAA Decommissioning Assessment form shall be completed and included with the final report. An example form is included with this scope of work. The bollards and piping near the building from the former UST shall be removed and disposed.

4.7 During the removal of underground heating oil tank 15-C-001 soil was excavated to 12'. Six confirmation samples were collected from the bottom and side walls. (See UST Decommissioning Assessment Tank 15-C-1.) Five of the samples were below cleanup levels. One sample collected from 11' below grade on the south side of the excavation exceeded the ADEC clean up level for DRO. Two borings were drilled at approximately 2 and 8 feet from the excavation. Samples were collected for DRO and BTEX from 15 to 32 feet in the borings. All sample results were below ADEC cleanup levels. Excavate the remaining PCS using a PID and qualified sampler to direct the excavation. Clean fill must be removed to reach the contaminated soil. When the excavated soil is thought to be clean a minimum of 3 samples shall be collected for DRO field screening by using ELISA text kits form EnSys, inc., or approved equal. The ELISA test kits shall be calibrated to 75 percent of the ADEC cleanup target level to determine whether additional excavation is necessary. The excavation and testing procedure will continue, if feasible, until field screening results are below the target level. Laboratory confirmation samples shall not be collected until field screening indicates all the contaminated soil has been removed. The laboratory confirmation samples shall be analyzed with a rapid turnaround. Do not backfill the excavation until the results of the confirmation samples have been received and are below the ADEC's method 2, under 40" zone values. Barricades to prevent unauthorized access shall be placed around the excavation until it can be backfilled. The removed PCS (assume 5 CY) shall be remediated at the on-site/off-site remediation system.

4.8 The 9 inch by 9 inch red VAT in Room 7, green 9 inch by 9 inch VAT in Rooms 2, 5, and 6 and the beige 12 inch by 12 inch beige VAT flooring in the bathroom (Room 4) and hallway portion (past the doorway of Room 3) shall be removed prior to demolition (1621 square feet total VAT). The black ceiling tile mastic in Rooms 5 and 6 (1150 square feet) and the 9 inch by 9 inch gray VAT (16 square feet) on the countertop in Room 6 shall be removed from the interior prior to demolition. The roof exterior contains non-friable black mastic in the valleys of the metal roof which shall also be removed prior to demolition (approximately 36 linear feet by 6 inches wide). Four roof vents are assumed to contain ACM tar (assumed ACM is about 16 linear feet). The furnace in room 6 was not sampled, but may contain ACM which shall be removed and disposed of in accordance with ACM procedures.

4.9 The exterior's brown trim, gray stairs, red walls, and red shingles contain lead based paint (LBP). All LBP on the ground shall be collected, drummed, and stored in the FAA's garage area. All LBP deposited on the ground during demolition and transport shall also be collected and handled in the same manner. Paint chips on the ground shall be removed at the start of the project to avoid spreading them and driving them into the ground.

5.0 DEFINITIONS

5.1 Contracting Officer (CO) – Federal Aviation Administration designated individual who is responsible to administer the work performed under this Contract.

5.2 Contracting Officer's Representative (COR) – Federal Aviation Administration designated individual who is responsible to inspect the work performed under this contract.

5.3 On-Site Technical Monitor (OTM)-Federal Aviation Administration personnel designated to provide technical input to the Contractors performance/compliance with contractual requirements of work under this contract.

5.4 Contractor – The corporation, partnership or individual to whom the Federal Aviation Administration awards a Contract to perform the work described in these Specifications.

6.0 MEETINGS

6.1 Prior to the startup of any mobilization to Tanana, the Contractor shall attend a Preconstruction Meeting. The Contractor shall identify his key personnel for the Contract at this time. FAA personnel will attend the meeting and all necessary coordination between such parties shall be discussed. The meeting may be held telephonically or in person at the FAA's Anchorage, Alaska Regional Office or another site selected by the Contracting Officer.

6.2 Daily Meeting: A brief meeting shall be held each morning prior to the day's work activities. It shall be attended by all workers and the Government representative and it shall include discussion of the day's work activities for the FSS activities only.

7.0 CONDITIONS AFFECTING THE WORK

7.1 General

7.1.1 The Contractor shall plan his work and coordinate all scheduled work activities with the CO. Contractor Equipment – The Contractor shall utilize licensed operators and provide and maintain his/her equipment in acceptable working order.

7.1.2 The Contractor must return construction access routes and areas used during the Contract to original condition.

7.1.3 The work outlined in this request for proposal is regulated by the Environmental Protection Agency (EPA) and ADEC to ensure the protection of the environment and the Occupational Safety and Health Administration (OSHA) to ensure the protection of the worker.

7.1.4 For excavation activities, OSHA regulations 29 CFR 1926 Subpart P (Excavations) and Subpart T (demolition) shall be adhered to during the course of performing the tasks outlined in this scope of work.

7.1.5 All permit conditions included in the Scope of Work shall be adhered to during the project. The demolished Flight Service Station (FSS) may be burned if the Contractor chooses. The Contactor shall acquire the burn permit and adhere to the ADEC's Open Burning Policy & Guidelines dated August 2004. The guidelines include not burning creosote pilings and removing tar paper and other materials prior to burning.

7.1.6 Power shutoff to the facilities scheduled for demolition will be accomplished/coordinated by FAA. It is the contractor's responsibility to confirm all sources of energy are in a zero energy state prior to commencing work.

7.1.7 Site preparation includes the removal and disposal of general debris at the site and the identified structures and debris. All debris shall be removed to the approval of the government representative (generally debris sized greater than one inch). All contractor spills of fuel and other material shall be the responsibility of the contractor. Driving over debris shall not be allowed to prevent spreading the debris and driving it into the ground. All areas impacted by the project shall be cleaned up and returned to at least initial condition prior to completion of the field work.

7.2 Asbestos Abatement

7.2.1 For asbestos abatement activities, all applicable EPA regulations including 40 CFR 61, Subpart M (National Emissions Standards for Hazardous Air Pollutants), TSCA II (Asbestos Hazard Emergency Response Act) and 40 CFR 763, Subpart E (The Final Rule to AHERA), 29 CFR 1910.134 (Respiratory Protection Standard), 29 CFR 1910.1001 (General Industry Standard), and

29 CFR 1926.1101 (Construction Standard for Asbestos) shall be adhered to during the course of performing the tasks outlined in this scope of work.

7.2.2 All abatement work shall include the proper preparation, removal, handling, and disposal of identified asbestos containing materials (ACM). All abatement work shall include the protection of workers and the environment from exposure to asbestos. The contractor shall provide all labor, materials, tools, equipment, services and incidentals necessary to perform the abatement work described in the scope of work, including any site preparation necessary for executing the work. Only currently certified asbestos abatement workers will be allowed to work on asbestos related tasks. All required air monitoring shall be performed by the contractor, to include personal samples that are required by OSHA. All abatement areas shall be sealed off with critical barriers. Tile/linoleum shall be removed in a substantially intact state or negative pressure enclosures shall be used. If negative enclosures are used, negative pressures shall be maintained at all times during abatement work. Sheetrock will be removed as friable ACM if it is ACM. Decontamination facilities shall be provided for all abatement workers and decontamination procedures shall be enforced to ensure workers cannot bring asbestos outside the work area.

7.3 Lead Abatement

7.3.1 For lead abatement activities all applicable EPA and OSHA regulations including 29 CFR 1910.1025 (Lead Standard) and 40 CFR Part 50, Appendix G (National Ambient Air Quality Standard for Lead) shall be adhered to during the course of performing the tasks outlines in this scope of work.

7.3.2 LBP chips on the ground shall be vacuumed prior to demolition to avoid spreading them around and breaking them up. The volume of lead based paint chips and debris (including soil) generated shall be kept to a minimum. LBP chips remaining on the ground surface after demolition and transport shall be removed and drummed using a vacuum or another method approved by the FAA. FAA structures painted with orange or white paint usually contain LBP. Lead based paint shall be removed from cut lines prior to cutting into the paint.

7.4 Waste Disposal: The contractor must plan for disposing of ACM waste material, general job demolition debris, and all other wastes at approved landfills/disposal facilities. The contractor is responsible for proper packaging, labeling, manifesting, and transporting of all wastes generated during this job except hazardous wastes. Manifest preparation must be coordinated through FAA as part of the work plan review, prior to receiving a final notice to proceed and prior to negotiating a project start date. All hazardous wastes or wastes requiring storage onsite shall be inventoried (including volume and contents of each container) and the inventory shall be submitted to the FAA at the end of the on-site project activities. The contactor shall store the hazardous waste in Shop Building 205.

7.5 Tank Removal: Tank contents shall be removed prior to tank removal. Tank contents shall be disposed by the contractor. Removal shall be conducted in accordance with ADEC and API procedures and an ADEC certified tank remover shall supervise the tank removal. An ADEC qualified sampler shall be used to collect samples. The qualified sampler shall have had experience as a sampler on at least 5 underground tank removal projects. Reporting requirements shall include ADEC and FAA paperwork. Reporting requirements and notifications shall be the responsibility of the contractor through the FAA. If the tank is painted with lead based paint, the paint shall be removed from cut lines prior to cutting. The heating oil tank at Tanana is not a regulated tank. An FAA Tank Decommissioning Assessment shall be completed.

7.6 Fill Material: All depressions made during excavation activities shall be brought up to existing grade with uncontaminated imported fill material. Backfill shall be compacted with placement equipment and mounded slightly to prevent settling. Small depressions shall be filled at the discretion of the on-site government representative. The backfill material source shall be identified in the work plan. Regrading in areas of petroleum contaminated soil is not allowed. Contaminated soil that has been remediated to ADEC's method 2, under 40" zone values may be used for backfill.

7.7 Landfill Issues.

7.7.1 All solid waste debris generated from this job, except clean concrete, must be recycled or removed to a permitted landfill before the project will be considered complete. Tanana's dump is not a permitted landfill.

7.7.2 Individual landfills throughout the state may have their own specific requirements as to what they will and will not accept. It is the contractor's responsibility to coordinate the job's entire debris waste stream with the landfill(s) being used and to provide documentation of such coordination. Landfills may or may not accept concrete and building debris. There may be varying fees associated with using a particular landfill.

7.8 The use of local labor, services, and materials is encouraged. The Tanana Tribal Council has contacts for asbestos and hazmat trained local laborers at 366-7170.

8.0 ORDER OF WORK

8.1 The Contractor shall schedule his activities so as to cause the least amount of interference with FAA operations. Such operations shall take precedence over construction convenience.

9.0 SPECIAL SCHEDULING REQUIREMENTS

9.1 The Contractor shall be responsible for the protection of existing facilities/equipment from physical or electrical damage as a result of accidental or incidental negligence, such as, but not limited to disruption of power to applicable existing equipment. In the event any of the above-defined services are interrupted, the Contractor shall restore services within twenty-four (24) hours basis including working during holidays and weekends with no additional costs or delay to this work or to the Government. See section 19.1 for additional requirements.

10.0 STORAGE OF MATERIAL AND EQUIPMENT

10.1 Materials shall be stored in a neat and orderly manner and shall be protected from being blown, scattered by wind/rain or foul weather/elements.

11.0 AVAILABILITY OF UTILITY SERVICES

11.1 The FAA will provide no utilities during this project.

11.2 The Contractor must provide any transportation, housing, meals, communications, etc. for its crew. Further, if on-site thermal remediation/HAVE is the selected remediation method, the Contractor shall furnish all fuel necessary for operation of the thermal remediation/HAVE unit.

12.0 CLEANING UP

12.1 Daily Cleanup – The Contractor shall remove from the work site all rubbish, waste, tools, equipment and appurtenances caused by and used in the execution of the work at the end of each day as needed to maintain egress, safety and sanitation.

12.2 Final Cleanup – Immediately before final inspection, all areas affected by construction operations shall be thoroughly cleaned and restored. The Contractor shall remove all unused materials from the site. The contractor shall return the soil stockpile area(s) to a uniform level grade after confirmation that post-stockpile lab samples are below ADEC method 2, under 40" zone values.

13.0 AS-BUILT DRAWINGS

13.1 Not Required

14.0 INSPECTION OF WORK

14.1 The FAA retains the right to inspect all work on the project but has no obligation to do so. FAA inspections and tests are for the sole benefit of FAA and do not:

14.1.1 Relieve the Contractor of the responsibility of providing adequate quality control measures.

14.1.2 Relieve the Contractor of responsibility for damage to or loss of material before acceptance.

14.1.3 Constitute or imply acceptance.

14.2 The presence or absence of the COR does not relieve the Contractor from any contract requirement, nor is the COR authorized to change any term or condition of the specification/contract.

15.0 CONTRACT ACCEPTANCE INSPECTION (CAI)

15.1 For on-site remediation systems the CAI shall be conducted after all contaminated soil has been treated and stockpiled; analytical results of all treated soil has been accepted by ADEC; all equipment, materials and debris have been removed from the work site; and the stockpile areas are returned to uniform level grades.

15.2 For off-site remediation systems the CAI shall be conducted after all contaminated soil has been removed from Tanana; all equipment, materials and debris have been removed from the work site; and the stockpile areas are returned to a uniform level grades.

16.0 SUBMITTALS

16.1 For pre-project submittals the Contractor shall supply two (2) draft and (4) final copies of all submittals. For post-project submittals the Contractor shall supply two (2) draft and four (4) final copies of all post-project submittals. One Site Specific Safety and Health Plan (SSHP), which combines the soil remediation work and the site preparation work, shall be prepared. For all other pre-project and post-project documents the soil remediation documents shall be prepared separately from the site preparation documents.

16.2 Contractor shall supply all submittals as both "Draft" and "Final" documents. See Section 17, Procedures, for review time and submittal process.

16.3 Electronic Deliverables: All documents, reports, work plans and drawings shall be submitted in both hard copy and electronic format. Documents shall be provided in their native (MicroSoft Word, AutoCAD, etc.) electronic formats and in Adobe Acrobat 6.0 Portable Document Format (PDF). PDF documents shall be a single document, from which a hard copy report can be generated by printing a single electronic file.

16.4 Contractor shall supply a SSHP as required by 29 CFR 1910. (Appendix 6)

16.5 Contractor shall supply a project schedule including, a mobilization and demobilization schedule for all equipment and personnel.

16.6 On-site Thermal Remediation or HAVE specific submittals;

16.6.1 The contractor shall supply an "Operation Plan" meeting all requirements of 18 AAC 75.365, including additional items identified in section 2.3.

16.6.2 The contractor shall submit confirmation that they have an EPA approved SPCC plan if required by 40 CFR 112.

16.6.3 The contractor shall provide a report documenting the project activities. The report shall contain as a minimum:

16.6.3.1 Project description.

16.6.3.2 Copies of all analytical results for clearance testing of remediated stockpiles.

16.6.3.3 Baseline and post-treatment analytical results for areas being used for treatment of contaminated soil.

16.6.3.4 Analytical results for the area under the existing contaminated soil stockpiles.

16.6.3.5 Maps showing surveyed locations for all the samples in the treatment area and for all the samples taken under the existing stockpiles.

16.6.3.6 Photos of treatment area before and after the project and of the existing soil stockpiles area after treatment.

16.6.3.7 Certification of disposal of liners and felt.

16.6.3.8 Final cleanup report for former tank 15-C-1 tank site. This report shall include the background information on the known contamination at this tank from the decommissioning of this tank and the release investigation for this tank. (See Decommissioning Assessment Tank 15-C-1 and Release Investigation Report FAA Tanana, Alaska, May 1999)

16.6.3.9 Decommissiong assessment for tank 15-C-2.

16.6.4 The contractor shall provide weekly progress reports to the FAA identifying quantities of soil remediated and analytical results for remediated soils.

16.6.5 The contractor shall prepare and submit for FAA review and approval, all necessary "Waste Profiles" required for disposal of the contaminated liner, felt, etc. These shall be submitted no later than one-week prior to shipment, to allow adequate time for review and correction, if needed.

16.6.6 The contractor shall prepare and provide for FAA review and approval, all necessary hazardous or non-hazardous waste manifests. These shall be submitted no later than one-week prior to shipment, to allow adequate time for review and correction, if needed.

16.7 Off-Site Thermal Remediation or HAVE specific submittals;

16.7.1 The Contractor shall submit a sampling and analysis plan (SAP) that includes the type of samples, number of samples and analysis necessary to properly characterize the contaminated soil in accordance with the Resource Conservation and Recovery Act, 40 CFR 260, 261 and 261. The sampling plan shall also address all characterization information necessary to address disposal requirements of the final disposal facility. The SAP shall identify the number and type of samples necessary to identify the presence or lack thereof, of contaminated soils under the existing contaminated soil stockpile.

16.7.2 The contractor shall submit a "Work Plan" identifying the contractors proposed methods for completing the fieldwork identified above. The Work Plan shall include a "layout plan" specifying where the containers will be staged, contaminated soil stockpiles (if necessary), and equipment will be staged.

16.7.2.1 The Work Plan shall also include a Waste Management plan for handling of decontamination water, contaminated personnel protective equipment (PPE) and other potentially hazardous wastes generated during the project.

16.7.2.2 A plan for ensuring that contaminated soil does not come in contact with uncontaminated soil during the cleanup process, except under an approved cleanup plan or operation plan under 18 AAC 75.365.

16.7.2.3 Additional elements required under 18 AAC 75.365, as applicable.

16.7.2.4 Details for removal of tank 15-C-002 and contaminated soil from tank 15-C-001 and 15-C-002. See attachment 3 for work plan requirements for fuel tank decommissioning.

16.7.3 The contractor shall prepare and submit for FAA review and approval, all necessary "Waste Profiles" required for disposal of the contaminated soils, liner, felt, etc. These shall be submitted no later than one-week prior to shipment, to allow adequate time for review and correction, if needed.

16.7.4 The contractor shall prepare and provide for FAA review and approval, all necessary hazardous or non-hazardous waste manifests. These shall be submitted no later than one-week prior to shipment, to allow adequate time for review and correction, if needed.

16.7.5 The contractor shall provide weekly progress reports to the FAA identifying quantities of soil disposed of and analytical results for any samples taken.

16.7.6 The contractor shall be responsible for arranging and completing any paperwork (manifests and transit letters) necessary to transit Canadian territorial waters. These shall be submitted in an adequate time to allow for review by Environment Canada and receive written approval from them for transit of the shipments.

16.7.7 The contractor shall provide a report documenting the project activities. The report shall contain as a minimum:

16.7.7.1 Project description.

16.7.7.2 Copies of all analytical results for clearance testing of remediated stockpiles.

16.7.7.3 Analytical results for the area under the existing contaminated soil stockpiles.

16.7.7.4 Maps showing surveyed locations for all the samples taken under the existing stockpiles.

16.7.7.5 Photos of the existing soil stockpiles area after treatment.

16.7.7.6 Certification of disposal of liners and felt.

16.7.7.7 Final cleanup report for former tank 15-C-1 tank site. This report shall include the background information on the known contamination at this tank from the decommissioning of this tank and the release investigation for this tank. (See Decommissioning Assessment Tank 15-C-1 and Release Investigation Report FAA Tanana, Alaska, May 1999)

16.7.7.8 Decommissiong Assessment for tank 15-C-2.

16.8 Site Preparation Submittals;

16.8.1 Pre-Project Submittals & Work Plan: The contractor shall provide a work plan that contains the information identified below, in an organized manner. A final work plan must be reviewed and approved prior to the issuance of a Notice to Proceed. The FAA reviews work plans in the order received. Only one hard copy is required for all draft submittals. Work plans shall include the following information and additional information is included in attachment 4:

16.8.1.1 Corporate licenses

16.8.1.2 Worker abatement certifications

16.8.1.3 Insurance/Bonding certificates

16.8.1.4 Work and Safety Plans which include a detailed, site-specific description of how the work will be accomplished

16.8.1.5 Written authorization from permitted landfill for accepting solid wastes

16.8.1.6 Any manifests required for the project, with all information completed except for quantities

16.8.2 Post-Project Submittals: The contractor shall provide the following information in an organized draft report, outlined as follows, to the Contracting Officer

16.8.2.1 Section 1, Project Information. Section 1 shall include details of what was removed– including size, depth, material, etc. for future clarification and regulatory requirements and a detailed description of the work that was performed. Maps shall be included showing locations of removed items and distances of the removed items to items referenced in the report. Maps shall also include items referenced in the report and remaining reference points. Discrepancies between the approved work plan and the actual field work should also be discussed.

16.8.2.2 Section 2, EPA, DOL, ADEC Notifications, if applicable

16.8.2.3 Section 3, Daily Construction Reports

16.8.2.4 Section 4, Regulated Area Sign In/Out Logs, if applicable

16.8.2.5 Section 5, Safety Meeting Log

16.8.2.6 Section 6, Color photographs of work in progress

16.8.2.7 Section 7, Disposal/Manifest Documentation of all wastes

16.9 Product Data – Preprinted material such as certifications, illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturers literature, catalogue data and other data to illustrate a portion of the work, but not prepared exclusively for this Contract.

16.10 Certifications – Documentation from the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor or other lower tiered contractor that products, materials, equipment or assemblies meet the specified requirements for remediation or disposal of petroleum contaminated soils.

17.0 Procedures

17.1 Not used.

17.2 Each copy of a submittal shall be marked with the following information:

17.3 Project title and location.

17.4 The name, address, and telephone number of the supplier, manufacturer or other lower tiered contractor associated with the submittal.

17.5 For product data, which has several different items, listed on the same sheet, the specific items being submitted shall be clearly marked.

17.6 Submittals shall be complete for each portion of the work; components of the work interrelated as a system shall be submitted at the same time.

17.7 The work shall conform to approved submittals. The Contractor shall keep a copy of all approved submittals on site for the duration of the project and make them available for inspection by the COR upon request.

17.8 Scheduling of Submittals

17.8.1 Coordinate preparation and processing of submittals with performance of the work. Allow a review period, beginning with receipt by FAA, of thirty- (30) calendar days for pre-project submittals. This period of review is the same for both submittal and resubmittal.

17.8.2 Contractors conducting on-site thermal remediation or HAVE shall allow a 45 day review period for their operations plan , to allow time for ADEC review and approval.

17.8.3 Draft post project submittals shall be submitted to the Contracting Officer within 60 days of project completion. The final copy shall be submitted within 60 days of comment receipt from the FAA. The post project submittals will be reviewed and must be accepted before final contract payout will be made.

18.0 DEVIATIONS

18.1 Deviations from the contract requirements are discouraged; however, they will be considered where advantageous to the FAA. Where deviations are proposed for consideration, submit a written request with documentation of the nature and features of the deviation and why the deviation is desirable and beneficial to the FAA. The proposed variation shall be identified separately and included along with the required submittal for the item. When a deviation is submitted for approval, the Contractor warrants the following:

18.2 The Contract has been reviewed to establish that the deviation, when incorporated, will be compatible with other elements of the work.

18.3 A cost estimate showing the differences in cost between the specified item and the proposed deviation, considering all work directly or indirectly affected by the proposed deviation.

18.4 The Contractor shall take actions and bear the additional costs necessary because of the proposed deviation.

19.0 PROTECTION OF EXISTING UTILITIES AND CABLES

19.1 The FAA shall identify all known existing utilities that may be impacted by the Contractor during this project. The Contractor shall be responsible for confirming the location of all utilities that may be impacted by their activities. FAA utility locates do not relieve the Contractor from responsibility for damage to any utilities and the necessity for being diligent in not damaging existing utilities.

19.2 The Contractor shall immediately repair, at his time and expense, any damage done by his personnel to utilities and/or cables within the work area. A written report thereof shall be submitted immediately to the COR describing the type of services interrupted, the length of time that the services were out and method used for repair.

20.0 PROTECTION OF EXISTING FACILITIES OPERATIONS

20.1 General – The Contractor must arrange on-site work so that there is no interference with any existing facilities operations during construction of the project. The Contractor shall be solely liable for any damage caused by the interference of his operations with these facilities.

21.0 PROTECTION OF EXISTING GROUND COVER

21.1 General – The Contractor must arrange on-site work so that during the construction of the project, damage to any existing facilities or ground cover is held to a minimum. The Contractor shall be solely liable for any damages caused by his operations with these facilities or ground cover.

22.0 HAZARDOUS MATERIAL/WASTE SHIPMENT

22.1 Hazardous Materials/Waste. While performing work specified in this Contract, the Contractor is subject to, and shall comply with the various regulations regarding hazardous materials, wastes, and substances. The Contractor is responsible for ensuring compliance with all applicable regulations. The Contractor shall provide preservation, packaging, and packing, which shall afford adequate protection against physical damage during shipment for all deliverable items. Markings for all deliverables shall be in accordance with industry standards and state and federal regulations. Applicable regulations include, but are not limited to the following; the Resource Conservation and Recovery Act: 40 Code of Federal Regulations (CFR) Parts: 260, 261, 262, 263, 268, and 279; the Toxic Substances Control Act: 40 CFR Part 761, the Hazardous Materials Transportation Act: 49 CFR Part: 171-179, Alaska Statutes and Regulations: 46.03, 18 AAC 60, 18 AAC 62, and Canadian Import and Export Hazardous Regulations.

22.2 Shipping Requirements. The Contractor shall ensure that all wastes shipped from FAA stations are specifically identified on shipping papers. RCRA hazardous wastes must be transported utilizing a uniform hazardous waste manifest and shall be manifested separately from non-

RCRA wastes. A non-hazardous waste manifest shall be utilized for non-RCRA wastes. PCBs shall be shipped using a uniform hazardous waste manifest and shall be manifested separately from all other items. When possible, the Contractor shall pre-print manifests before mobilization to the field. The FAA requires one (1) week to review and approve pre-printed manifests. In cases where items are added or changed in the field, a copy of the manifest shall be transmitted to FAA by FAX allowing reasonable time for FAA review and approval. Some non-hazardous articles such as scrap metal can be shipped on a straight-bill-of-lading. The Contractor is responsible for ensuring that the FAA receives legible copies of all shipping papers. All hazardous materials, which cannot be recycled or otherwise used, shall be manifested to a TSDF permitted by the EPA or the equivalent state agency. The TSDF shall meet all requirements for TSDF as identified in 40 CFR Parts 264-268.

22.3 Manifests. All hazardous materials/substances/wastes identified for handling and removal from the site shall be packaged, labeled, marked and manifested according to applicable state and federal regulations (40 CFR 263). Verification of the accuracy and completeness of the manifests is the responsibility of the Contractor. The Contractor shall provide a qualified person to review every manifest. All Contractor and/or Subcontractor personnel responsible for preparing or reviewing manifests shall have received a minimum of 40 hours of training pursuant with the requirements of 49 CFR Parts: 171-179 and training pursuant with 40 CFR Parts: 260, 261, 262, 263, 268, 279. The Contractor's field representative is subject to removal from field activities if the Contracting Officer questions the field representative's knowledge of the regulations listed above. The FAA Contracting Officer's Representative (COR) **or On-site Technical Monitor (OTM)** will sign the manifest after verification of the accuracy and completeness of the manifest and approval by designated AAL personnel.

22.4 The Contractor shall ensure that the FAA receives the correct generator copies of all manifests. The original generator copy of the hazardous waste manifest, signed by all transporters and the TSDF, and certificates of disposal, destruction, and/or treatment, shall be provided to FAA. The Contractor shall write in block 3 of the manifest, under "Generator's Name and Mailing Address"

Federal Aviation Administration, SA PSU
Attn: (Kirby Brown)
700 North Boniface Parkway
Anchorage, AK 99510
907-269-1150

22.5 All manifests shall be numbered using the following format. The first 3 fields of the 5 digit manifest number shall be the 3-letter station designator, such as TAL for Tanana which will immediately identify the manifest as originating in Tanana. The remaining 2 fields will be numbers such as 01, 02, 03, etc. which will identify the individual manifest number. (Example TAL05) FAA will provide these numbers to the Contractor. The Contractor shall not assign a manifest number that has not been provided by the FAA.
All containers shipped under FAA manifests shall be numbered using the following format. The first 2 fields of the 10 digit container number shall be the last 2 digits of the year, such as 94. The next five fields shall be the Manifest number, such as, TAL01. The next field shall be a dash, with the final 2 fields representing the individual container number, such as -01. (example 94TAL02-03) All container numbers shall be represented on the manifest or continuation sheet.

22.6 Additional Responsibilities. The Contractor is responsible for obtaining necessary profiles, preparing exception reports when required by 40 CFR 262.42 and 40 CFR 761.215, preparing Land Disposal Restriction Notification forms, and assuring the waste (both hazardous and solid) is ultimately disposed at the designated facility. RCRA and non-RCRA wastes shall be manifested separately.

22.7 Transportation. All transporters which handle, transport or store materials included under this task order shall possess hazardous materials transportation permits from the EPA or equivalent state agency. The permits shall be current and the transporter shall comply with all applicable regulations for handling and transporting hazardous materials. The Transporter must notify the Contractor immediately of any delays, problems or violations of transport regulations which may occur during transport of materials. Contractor is responsible for obtaining any necessary "Transit" Approvals for wastes being sent through Canadian Waters.

23.0 REFERENCE MATERIALS

23.1 The publications and documents listed below form a part of the Contract to the extent referenced, and will be provided via compact disc in portable document format.

23.2 The publications and documents are referred to in text by basic designation only.

23.3 For products or workmanship specified by association, trade, or Federal Standards, comply with the requirements of the standard, except where more rigid requirements are specified or are required by applicable codes.

Source For Referenced Documents and Standards:

- Oil and Hazardous Substances Pollution Control Regulations, Alaska Department of Environmental Conservation, 18 AAC 75.
- Underground Storage Tank Regulations and Procedures Manual, Alaska Department of Environmental Conservation, 18 AAC 78.

PART I - SECTION F
DELIVERIES OR PERFORMANCE

3.1-1 **Clauses and Provisions Incorporated by Reference** (December 2005)

This screening information request (SIR) or contract, as applicable, incorporates by reference the provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at:
http://www.asu.faa.gov/conwrite/ (on this web page, select "Search and View Clauses").

3.2.2.3-42	**Differing Site Conditions** (July 2004)
3.2.2.3-43	**Site Investigation and Conditions Affecting the Work** (July 2004)
3.2.2.3-46	**Supervising the Contract Work** (July 2004)
3.2.2.3-47	**Permits and Responsibilities** (July 2004)
3.2.2.3-50/alt1	**Property Protection Alternate I** (July 2004)
3.2.2.3-60	**Specifications, Drawings, and Material Offers** (July 2004)
3.2.2.3-68	**Safety and Health** (July 2004)
3.2.2.3-69	**Subcontracts - Construction** (July 2004)
3.2.2.3-69/alt1	**Subcontracts - Construction Alternate I** (July 2004)
3.10.1-11	**Government Delay of Work** (April 1996)
3.2.2.3-41	**Performing Work** (July 2004)

The Contractor (you) must perform, using your own organization, work equivalent to at least **80%** of the total amount of work under the contract on the site. The CO may modify this contract to reduce this percentage if you request a reduction and the CO determines that it would be to the Government's advantage to do so.

(End of clause)

F-1 ***Starting, Performing, and Completing Work***

The Contractor (you) must
(a) begin work under this contract within **30 days after the date you receive the notice to proceed,**
(b) perform the work diligently, and
(c) complete the entire work ready for use not later than **75 calendar days after the NTP is issued.** The time allowed for completion must include final cleanup of the premises.

The FAA anticipates the NTP date to be not later than June1, 2006. **The NTP will not be issued until the FAA and the ADEC have approved the Contractor's work plan.** All final report submissions required under the contract shall be submitted to the CO not later than October 1, 2007.
(End of clause)

PART I - SECTION G
CONTRACT ADMINISTRATION DATA

3.1-1 ***Clauses and Provisions* Incorporated by Reference** (December 2005)

This screening information request (SIR) or contract, as applicable, incorporates by reference the provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at:
http://www.asu.faa.gov/conwrite/ (on this web page, select "Search and View Clauses").

3.2.2.3-62 **Preconstruction Conference** (July 2004)

The successful offeror must attend a pre-construction conference at a site the Contracting Officer designates before starting the work.

(End of clause)

G-1. Contract Administration

The Contracting Officer (CO) has the overall responsibility for this contract. The CO is the only authorized person to take action on behalf of the Government, to modify contract terms, conditions, requirements, specifications and delivery schedule.

It is the responsibility of the Contractor to notify the CO immediately if there is any appearance of technical or other direction that is or may be outside the scope of the contract.

The Contractor shall immediately notify the CO for clarification when a question arises regarding the authority of any person to act for the CO.

G-2. The CO for this contract is:

Nancy A. Eckroth
Logistics Division, AAL-059A
Federal Aviation Administration
222 W. 7th Avenue
Anchorage, Alaska 99518
(907) 271-5845 Phone

The COTR for this contract is:

Jim Swalling
AAL-471
Federal Aviation Administration
(907) 271-5354

PART I - SECTION H
SPECIAL CONTRACT REQUIREMENTS

H-1 Proposal Guarantee

(a) Offerors must furnish a proposal guarantee in the form of a proposal bond, a postal money order, a certified or cashier's check, an irrevocable letter of credit, or United States bonds or notes with a maturity of less than five years.

(b) The required amount of the proposal guarantee is **20 percent of the offer amount.**

(c) The Contracting Officer will return proposal guarantees, other than proposal bonds:

(1) To unsuccessful offerors as soon as possible after an award decision is made; and

(2) To the successful offeror after it signs the contract and submits acceptable bonds required under the contract.

(d) If the successful offeror fails to sign the contract or submit the required bonds within the time specified by the Contracting Officer, the contract may be terminated for default.

(e) If the contract is terminated for default, the offeror is liable for any cost of acquiring the work in excess of its proposed price, and the guarantee is available to offset the difference. However, the guarantee is not an exclusive remedy.

H-2 Performance Bond Requirements

(a) The contractor is required to submit a performance bond in a penal amount equal to **100 percent of the contract price**, within the time specified by the Contracting Officer.

(b) The bond must be executed on specified forms (Attachment 8, SF24), and sureties must be acceptable to the Federal Aviation Administration. Corporate sureties must appear on the list in Treasury Circular 570, and the amount of the bond may not exceed the underwriting limit stated for the surety on that list.

(c) Failure to submit an acceptable bond may be cause for termination of the contract for default.

(End of clause)

H-3 Payment Bond Requirements

(a) The contractor is required to submit a payment bond in the penal amount of **100 percent of the original contract price**, within the time required by the Contracting Officer.

(b) The bond must be executed on the forms attached to this SIR (Attachment 9, SF-25A), and sureties must be acceptable to the Federal Aviation Administration. Corporate sureties must appear on the list in Treasury Circular 570, and the amount of the bond may not exceed the underwriting limit stated for the surety on that list.

(c) Failure to submit an acceptable bond may be cause for termination of the contract for default.

H-4 Insurance

In accordance with the requirements of AMS Clause 3.4.1-10, Insurance-Work on government Installation, the Contractor shall secure, pay the premium for, and keep in force until the expiration of this contract adequate insurance to specifically cover all liability assumed by the Contractor under this contract:

a) *Workers' Compensation* - as required to comply with applicable Federal and State of Alaska statutes.

b) *General Liability Insurance*. The Contractor shall maintain general liability insurance including bodily injury and property damage with minimum limits of $1,000,000 combined single limit per occurrence.

c) *Automobile Liability Insurance*. The contractor shall maintain automobile liability insurance. The policy shall provide for bodily injury and property damage liability covering the operation of all owned, hired, and non-owned vehicles used in connection with performance of this contract. Policies covering automobiles operated in the United States shall provide coverage in the amount of $1,000,000 combined single limit for bodily injury and property damage liability per accident.

The Contractor shall furnish a certificate of insurance or, if required by the Contracting Officer, true copies of liability policies including the FAA contract number. Insurance shall be effective, and evidence of acceptable insurance furnished before commencement of on-site performance.

H-5 Wage Determination

In accordance with Clause 3.6.2-18, Davis-Bacon Act, Wage Determination No. AK030001, Modification No. 35, dated 2/17/2006, is included and made a part of this contract. (Attachment 7, 6 pages).

3.4.1-6 Additional Bond Security (April 1996)

If any surety furnishing a bond in connection with this contract becomes unacceptable to the Federal Aviation Administration or fails to furnish reports on its financial condition as requested by the Contracting Officer, or if the contract price increases to the point where the security furnished becomes inadequate in the Contracting Officer's opinion, the contractor must promptly furnish additional security as required to protect the interests of the Federal Aviation Administration and of persons supplying labor or materials in performance of this contract.

(End of clause)

PART II - SECTION I
CONTRACT CLAUSES

3.1-1 **Clauses and Provisions Incorporated by Reference** (December 2005)

This screening information request (SIR) or contract, as applicable, incorporates by reference the provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at:
http://www.asu.faa.gov/conwrite/ (on this web page, select "Search and View Clauses").

3.2.2.3-33 **Order of Precedence** (July 2004)
3.2.2.3-49 **Protecting of Existing Vegetation, Structures, Equipment, Utilities, and Improvements** (July 2004)
3.2.2.7-6 **Protecting the Government's Interest when Subcontracting with Contractors Debarred, Suspended, or Proposed for Debarment** (April 1996)
3.2.5-1 **Officials Not to Benefit** (April 1996)
3.2.5-3 **Gratuities or Gifts** (January 1999)
3.2.5-4 **Contingent Fees** (October 1996)
3.2.5-5 **Anti-Kickback Procedures** (October 1996)
3.2.5-7 **Disclosure Regarding Payments to Influence Certain Federal Transactions** (June 1999)
3.2.5-8 **Whistleblower Protection for Contractor Employees** (April 1996)
3.3.1-2 **Payments under Fixed-Price Construction Contracts** (April 1996)
3.3.1-15 **Assignment of Claims** (April 1996)
3.3.1-19 **Prompt Payment for Construction Contracts** (August 1998)
3.3.2-1 **FAA Cost Principles** (October 1996)
3.4.1-7 **Notice to Proceed** (April 1996)
3.4.1-10 **Insurance--Work on a Government Installation** (July 1996)
3.6.2-1 **Contract Work Hours and Safety Standards Act-Overtime Compensation** (September 2003)
3.6.2-9 **Equal Opportunity** (August 1998)
3.6.2-12 **Affirmative Action for Special Disabled and Vietnam Era Veterans** (January 1998)
3.6.2-13 **Affirmative Action for Workers With Disabilities** (April 2000)
3.6.2-14 **Employment Reports on Special Disabled Veterans and Veterans of Vietnam Era** (January 1998)
3.6.2-18 **Davis Bacon Act** (April 1996)
3.6.2-22 **Subcontracts (Labor Standards)** (April 1996)
3.6.3-1 **Clean Air and Water Certification** (April 2000)
3.6.3-2 **Clean Air and Clean Water** (April 1996)
3.6.3-13 **Recycle Content and Environmentally Preferable Products** (January 2002)
3.6.3-14 **Use Of Environmentally Preferable Products** (January 2002)
3.10.1-7 **Bankruptcy** (April 1996)
3.10.1-8 **Suspension of Work** (August 1998)
3.10.1-12 **Changes--Fixed-Price** (April 1996)
3.10.1-15 **Changes--Construction, Dismantling, Demolition, or Removal of Improvements** (July 1996)
3.10.1-16 **Changes and Changed Conditions** (April 1996)
3.10.1-19 **Modification Cost Proposal - Price Breakdown (Construction)** (April 1996)

3.10.6-1 **Termination for Convenience of the Government (Fixed Price)** (October 1996)
3.10.6-6 ***Default*** **(Fixed Price Construction)** (October 1996)
3.1.7-6 **Disclosure of Certain Employee Relationships** (October 2005)

(a) The policy of the FAA is to avoid doing business with contractors subcontractors and consultants who have an unacceptable conflict of interest or an unacceptable appearance of a conflict of interest. The purpose of this policy is to maintain the highest level of integrity within its workforce and to ensure that the award of procurement contracts is based upon fairness and merit.

(b) The contractor shall provide to the Contracting Officer the following information with its proposal and shall provide an information update within 30 days of the award of a contract, any subcontract or any consultant agreement or within 30 days of the retention of a Subject Individual or former FAA employee subject to this clause:
The names of all Subject Individuals who
(i) participated in preparation of proposals for award; or
(ii) are planned to be used during performance; or
(iii) are used during performance; and
The names of all former FAA employees, retained by the contractor who were employed by FAA during the two year period immediately prior to the date of:
(i) the award; or
(ii) their retention by the contractor; and
The date on which the initial expression of interest in a future financial arrangement was discussed with the contractor by any former FAA employee whose name is required to be provided by the contractor pursuant to subparagraph (2); and
The location where any Subject Individual or former FAA employee whose name is required to be provided by the contractor pursuant to subparagraphs (1) and (2), are expected to be assigned.

(c) "Subject Individual" means a current FAA employee's father, mother, son, daughter, brother, sister, uncle, aunt, first cousin, nephew, niece, husband, wife, father-in-law, mother-in-law, son-in-law, daughter-in-law, brother-in-law, sister-in-law, stepfather, stepmother, stepson, stepdaughter, stepbrother, stepsister, half brother, half sister, spouse of an in-law or a member of his/her household.

(d) The contractor shall incorporate this clause into all subcontracts or consultant agreements awarded under this contract and shall further require that each such subcontractor or consultant incorporate this clause into all subcontracts or consultant agreements at any tier awarded under this contract unless the Contracting Officer determines otherwise.

(e) The information as it is submitted, shall be certified as being true and correct. If there is no such information, the certification shall so state.

(f) Remedies for nondisclosure: The following are possible remedies available to the FAA should a contractor misrepresent or refuse to disclose or misrepresent any information required by this clause:

(i) Termination of the contract.
(ii) Exclusion from subsequent FAA contracts.
(iii) Other remedial action as may be permitted or provided by law or regulation or policy or by the terms of the contract.

3.3.1-10 **Availability of Funds** (April 1996)

Funds are not presently available for this contract. The FAA 's obligation under this contract is contingent upon the availability of appropriated funds from which payment for contract purposes can be made. No legal liability on the part of the FAA for any payment may arise until funds are made available to the Contracting Officer for this contract and until the Contractor receives notice of such availability, to be confirmed in writing by the Contracting Officer.

(End of clause)

3.3.1-33 **Central Contractor Registration** (October 2005)

(a) Definitions. As used in this clause.
"Central Contractor Registration (CCR) database" means the primary Government repository for Contractor information required for the conduct of business with the Government.
"Data Universal Numbering System (DUNS) number" means the 9-digit number assigned by Dun and Bradstreet, Inc. (D&B) to identify unique business entities.
"Data Universal Numbering System +4 (DUNS+4) number" means the DUNS number assigned by D&B plus a 4-character suffix that may be assigned by a business concern. (D&B has no affiliation with this 4-character suffix.) This 4-character suffix may be assigned at the discretion of the business concern to establish additional CCR records for identifying alternative Electronic Funds Transfer (EFT) accounts for the same parent concern.
"Registered in the CCR database" means that?
(1) The Contractor has entered all mandatory information, including the DUNS number or the DUNS+4 number, into the CCR database; and
(2) The Government has validated all mandatory data fields and has marked the record "Active."

(b)(1) By submission of an offer, the Offeror acknowledges the requirement that a prospective awardee shall be registered in the CCR database prior to award, during performance, and through final payment of any contract, basic agreement, basic ordering agreement, or blanket purchasing agreement resulting from this solicitation.
(2) The Offeror shall enter, in the block with its name and address on the cover page of its offer, the annotation "DUNS" or "DUNS +4" followed by the DUNS or DUNS +4 number that identifies the Offeror's name and address exactly as stated in the offer. The DUNS number will be used by the Contracting Officer to verify that the Offeror is registered in the CCR database.

(c) If the offeror does not have a DUNS number, it should contact Dun and Bradstreet directly to obtain one.
(1) An offeror may obtain a DUNS number?
(i) If located within the United States, by calling Dun and Bradstreet at 1-866-705-5711 or via the Internet at http://www.dnb.com; or
(ii) If located outside the United States, by contacting the local Dun and Bradstreet office.
(2) The offeror should be prepared to provide the following information:
(i) Company legal business.
(ii) Tradestyle, doing business, or other name by which your entity is commonly recognized.
(iii) Company Physical Street Address, City, State, and ZIP Code.
(iv) Company Mailing Address, City, State and ZIP Code (if different from physical street address).
(v) Company Telephone Number.
(vi) Date the company was started.
(vii) Number of employees at your location.
(viii) Chief executive officer/key manager.
(ix) Line of business (industry).
(x) Company Headquarters name and address (reporting relationship within your entity).

(d) If the Offeror does not become registered in the CCR database in the time prescribed by the Contracting Officer, the Contracting Officer will proceed to award to the next otherwise successful registered Offeror.

(e) Processing time, which normally takes 48 hours, should be taken into consideration when registering. Offerors who are not registered should consider applying for registration immediately upon receipt of this solicitation.

(f) The Contractor is responsible for the accuracy and completeness of the data within the CCR database, and for any liability resulting from the Government's reliance on inaccurate or incomplete data. To remain registered in the CCR database after the initial registration, the Contractor is required to review and update on an annual basis from the date of initial registration or subsequent updates its information in the CCR database to ensure it is current, accurate and complete. Updating information in the CCR does not alter the terms and conditions of this contract and is not a substitute for a properly executed contractual document.

(g)

(1)

(i) If a Contractor has legally changed its business name, "doing business as" name, or division name (whichever is shown on the contract), or has transferred the assets used in performing the contract, but has not completed the necessary requirements regarding novation and change-of-name agreements in AMS Procurement Guidance T3.10.1.A-8, the Contractor shall provide the responsible Contracting Officer a minimum of one business day's written notification of its intention to:

(A) change the name in the CCR database;

(B) comply with the requirements of T3.10.1.A-8; and

(C) agree in writing to the timeline and procedures specified by the responsible Contracting Officer. The Contractor must provide the Contracting Officer with the notification, sufficient documentation to support the legally changed name.

(ii) If the Contractor fails to comply with the requirements of paragraph (g)(1)(i) of this clause, or fails to perform the agreement at paragraph (g)(1)(i)(C) of this clause, and, in the absence of a properly executed novation or change-of-name agreement, the CCR information that shows the Contractor to be other than the Contractor indicated in the contract will be considered to be incorrect information within the meaning of the "Suspension of Payment" paragraph of the electronic funds transfer (EFT) clause of this contract.

(2) The Contractor shall not change the name or address for EFT payments or manual payments, as appropriate, in the CCR record to reflect an assignee for the purpose of assignment of claims. Assignees shall be separately registered in the CCR database. Information provided to the Contractor's CCR record that indicates payments, including those made by EFT, to an ultimate recipient other than that Contractor will be considered to be incorrect information within the meaning of the "Suspension of payment" paragraph of the EFT clause of this contract.

(h) Offerors and Contractors may obtain information on registration and annual confirmation requirements via the internet at http://www.ccr.gov or by calling 1-888-227-2423, or 269-961-5757.

(End of clause)

3.3.1-34 **Payment by Electronic Funds Transfer/Central Contractor Registration**
(October 2005)

(a) Method of payment.

(1) All payments by the Government under this contract shall be made by electronic funds transfer (EFT), except as provided in paragraph (a)(2) of this clause. As used in this clause, the term "EFT" refers to the funds transfer and may also include the payment information transfer.

(2) In the event the Government is unable to release one or more payments by EFT, the Contractor agrees to either?

(i) Accept payment by check or some other mutually agreeable method of payment; or

(ii) Request the Government to extend the payment due date until such time as the Government can make payment by EFT (but see paragraph (d) of this clause).

(b) Contractor's EFT information. The Government shall make payment to the Contractor using the EFT information contained in the Central Contractor Registration (CCR) database. In the event that the EFT information changes, the Contractor shall be responsible for providing the updated information to the CCR database.

(c) Mechanisms for EFT payment. The Government may make payment by EFT through either the Automated Clearing House (ACH) network, subject to the rules of the National Automated Clearing House Association, or the Fedwire Transfer System. The rules governing Federal payments through the ACH are contained in 31 CFR Part 210.

(d) Suspension of payment. If the Contractor's EFT information in the CCR database is incorrect, then the Government need not make payment to the Contractor under this contract until correct EFT information is entered into the CCR database; and any invoice or contract financing request shall be deemed not to be a proper invoice for the purpose of prompt payment under this contract. The prompt payment terms of the contract regarding notice of an improper invoice and delays in accrual of interest penalties apply.

(e) Liability for uncompleted or erroneous transfers.

(1) If an uncompleted or erroneous transfer occurs because the Government used the Contractor's EFT information incorrectly, the Government remains responsible for?

(i) Making a correct payment;

(ii) Paying any prompt payment penalty due; and

(iii) Recovering any erroneously directed funds.

(2) If an uncompleted or erroneous transfer occurs because the Contractor's EFT information was incorrect, or was revised within 30 days of Government release of the EFT payment transaction instruction to the Federal Reserve System, and?

(i) If the funds are no longer under the control of the payment office, the Government is deemed to have made payment and the Contractor is responsible for recovery of any erroneously directed funds; or

(ii) If the funds remain under the control of the payment office, the Government shall not make payment, and the provisions of paragraph (d) of this clause shall apply.

(f) EFT and prompt payment. A payment shall be deemed to have been made in a timely manner in accordance with the prompt payment terms of this contract if, in the EFT payment transaction instruction released to the Federal Reserve System, the date specified for settlement of the payment is on or before the prompt payment due date, provided the specified payment date is a valid date under the rules of the Federal Reserve System.

(g) EFT and assignment of claims. If the Contractor assigns the proceeds of this contract as provided for in the assignment of claims terms of this contract, the Contractor shall require as a condition of any such assignment, that the assignee shall register separately in the CCR database and shall be paid by EFT in accordance with the terms of this clause. Notwithstanding any other requirement of this contract, payment to an ultimate recipient other than the Contractor, or a financial institution properly recognized under an assignment of claims, is not permitted. In all respects, the requirements of this clause shall apply to the assignee as if it were the Contractor. EFT information that shows the ultimate recipient of the transfer to be other than the Contractor, in the absence of a proper assignment of claims acceptable to the Government, is incorrect EFT information within the meaning of paragraph (d) of this clause.

(h) Liability for change of EFT information by financial agent. The Government is not liable for errors resulting from changes to EFT information made by the Contractor's financial agent.

(i) Payment information. The payment or disbursing office shall forward to the Contractor available payment information that is suitable for transmission as of the date of release of the EFT instruction to the Federal Reserve System. The Government may request the Contractor to designate a desired format and method(s) for delivery of payment information from a list of formats and methods the payment office is capable of executing. However, the Government does not guarantee that any particular format or method of delivery is available at any particular payment office and retains the latitude to use the format and delivery method most convenient to the Government. If the Government makes payment by check in accordance with paragraph (a) of this clause, the Government shall mail the payment information to the remittance address contained in the CCR database.

(End of clause)

3.6.2-24 **Affirmative Action Compliance Requirements for Construction** (November 1997)

(a) Definitions.

(1) "Employer identification number," as used in this clause, means the Federal Social Security number used on the employer's quarterly federal tax return, U.S. Treasury Department Form 941.

(2) "Minority," as used in this clause, means

(i) Black (all persons having origins in any of the black African racial groups not of Hispanic origin);

(ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race);

(iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

(b) If the Contractor, or a subcontractor at any tier, subcontracts a portion of the work involving any construction trade, each such subcontract in excess of $10,000 shall include this clause, including the goals for minority and female participation stated herein.

(c) The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate work force in each trade on all construction work in the covered area, are as follows:

Goals for minority participation: **15.1%**
Goals for female participation: **6.9%**

Compliance with the goals will be measured against the total work hours performed.

(d) The Contractor shall provide written notification to the Office of Federal Contract Compliance Programs (OFCCP) area office within 10 working days following award of any construction subcontract in excess of $10,000 at any tier for construction work under the contract resulting from this screening information request. The notification shall list the:

(1) Name, address, and telephone number of the subcontractor,

(2) Employer identification number of the subcontractor;

(3) Estimated dollar amount of the subcontract;

(4) Estimated starting and completion dates of the subcontract; and

(5) Geographical area in which the subcontract is to be performed.

(e) The Contractor shall implement the affirmative action procedures in subparagraphs (f)(1) through (7) of this clause. The goals stated in this contract are expressed as percentages of the total hours of employment and training of minority and female utilization that the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for the geographical area where that work is actually performed. The Contractor is expected to make substantially uniform progress toward its goals in each craft.

(f) The contractor shall take affirmative action steps at least as extensive as the following:

(1) Ensure a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities where the Contractor's employees are assigned to work. The Contractor, if possible, will assign two or more women to each construction project. The Contractor shall ensure that foremen, superintendents, and other on-site supervision, personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at these sites or facilities.

(2) Immediately notify the OFCCP area office when the union or unions, with which the Contractor has a collective bargaining agreement, has not referred back to the Contractor a minority or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(3) Develop on-the-job training opportunities and/or participate in training programs for the area that expressly include minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under subparagraph (f)(2) above.

(4) Review, at least annually, the Contractor's equal employment policy and affirmative action obligations with all employees having responsibility for hiring, assignment, layoff, termination, or other employment decisions. Conduct reviews of this policy with all on-site supervision, personnel prior to

initiation of construction work at a job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(5) Disseminate the Contractor's equal employment policy externally by including it in any advertising in the news media, specifically including minority and female news media. Provide written notification to, and discuss this policy with, other Contractors and subcontractors with which the Contractor does or anticipates doing business.

(6) Conduct, at least annually, an inventory and evaluation at least of all minority and female personnel for promotional opportunities. Encourage these employees to seek or to prepare for, through appropriate training, etc., opportunities for promotion.

(7) Maintain a record of solicitations for subcontracts for minority and female construction contractors and suppliers, including circulation of solicitations to minority and -female contractor associations and other business associations.

(g) The Contractor is encouraged to participate in voluntary associations that may assist in fulfilling one or more of the affirmative action obligations contained in subparagraphs (f)(1) through (7). The efforts of a contractor association, joint contractor-union, contractor-community, or similar group of which the contractor is a member and participant, may be useful in achieving one or more of its obligations under subparagraphs (f)(1) through (7).

(h) A single goal for minorities and a separate single goal for women shall be established. The Contractor is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of Executive Order 11246, as amended, if a particular group is employed in a substantially disparate manner.

(i) The contractor shall not use goals or affirmative action standards to discriminate against any person because of race, color, religion, sex, or national origin.

(j) The Contractor shall not enter into any subcontract with any person or firm debarred from Government contracts under Executive Order 11246, as amended.

(k) The Contractor shall carry out such sanctions and penalties for violation of this clause and of the Nondiscrimination and Affirmative Action clause, including suspension, termination, and cancellation of existing subcontracts, as may be imposed or ordered under Executive Order 11246, as amended, and its implementing regulations, by the OFCCP. Any failure to carry out these sanctions and penalties as ordered shall be a violation of this clause and Executive Order 11246, as amended.

(l) Nothing contained herein shall be construed as a limitation upon the application of other laws that establish different standards of compliance.

(End of clause)

3.6.3-12 **Asbestos-Free Construction** (August 1998)

In performing this contract, the Contractor shall not use asbestos or asbestos-containing building materials during construction, renovation, and/or modernization of this facility and shall provide to the

Contracting Officer (CO) a signed statement [CO state due date of statement here related to completion of the project] indicating that to the best of its knowledge, no asbestos or asbestos-containing building materials were used during construction, renovation, and/or modernization of this facility. The Contractor's certification under this clause is considered to be a material requirement of the contract and the FAA may withhold payment pending submittal and receipt of an acceptable certification.

The FAA CO may authorize sample testing of contractor building materials used during construction, renovation, and/or modernization of this facility to verify that they are asbestos-free. The FAA will bear the expense of this testing unless the testing reveals that the Contractor used asbestos-containing building material in performing this contract. If asbestos-containing material is found, the Contractor shall remove and replace the asbestos-containing material and decontaminate the site of asbestos contamination caused by the Contractor at no additional cost to the Government. In addition, the Contractor shall bear the expense of the original testing and retesting to determine that the asbestos removal and site decontamination are satisfactorily completed.

(End of clause)

3.9.1-1 **Contract Disputes** (November 2002)

(a) All contract disputes arising under or related to this contract shall be resolved through the Federal Aviation Administration (FAA) dispute resolution system at the Office of Dispute Resolution for Acquisition (ODRA) and shall be governed by the procedures set forth in 14 C.F.R. Parts 14 and 17, which are hereby incorporated by reference. Judicial review, where available, will be in accordance with 49 U.S.C. 46110 and shall apply only to final agency decisions. A contractor may seek review of a final FAA decision only after its administrative remedies have been exhausted.

(b) The filing of a contract dispute with the ODRA may be accomplished by mail, overnight delivery, hand delivery, or by facsimile. A contract dispute is considered to be filed on the date it is received by the ODRA.

(c) Contract disputes are to be in writing and shall contain:

(1) The contractor's name, address, telephone and fax numbers and the name, address, telephone and fax numbers of the contractor's legal representative(s) (if any) for the contract dispute;

(2) The contract number and the name of the Contracting Officer;

(3) A detailed chronological statement of the facts and of the legal grounds for the contractor's positions regarding each element or count of the contract dispute (i.e., broken down by individual claim item), citing to relevant contract provisions and documents and attaching copies of those provisions and documents;

(4) All information establishing that the contract dispute was timely filed;

(5) A request for a specific remedy, and if a monetary remedy is requested, a sum certain must be specified and pertinent cost information and documentation (e.g., invoices and cancelled checks) attached, broken down by individual claim item and summarized; and

(6) The signature of a duly authorized representative of the initiating party.

(d) Contract disputes shall be filed at the following address:

(1) Office of Dispute Resolution for Acquisition, AGC-70,
Federal Aviation Administration,
800 Independence Ave, S.W., Room 323,
Washington, DC 20591,

Telephone: (202) 267-3290,
Facsimile: (202) 267-3720; or

(2) other address as specified in 14 CFR Part 17.

(e) A contract dispute against the FAA shall be filed with the ODRA within two (2) years of the accrual of the contract claim involved. A contract dispute by the FAA against a contractor (excluding contract disputes alleging warranty issues, fraud or latent defects) likewise shall be filed within two (2) years after the accrual of the contract claim. If an underlying contract entered into prior to the effective date of this part provides for time limitations for filing of contract disputes with the ODRA which differ from the aforesaid two (2) year period, the limitation periods in the contract shall control over the limitation period of this section. In no event will either party be permitted to file with the ODRA a contract dispute seeking an equitable adjustment or other damages after the contractor has accepted final contract payment, with the exception of FAA claims related to warranty issues, gross mistakes amounting to fraud or latent defects. FAA claims against the contractor based on warranty issues must be filed within the time specified under applicable contract warranty provisions. Any FAA claims against the contractor based on gross mistakes amounting to fraud or latent defects shall be filed with the ODRA within two (2) years of the date on which the FAA knew or should have known of the presence of the fraud or latent defect.

(f) A party shall serve a copy of the contract dispute upon the other party, by means reasonably calculated to be received on the same day as the filing is to be received by the ODRA.

(g) After filing the contract dispute, the contractor should seek informal resolution with the Contracting Officer.

(h) The FAA requires continued performance with respect to contract disputes arising under this contract, in accordance with the provisions of the contract, pending a final FAA decision.

(i) The FAA will pay interest on the amount found due and unpaid from (1) the date the Contracting Officer receives the contract dispute, or (2) the date payment otherwise would be due, if that date is later, until the date of payment. Simple interest on contract disputes shall be paid at the rate fixed by the Secretary of the Treasury that is applicable on the date the Contracting Officer receives the contract dispute and then at the rate applicable for each 6-month period as fixed by the Treasury Secretary until payment is made.

(j) Additional information and guidance about the ODRA dispute resolution process for contract disputes can be found on the ODRA Website at http://www.faa.gov.

(End of clause)

3.9.1-2 **Protest After Award** (August 1997)

(a) Upon receipt of a notice that a protest has been filed with the FAA Office of Dispute Resolution, or a determination that a protest is likely, the Administrator or his designee may instruct the Contracting

Officer) to direct the Contractor to stop performance of the work called for by this contract. The order to the Contractor shall be in writing, and shall be specifically identified as a stop-work order issued under this clause. Upon receipt of the order, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Upon receipt of the final decision or other resolution of the protest, the Contracting Officer shall either--

(1) Cancel the stop-work order; or

(2) For other than cost-reimbursement contracts, terminate the work covered by the order as provided in the "Default" or the "Termination for Convenience of the Government" clause(s) of this contract; or

(3) For cost-reimbursement contracts, terminate the work covered by the order as provided in the "Termination" clause of this contract.

(b) If a stop-work order issued under this clause is canceled either before or after the final resolution of the protest, the Contractor shall resume work. The Contracting Officer shall make for other than cost-reimbursement contracts, an equitable adjustment in the delivery schedule or contract price, or both; and for cost-reimbursement contracts, an equitable adjustment in the delivery schedule, the estimated cost, the fee, or a combination thereof, and in any other terms of the contract that may be affected; and the contract shall be modified, in writing, accordingly, if--

(1) The stop-work order results in an increase in the time required for, or in the Contractor's cost properly allocable to, the performance of any part of this contract; and

(2) The Contractor asserts its right to an adjustment within 30 days after the end of the period of work stoppage; provided, that if the Contracting Officer decides the facts justify the action, the Contracting Officer may receive and act upon a proposal submitted at any time before final payment under this contract.

(c) If a stop-work order is not canceled and the work covered by the order is terminated for the convenience of the Government, the Contracting Officer shall allow reasonable costs resulting from the stop-work order in arriving at the termination settlement.

(d) If a stop-work order is not canceled and the work covered by the order is terminated for default, the Contracting Officer shall allow, by equitable adjustment or otherwise, reasonable costs resulting from the stop-work order.

(e) The Government's rights to terminate this contract at any time are not affected by action taken under this clause.

(End of clause)

3.10.1-23 Contracting Officer's Representative--Construction Contracts (July 1996)

(a) The Contracting Officer may appoint other Government personnel to accomplish certain contract administration matters. While there shall be various titles and divisions of duties for these individuals, generically they are known as Contracting Officer's Technical Representatives (COTR's). The Contracting Officer will provide written notice of COTR appointment(s), setting forth the authorities and limitations, to the Contractor within 10 calendar days prior to the notice to proceed. COTR duties may include, but are not limited to:

(1) Perform as the authorized representative of the Contracting Officer for technical matters, including interpretation of specifications and drawings, and inspection and review of work performed.

(2) Perform as the authorized representative of the Contracting Officer for administrative matters, including reviewing payments, and updated delivery schedules.

(b) These representatives are authorized to act for the Contracting Officer in all specifically delegated matters pertaining to the contract, except:

(1) contract modifications that change the contract price or cost, technical requirements or time for performance, unless delegated field modification authority;

(2) suspension or termination of the Contractor's right to proceed, either for default or for convenience;

(3) final decisions on any matters subject to appeal, e.g., disputes under the "Contract Disputes" clause; and

(4) final acceptance under the contract.

(End of clause)

3.10.1-25 Novation and Change-Of-Name Agreements (January 2003)

a. In the event the Contractor wishes the Government to recognize a successor in interest to the contract due to a complete transfer of assets required to perform the contract or an applicable merger, the Contractor must submit a written request to the Contracting Officer with the required documentation. This is required in order to obtain the Government's consent for the successor Contractor to assume contract performance and receive payments for deliveries.

b. For a change of Contractor name the contractor agrees to provide the necessary documentation to establish that a legal name change has been made, including any revision to payment addresses/accounts.

c. The Contractor agrees to follow the procedures and provide the documents, as requested by the cognizant Contracting Officer, described in FAA Procurement Guidance entitled "Novation and Change-Of-Name Agreements" published at http://fast.faa.gov/procurement_guide/html/3-10-1.htm.

d. When it is in the Government's interest not to concur in the transfer of the contract from one company to another, the Contractor remains subject to all contract terms and conditions including termination for default should the Contractor fail to perform.

(End of Clause)

3.13-5 Seat Belt Use by Contractor Employees (January 1999)

In accordance with Executive Order 13043 entitled "Increasing Seat Belt Use in the U.S.," the contractor is encouraged to implement, communicate and enforce on the job seat belt policies and programs for their employees and subcontractors when operating company-owned, rented or personally-owned vehicles.

(End of clause)

PART III - SECTION J
LIST OF ATTACHMENTS

J-1 The following documents, exhibits and/or attachments are incorporated in this solicitation and any resulting contract.

Attachment	Title	Date	No. of Pages
Attachment 1	FAA Sample Identification		3 Pages
Attachment 2	Drawing – Groundwater Wells and Probes Location		1 Page
Attachment 3	Fuel Tank Decommissioning Work Plan (WP) Details		2 Pages
Attachment 4	Site Preparation Work Plan Requirements		3 Pages
Attachment 5	Tanana FSS Building No. 400		1 Page
Attachment 6	Health and Safety Plan		1 Page
Attachment 7	Wage Determination No. AK030001, dated 02/17/2006		6 Pages (2 sided)
Attachment 8	Bid Bond Form (SF-24)		2 Pages
Attachment 9	Payment Bond Form (SF-25A)		2 Pages

PART IV - SECTION K
REPRESENTATIONS, CERTIFICATIONS, AND OTHER STATEMENTS OF OFFERORS

3.1-1 **Clauses and Provisions Incorporated by Reference** (December 2005)

This screening information request (SIR) or contract, as applicable, incorporates by reference the provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at:
http://www.asu.faa.gov/conwrite/ (on this web page, select "Search and View Clauses").

3.2.5-2 **Independent Price Determination** (October 1996)
3.6.3-10 **Certification of Toxic Chemical Release Reporting** (August 1998)
3.2.2.3-70 **Taxpayer Identification** (July 2004)

(a) Definitions.

(1) "Common parent," as used in this clause, means a corporate entity that owns or controls an affiliated group of corporations that files an offeror's (you, your) Federal income tax returns on a consolidated basis, and of which you are a member.

(2) "Corporate status," as used in this clause, means a designation as to whether you are a corporate entity, an unincorporated entity (for example, sole proprietorship or partnership), or a corporation providing medical and health care services.

(3) "Taxpayer Identification Number (TIN)," as used in this clause, means the number the Internal Revenue Service (IRS) requires you use in reporting income tax and other returns.

(b) All offerors must submit the information required in paragraphs (c) through (e) of this provision to comply with reporting requirements of 26 U.S.C. 6041, 6041A, and 6050M and implementing regulations issued by IRS. The FAA will use this information to collect and report on any delinquent amounts arising out of your relation with the Federal Government, under Public Law 104 -134, the Debt Collection Improvement Act of 1996, Section 31001(I)(3). If the resulting contract is subject to the reporting requirements and you refuse or fail to provide the information, the Contracting Officer (CO) may reduce your payments 31 percent under the contract.

(c) Taxpayer Identification Number (TIN).

[ ] TIN: ____________________________
[ ] TIN has been applied for.
[ ] TIN is not required because:
[ ] Offeror is a nonresident alien, foreign corporation, or foreign partnership that does not leave income effectively connected with the conduct of a trade or business in the U.S. and does not have an office or place of business or a fiscal paying agent in the U.S.;
[ ] Offeror is an agency or instrumentality of a foreign government;
[ ] Offeror is an agency or instrumentality of a Federal, state, or local government;
[ ] Other--State basis. ________________________________.

(d) Corporate Status.

[ ] Corporation providing medical and health care services, or engaged in the billing and collecting of payments for such services;
[ ] Other corporate entity
[ ] Not a corporate entity
[ ] Sole proprietorship
[ ] Partnership
[ ] Hospital or extended care facility described in 26 CFR 501(c)(3) that is exempt from taxation under 26 CFR 501(a).

(e) Common Parent.

[ ] A common parent does not own or control the offeror as defined in paragraph (a).
[ ] Name and TIN of common parent:
Name ____
TIN ____

(End of provision)

3.2.2.7-7 Certification Regarding Debarment, Suspension, Proposed Debarment, and Other Responsibility Matters (April 1996)

(a) The Offeror certifies, to the best of its knowledge and belief, that--

(i) The Offeror and/or any of its Principals--

(A) Are [ ] are not [ ] presently debarred, suspended, proposed for debarment, or declared ineligible for the award of contracts by any Federal agency;

(B) Have [ ] have not [ ] within a three-year period preceding this offer, been convicted of or had a civil judgment rendered against them for: commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, state, or local) contract or subcontract; violation of Federal or state antitrust statutes relating to the submission of offers: or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property; and

(C) Are [ ] are not [ ] presently indicted for, or otherwise criminally or civilly charged by a governmental entity with, commission of any of the offenses enumerated in subdivision (a)(1)(i)(B) of this provision.

(ii) The Offeror has [ ] has not [ ] within a three-year period preceding this offer, had one or more contracts terminated for default by any Federal agency.

'Principals,' for the purposes of this certification, means officers; directors; owners; partners; and, persons having primary management or supervisory responsibilities within a business entity (e.g., general manager; plant manager; head of a subsidiary, division, or business segment, and similar positions). THIS CERTIFICATION CONCERNS A MATTER WITHIN THE JURISDICTION OF AN AGENCY OF THE UNITED STATES AND THE MAKING OF A FALSE, FICTITIOUS, OR FRAUDULENT CERTIFICATION MAY RENDER THE MAKER SUBJECT TO PROSECUTION UNDER SECTION 1001, TITLE 18, UNITED STATES CODE.

(b) The Offeror shall provide immediate written notice to the Contracting Officer if, at any time prior to contract award, the Offeror learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

(c) A certification that any of the items in paragraph (a) of this provision exists will not necessarily result in withholding of an award under this SIR. However, the certification will be considered in connection with a determination of the Offeror's responsibility. Failure of the Offeror to furnish a certification or provide such additional information as requested by the Contracting Officer may render the Offeror nonresponsible.

(d) Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render, in good faith, the certification required by paragraph (a) of this provision. The knowledge and information of an Offeror is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

(e) The certification in paragraph (a) of this provision is a material representation of fact upon which reliance was placed when making award. If it is later determined that the Offeror knowingly rendered an erroneous certification, in addition to other remedies available to the Government, the Contracting Officer may terminate the contract resulting from this SIR for default.

(End of provision)

3.6.3-11 Toxic Chemical Release Reporting (August 1998)

(a) Unless otherwise exempt, the Contractor, as owner or operator of a facility used in the performance of this contract, shall file by July 1 for the prior calendar year an annual Toxic Chemical Release Inventory Form (Form R) as described in sections 313(a) and (g) of the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) (42 U.S.C. 11023(a) and (g)), and section 6607 of the Pollution Prevention Act of 1990 (PPA) (42 U.S.C. 13106). The Contractor shall file, for each facility subject to the Form R filing and reporting requirements, the annual Form R throughout the life of the contract.

(b) A Contractor owned or operated facility used in the performance of this contract is exempt from the requirement to file an annual Form R if--

(1) The facility does not manufacture, process, or otherwise use any toxic chemicals listed under section 313(c) of EPCRA, 42 U.S.C. 11023(c);

(2) The facility does not have 10 or more full-time employees as specified in section 313(b)(1)(A) of EPCRA, 42 U.S.C. 11023(b)(1)(A);

(3) The facility does not meet the reporting thresholds of toxic chemicals established under section 313(f) of EPCRA, 42 U.S.C. 11023(f) (including the alternate thresholds at 40 CFR 372.27, provided an appropriate certification form has been filed with EPA);

(4) The facility does not fall within Standard Industrial Classification Code (SIC) designations 20 through 39 or;

(5) The facility is not located within any State of the United States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the United States Virgin Islands, the Northern Mariana Islands, or any other territory or possession over which the United States has jurisdiction.

(c) If the Contractor has certified to an exemption in accordance with one or more of the criteria in paragraph (b) of this clause, and after award of the contract circumstances change so that any of its owned or operated facilities used in the performance of this contract is no longer exempt--

(1) The Contractor shall notify the Contracting Officer; and

(2) The Contractor, as owner or operator of a facility used in the performance of this contract that is no longer exempt, shall--

(i) Submit a Toxic Chemical Release Inventory Form (Form R) on or before July 1 for the prior calendar year during which the facility becomes eligible; and

(ii) Continue to file the annual Form R for the life of the contract for such facility.

(d) The Contracting Officer may terminate this contract or take other action as appropriate, if the Contractor fails to comply accurately and fully with the EPCRA and PPA toxic chemical release filing and reporting requirements.

(e) Except for acquisitions of commercial items shall--

(1) For competitive subcontracts expected to exceed $100,000 (including all options), include a solicitation provision substantially the same as the provision entitled Certification of Toxic Chemical Release Reporting; and

(2) Include in any resultant subcontract exceeding $100,000 (including all options), the substance of this clause, except this paragraph (e).

(End of clause)

BUSINESS DECLARATION

K-1

1. Name of Firm: ______ Tax Identification No.: ______

2. Address of Firm: ______

3. Telephone Number of Firm: ______

4. a. Name of Person Making Declaration ______

   b. Telephone Number of Person Making Declaration ______

   c. Position Held in the Company ______

5. Controlling Interest in Company *("X" all appropriate boxes)*

   ☐ a. Black American ☐ b. Hispanic American ☐ c. Native American ☐ d. Asian American

   ☐ e. Other Minority *(Specify)* ______ ☐ f. Other *(Specify)* ______

   ☐ g. Female ☐ h. Male ☐ i. 8(a) Certified *(Certification letter attached)* ☐ j. Service Disabled Veteran Small Business

6. Is the person identified in Number 4 above, responsible for day-to-day management and policy decision making, including but not limited to financial and management decisions?

   ☐ a. Yes ☐ b. No *(If "NO," provide the name and telephone number of the person who has this authority.)*

   ______

7. Nature of Business *(Specify all services/products (NAIC))* ______

8. (a) Years the firm has been in business: ______ (b) No. of Employees ______

9. Type of Ownership: ☐ a. Sole Ownership ☐ b. Partnership

   ☐ c. Other *(Explain)* ______

10. Gross receipts of the firm for the last three years: a.1. Year Ending: ______ b.1. Gross Receipts ______

    a.2. Year Ending: ______ b.2. Gross ______ a.3. Year Ending: ______ b.3. Gross Receipts ______

11. Is the firm a small business? ☐ a. Yes ☐ b. No

12. Is the firm a service disabled veteran owned small business? ☐ a. Yes ☐ b. No

13. Is the firm a socially and economically disadvantaged small business? ☐ a. Yes ☐ b. No

I DECLARE THAT THE FOREGOING STATEMENTS CONCERNING ______ ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE, INFORMATION, AND BELIEF. I AM AWARE THAT I AM SUBJECT TO CRIMINAL PROSECUTION UNDER THE PROVISIONS OF 18 USCS 1001.

14. a. Signature ______ b. Date: ______

    c. Typed Name ______ d. Title: ______

PART IV - SECTION L
INSTRUCTIONS, CONDITIONS, AND NOTICES TO OFFERORS

3.1-1 **Clauses and Provisions Incorporated by Reference** (December 2005)

This screening information request (SIR) or contract, as applicable, incorporates by reference the provisions or clauses listed below with the same force and effect as if they were given in full text. Upon request, the Contracting Officer will make the full text available, or offerors and contractors may obtain the full text via Internet at:
http://www.asu.faa.gov/conwrite/ (on this web page, select "Search and View Clauses").

3.2.2.3-1 **False Statements in Offers** (July 2004)
3.2.2.3-12 **Amendments to Screening Information Requests** (July 2004)
3.2.2.3-14 **Late Submissions, Modifications, and Withdrawals of Submittals** (July 2004)
3.2.2.3-16 **Restricting, Disclosing and Using Data** (July 2004)
3.2.2.3-19 **Contract Award** (July 2004)
3.13-4 **Contractor Identification Number Data Universal Numbering System (DUNS) Number** (August 1997)
3.2.4-1 **Type of Contract** (April 1996)

The FAA contemplates award of a FIRM FIXED-PRICE CONTRACT resulting from this Screening Information Request.

(End of provision)

3.9.1-3 **Protest** (November 2002)

AS A CONDITION OF SUBMITTING AN OFFER OR RESPONSE TO THIS SIR (OR OTHER SOLICITATION, IF APPROPRIATE), THE OFFEROR OR POTENTIAL OFFEROR AGREES TO BE BOUND BY THE FOLLOWING PROVISIONS RELATING TO PROTESTS:

(a) Protests concerning Federal Aviation Administration Screening Information Requests (SIRs) or awards of contracts shall be resolved through the Federal Aviation Administration (FAA) dispute resolution system at the Office of Dispute Resolution for Acquisition (ODRA) and shall be governed by the procedures set forth in 14 C.F.R. Parts 14 and 17, which are hereby incorporated by reference. Judicial review, where available, will be in accordance with 49 U.S.C. 46110 and shall apply only to final agency decisions. A protestor may seek review of a final FAA decision only after its administrative remedies have been exhausted.

(b) Offerors initially should attempt to resolve any issues concerning potential protests with the Contracting Officer. The Contracting Officer should make reasonable efforts to answer questions promptly and completely, and, where possible, to resolve concerns or controversies. The protest time limitations, however, will not be extended by attempts to resolve a potential protest with the Contracting Officer.

(c) The filing of a protest with the ODRA may be accomplished by mail, overnight delivery, hand delivery, or by facsimile. A protest is considered to be filed on the date it is received by the ODRA.

(d) Only an interested party may file a protest. An interested party is one whose direct economic interest has been or would be affected by the award or failure to award an FAA contract. Proposed subcontractors are not "interested parties" within this definition.

(e) A written protest must be filed with the ODRA within the times set forth below, or the protest shall be dismissed as untimely:

(1) Protests based upon alleged improprieties in a solicitation or a SIR that are apparent prior to bid opening or the time set for receipt of initial proposals shall be filed prior to bid opening or the time set for the receipt of initial proposals.

(2) In procurements where proposals are requested, alleged improprieties that do not exist in the initial solicitation, but which are subsequently incorporated into the solicitation, must be protested not later than the next closing time for receipt of proposals following the incorporation.

(3) For protests other than those related to alleged solicitation improprieties, the protest must be filed on the later of the following two dates:

(i) Not later than seven (7) business days after the date the protester knew or should have known of the grounds for the protest; or

(ii) If the protester has requested a post-award debriefing from the FAA Product Team, not later than five (5) business days after the date on which the Product Team holds that debriefing.

(f) Protests shall be filed at:

(1) Office of Dispute Resolution for Acquisition, AGC-70,
Federal Aviation Administration,
800 Independence Ave., S.W.,
Room 323,
Washington, DC 20591,

Telephone: (202) 267-3290,
Facsimile: (202) 267-3720; or

(2) other address as specified in 14 CFR Part 17.

(g) At the same time as filing the protest with the ODRA, the protester shall serve a copy of the protest on the Contracting Officer and any other official designated in the SIR for receipt of protests by means reasonably calculated to be received by the Contracting Officer on the same day as it is to be received by the ODRA. The protest shall include a signed statement from the protester, certifying to the ODRA the manner of service, date, and time when a copy of the protest was served on the Contracting Officer and other designated official(s).

(h) Additional information and guidance about the ODRA dispute resolution process for protests can be found on the ODRA Website at http://www.faa.gov.

(End of provision)

3.13-1 Approval of Contract (April 1996)

This contract is subject to the written approval of the Contracting Officer and shall not be binding until so approved.

(End of clause)

PART IV - SECTION M
EVALUATION FACTORS FOR AWARD

M-1 Evaluation Factors for Award

The FAA will award a contract resulting from this solicitation to the responsive, responsible, offeror whose proposal meets the Government's requirements as specified in the solicitation and offers the best value based on price.

ATTACHMENT 1
FAA SAMPLE IDENTIFICATION

Samples will be minimally identified by the first six parts of the following sample identification system. Samples requiring multiple analyses and/or multiple containers will use a single number for all containers. If the sample location is not at a facility identified in the list of facility identifiers, use the identifier for the nearest facility with an identifier. The Contractor may add additional number/letters to the end of the code. The sample identification system is shown below:

1.	FAA Station Identifier	e.g., BET – Bethel
2.	Year (last two digits)	e.g., 97, 98

3. Sample Collection Method/Location

Surface Sample	SL	Subsurface Sample	SS
Sediment Sample	SD	Monitoring Well	MW
Private Well	PW	Surface Water	SW
Drum	DR	Wipe Sample	WP
Trip Blank	TB	Equipment (Rinsate) Blank	EB
Observation Well	OW	Pump Test Well	PT
Storage Tank	ST	Transformer	TR
Asbestos Containing Material	AS	Sump	SP
Monitoring Probe	MP		

4. Location/Well Number — 001-999

5. Facility Identifier

RCAG	C	Flight Service Station	F
Non-Directional Beacon	N	Quarters Area	Q
Runway/Runway Aids	R	Shop/Power/Storage	S
Tank Farm	T	VORTAC	V
Other	M		

6. Sample Number — 01-99

7. Number/Letter Identifiers — Optional Identifiers for Contractor's Use

FAA SAMPLE IDENTIFICATION

Groundwater sample numbers are assigned sequentially by sampling round, using the same well number, e.g., MW001T01, MW001T02, MW001T03 are the numbers for the groundwater samples from the initial and two successive rounds of groundwater samples obtained from Monitoring Well Number 001 located at the Tank Farm. Duplicate samples for groundwater shall use a fictional well number.

Each sample obtained in the borehole is assigned a sequential number starting with the surface sample. This includes samples that are only screened in the field. Samples sent to the laboratory are not to be renumbered.

Trip blanks and equipment blanks do not need the final two digits. The blanks shall be numbered sequentially for each station for each year.

Several examples of sample identification numbers are described below:

YAK97SL001V01

where: YAK = Yakutat Station
97 = Sample collected in 1997
SL = Surface soil sample
001 = Sample location number 1
V = Sample location is near the VORTAC
01 = The first sample from that location

FAI97MP003R02

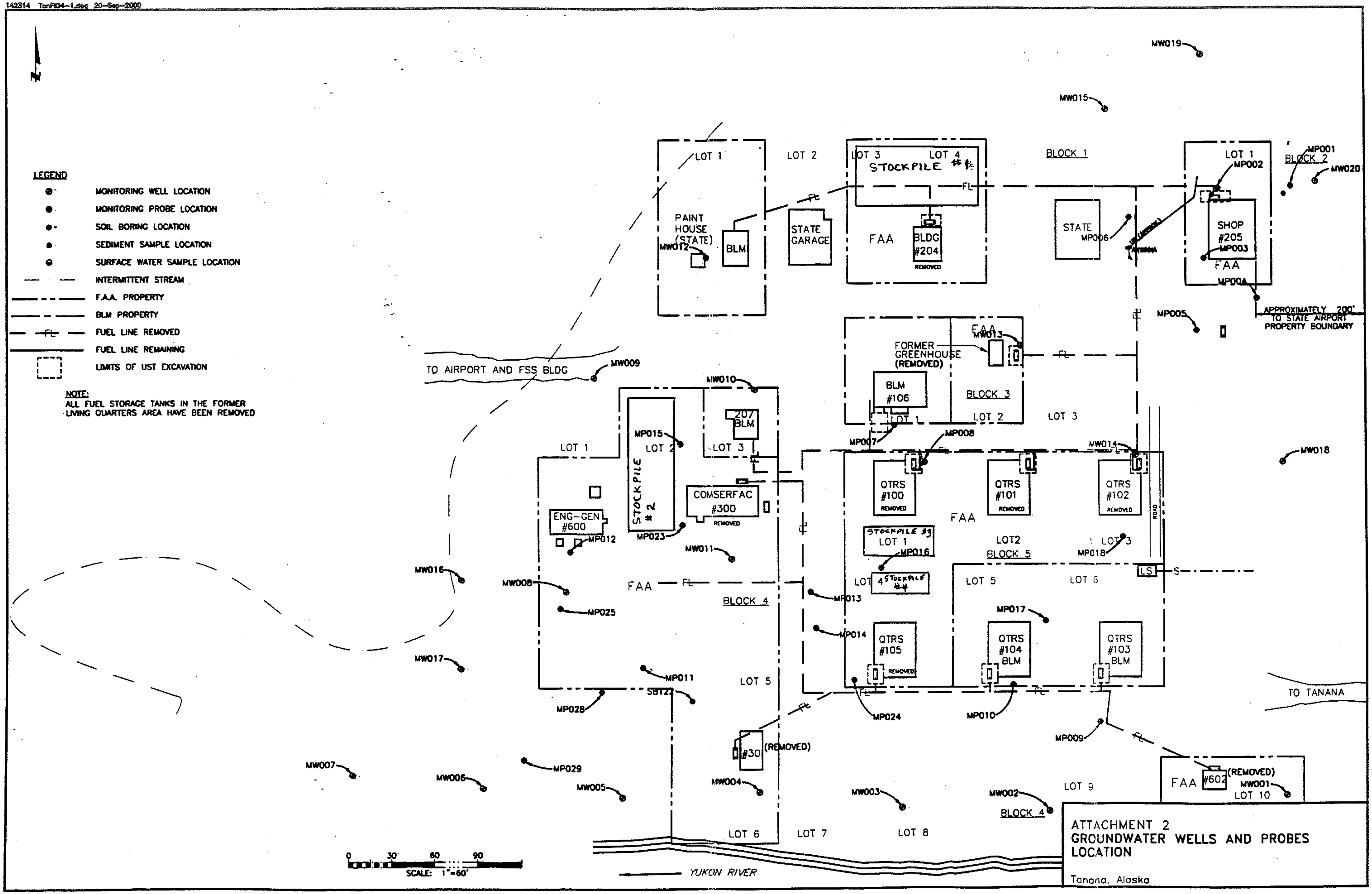
where: FAI = Fairbanks Station
97 = Sample collected in 1997
MP = Sample collected from monitoring probe
003 = Monitoring probe number 3
R = The well is located near Runway-associated facilities/equipment
02 = The second round of sampling from MP003

EAA94SS018Q01

where: EAA = Eagle Station
94 = Sample collected in 1994
SS = Soil sample collected from a boring
018 = The sample location in number 18
Q = The sample location is in the Quarters Area
01 = The first sample collected from the boring, usually at the surface

The next sample taken from the boring would be EAA94SS018Q02. All samples collected from the borehole have to be labeled even if the sample is used only for field-performed analyses. Samples sent to the laboratory must maintain the original number assigned. <u>DO NOT RENUMBER THE SAMPLES SENT TO THE LABORATORY.</u>

142314 TanF104-1.dwg 20-Sep-2000



ATTACHMENT 2
GROUNDWATER WELLS AND PROBES LOCATION

Tanana, Alaska

ATTACHMENT 3

FUEL TANK DECOMMISSIONING WORK PLAN (WP) DETAILS

A. The Contractor shall perform all work in accordance with all federal, state, and local laws and regulations; these Specifications; and all approved plans submitted under this Contract. The Contractor shall develop, implement, maintain, and supervise as part of the work a comprehensive WP for tank removal and field operations.

B. The WP is submitted to assure that the Contractor understands the project objectives and the chemical quality management details of the Specifications and applicable regulations, and to ensure that the CO has the opportunity to approve the Contractor's implementation procedures.

C. The Contractor shall submit a WP for approval by the CO in accordance with the provisions of these Specifications and applicable regulations and guidelines. The WP shall contain:

1. Identify applicable regulatory requirements and permits
2. Detail the proposed tank excavation, cleaning, and cutting procedures
3. Identify proposed methods for removal of residue, vapor, liquid, and contaminated water, and control of surface water
4. Identify proposed methods for handling, storage, and disposal of residual tank fluids and sludge
5. Identify borrow source(s)
6. Detail dewatering procedures, if anticipated
7. Identify key personnel and their responsibilities
8. Identify licensed treatment/disposal or recycling facility, if required
9. Detail site control measures
10. Identify known utilities at the project site and their owners
11. Identify the fire department having jurisdiction over the project site
12. Identify personnel security clearances, if required
13. Delineate the methods the Contractor intends to use to accomplish the chemical QC items indicated in the Specifications to assure accurate, precise, representative, legally defensible, and comparable data
14. Identify proposed field-screening methods and equipment
15. Specify the required number of project and QC samples and the analytical test methods
16. Detail the project-related qualifications and certification of the Contractor's laboratory facilities and analytical instrumentation
17. Include specific sampling points and rationale for selection of these sites, specific sampling procedures, specific packaging and chain-of-custody procedures, specific analytical protocols, and specific control limits (acceptance criteria) to be employed by the contract laboratories
18. Provide documentation that field personnel collecting samples are qualified as required by 18 AAC 78 and documentation of sampling experience on at least 5 underground tank removal projects

19. Include decontamination procedures for sampling equipment that contacts potentially contaminated soil and water

20. Provide documentation for ADEC certified tank remover

Attachment 4

Site Preparation Work Plan Requirements

General

Generally, the work plan should describe, in very specific terms, what work is going to be performed, how it will be performed, any special requirements to doing the work, and what regulation(s) the work will be performed in accordance with. The work plan must be written in such detail that a person unfamiliar with the project could be introduced to the project in mid-stream and could, by reading the work plan, be thoroughly familiarized with the project.

The format of the work plan is left to the discretion of the successful bidder; however, the contents must be well thought out and communicated clearly enough to satisfy the FAA technical review team's concerns about contractor plans and work practices.

Asbestos & Lead Abatement

Your work plan needs to describe how asbestos or lead abatement will be performed or conducted. Your plan must cover work area preparation & controls, method(s) of abatement, air monitoring, work area cleanup, decontamination and waste disposal. Worker certification & EPA/OSHA notifications need to be included.

Building Demolition & Debris Removal

Your work plan needs to describe the type(s) of equipment that will be used during the job and the method that will be used to demolish a building or structure. The work plan also needs to describe how demolition debris will be transported to the landfill. The backfill source shall be included in the work plan.

Landfill Information

Your work plan needs to include correspondence from the landfill you will be using. The correspondence needs to confirm the landfill will accept the debris generated from your work.

Following is an example work plan outline that the successful bidder may choose to follow to prepare project-specific work plan documents. The contents of the work plan will vary depending on the type and nature of work involved.

GENERAL ITEMS THAT MUST BE COVERED IN YOUR WORKPLAN (WHEN APPLICABLE)

SAMPLE WORK PLAN OUTLINE

Introduction
Objectives
Scope of Work
Schedule

Project Organization and Responsibilities
Corporate Licenses
Insurance Certificates
Contractor Personnel
Contractor Certifications for Project
FAA Personnel
Subcontractor Services

Site and Facility Descriptions
Station Location and Description and Map
Physical Characteristics of Station
Facility Descriptions and Previous Investigations

Regulatory Framework
Environmental
EPA Project Notifications
Occupational Safety and Health
DOL Project Notifications
Transportation

Sampling and Analysis Plan

Field Work Methods and Procedures
Utility Clearances and Permits
Description of Work to be Accomplished
Statement of Purpose
Actual Step-by-Step Description of Work
Sequence of Tasks to be Performed
Site Control/Control Areas/Regulated Areas
Decontamination
Data Management Plan
Project-Related Wastes
Disposal Arrangements

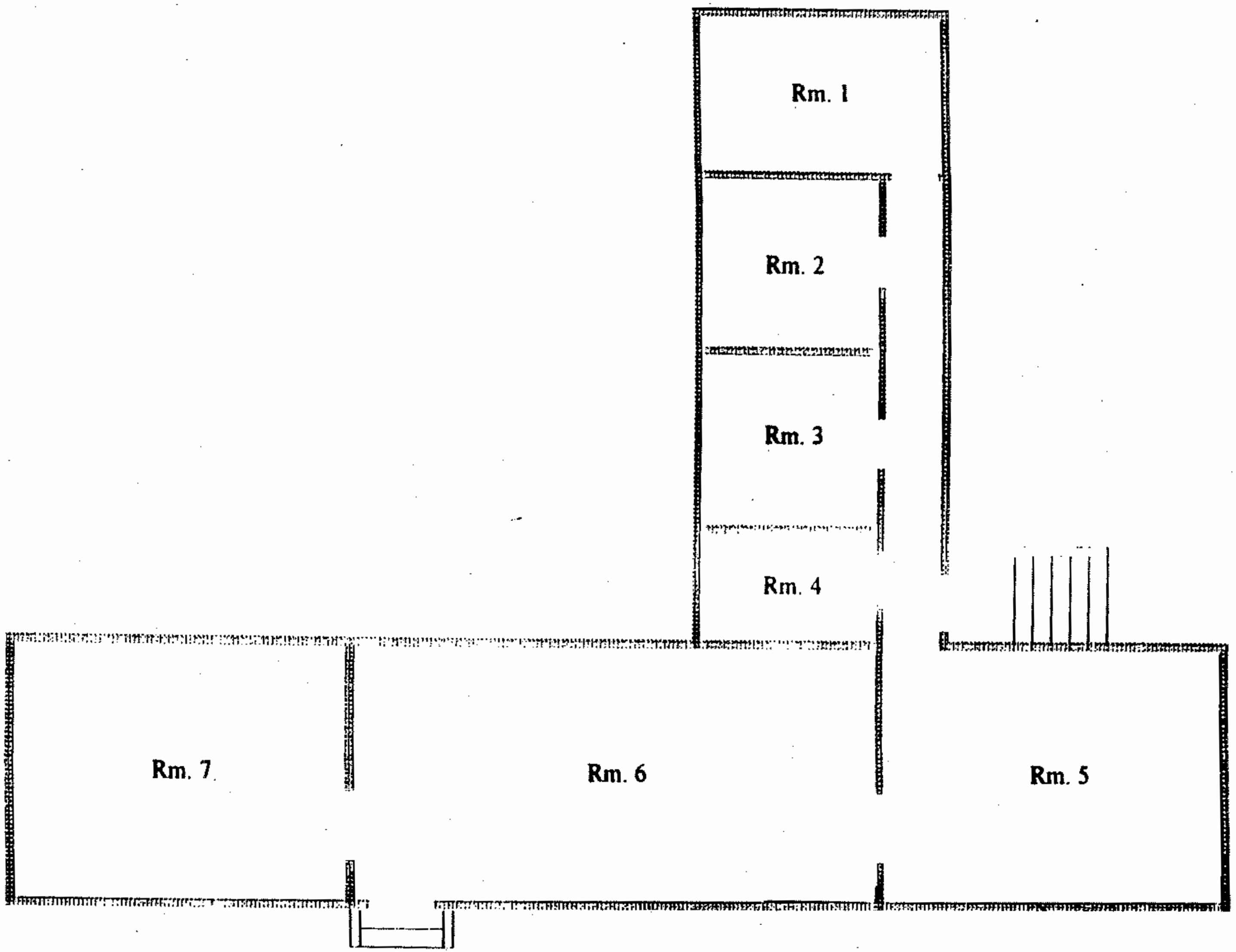
Project Controls and Status Reporting

References

Appendices:

A Field Forms

B Completed (except for quantities) manifests



Not To Scale

Attachment 5

BRISTOL ENVIRONMENTAL SERVICES CORPORATION FAA Contract No. DTFA-0496-C-20013	**Tanana (TAL) FSS Building No. 400** **HSA 55**	**Inspection Date: June 11, 1996** **Drawn by: MAS**	**Figure 66** **Project No.**

Attachment 6

Health and Safety Plan

1 General Personal Protection
2 Respiratory Protection
3 Engineering Controls/Administrative Controls
4 Emergency Procedures
5 Material Safety Data Sheets (MSDS)
6 Hazard Communication Program
7 Air Monitoring
8 Decontamination
9 Spill Containment
10 Confined Space

General Decision Number: AK030001 02/17/2006 AK1

Superseded General Decision Number: AK020001

State: Alaska

Construction Types: Building and Heavy

Counties: Alaska Statewide.

BUILDING AND HEAVY CONSTRUCTION PROJECTS (does not include residential construction consisting of single family homes and apartments up to and including 4 stories)

Modification Number	Publication Date
0	06/13/2003
1	11/28/2003
2	02/06/2004
3	03/05/2004
4	04/02/2004
5	04/16/2004
6	05/14/2004
7	06/18/2004
8	07/23/2004
9	08/06/2004
10	08/20/2004
11	09/10/2004
12	10/01/2004
13	10/15/2004
14	10/22/2004
15	12/10/2004
16	01/21/2005
17	02/11/2005
18	02/18/2005
19	03/04/2005
20	04/22/2005
21	05/20/2005
22	07/08/2005
23	07/29/2005
24	08/12/2005
25	08/26/2005
26	09/02/2005
27	09/16/2005
28	09/23/2005
29	09/30/2005
30	10/28/2005
31	11/18/2005
32	12/16/2005
33	01/27/2006
34	02/10/2006
35	02/17/2006

	Rates	Fringes
Carpenters & Drywallers	$ 30.39	14.05
Millwright	$ 32.37	14.10

CARP2520-003 08/01/2005

	Rates	Fringes
Diver		
Stand-by	$ 34.06	14.05
Tender	$ 33.06	14.05
Working	$ 68.12	14.05
Piledriver		
Carpenter	$ 30.39	14.05
Piledriver; Skiff Operator and Rigger	$ 29.39	14.05
Sheet Stabber	$ 30.39	14.05
Welder	$ 31.39	14.05

ELEC1547-004 05/02/2005

	Rates	Fringes
Cable splicer	$ 34.67	3%+14.85
Electrician;Technician	$ 32.92	3%+14.85

---

* ELEC1547-005 01/01/2006

Line Construction

	Rates	Fringes
Cable splicer	$ 39.80	3%+17.85
Linemen (Including Equipment Operators, Technician)	$ 38.05	3%+17.85
Powderman	$ 36.05	3%+17.85
Tree Trimmer	$ 26.85	3%+17.85

ELEV0019-002 01/01/2006

	Rates	Fringes
Elevator Mechanic	$ 41.195	13.265+a+b

FOOTNOTE: a. Employer contributes 8% of the basic hourly rate for over 5 year's service and 6% of the basic hourly rate for 6 months to 5 years' of service as vacation paid credit. b. Eight paid holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day; Friday after Thanksgiving and Christmas Day

---

ENGI0302-002 09/01/2005

	Rates	Fringes
Power equipment operators:		
GROUP 1	$ 32.92	12.55
GROUP 1A	$ 34.46	12.55
GROUP 2	$ 32.25	12.55

Bombardier (tack or tow rig); Boring Machine; Brooms-power; Bump Cutter; Compressor; Farm tractor; Forklift, industrial type; Gin Truck or Winch Truck with poles when used for hoisting; Grade Checker and Stake Hopper; Hoist, Air Tuggers, Elevators; Loaders: (a) Elevating-Athey, Barber Green and similar types (b) Forklifts or Lumber Carrier (on construction job site) (c) Forklifts with Tower (d) Overhead and Front-end, under 2 1/2 yds. Locomotives:Dinkey (air, steam, gas and electric) Speeders; Mechanics (light duty); Mixers: Concrete Mixers and Batch 200 yds. per hour and under; Oil, Blower Distribution; Post Hole Diggers, mechanical; Pot Fireman (power agitated); Power Plant, Turbine Operator, under 300 k.w.; Pumps-water; Rig oiler/assistant engineer, over 45 ton, over 3 yards or over 150 foot boom; Roller-other than Plantmix; Saws, concrete; Straightening Machine; Tow Tractor

GROUP 4: Rig Oiler/Assistant Engineer (Advances to Group III if over 45 tons or 3 yards or 150 ft. boom); Swamper (on trenching machines or shovel type equipment); Spotter; Steam Cleaner

FOOTNOTE: Groups 1-4 receive 10% premium while performing tunnel or underground work.

IRON0751-003 08/01/2005

	Rates	Fringes
Ironworkers:		
BRIDGE, STRUCTURAL, ORNAMENTAL, REINFORCING MACHINERY MOVER, RIGGER, SHEETER, STAGE RIGGER, BENDER OPERATOR	$ 29.05	16.10
FENCE, BARRIER AND GUARDRAIL INSTALLERS	$ 25.55	16.10
GUARDRAIL LAYOUT MAN	$ 26.29	16.10
HELICOPTER, TOWER	$ 30.05	16.10

LABO0341-005 07/01/2005

	Rates	Fringes
Laborers: North of the 63rd Parallel & East of Longitude 138 Degrees		
GROUP 1	$ 26.08	12.85
GROUP 2	$ 26.89	12.85
GROUP 3	$ 27.60	12.85
GROUP 3A	$ 30.20	12.85
GROUP 3B	$ 31.28	12.85
GROUP 4	$ 17.81	12.85
TUNNELS, SHAFTS, AND RAISES		
GROUP 1	$ 28.70	12.85
GROUP 2	$ 29.59	12.85
GROUP 3	$ 30.37	12.85
GROUP 3A	$ 33.23	12.85
GROUP 3B	$ 34.42	12.85

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill Doctor (in the field); Drillers (including, but not limited to, wagon drills, air track drills; hydraulic drills); Powderman; Pioneer Drilling and Drilling Off Tugger (all type drills); Pipelayers

GROUP 3B: Grade checker (setting or transferring of grade marks, line and grade)

GROUP 4: Final Building Cleanup

TUNNELS, SHAFTS, AND RAISES CLASSIFICATIONS

GROUP 1: Brakeman; Muckers; Nippers; Topman and Bull Gang; Tunnel Track Laborer

GROUP 2: Burning and Cutting Torch; Concrete Laborers; Jackhammers; Nozzleman, Pumpcrete or Shotcrete.

GROUP 3: Miner; Retimberman

GROUP 3A: Asphalt Raker, Asphalt Belly dump lay down; Drill Doctor (in the field); Drillers (including, but not limited to, wagon drills, air track drills; hydraulic drills); Powderman; Pioneer Drilling and Drilling Off Tugger (all type drills); Pipelayers.

GROUP 3B: Grade checker (setting or transferring of grade marks, line and grade)

Tunnel shaft and raise rates only apply to workers regularly employed inside a tunnel portal or shaft collar.

PAIN1140-004 07/01/2005

SOUTH OF THE 63RD PARALLEL

	Rates	Fringes
Painters:		
Brush, Roller, Sign, Paper and Vinyl, Swing Stage, Hand Taper/Drywall, Structural Steel, and Commercial Spray	$ 24.80	13.35
Machine Taper/Drywall	$ 25.00	13.35
Spray-Sand/Blast, Epoxy and Tar Applicator	$ 25.60	13.35
Steeple Jack & Tower	$ 26.60	13.35

PAIN1140-005 07/01/2005

	Rates	Fringes
Soft Floor Layer	$ 27.07	9.12

PAIN1140-006 07/01/2005

South of the 63rd Parallel

	Rates	Fringes
Plumber; Steamfitter	$ 32.13	14.57

PLUM0375-002 07/01/2005

North of the 63rd Parallel

	Rates	Fringes
Plumber; Steamfitter	$ 35.21	15.70

PLUM0669-002 01/01/2006

	Rates	Fringes
Sprinkler Fitter	$ 36.05	14.15

ROOF0190-002 09/01/2005

	Rates	Fringes
Roofer (including Built Up, Composition and Single Ply)		
North of the 63rd Parallel	$ 31.62	10.00
South of the 63rd Parallel	$ 29.62	10.00

SHEE0023-003 07/01/2005

South of the 63rd Parallel

	Rates	Fringes
Sheet Metal Worker	$ 33.34	14.55

SHEE0023-004 06/01/2005

North of the 63rd Parallel

	Rates	Fringes
Sheet Metal Worker	$ 35.12	14.88

TEAM0959-003 09/01/2005

	Rates	Fringes
Truck Driver		
GROUP 1	$ 32.72	11.60
GROUP 1A	$ 33.79	11.60
GROUP 2	$ 31.65	11.60
GROUP 3	$ 30.96	11.60
GROUP 4	$ 30.48	11.60
GROUP 5	$ 29.82	11.60

GROUP 1: Semi with Double Box Mixer; Dump Trucks (including rockbuggy and trucks with pups) over 40 yards up to and

attendant); Batch Truck, up to and including 7 yards; Gear/Supply Truck; Bus Operator, Up to 30 Passengers;

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29 CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

# BID BOND *(See Instructions on Reverse)*	1. DATE BOND EXECUTED *(MUST NOT BE LATER THAN BID OPENING DATE.)*
2. PRINCIPAL *(LEGAL NAME AND BUSINESS ADDRESS)*	3. TYPE OF ORGANIZATION *("X" ONE)* ☐ Individual ☐ Partnership ☐ Joint Venture ☐ Corporation
	4. STATE OF INCORPORATION

5. SURETY(IES) *(NAME AND BUSINESS ADDRESS)*

a. Penal Sum of Bond					b. Bid Identification	
Percent of of Bid Price	Amount not to exceed				Bid Date	Invitation No.
	Million(s)	Thousand(s)	Hundred(s)	Cents		
					For (Construction , Supplies or Services)	

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The principal has submitted the bid identified above.

THEREFORE:

The above obligation is void if the Principal - (a) Upon acceptance by the Government of the bid identified above, within the specified therein for acceptance (sixty (60) days if no period is specified), executes the further contractual documents and gives the bond(s) required by the terms of the bid as accepted within the time specified (ten (10) days if no period is specified) after receipt of the forms by the principal; or (b) In the event of failure to execute such further contractual documents and give such bonds, pays the Government for any cost of procuring the work which exceeds the amount of the bid.

WITNESS:

The Principal and surety(ies) executed this bid bond and affixes their seals on the above date.

6. PRINCIPAL				
a. Signature(s)	(1) (seal)	(2) (seal)	(3) (seal)	Corporate Seal
b. Name(s) & Titles *(Typed)*	(1)	(2)	(3)	

7. INDIVIDUAL SURETY(IES)		
a. Signature(s)	(1) (Seal)	(2) (Seal)
b. Name(s) *(Typed)*	(1)	(2)

8. CORPORATE SURETY(IES)					
Surety A	a. Name & Address		b. State of Inc.	c. Liability Limit $	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s)*(Typed)*	(1)	(2)		

PAYMENT BOND *(See Instructions on Reverse)*	1. DATE BOND EXECUTED *(MUST NOT BE LATER THAN DATE OF CONTRACT.)*
2. PRINCIPAL *(LEGAL NAME AND BUSINESS ADDRESS)*	3. TYPE OF ORGANIZATION *("X" ONE)* ☐ Individual ☐ Partnership ☐ Joint Venture ☐ Corporation
	4. STATE OF INCORPORATION

5. SURETY(IES) *(NAME AND BUSINESS ADDRESS)*

a. Penal Sum of Bond					b. Bid Identification	
Percent of of Bid Price	Amount not to exceed				Bid Date	Invitation No.
	Million(s)	Thousand(s)	Hundred(s)	Cents		
					For (Construction , Supplies or Services)	

OBLIGATION:

We, the Principal and Surety(ies) are firmly bound to the United States of America (hereinafter called the Government) in the above penal sum. For payment of the penal sum, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally. However, where the Sureties are corporations acting as co-sureties, we, the Sureties, bind ourselves in such sum "jointly and severally" as well as "severally" only for the purpose of allowing a joint action or actions against any or all of us. For all other purposes, each Surety binds itself, jointly and severally with the Principal, for the payment of the sum shown opposite the name of the Surety. If no limit is indicated, the limit of liability is the full amount of the penal sum.

CONDITIONS:

The above obligation is void if the Principal promptly makes payment to al persons having a direct relationship with the Principal or a subcontractor of the principal for furnishing labor, material or both in the prosecution of the work provided for in the contract identified above, and any authorized modifications of the contract that subsequently are made. Notice of those modifications to the Surety(ies) are waived.

WITNESS:

The Principal and surety(ies) executed this bid bond and affixes their seals on the above date.

6. PRINCIPAL				
a. Signature(s)	(1) (seal)	(2) (seal)	(3) (seal)	Corporate Seal
b. Name(s) & Titles *(Typed)*	(1)	(2)	(3)	

7. INDIVIDUAL SURETY(IES)		
a. Signature(s)	(1) (Seal)	(2) (Seal)
b. Name(s) *(Typed)*	(1)	(2)

8. CORPORATE SURETY(IES)					
Surety A	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		

8. CORPORATE SURETY(IES) *(Continued)*

S u r e t y **B**	a. Name & Address		b. State of Inc.	a. Liability Limit	*Corporate* Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
S u r e t y **C**	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
S u r e t y **D**	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
S u r e t y **E**	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
S u r e t y **F**	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
S u r e t y **G**	a. Name & Address		b. State of Inc.	a. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		

Instructions

1. This form, for the protection of persons supplying labor and material is used when a payment bond is required under the Act of August 24, 1935, 49 Stat. 793 (40 USC 270a-270e).
2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
3. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the space (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

   (b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capability.
4. Corporations executing the bond shall affix their corporate seals. Individuals shall execute the bond opposite the word "Corporate Seal;" and shall affix an adhesive seal if executed in Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.
5. Type the name and title of each person signing this bond in the space provided.

8. CORPORATE SURETY(IES) *(Continued)*

Surety B	a. Name & Address		b. State of Inc.	c. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
Surety C	a. Name & Address		b. State of Inc.	c. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
Surety D	a. Name & Address		b. State of Inc.	c. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
Surety E	a. Name & Address		b. State of Inc.	c. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		
Surety F	a. Name & Address		b. State of Inc.	c. Liability Limit	Corporate Seal
	d. Signatures	(1)	(2)		
	e. Name(s) & Title(s) *(Typed)*	(1)	(2)		

Instructions

1. This form is authorized for use when a bid guaranty is required.
2. Insert the full legal name and business address of the Principal in the space designated "Principal" on the face of the form. An authorized person shall sign the bond. Any person signing in a representative capacity (e.g., an attorney-in-fact) must furnish evidence of authority if that representative is not a member of the firm, partnership, or joint venture, or an officer of the corporation involved.
3. The bond may express penal sum as a percentage of the bid price, in these cases, the bond may state a maximum dollar limitation (e.g., 20% of the bid price but the amount not to exceed ________ dollars).
4. (a) Corporations executing the bond as sureties must appear on the Department of the Treasury's list of approved sureties and must act within the limitation listed therein. Where more than one corporate surety is involved, their names and addresses shall appear in the space (Surety A, Surety B, etc.) headed "CORPORATE SURETY(IES)." In the space designated "SURETY(IES)" on the face of the form, insert only the letter identification of the sureties.

   (b) Where individual sureties are involved, a completed Affidavit of Individual Surety (Standard Form 28), for each individual surety, shall accompany the bond. The Government may require the surety to furnish additional substantiating information concerning its financial capability.
5. Corporations executing the bond shall affix their corporate seals, individuals shall execute the bond opposite the word "Corporate Seal;" *and shall affix an adhesive seal if executed in* Maine, New Hampshire, or any other jurisdiction requiring adhesive seals.
6. Type the name and title of each person signing this bond in the space provided.
7. In its application to negotiated contracts, the terms "bid" and "bidder" shall include "proposal" and "offeror."

Appendix B

Operations Plan

THERMAL TREATMENT OPERATIONS PLAN
STOCKPILES #1, #2 & #4
FORMER FAA QUARTERS AREA - TANANA, ALASKA

Prepared For:

RIDGE CONTRACTING
P.O. BOX 240121
ANCHORAGE, AK 99524

Prepared By:

RA / MET, JV
201 EAST 54TH AVE., SUITE 205
ANCHORAGE, AK 99518

JULY 5, 2006

TABLE OF CONTENTS

Section — ***Page***

ATTACHMENTS

1.0 PLAN PURPOSE

This plan describes the operational procedures that will be undertaken for compliant and safe remediation of 1,240 cubic yards (cy) of petroleum contaminated soil located at the Former Federal Aviation Administration Quarters Area and Flight Service Station, in Tanana, Alaska. The plan consists of a project summary, a list of project personnel, the M1 Thermal Desorption Treatment process, and a work description/operational details as they relate to the Tanana project/work plan.

2.0 PROJECT SUMMARY

The Federal Aviation Administration, Alaska District, (FAA) has tasked Ridge Contracting, Inc. (RCI) with remediation of petroleum contaminated soil (PCS) stockpiled in Tanana, Alaska. The soils are located in three (3) stockpiles designated as Stockpiles #1, #2 & #4 within the FAA Former Quarters Area (FQA). The soils originated from fuel storage tank and pipeline decommissioning activities and surface diesel stained areas at the Flight Service Station (FSS) and FQA.

The general objectives of the associated operations are to safely, and in accordance with FAA, Alaska Department of Environmental Conservation (ADEC) and all other applicable State and Federal regulations, treat existing PCS-contaminated soil at Tanana, Alaska.

Contaminated soil will be remediated using the M1-12 Infra-Red Thermal Desorption Treatment technology. Soil will be treated to the extent necessary to reduce contamination to concentrations that are below ADEC Method 2, “Under 40-inch zone” for gasoline range organic compounds (GRO), diesel range organic compounds (DRO), residual range organic compounds (RRO) and Method 2, Arctic Zone, Inhalation criteria for benzene, toluene, ethylbenzene and total xylenes (BTEX).

The soil treatment subcontractor, Remedial Alternatives, LLC / Mobile Environmental Technologies JV (RA / MET), will mobilize equipment, materials and personnel to

Tanana after the work plan is approved. The RCI field team will mobilize equipment and personnel before RA / MET arrives at the site to ensure ancillary work associated with the project is completed.

Site setup will involve construction of a treatment area, construction of a clean soil staging area, assembly of five M1-12 Infra Red Thermal (IRT) boxes, and screening of oversize (greater than 2-inch) material. Oversize material will not be thermally treated and will be placed on the pad at a location designated by the FAA or may be used by the contractor if agreed upon by the FAA.

3.0 PROJECT SERVICES AND PERSONNEL

RCI will work with and support RA / MET personnel during thermal remediation equipment setup, work area construction, and soil remediation activities as required. Ridge Contracting will provide on-site safety and health management and quality control. Ridge Contracting will also implement the work plan and manage the field effort according to the approved plans. RCI will provide field screening equipment, sample management supplies, waste management, and personnel to test and manage samples in the field and off-site. RCI shall keep complete and accurate field logbooks as well as complete daily Contractor Quality Control (CQC) reports. Copies of RCI and RA-MET JV logbooks shall be included as an appendix to the post-field activities Project Summary Report. The treatment operation will operate 24 hours per day and 7 days per week.

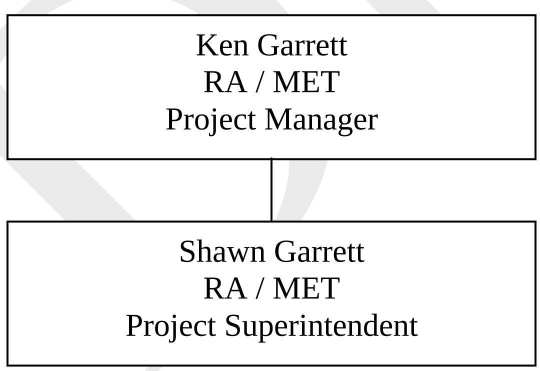
RA / MET personnel, with support from RCI personnel, will be responsible for the following activities: setting up the staging areas for the M1-12 IRT units and treated soil, shipping materials and equipment needed to treat contaminated soil, assembling and maintaining the M1-12 IRT boxes, ensuring that systems adequately treat soils to meet Data Quality Objectives, ensuring the safety of their site personnel, and operating a clean and safe site. RA / MET will also be responsible for generating power and obtaining fuel to operate the thermal system and ensuring equipment is properly maintained. RA / MET shall document daily field activities in a logbook or daily log that shall be provided to the site manager at the tail gate safety meeting each day.

The roles of key RA / MET personnel supporting this project are listed as follows:

RA / MET Project Manager- Mr. Ken Garrett will be responsible for co-ordination of all mobilization of the project, negotiating the subcontract with the RCI Contracts Manager and coordinating all setup of the IRT systems with the RA / MET Project Superintendent. He will ensure coordination between the RA / MET Project Superintendent to ensure that all site activities are performed safely, efficiently, correctly, and with the appropriate level of quality. RA / MET daily reports will be submitted to Mr. Garrett for review and approval. All variances to the work plan shall be submitted to him and he will coordinate approval with the RCI Project Manager prior to implementation of any changes.

RA / MET Project Superintendent- Mr. Jeff Plymate will be responsible for setting up the IRT treatment train, loading and unloading the IRT systems, overseeing all field activities associated with thermally treating the soils, and ensuring compliance with all applicable laws, regulations, and policies. Mr. Plymate will keep accurate burn logs associated with the thermal process and submit these reports along with Daily Reports to the RCI Site Superintendent.

The following Figure depicts the RA / M ET Organizational Chart



4.0 M1 THERMAL DESORPTION PROCESS

4.1 Process Description

The M1 technology is a thermal desorption system (it is not a combustion based technology), which removes organic contaminants from soil and wastes. Preceding soil treatment, approximately 12 cy of contaminated soil is loaded into each M1 unit via a front end loader and the lid is sealed.

The M1 utilizes infrared heating elements to heat contaminated soil. Electricity (produced from on site generator power) is applied to the infrared heating elements inside the element housings. These elements heat up to 1400-1600 degrees F. The heat level is set by the M1 operator. Heat is transferred from the infrared elements to the soil by conduction. Soil is heated to temperatures between 500 and 1600 degrees F, which lead to the evaporation of water (soil moisture) and the volatilization and decomposition of organic contaminants. As the soil temperature rises, volatile components are volatilized and non-volatile components are cracked to give way to more volatile species that are more easily driven off or which are converted to carbon dioxide by the presence of free or bound oxygen in the material.

Steam pressure, evolving from soil moisture evaporation, forces volatilized contaminants and steam into the relative low-pressure element housings. The steam and contaminants are driven into the upper and lower perforated element housings where they are routed into the center housing, which is not perforated. The steam and contaminants are forced to travel along the 1400 to 1600 degree element (center housing), ensuring conversion of organic contaminants to carbon dioxide, by cracking the most resilient of species, and water prior to being exhausted.

4.2 System Component:

4.2.1 M1-12 Infra-Red Thermal Box

Components and Specifications of the M1-12 are summarized as follows:

Airflow:

Input: None

Exhaust Flow: 50-70 Actual cubic feet per minute (ACFM)

Exhaust Temperature: 400-800°F

Soil Temperatures to a maximum of 1,600 °F

Treatment Cycle per Batch; Approximately 36 hours

Soil Volume: 12 cy

Outside Dimensions: Width = 6 feet; Length = 12 feet; Height = 5 feet

Weight: 5,500 pounds of stainless steel construction material

Power Requirements: 90kW, 480 volt, 3-phase power per box

Power Source: Either the grid or generator power

Power Controls: Each box connects to its own power control panel that distributes power to the heating elements and controls operating temperatures

Heating Elements: Each M1-12 unit utilizes 15 heating elements that are 11.5 feet long and require 6 kW each.

4.2.3 Generator

Multiquip diesel generator

DCA600SSK

Multiquip diesel generator

PERFORMANCE DATA	DCA600SSK
Standby Output KW	528 kW
Prime Output KW	480 kW
Generator RPM	1800
Frequency	60 Hz
Insulation	Class F
Sound Level dBA - 23 ft - full load	75
Amps - Single Phase 120V	1333.3A (4 wire)
Amps - Single Phase 240V	666.7A (4 wire)
Amps - Three Phase 240V	1443A
Amps - Three Phase 480V	721A
Voltage - Single Phase	120, 127, 139, 240, 254, 277 Volts - Switchable
Voltage - Three Phase	208, 220, 240, 416, 440, 480 Volts - Switchable
Number of Poles	4 - Pole
Excitation	Brushless w AVR
Armature Connection	Star with Neutral
Voltage Regulation	+/- 1%
Power Factor	0.8
Generator Design	Revolving field, self-ventilated, single bearing
POWER SOURCE	
Displacement cu in (cc)	1413 (23,150)
Bore x Stroke (mm)	170 x 170
Fuel Consumption - Full Load	33.9 GPH - 3.81 Hours
Fuel Consumption - 3/4 Load	26.7 GPH - 4.83 Hours
Fuel Consumption - 1/2 Load	17.4 GPH - 7.41 Hours
Fuel Consumption - 1/4 Load	10.6 GPH - 12.17 Hours
Engine Coolant Capacity	28.9 Gallons
Fuel Tank Capacity	129 Gallons
Battery	12V 200Ah x 2 - 24v Sys
Engine Design	4 Cycle, Water Cooled, Direct Injection, Turbocharged, Aftercooled
Engine Model	SA6D170AE-1
Engine HP / RPM	688 / 1800
Oil Capacity	31.4 Gallon
Engine Make	Komatsu
Starting System	Electric
No. Cylinders	6
DIMENSIONS	
Overall Height - in (cm)	95 (241)
Overall Length - in (cm)	220 (559)
Overall Width - in (cm)	65 (165)
Approx Net Weight - lb (kg)	19,534 (8860)
OPTIONS	
Automatic Start/Stop Control	Standard
Electronic Governor Control	Standard
Battery Charger	Option
Engine Pre-Heater	Option

The generator onsite will be serviced every 240 hours of operation. Used oil will be containerized for disposal in Fairbanks, Alaska during demobilization of the project.

4.2.4 Fuel Tankage

A 1,000 gallon, above-ground fuel holding tank will be located on site at the designated treatment area to fuel the generator powering the M1-12 units. The fuel tank will be placed in a lined and bermed enclosure with sufficient containment capacity to hold 115% of the actual fuel volume. The 1,000 gallon fuel tank will be placarded with the correct placards and signage as required. Fuel will be transported by a DOT certified fuel truck from the Tanana fuel depot to the 1,000 gallon tank and transferred into the tank on a daily basis.

5.0 WORK DESCRIPTION

5.1 Site Setup

Site setup will involve construction of a treatment area, construction of a clean soil staging area, assembly of five M1-12 Infra-Red Thermal (IRT) boxes, and screening of oversize (greater than 2-inch) material. Oversize material will not be thermally treated and will be placed on the pad at a location designated by the FAA or utilized by RCI for backfill operations upon approval by the FAA.

Five M1-12 IRT boxes will be staged in a 30 foot by 100 foot (3,000 square foot) area to receive contaminated soil. Each box holds approximately 12 cy and a total of 57 cy will be treated each batch cycle. The staging area will be located south of Stockpile #2 in an open area. The five M1-12 units will be staged in the open area closest to the stockpiled contaminated soil located in Stockpile #2 to reduce the distance required to transport the soil via front end loader. The 3,000 square foot footprint of the thermal treatment area will be dug down approximately 18 inches and a 20 milliliter HDPE liner will be placed in the depression and re-covered with the excavated soil. The liner will prevent migration of leachate from treatment operations to the pad (See the primary Work Plan for additional project details).

5.2 Pre-Processing Contaminated Soils

Pre-processing of the soils will occur by utilizing a front end loader and extracting the soil from the front end of the existing stockpile and removing the bottom liner as the stockpile is reduced. The soil may be run through the grizzly / screener unit to remove oversized debris greater than 2 inches in diameter. If found, oversized material will not be thermally treated and will be placed on the pad at a location designated by the FAA or may be used by RIDGE CONTRACTING in backfilling operations upon approval by the FAA.

Processed soil under 2 inches in diameter will be relocated into a temporary lined short term storage cell whereby it can be picked up by front end loader and loaded into the M1-12 IRT boxes.

5.3 M1-12 Soil Loading

Prior to placing soil from the screened stockpiles into the M1-12 IRT, the lid will need to be removed. The lid is removed by fitting a specialized lifting device to the front end loader and positioning the device squarely over the lid. The lifting device is fitted with wire choker slings and wide mouth lifting hooks which are then attached to the welded islets on the lid and the lid is removed.

Once the lid is off the unit, the operator of the 966 front end loader will exchange the forks on the unit for the 4 cy bucket. The operator will then fill the bucket from outside the cell to approximately 1/2 of the capacity of the bucket and shake off any excess material in the cell. The loader will then proceed to the unit whereby the ground man will guide the operator over the centered part of the IRT box. The loader operator will then dump the soil into the IRT box and return to the stockpile for the next bucket.

The boxes will be loaded to within 6 inches of the top of the box and the lid replaced and clamped down.

5.4 Soil Treatment

The M1 technology is a thermal desorption system (it is not a combustion based technology), which removes organic contaminants from soil and wastes. The M1 is an airtight unit, with the exception of the dedicated exhaust port. Preceding soil treatment, approximately 12 cy of contaminated soil is loaded into each M1 unit via a front end loader and the lid is sealed.

The M1-12 is then turned on and the temperatures within the unit recorded on a designated schedule and recorded into the Daily Burn Log.

5.5 Soil Unloading

Once the soil in the M1-12 IRT boxes reach temperatures between 350 – 400°F the impacted soils will be considered ready for analytical testing. The soil will be removed from the M1-12 IRT boxes by attaching the forks to the front end loader and attaching the specialized lifting devise from the boxes to the forks. The loader operator will then position the lifting devise directly over the IRT box and attach the wide mouth hooks located at the end of the ¾ inch x 2 foot long wire chokers through the lifting eyelets welded to the box. The box will be lifted vertically by the loader. Once the soil exits the bottom of the box, the loader will back up approximately 10 feet and set the box down. The burned soil will then be transferred to the clean soil stockpile area, and the boxes will be moved back over to the burn area and reloaded for the next burn cycle.

5.6 Dust Control & Rehydrating

Upon completion unloading the soil, the treated soil will be allowed to cool for approximately 2 to 4 hours in the clean stockpile area. Once cooled sufficiently, the soil will be misted with water to reduce fugitive dusts in and around the work area. Due to the extreme hydrophobic nature of the soil, water will be applied to the soil using standard yard type sprinklers attached to a 24 hour timing device. Due to the unknown nature of the specific soils, the 24 hour timer will be re-adjusted periodically to ensure the exact moisture content is applied without creating excess runoff.

The soils will then be turned periodically with the bucket on the front end loader to insure complete contact with the water / soil.

5.7 Thermal Treatment Effectiveness Evaluation and Monitoring

The adequacy of the thermal treatment and soil handling process will be evaluated with field screening performed by the on-site ADEC qualified field sampler using a photoionization detector (PID) and also by off-site testing that will be performed by TestAmerica laboratory located in Anchorage, Alaska. The Sampling and Analysis Plan is provided in the primary Work Plan for this project.

6.0 ENVIRONMENTAL PROTECTION

6.1 Equipment Decontamination and Cleaning

Equipment that enters the contaminated stockpile area will be swept clean of soil and debris before it leaves the soil cell to ensure that the surrounding non-impacted pad area is not contaminated. Soil adhering to the stockpile liner will be swept off and thermally treated. Liner will be disposed as a non-hazardous material associated with fuel contaminated soil by cutting into sufficient size to fit into supersacks for disposal at the Denali Borough landfill, the approved landfill for this project. No waste water shall be generated from decontamination of the equipment.

6.2 Waste Management

Wastes generated from the soil treatment process and stockpile decommissioning will be handled in the following manner:

6.2.1 Stockpile Runoff Water

Due to the time of the season, it is assumed that run-off water located in and around the stockpiled cells will have been naturally evaporated. If water does exist around the cells, the water will be collected and dumped back onto the existing contaminated soils and allowed to evaporate during the burning process.

6.2.2 Dust Control

Dust generated from the soils after the burning process will be placed in a re-hydration / cooling cell located at the clean soil staging areas. The re-hydration / cooling area will be fitted with a standard garden type sprinkler / mister system connected to a 24 hour timer and water regulated over the soils to omit fugitive dust on the site.

6.2.3 Air Emissions

As the M1-12 does not require air permitting and falls in the category of under 5 tons per hour, air emissions are not an issue at the site.

6.2.4 Trash / Oversized Debris

Oversized rock debris (greater than 2 inches in diameter) will be used onsite as fill material or as specified in the Work Plan. Wood and paper debris will be collected at the end of the project and disposed of at the approved landfill.

6.2.5 Base Liner

The base liner below Stockpiles #1, #2 & #4 will be hand swept inside the bermed area and the swept particulate placed into the M1-12 for burning. The liner will then be cut into pieces of appropriate size to allow the liner to be placed inside a supersack for transport off-site for disposal at the approved landfill.

6.2.6 Used Oil and Filters

Used oil and filters generated from generator servicing during the project will be containerized in environmentally safe transport containers and transported to the approved landfill for disposal at the end of the project.

6.2.7 Absorbent Pads

All polypropylene pads used for spill prevention during the project will be collected and placed into a lidded drum for disposal at the approved landfill at the end of the project. The drum will be labeled and manifested accordingly for disposal.

6.2.8 Impacted Pad Soils

Any soil outside the bermed stockpiles that is accidentally impacted through the use of heavy equipment or fueling activities will be added to the stockpile and burned in the M1-12 IRT boxes.

6.3 Spill Prevention and Response

6.3.1 Leased Equipment

Upon arrival at the Tanana site, all leased equipment will be inspected by the Project Superintendent for leaks. If leaks are noted in the machinery the leak will be repaired prior to use on the pad. All front end loaders, excavators, pickup trucks and any other rolling stock will be required to have 24 inch by 24 inch polypropylene pads located on the equipment for emergency response. In addition, when equipment is not in use outside the stockpile area, “duck ponds” will be placed beneath the equipment to insure against any dripping of lubricants.

6.3.2 Fueling Activities

During fueling activities associated with re-fueling the 1,000 gallon stationary tank, two people will always be present during the activity. One person will be stationed next to the fueling valve located on the truck and one person will be located at the nozzle end feeding the tank. The tank will be located inside a lined and bermed area of sufficient size to contain 115% of the tank capacity. Polypropylene pads will be located at the tank and also on the truck. Should an incident occur whereby a leak is detected, all fueling activities will immediately cease, valves will be secured at the tank and the truck and absorbent pads placed in the area that is impacted. Once the leak has been repaired and the absorbent collected, if any impacted soils are present they will be taken up and processed through the M1-12 IRT system. If the spill exceeds 1 gallon in size, the spill will be reported to the proper authorities.

ATTACHMENT A

Health and Safety Plan

HEALTH AND SAFETY PLAN
FAA FORMER QUARTERS AREA
AND
FLIGHT SERVICE STATION
TANANA, ALASKA

Prepared For:

RIDGE CONTRACTING
P.O. BOX 240121
ANCHORAGE, AK 99524

Prepared By:

Remedial Alternatives, LLC /
Mobile Environmental Technologies Joint Venture
201 EAST 54TH AVE., SUITE 205
ANCHORAGE, AK 99518

July 6, 2006

TABLE OF CONTENTS

Section ***Page***

TABLE OF CONTENTS

Section ***Page***

LIST OF APPENDICES

1.0 BACKGROUND

1.1 Introduction

This Health and Safety Plan presents the health and safety procedures that are intended to guide onsite soil remediation services to be completed by Remedial Alternatives, LLC / Mobile Environmental Technologies Joint Venture (RA / MET) at the former FAA Former Quarters Area and Flight Service Station located in Tanana, Alaska.

The Health and Safety Plan will be implemented by the RA/MET Project Manager and Health and Safety Officer. Compliance with this plan is required of all RA/MET personnel, subcontractors, and associated third parties at the site. A copy of the Health and Safety Plan will be maintained on-site during work activities. All field personnel will review the Health and Safety Plan prior to site work and will sign an acknowledgement form indicating that they have reviewed the plan. Additionally, RA/MET personnel will be required to review and adhere to the Site Safety and Health Plan prepared by Ridge Contracting . If conflicts arise between the two plans, the most stringent requirements will be followed.

The content of this Health and Safety Plan may be revised and/or amended should additional information become available concerning the hazards present at the site and/or should significant changes occur in the scope of work, operational procedures, site hazards, and hazard control measures. The Health and Safety Plan may be modified by the Health and Safety Officer upon review and approval of the Project Manager, Industrial Hygienist and other applicable responsible authority. All field personnel will be informed of any changes to the Health and Safety Plan.

This Health and Safety Plan has been prepared for the use of RA/MET and its personnel for the specific activities to be implemented at the site and may be used as a guidance document by properly trained and experienced RA/MET subcontractors. RA, however, does not guarantee the health or safety of any person entering the site.

Due to the nature of the hazards present at the site and construction activities to be conducted, it is not possible to determine, evaluate, and provide protection for all possible hazards that may be encountered. Strict adherence to the procedures contained in this Health and Safety Plan will reduce, but will not eliminate, the potential for injury at the site. The health and safety guidelines contained in this plan should not be used on another site without prior evaluation by trained health and safety specialists.

1.2 Site Location and History

The Tanana FAA Station is an active air navigation station owned by the State of Alaska and operated by FAA. The station consists of facilities and sites at the facility and several outlying. The Tanana FAA Station is in interior Alaska, approximately 2 miles west of the confluence of the Tanana and Yukon rivers and 0.25 mile west of Tanana, a city with a population of 299. Tanana is approximately 135 miles west of Fairbanks. The Tanana FAA Station lies at 65°10'00" north latitude and 152°4'00" west longitude, within Township 4 North, Range 22 West, Section 13, and Township 4 North, Range 23 West, Sections 14 and 15, Fairbanks Meridian (U.S. Geological Survey Tanana A-5 Quadrangle).

FAA involvement at Tanana began in 1941. At one time, the FAA Tanana Station consisted of 1,650 acres. Currently, FAA owns a total of 40 of the original 1,650 acres, No permanent FAA personnel are stationed at Tanana. The station is maintained by FAA personnel based in Fairbanks.

The Tanana FAA Station includes four FAA-owned facilities, one FAA-owned site, and eight other facilities and sites. The layout of the Tanana FAA Station is shown in Figure 1-2 (Ecology and Environment, Inc. [E&E],1992).

1.3 Site Topography and Geology

The area surrounding the city is gently rolling terrain characteristic of the Yukon River Valley. Peaks of the Ray Mountains rise to the north of Tanana. Schist, sandstone, siltstone, claystone, and shale underlie the village at depths of 35 to 140 feet, but most regularly at depths of 50 to 60 feet.

Soils in the vicinity of the community consist of 5 to 15 feet of silt, sandy silt, and silty sand overlying gravel sediments, which exist from depths of 35 to 70 feet.

Tanana lies at the northernmost extent of the discontinuous permafrost zone. The town is generally underlain by permafrost 35 to 65 feet thick, but permafrost is likely to be absent in areas adjacent to the Yukon River. Seasonal frost has been reported to depths of 20 feet.

The main community area is generally elevated above the floodplain of the Yukon River, and soils are well drained. There is a wetland area north of town.

In general, the groundwater flow direction in the vicinity of the Tanana FAA Station is expected to mirror the surface topography. However, groundwater recharge and flow paths are influenced by the presence of discontinuous silt and clay layers that act as nearly impermeable barriers. Local silt and clay layers may create locally perched or confined aquifers in the sediments. Near the Tanana FAA Station, groundwater occurs within unconsolidated deposits of depths ranging from 15 to 45 feet below ground surface (bgs).

Water for the community is provided by two wells, which are located approximately 200 feet apart and less than 25 feet from the Yukon River. Following chlorination, fluoride treatment, and softening to reduce iron content, water is stored in a 5,000-gallon storage tank at the city's washeteria building. The Head Start School, city offices, and fire station also receive piped water. The Tanana City School, Health Center, Elderly Center, IRA Council Building and teacher housing all receive water from a 97-foot well that was drilled in 1976 on the former Tanana Hospital compound. A water project conducted in 1970 attempted to drill 55 individual wells for Tanana residents, but most wells were never completed or used because of permafrost or poor water quality (CH2-OH, 1999).

FAA formerly owned four wells at the Tanana station: two at the FSS and two at the Water Treatment and Pumphouse Building (Building 602). Because of the poor water quality, one of the wells - t the FSS-was abandoned and decommissioned by CH2-OH in 1997, and water from the other is used only for toilets in the FSS Building. Both wells at Building 602 were decommissioned by CH2-OH in 1997. Records indicate that the wells at Building 602 were 38 feet and 58 feet deep, and the remaining active FSS well is 47 feet deep. Both withdrew water from sand and gravel layers. The second Building 602 well and the inactive FSS well withdrew groundwater from unknown depths (E&E, 1992).

Surface water in the Tanana area flows toward one of three rivers: Tanana, Yukon, or Tozitna. The Tanana River is usually silty and contains numerous sandbars and islands in its final 15 miles before reaching the Yukon River, approximately 2 miles east of the City of Tanana. The Tozitna River is nearly free of suspended sediment. It drains a valley that lies along the south face of the Ray Mountains, 45 miles north of Tanana. The Tozitna River joins the Yukon River 10 miles below the confluence of the Yukon and Tanana rivers (CH2-OH, 1999). The Tanana FAA station is along the Yukon River and may be subject to flooding. This proximity suggests that surface-water runoff from the station may enter the river. Approximate surface drainage patterns are shown in the site plan figures (E&E, 1992).

Tanana lies within a region of continental climate, with extreme temperatures in both winter and summer. The coldest months are December through February, when the average daily maximum temperatures range from -3°F to 4°F and the average daily minimums are -14°F.

1.4 Scope Of Work

The scope of work to be conducted at the Former Quarters Area includes mobilization, stockpile screening, & debris removal, soil remediation by infra-red thermal oxidation, site restoration, and demobilization.

1.4.1 Mobilization and Demobilization

Equipment required to remediate soils in Tanana require mobilization via barge and cargo aircraft from Anchorage and Nenana, Alaska. Following arrival in Tanana RA/MET will be responsible for unloading the barge using a loader-forklift currently present in Tanana. Equipment will be removed from the barge and placed in a staging area for subsequent transport to the thermal treatment work area near the location of Stockpile #2. The assembled M1-12 infra-red thermal treatment units weigh 5,500 pounds each and the 500 kilo-watt generator weighs 19,000 lbs. The M1-12 boxes will be loaded onto a flat bed truck and transported to the staging area. The generator will be towed to the site as it is trailer mounted. The process will be reversed during demobilization.

1.4.2 Stockpile Screening

Operation of heavy equipment (e.g., excavators, loaders, backhoes, etc.) and site personnel for excavation, screening, and site restoration.

Stockpile screening will be accomplished by entering Stockpile #2 and removing the soil from the South end of the stockpile and depositing it back in a Westerly direction to clear sufficient space to setup the grizzly screening unit. Screening will then take place by taking soil from the stockpile by front end loader and depositing on the screen whereby the grater than 2-inch material and any other debris will exit off the grizzly. No personnel will be allowed around the screening operation other than the operator, unless first cleared with the Project Manager and Site Health and Safety Officer. Once sufficient debris is deposited at the grizzly, the screening will stop and the debris removed, separated and stockpiled at a designated location.

1.4.3 M1-12 Operations Infra Red Thermal

M1 Setup

A load-tested lifting harness will be utilized for moving the M1 units around the project site. The lifting eye locations for moving the M1 (while empty) are located in the center of the M1. These two lifting eyes are vertical – not horizontal like the lifting eyes on the lid. The M1-12 weighs approximately 5,500 lbs each. It is important to verify that the heavy equipment utilized on-site is rated to lift these units.

As part of the M1 setup, the location of the M1 Power Control Panel is critical. Each M1 has its own control panel. This panel needs to be placed within 10 feet of the M1's plug end.

Prior to plugging in the M1, the RA/MET JV Thermal Desorption Unit Project Manager (PM) should unlock and check inside the M1 Maintenance Access Door to verify that the element terminal connections are tight and separated.

Once it has been verified that the terminal connections are tight, the PM should close and re-lock the M1 Maintenance Access Door. When the door is locked and the M1 Power Control Panel's main switch is turned to the "off" position, the M1 Power Control Panel can be connected to the M1. This connection consists of 3 red watertight 60 amp plugs and 2 yellow thermocouple connectors.

It does not matter which order the red plugs are connected. Any of the red male connections can be plugged into any of the red female connections and any of the yellow male thermocouple connections can be plugged into any of the yellow female thermocouple connections

M1 Loading

Prior to loading the M1 with soil, check to make sure that there is no damage to the inside of the M1. Check to make sure that the element housings are in their individual positions with each end secured.

In order to minimize the amount of "hand shoveling", cautiously load the M1 with the excavator or loader. A good loading strategy is to make special effort to fill the center of the M1 last. It is easy to fill the center of the M1 first but then difficult to hand shovel soil to the sides and ends. Avoid dropping soil into the M1 from heights greater than 2 feet from the top of the unit. The fill level for the M1 is approximately 8 inches from the top. While filling the M1, make sure to fill any voids that larger debris might create in the soil. Sort out and remove any wood debris and visqueen. Site personnel will not enter the M1-12 units during inspection, maintenance, or loading operations

Startup

Once the M1 is loaded with soil, clean off the top edges of the M1 where the lid will be placed. Install two of the lid bolts (without the washers) at one end of the M1 to use as guides for placing the lid. Place the lid and install the remaining bolts. Tighten the bolts until the lid begins to squeeze the fiberglass rope gasket and a seal is formed between the lid and the top of the M1.

First, check to confirm that the door on the M1 unit is properly closed and locked. Next, turn the main power disconnect switch on the M1 Power Control Panel to the "on" position. Turn the control selector switch to "setup" and verify that the series 93 Temperature Controller is showing both the current element temperature and the setpoint temperature. The element temperature displayed should be close to the outside air temperature. For example, if the weather outside is around 45°F., the element temperature should show around 45°F. If the M1 has recently been operated, the element temperature could be higher because it takes time for the elements to cool once the M1 has been emptied of soil.

If both LEDs are displayed, the control selector switch can be moved to the "on" position. This energizes the heating elements and begins the soil treatment cycle. During the treatment cycle, it is normal to hear what sounds like thumping inside the M1. This is the sound of the heating elements and their housings expanding.

Soil Treatment

Once the control selector is switched to the "on" position, electricity is applied to the infrared heating elements inside the element housings. These elements heat up to 1400 to 1600°F. As the soil temperature rises (via conduction), hydrocarbons and water volatilize and create high pressure. This pressure forces the steam and volatilized hydrocarbons into the low-pressure element housings. The upper and lower element housings are perforated with the center being solid. The steam and hydrocarbons are driven by steam pressure into the upper and lower element housings where they are routed into the center housing, which is not perforated. The steam and hydrocarbons are forced to travel along the 1400 to 1600 degree element (center housing) where the vapors are destroyed prior to exhaust.

M1 Power Control Panel Operation

The main function of the M1 Power Control Panel is to monitor and control the power that is delivered to the heating elements. This panel utilizes 3 SCR's (Silicon Controlled Rectifiers) that operate on a variable time base

SCR's are a solid-state contactor that can turn the power on and off in as quick as three AC wave cycles (less than 0.1 seconds). This type of control allows the M1 Power Control Panel to maintain very accurate heating element temperatures.

A Series 93 Temperature Controller controls the output of all three SCR's. This controller provides input to the SCR's which cause them to cycle on and off. It also controls how fast or slow the SCR's cycle.

Each M1 utilizes 15 heating elements. Two of these elements are fitted with thermocouple temperature sensors. One of the two provides temperature data to the Series 93 Temperature Controller. The Series 93 uses this thermocouple temperature as a guide to control the other 14 elements. The second thermocouple temperature is wired to a high limit controller (Series 146) that will shut off power to the SCR's if the thermocouple temperature exceeds the temperature setpoint of the high limit controller. For example, if the Series 93 is set at 1200 °F. and the high limit controller is set to 1350 °F – and for some reason the element temperature climbs up to 1350°F, the high limit controller will shut the power off to the heating elements. Once this happens, the high limit LED (on the M1 power control panel) will appear. In order to re-energize the elements, the "limit reset" button will have to be pushed.

The Series 93 can be adjusted during a soil treatment cycle. At any time during treatment, the setpoint temperature of the Series 93 can be raised (or lowered) to a maximum of 1450°F.

Performance Monitoring
During a treatment cycle, it is necessary to periodically monitor the following:

- Output of the M1 power control panel
- Soil temperatures
- M1 exterior structure

<u>1. Output of the M1 power control panel</u>
If possible, the output temperature of the Series 93 should be observed at least once per hour during operation. The need for hourly observation is to ensure that the controller has not tripped the high limit controller and shut down power to the heating elements.

<u>2. Soil temperatures</u>
Soil temperatures should be monitored periodically to determine the progress of soil treatment. This is done by inserting thermocouple probes through the exterior of the M1 and into the soil. These probes are typically placed between heating elements and between layers. A Fluke Multimeter (fitted with a thermocouple adapter) is used for reading the thermocouple temperatures. ***CAUTION:*** When the thermocouple probe is removed from the soil – it will be hot. At the end of a soil treatment cycle, soil temperatures between 300 and 400 F would typically indicate that the soil has been treated to desired levels.

<u>3. M1 exterior structure</u>
Each time soil temperatures are checked, the entire exterior structure of the M1 should be visually inspected for problems (e.g. a loose lid bolt is allowing air to leak out of the lid).

Shutdown
When soil temperatures indicate that a batch is completed (typically, soil temperatures between 250 and 350), the M1 Power Control Panel's control selector switch can be switched to the "off" position. The main power disconnect on the M1 power control panel should also be switched to the "off" position. Disconnect the three red plugs and the two yellow thermocouple plugs. Once these steps have been taken, the M1 will be disconnected from the M1 Power Control Panel.

Unloading the M1
Once M1 has been completely disconnected from the M1 power control panel, the M1 should be allowed to cool for a minimum of 90 minutes. This 90-minute period allows the heating elements and the element housings to cool and regain their rigidity. Take this time to move the M1 power control panel and power cords at least 15 feet from the M1 and out of the potential path of any moving equipment or other hazards. This will keep the hot soil and dust from damaging the panel and/or power cords.

In order to unload the M1, the lid must be unbolted and removed. ***CAUTION****:* When unbolting and removing the lid, be sure to wear gloves to protect hands from hot air and/or steam inside the M1. Face shields and thermal protective gloves will be used by all personnel while working around the M1-12 IRT boxes.

The M1 is designed without a bottom. This allows soil to flow out as the M1 is lifted. Lifting eyes designed specifically for unloading the M1 are located in each of the four inside corners. During unloading, only two lifting eyes are used at a time. First, one end of the M1 is lifted a few inches off the ground and then the lifting harness is moved to the opposite end and used to lift this end a few inches off the ground. Once this has been accomplished, a load rated lifting device is placed on the forks of the front end loader and positioned over the box. The lifting rack is then attached to the welded lifting eyes on all 4 corners of the box and the box lifted off the soils.

CAUTION: Any equipment that is exposed to the soil or to the inside of the M1 will get hot. This includes but is not limited to heavy equipment buckets, lifting harnesses or chains and hand shovels

CAUTION: The soil that is emptied from the M1 is hot. Do not touch the soil or place anything on the soil until it has had adequate time to cool. After the soil has been allowed to cool for approximately one (1) hour, it will be removed via bucket on the front end loader to the soil re-hydration cooling area and the re-hydration system will be activated to finish the cooling / re-hydration process. A more detailed description is provided in the Thermal Treatment Operations Plan. Approximately 12 hours is required for normal cooling if hydration is not being applied.

CAUTION: Take care to empty the M1 slowly. This will help reduce the amount of dust that is created by the flow of soil.

CAUTION: Cooling of the soils may create a flying debris hazard for personnel working nearby. Rapidly cooled rocks may fracture causing a rock/debris flying hazards within 15 feet of the treated soil stockpile being hydrated. Personnel are not allowed to work within this area until the soils have cooled sufficiently.

Maintenance
There are a few components of the M1-12 that require routine (monthly) maintenance. These components include:

- Lid seal gaskets
- M1's exterior

Lid seal gaskets
If the M1-12 is being used continuously, it is recommended that the lid seal gaskets be replaced. The need to replace these gaskets will be indicated by their ability to seal the lid and contain steam during operation. If the gaskets are not damaged, monthly replacement may not be necessary.

M1's exterior
Each month, when the M1 is not in use, the M1's exterior should be washed with soap and water. Any areas of rust or corrosion should be cleaned and repainted.

Inspections
After each treatment cycle, the following should be visually inspected for any defects:

- Lid Clamps
- Lid Gaskets
- Heating element housings
- Heating element terminal connections

In addition, the interior and exterior of the M1-12 should be visually inspected for any unusual wear and tear or metal fatigue. The interior end exterior of the Power Control Panel should also be visually inspected for any possible component failures. Prior to inspection

1.4.4 Support Operations

- Field project operations supervision/administration
- General construction work
- General site cleanup work

2.0 KEY PERSONNEL AND RESPONSIBILITIES

Project personnel and key RA/MET personnel and their health and safety responsibilities are indicated in this section of the health and safety plan.

2.1 Project Personnel Listing

A listing of project personnel is provided in ***Appendix A***.

2.2 RA/MET Personnel and Health and Safety Responsibilities

RA/MET Project Manager .... Ken Garrett
Project Superintendent.......... Shawn Garrett
Health and Safety Officer .... Shawn Garrett

2.2.1 Project Manager

The Project Manager has primary responsibility for development, implementation, and enforcement of the Health and Safety Plan. Certain health and safety activities are delegated by the Project Manager to the Health and Safety Officer for implementation.

Project Manager responsibilities include:

- Ensure that personnel are instructed regarding:
  - Provisions of the Health and Safety Plan
  - Site hazards and control measures
  - Safe work practices
  - Emergency procedures
- Ensure that the HASP properly identifies the project hazards, risks, and mitigation measures with the defined scope of work.
- Ensure that work operations adhere to established health and safety procedures
- Enforce implementation of health and safety requirement

2.2.2 Health and Safety Officer

The Health and Safety Officer is responsible for assisting the Project Manager with implementation of the Health and Safety Plan. The Health and Safety Officer has the authority to suspend work any time it is determined that the provisions of the Health and Safety Plan are not adequate to provide a safe working environment for workers. The Health and Safety Officer will consult with the Ridge Contracting Site Health and Safety Officer should health and safety considerations not addressed in the Health and Safety Plan arise.

RA/METHealth and Safety Officer responsibilities include:

- Maintain copies of the Health and Safety Plan on site during all field activities

- Review contents of the Health and Safety Plan
- Implement provisions of the Health and Safety Plan
- Conduct daily safety meetings
- Maintain safety equipment and supplies
- Perform air quality monitoring as required
- Advise regarding decontamination and emergency response operations
- Set up work zone markers and signs, as applicable
- Perform safety inspections
- Report accidents, incidents, and safety rule infractions to the Project Manager
- Maintain health and safety documentation.

2.2.3 RA/MET Project Superintendent

The RA/MET Project Superintendent is responsible for the following:

- Understanding and complying with the Health and Safety Plan and any additional health and safety instructions
- Observing the "**Buddy System**" during work activities
- Promptly reporting all injuries or illnesses to the Project Manager and/or Health and Safety Officer and the RIDGE CONTRACTING Site Superintendent or Site Safety and Health Officer
- Immediately reporting any violations of the Health and Safety Plan to the Project Manager and/or Health and Safety Officer, and the RIDGE CONTRACTING Site Superintendent or Site Safety and Health Officer

3.0 JOB HAZARD ANALYSIS

3.1 Physical Hazards

The primary physical hazards that may potentially be encountered during site work include:

- Fire/Explosion
- Excavation Safety
- Heavy Equipment Operation
- M1 unit(s) Handling and Operation
- Rigging and Lifting
- Hot Work
- Vehicle and Equipment Traffic
- Electrical Equipment
- Noise Exposure
- Miscellaneous Physical Hazards.

3.1.1 Fire/Explosion

- Procedures relating to fire/explosion hazards and safety controls for site operations include:
  - No smoking in areas where flammable/combustible materials are present
  - A combustible gas indicator will be used to determine if combustible vapors or gases exceed 10 percent of the LEL during work activities
  - Static electricity generating equipment will be bonded/grounded whenever transferring flammable/combustible liquids or when working in areas where flammable/combustible materials are present
  - Portable multi-purpose fire extinguishers will be maintained on site at all times, kept fully charged, inspected weekly, and serviced annually
  - Portable multi-purpose fire extinguishers will be placed within 75 feet of active work areas where flammable/combustible materials are present
  - No hot work without approval by the Project Manager and completion of a "Hot Work Permit"

3.1.2 Excavation Safety

- Excavation activities will require several precautions to be taken prior to any excavation activity and include the following (as applicable):
  - Conduct and/or review utility clearance information and determine the location of overhead and underground utilities prior to excavation
  - Contact "Call Before You Dig" within 48 hours before excavation, and re-notify as required
  - Delineate areas to be excavated with white paint or other suitable markings
  - Ensure that no construction equipment or personnel come closer than 10 feet to an energized overhead high voltage line (Note: Overhead high voltage power lines >50,000 volts require additional distance)

- Barricade, tape off or secure open trenches during non-work periods
- Ensure compliance with all applicable OSHA requirements for installation of trenches and/or excavations deeper than 5 feet, in which a person is required to descend.

3.1.3 Heavy Equipment Operation

➢ Safety procedures regarding the use of heavy equipment include the following:

- Only experienced personnel will operate excavating equipment on site
- All equipment will have seat belts, good functioning brakes, and operating backup alarms and horns
- Equipment should be checked at the beginning of each shift to ensure that the following systems/parts are in good working order:
  - ☐ Service, emergency and parking brakes
  - ☐ Tires/tracks
  - ☐ Horn
  - ☐ Steering mechanism
  - ☐ Coupling devices
  - ☐ Seat belts
  - ☐ Operating controls
  - ☐ Safety devices
  - ☐ Backup alarms.
- Excavation work areas will be properly marked and guarded with barriers and/or caution tape to prevent unauthorized personnel entry and to prevent personnel from falling into an open hole
- Workers will be cautioned to look carefully where they walk to avoid moving equipment and to maintain eye contact with heavy equipment operators
- Workers will be required to wear reflective/high visibility outer clothing when working around heavy equipment
- No personnel will be allowed within the swing radius of heavy equipment
- Concurrent operations will be curtailed to prevent workers from being placed in dangerous proximity to moving heavy equipment
- Roll-over protection will be required on moving equipment such as backhoes when working on sloping surfaces which present increased risks of rollover
- Equipment being operated in reverse shall have a reverse signal alarm, or the horn will be sounded while backing up
- Whenever equipment is parked, the parking brake shall be set, and when on inclines, wheels will be chocked
- Parts of machinery such as hoe buckets or truck beds held aloft shall be blocked or cribbed before employees are allowed to work under or between them

3.1.4 M1 Unit(s) Handling and Operation

- The following requirements must be followed to ensure health and safety standards are met when working with or around the M1 units:

  - Only qualified personnel are permitted to direct the handling of, handle, inspect, and operate M1 units.

  - Wear hard hats when lifting M1 units, lifting/removing M1 lids, and during soil loading/unloading (hard hats should be worn on the remediation site at all times).

  - When lifting M1 units, use only Load Certified Lifting Harnesses. Verify that the lifting equipment site is rated to lift these units (M1-12 units weigh approximately 5,500 lbs.).

  - As part of the M1 setup, the location of the M1 Power Control Panel must be placed within 10 feet of the M1 plug end.

  - Prior to plugging in the M1 unit, the MET site supervisor must unlock and check inside the M1 Maintenance Access Door to verify that the element terminal connections are tight and separated. Once it has been verified that the terminal connections are tight, the MET site supervisor must close and relock the M1 Maintenance Access Door. When the door is locked and the M1 Power Control Panel's power switch is turned to the "off" position, the M1 power control panel can be connected to the M1.

  - Once the M1 is loaded with soil, clean off the top edges of the M1 where the lid will be placed. Install two of the lid bolts (without the washers) at one end of the M1 to use as guides for setting the lid. Place the lid and install the remaining bolts. Tighten the bolts until the lid begins to squeeze the fiberglass rope gasket and a proper seal is formed between the lid and the top of the M1.

  - The M1 must be operated only in full compliance with all applicable provisions of 29 CFR part 1910, and analogous or relevant and or applicable state laws.

  - **Inclement weather operation:** The M1 units are designed to operate under most weather conditions, however, they should not be energized during any weather conditions that could cause damage to the M1 because of falling or blowing debris. In addition they should not be energized during rain events that might cause flooding or high water conditions.

  - **Lockout/Tagout:** Follow all applicable lockout/tagout procedures of 29 CFR 1910. 147 and analogous state laws

  - **Maintenance Door Access:** Do not unlock or open the M1's maintenance access door without following the lockout/tagout procedure for maintenance/repairs.

  - **Operating Temperature:** Do not operate the Series 93 output setpoint over 1450 F.

  - **High Temperatures:** Due to the temperatures the M1-12 system operates at, at no time will any personnel be allowed to enter the M1-12 box.

  - **Emission:** Do not touch the M1 exhaust stack or the exhaust steam/air. The exhaust steam/air is very hot. Avoid direct breathing of emissions from exhaust stack.

  - After each treatment cycle, the following must be visually inspected by qualified MET personnel for any defects:

    - ☐ Lid Clamps

- ☐ Lid Gaskets
- ☐ Condenser's water supply hoses
- ☐ Heating element housings
- ☐ Heating element terminal connections

In addition, the interior and exterior of the M1-12 must be visually inspected for any unusual wear and tear or metal fatigue. The interior and exterior of the Power Control Panel must also be visually inspected for any possible component failures. Prior to inspection of the interior of the Power Control Panel, be sure to follow proper lock-out/tag-out procedures.

3.1.5 Rigging

- Do not use the chain on hoists or come-along as a sling.
- Inspect rigging equipment each time you use it. If you find any defect in the equipment, report it to your supervisor.
- When rigging equipment is not in use, store it in an area where it will be protected from welding sparks, excessive moisture and excessive heat.
- Keep your hands away from pinch points.
- When attaching chain hoists or come-along to any structure, make sure they will support the load you are lifting.
- Use softeners (space blocks) to pad sharp edged corners of materials to be lifted to protect slings, chokers, etc.
- Use safety latches on chain hoists and come-along that are so equipped as an alternative, mouse the hooks.
- Either screw eyebolts all the way down to the bolt shoulder or use spacers

3.1.6 Hot Work

- No hot work without approval by the Project Manager and completion of a "Hot Work Permit"
- A combustible gas indicator will be used to determine if combustible vapors or gases exceed 10 percent of the LEL prior to hot work activities
- All hot work must be conducted under a fire watch and with either a dry chemical fire extinguisher or a charged fire hose with a fog nozzle present
- Where potential exposure to injurious radiant energy from torch cutting operations exists, protective lenses with the following filter shading will be used:

  - ☐ Cutting - Light (1"); Filter shade #3 or #4
  - ☐ Cutting - Medium (1-6"); Filter shade #4 or #5
  - ☐ Cutting - Heavy (>6"); Filter shade #5 or #6
  - ☐ Carbon-arc welding: *Filter shade #14*.

3.1.7 Vehicle and Equipment Traffic

➢ Vehicle and equipment traffic precautions include:

- Orange reflective roadwork safety vests to be worn by site personnel that work in areas of vehicle traffic

- Use of traffic cones, barricade tape, and/or barricades around work areas with vehicle traffic.

3.1.8 Electrical Equipment

➢ Use of electrical equipment on site will require the following:

- Personnel working on site will ensure that all electrical power tools, lighting equipment, etc. to be used are properly grounded

- Personnel will use ground fault circuit interrupters (GFCI), or implement an assured equipment grounding conductor program

- All electrical equipment will be shut down, locked out and tagged out prior to servicing of equipment.

- **Lockout/Tagout:** Follow equipment specific lock-out/tag-out procedures, all applicable lockout/tagout regulations specified in 29 CFR 1910. 147, and applicable and associated state laws

<u>Lockout/Tagout Device Application</u>
A lockout or tagout device is to be affixed to the isolating device such as a breaker or steam valve. Lockout devices will hold the energy isolating device in the "off", "safe" or energy neutral position. A tagout device will be affixed so that it will state clearly that the operation or movement of the energy isolating device is prohibited and removal of the tag is permitted only by the person who affixed the tag. Tagout devices are to be used where a lockout device can not be used or in combination with a lockout device.

- ☐ The 29 CFR 1910.147 lockout/tagout procedures requires that employers establish a program <u>and utilize procedures</u> for affixing appropriate lockout devices or tagout devices to energy isolating devices, and to otherwise disable machines or equipment to prevent unexpected energization, start up or release of stored energy in order to prevent injury to employees.
- ☐ **Lockout devices.** Lockout devices shall be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.
- ☐ **1910.147(c)(5)(ii)(C)(2)** **Tagout devices.** Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. Tagout device attachment means shall be of a non-reusable type, attachable by hand, self-locking, and non-releasable with a minimum unlocking strength of no less than 50 pounds and having the general design and basic characteristics of being at least equivalent to a one-piece, all environment-tolerant nylon cable tie.
- ☐ <u>**1910.147(c)(5)(ii)(D)**</u> **Identifiable.** Lockout devices and tagout devices shall indicate the identity of the employee applying the device(s).
- ☐ **1910.147(c)(5)(iii)** Tagout devices shall warn against hazardous conditions if the machine or equipment is energized and shall include a legend such as the following: **Do Not Start. Do Not Open. Do Not Close. Do Not Energize. Do Not Operate.**

3.1.9 Noise Exposure (85dBA will not be exceeded)

- The operation of heavy equipment and machinery at the site may generate noise levels that exceed 85dBA

  - Hearing protection will be used by site personnel whenever noise exposures exceed 85 decibels on the A-weighted scale (dBA)

  - Noise exposures in excess of 85 dBA will be assumed to be present whenever, at 3 feet apart in normal conversation, voices must be raised to be heard and also whenever working in the immediate areas of operating heavy equipment, generators, compressors, and similar equipment. A type II sound level meter/audio dosimeter will be used as needed to verify sound levels and the need for hearing protection for such operations

  - Personnel working in the immediate area of operating equipment will use hearing protection (e.g., foam ear plugs).

3.1.10 Heat Stress

- Heat stress precautions and prevention measures include the following:

  - Personnel will be made aware that heat stress can occur during periods of elevated ambient temperatures, moderate to heavy workloads, and when impermeable protective clothing is in use

  - Personnel will be informed regarding the various forms of heat stress (e.g., heat cramps, heat exhaustion, heat stroke) and the symptoms of exposure which are as follows:

    - ☐ Early signs of heat cramps and heat exhaustion are cramps, faintness, dizziness or disorientation, and pale, clammy skin

    - ☐ Heat stroke is an extremely serious medical emergency with sudden onset and symptoms that include dilated pupils, dry and hot skin, loss of consciousness, and convulsions

  - Workers will be responsible for observing each other and themselves for development of heat stress symptoms

  - Personnel will be encouraged to drink generous amounts of electrolyte replacement fluids (even if not thirsty) to prevent dehydration

  - Work/rest regimens will be adjusted as required to avoid heat stress

3.1.11 Inclement Weather

- In cases of inclement weather or other applicable environmental conditions (high winds, rain, lightning, earthquake, etc.), the following safety instructions are required:

  - Presence of strong winds will cause stoppage of affected work activities at elevated work locations (e.g., towers, roofs, ladders, scaffolds, platforms, etc.) and stoppage of use of equipment whose safe operation can be affected by high winds (e.g., cranes, manlifts). In addition, should high winds develop and cause excess dusts from the soil being treated at the site, work will stop and the area the dust is derived from will be covered with a suitable liner to alleviate the issue.

- Presence of heavy rain will cause stoppage of affected work activities where the heavy rain can create safety hazards due to limited visibility, wet work surfaces, slippery equipment controls, increased electrical hazards, cold stress, etc.

- Presence of lightning will cause stoppage of affected work activities where lightning presents an increased safety hazard of electrocution (e.g., cranes, heavy equipment, drill rigs, tanks, towers, etc.)

- Occurrence of an earthquake will require stoppage of affected work activities and evacuation of personnel from all excavations and trenches, confined spaces, and buildings of questionable stability

- In the case of work stoppage due to inclement weather conditions, work will not resume until an all clear signal has been communicated to affected personnel

- In the case of work stoppage due to lightning, an all clear will not be given until no lightning has appeared in the area for a period of 10 minutes

3.1.12 Miscellaneous Physical Hazards

- Miscellaneous physical hazards and safety procedures to be followed will be discussed with personnel in daily safety meetings and may include discussion of the following topics:

  - Material handling
  - Flying debris from treated soil cooling
  - Safe lifting procedures
  - M1-12 Lifting and Handling
  - Housekeeping
  - Uneven terrain
  - Elevated work surfaces
  - Poor illumination
  - Overhead obstructions
  - Slippery work surfaces
  - Sharp objects
  - Tripping hazards
  - Fall hazards.

4.0 EXPOSURE MONITORING PLAN

The Health and Safety Officer will be responsible for completing exposure monitoring during field operations where there is potential exposure to combustible gases, oxygen deficiency, volatile organic compounds, above PELs. The frequency of such personal and environmental monitoring is indicated in this section of the Health and Safety Plan. Ridge Contracting will supply the combustible gas/oxygen indicator

4.1 Direct Reading Instrument Air Monitoring

4.1.1 Combustible Gases and Oxygen

A combustible gas/oxygen indicator will be utilized during activities where the presence of flammable vapors/gases or oxygen deficient/enriched atmospheres is suspected. Monitoring for combustible gases and oxygen deficiency will be conducted prior to initial site entry, initiating hot work, during drum handling, entering a confined space, entering an excavation, and during drilling. Periodic measurements will be taken during such activities.

The combustible gas/oxygen indicator (MSA 261, 360, or 361) is capable of rating and indicating flammable vapor and gas concentrations of 0 percent to 100 percent of the lower explosive limit (LEL). Oxygen can be measured within a range of 0 percent to 25 percent by volume. The combustible gas/oxygen indicator will be calibrated prior to use to a known concentration of combustible gas as indicated by instrument manufacturer instructions.

4.2 Physical Hazard Monitoring

4.2.1 <u>Noise Exposure</u>

Noise exposure monitoring will be completed for work operations where noise exposures are anticipated to exceed 85 dBA (e.g., heavy equipment, generators, compressors, etc.). A type II sound level meter/audio dosimeter will be used to verify sound levels and the need for hearing protection for such operations. Earplugs or other applicable hearing protection will be available to all onsite personnel for use onsite.

5.0 SITE CONTROL

Due to the nature of work activities to be conducted at the site, the establishment of formalized work zones will be required. Site specific drawings will be prepared as the project progresses.

5.1 Site Communications

Site communications are critical to allow for expedient communication of operational instructions, safety information, and emergency communications, and will include:

- Portable two-way radios will be used on site to communicate between key personnel.

5.2 Site Security

Site security measures are required to prohibit access to the site by unauthorized persons. Site security measures include the following:

- Personnel are required to check-in with the on-site RIDGE CONTRACTING Site Superintendent or other designated responsible authority before entering the construction areas of the site

5.3 General Site Control Procedures

The following procedures will be used to assist in controlling on site activities:

- Only persons authorized by the RIDGE CONTRACTING Site Safety and Health Officer and Site Superintendent may enter work areas
- All site personnel will wear the appropriate PPE in work areas
- Individuals in working areas will remain in visual contact with one another ("buddy system")
- For emergency communication, the Project Manager or Health and Safety Officer will contact and coordinate with the RIDGE CONTRACTING Site Superintendent or Site Safety and Health Officer by radio or direct verbal communication prior to locating the nearest available phone in order to contact essential RA/MET personnel in the event of an emergency.

6.0 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) will be required for all field operations.

6.1 Protection Description

➢ Level D protection will consist of the following:

- Standard work clothing
- Steel-toe safety boots
- Work gloves (as needed)
- Hard hat
- Safety glasses
- Ear plugs (if noise levels >85 dBA)
- Orange reflective safety vest (if vehicle traffic)

7.0 STANDARD SAFETY PROCEDURES

7.1 Standard Work Procedures

Personnel working on the site will work in a safe manner at all times. This includes, but is not limited to, the following actions:

7.1.1 <u>Health and Safety Plan Review and Documentation</u>

➢ Health and Safety Plan review and documentation requirements include:

- All RA/MET personnel entering the site will sign a statement attesting to their having read and understood the Health and Safety Plan and agreement to follow the Plan

- RA/MET workers new to the site must read and sign the Health and Safety Plan before being allowed to work at the site

- Questions relating to the Health and Safety Plan will be answered by the RA/MET Health and Safety Officer prior to entering the site

- Prior to the start of work, the Site Health and Safety Officer will provide the RA/MET Project Superintendent at the site with informal training on project operations and Health and Safety Plan requirements and will include review of the following topics:

    - ☐ Provisions of the Health and Safety Plan
    - ☐ Emergency procedures
    - ☐ Site lay-out and work zone demarcation
    - ☐ Buddy system requirements
    - ☐ Location of emergency medical facilities
    - ☐ Procedures for reporting illness/injury
    - ☐ Warning signals and evacuation procedures
    - ☐ Specific site requirements.

7.1.2 <u>General Safe Work Practices</u>

➢ General safe work practices include:

- All RA/MET workers will obey directives from the Health and Safety Officer

- RA/MET personnel who do not comply with safety requirements may be immediately dismissed from the site as required by the Project Manager and/or Health and Safety Officer

- The Project Manager and/or Health and Safety Officer will conduct or participate in on site safety meetings on a daily basis prior to starting work to review work operations and to discuss pertinent site safety topics
- All personnel at the site will work in teams of at least two (2) persons ("buddy system") and visual contact between team members must be maintained
- Drugs, alcohol, and firearms are not allowed at the site
- RA/MET equipment problems will be reported to the RA/MET Health and Safety Officer and RIDGE CONTRACTING Site Superintendent at once
- At least one person trained in first aid and CPR will be on site during remediation activities,
- Dust control measures (water spray) will be implemented if excessive dust is observed
- Engines will be shut off while fueling or during maintenance.
- Cranes or other equipment with tall booms will not operate within ten (10) feet of an electrical conductor
- All workers are to stay clear of moving equipment, booms, and buckets
- Measures to control dust created during work operations will be implemented and will involve application of water to dusty surfaces to minimize dust generation.

7.1.3 <u>Personal Protective Equipment</u>

➢ Standard PPE requirements include:

- PPE is required in the Work Zone as directed by the Health and Safety Plan or by the RA/MET Health and Safety Officer
- Personnel are responsible for the proper use of all required PPE
- Protective clothing or other damaged PPE will be immediately repaired or replaced

7.1.4 <u>Sanitation</u>

➢ Sanitation requirements include the following:

- Good personal hygiene and decontamination practices will be followed at all times
- Site washing facilities will be provided and personnel will be required to wash their hands and face prior to breaks and lunch
- Potable water will be made available for personnel at the job site

7.1.5 <u>Accident Reporting</u>

➢ Accident reporting requirements include:

- All injuries/accidents, including exposure incidents, will be immediately reported to the RA/MET Health and Safety Officer and the RIDGE CONTRACTING Site Superintendent or Site Safety and Health Officer.

- A written report of an accident/incident is to be completed and submitted to the RA/MET Health and Safety Officer.

7.1.6 Miscellaneous

➢ Miscellaneous standard safety procedures include:

- All RA/MET visitors must have prior approval from the RA/MET and RIDGE CONTRACTING Project Managers before being admitted to the site

- All RA/MET visitors must read and acknowledge understanding of the Health and Safety Plan. RA/MET visitors may also be required to review and acknowledge understanding of the RIDGE CONTRACTING Site Safety and Health Plan

- All requests by media or outsiders for information will be referred to the appropriate agency or client representative.

7.2 Standard Operating Procedures

RA/MET has written health and safety policies and procedures that establish protocol for implementation of specific safety programs. Employee compliance with these policies and procedures is mandatory. These policies include the following:

- Injury and Illness Prevention Program
- Accident Reporting and Investigation
- Personal Level of Protection Program
- Hazard Communication Program
- Hearing Conservation Program
- Permit-Required Confined Space Program
- Site-Specific Health and Safety Program

8.0 EMERGENCY RESPONSE PLAN

The following emergency/contingency plans will address possible site emergencies:

➢ Prior to field work, the Health and Safety Officer will coordinate with the BSI-OASIS Site Superintendent and Site Safety and Health Officer to plan escape routes and discuss them with site personnel. Initial planning will include establishing the best means for evacuation from work areas in case of catastrophe

➢ RA/MET personnel will immediately notify and report to the RA/MET Health and Safety Officer and/or Project Manager and the RIDGE CONTRACTING Site Superintendent and /or Site Safety and Health Officer in the event of any type of site emergency.

8.1 Emergency Communications

A portable satellite phone will be available for emergency communications.

8.2 Emergency Telephone Numbers/Assistance

An emergency telephone list (***Appendix B***) will be maintained at the site in the event of an emergency situation. and will be used for any type of site emergency.

8.3 Response to Fire

In the event of a fire, the following procedures will be implemented:

- In the event of a large fire (beyond immediate control of a small on site fire extinguisher), personnel will immediately evacuate the work area and reassemble at a pre-determined safe, upwind site location

- In the event of a small fire, trained personnel will use an on site fire extinguisher for containment.

8.4 Emergency Supplies

Emergency supplies will be immediately available on site and will include:

- First aid kit
- Supply of clean water.

8.5 Emergency Hospital and Hospital Route Information

Emergency planning will involve selection of an emergency hospital and determination of the route to the hospital. The emergency hospital, location, and route map are provided in ***Appendix B***.

8.6 Response to Medical Emergency

In the event of a medical emergency, the following procedures will be implemented:

- Remove the exposed or injured person from immediate danger

- Contact the RIDGE CONTRACTING Site Superintendent or Site Safety and Health Officer and notify them of the situation

- Evacuate personnel from work area until the Health and Safety Officer determines that it is safe for work to resume

- Trained on site personnel will administer first aid or CPR as necessary

- Call for emergency medical assistance to the Samuel Simmonds Memorial Hospital and inform them of the following:

  - Specific directions to the emergency location
  - Phone number from which you are calling
  - Tell what happened
  - Number persons needing help
  - What is currently being done for victim(s)
  - For life-threatening injuries, request instructions from the Emergency Dispatcher as to procedure to be followed.

9.0 TRAINING

9.1 Daily Safety Meetings

Daily safety meetings will be conducted at the beginning of each work shift to discuss operational tasks to be completed and pertinent site safety topics. Meetings are documented and those in attendance are requested to sign meeting forms.

9.2 40 Hour HAZWOPER

All project site personnel will have completed 40 hour HAZWOPER training within the past year have a current 8 hour refresher.

10.0 RECORDKEEPING

10.1 Health and Safety Documentation

Various health and safety documents will be maintained by the Health and Safety Officer.

- Health and safety documentation records, as applicable, include the following:
  - Training records
  - Medical clearance forms
  - Health and Safety Plan review forms
  - Daily safety meeting forms
  - Safety inspection report forms
  - Injury and illness forms
  - Accident investigation forms
  - Other health and safety documents.

Applicable Health and Safety Plan forms are provided in ***Appendix C***.

11.0 REFERENCES

CH2-OH, *Release Investigation Report, Fuel Storage Tank Management Program, and Expanded Site Investigation/Interim Cleanup, Tanana, Alaska*, May 1999.

Ecology and Environment, Inc. (E & E), *Environmental Compliance Investigation Report, Tanana FAA Station, Tanana, Alaska*, 1992.

National Institute for Occupational Safety and Health, Occupational Safety and Health Administration, U.S. Coast Guard, and U.S. Environmental Protection Agency. 1985. *Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.* October.

Pocket Guide to Chemical Hazards. 1990. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health. June.

U.S. Department of Labor, Occupational Safety and Health Administration. *Hazardous Waste Operations and Emergency Response*

APPENDIX A

PROJECT PERSONNEL & COMPETENT PERSONS LIST

- **Shawn Garrett, Competent Person, RA/MET.**

APPENDIX B

EMERGENCY TELEPHONE LIST AND HOSPITAL LOCATION/ROUTE MAP

Paramedics/Ambulance (Emergency)	**907-366-7222**
Fire Department (Emergency)	**907-366-7170**
Police (Emergency)	**907-366-7158**
RA/MET	**503-887-8082**
Hospital	**907-366-7222**
Project Manager, Shawn Garrett	**503-887-8082**
SHSO, Shawn Garrett	**503-887-8082**

APPENDIX C

HEALTH AND SAFETY PLAN FORMS

Health & Safety Plan Sign In Sheet

Date	Print Name	Signature

Appendix C

Field Forms

Ridge Contracting, Inc.

DAILY JOB REPORT

FOREMAN: ______________________ **DATE:** __________ **DAY:** __________

SIGNATURE: ______________________ **START TIME:** __________ **STOP TIME:** __________

WEATHER: ______________________ **JOB#:** __________ **JOB NAME:** __________

MANPOWER		EQUIPMENT ON SITE		
CRAFT	QTY	DESCRIPTION	OWNER	HOURS USED

SUBCONTRACTORS / OTHER JOB SITE PERSONNEL

NAME	DESCRIPTION	SUB TO	HOURS ON-SITE

WORK DESCRIPTION

Appendix D

Waste Profiles

U.S. Department
of Transportation
Federal Aviation Administration

FACSIMILE MESSAGE

FAA, SOUTH ALASKA SMO
TECHNICAL SUPPORT UNIT
700 NORTH BONIFACE PARKWAY
ANCHORAGE, ALASKA 99506
FAX: (907) 269-2520
PHONE: (907) 269-1192

DATE: 7/24/06

TO: SHARON SADLON

FAX #: 561-5475 PHONE #: 561-2705

FROM: KIRBY BROWN Phone: 269-1850

Subject: PROFILES

Pages: Cover + 4

__ Urgent ___ For Review __ Please Comment __ Please Reply __ Per Your Rqst

COMMENTS:

HAVE 2 PROFILES.

ONE FOR FLAMMABLE. FLASHPOINT < 140

ONE FOR NON-FLAMMABLE, FP > 140

EMERALD ALASKA, INC. **Waste Profile Questionaire #: AK02901-E**

A. Generator Information

EPA ID: EXEMPT

Generator #: FAA-TAL
State ID:
Customer:

Generator Name	FAA - TANANA	Billing Company	
Site Address	700 NORTH BONIFACE PARKWAY	Site Address	
City ST Zip	ANCHORAGE, AK 99506	City ST Zip	
Contact	KIRBY BROWN	Contact	
Position		Position	
Phone, Fax	(907) 269-1850	Phone, Fax	

B. Shipping Information

Proper Shipping Name: FLAMMABLE LIQUIDS, N.O.S. (MIXED FUELS)

DOT ID: UN1993 Hazard Class: 3 Packing Group: II ERG: 128 RQ: 100

C. Regulatory Information

Name of Material: OFF-SPEC FUELS (MIXED FLAMMABLES)

Generating Process: DISCARDED PRODUCT

- ☐ Regulated Radioactive Waste
- ☐ Regulated Infectious or Biological Waste
- ☐ Material Poisionous by Inhalation
- ☐ Regulated Benzene NESHAP Waste
- ☐ TSCA Regulated PCB Waste
- ☐ Regulated Ozone Depleting Substance
- ☐ CERCLA Regulated (Superfund) Waste
- ☐ Hazardous Debris (subjet to LDR)

- ☐ Waste contains Pesticides. PPM
- ☐ Waste contains Phenolics. PPM
- ☐ Waste contains Dioxins. PPM
- ☐ Waste contains Halogens. PPM
- ☐ Sorbent Added? Is Biodegradable? ☐
- ☐ EXEMPT Waste? CFR Part

Form Code
Source Code
Origin Code
System Code
State Codes

EPA Codes

D. Chemical / Constituent Composition

Constituent	PPM	% Volume	Constituent	PPM	% Volume
DIESEL		10-50	GASOLINE		50-70
SLUDGE		1-2	USED OIL		1-10
WATER		0-1			

E. Elements / Metals Composition

Method (TCLP, Generator, etc): NONE

	PPM		PPM		PPM		PPM
Aluminum		Chromium		Mercury		Sodium	
Antimony		Cobalt		Molybdenum		Sulfur	
Arsenic		Copper		Nickel		Thallium	
Barium		Iodine		Phosphorous		Titanium	
Beryllium		Fluorine		Potassium		Vanadium	
Bromine		Lead		Selenium		Zinc	
Cadmium		Lithium		Silicon			
Chlorine		Manganese		Silver			

F. Reactive Characteristics

- ☐ Explosive
- ☐ Shock Sensitive
- ☐ Pyrophoric
- ☐ Oxidizer
- ☐ Water Reactive
- ☐ Air Reactive
- ☐ Reactive Cyanides
- ☐ Reactive Sulfides
- ☐ Polymerizable

EMERALD ALASKA, INC. **Waste Profile Questionaire #: AK02901-E**

G. Physical Characteristics

# Phases	VAR	Color	VARIES	FlashPt:	pH:	
% Liquids	VAR	Odor / Describe	PETROLEUM	☐ <73F (23C)	☐ 0-2	☐ N/A
% Sludges	VAR	Viscosity		☒ 73-140F (23-60C)	☐ 2.1-4	
% Solids	VAR	Density / Units	/	☐ 141-200F (61-93C)	☒ 4.1-10	
% Powders	N/A	Specific Gravity		☐ >200F (93C)	☐ 10.1-12.4	
% Gases	N/A	BTUs / Lb	>5000	☐ N/A	☐ >= 12.5	

H. Comments

Generator's Certification

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all material described by this profile.

Generator's Authorized Signature: [signature] **Date** ______

Name (Print) KIRBY BROWN **Title** FAA/NISC

TSDF's Certification

EMERALD ALASKA, INC.
2020 VIKING DRIVE
ANCHORAGE, AK 99501

As an authorized representative of Emerald Services, Inc. , I certify, by my sgnature below, that Emerald Services, Inc. has the necessary permits per WAC 173-303-290(3) and 40CFR 264.12(b) to accept and properly manage the waste stream identified above.

TSDF's Authorized Signature: ______ **Date** ______

EMERALD ALASKA, INC. **Waste Profile Questionaire #: AK02901-F**

A. Generator Information

EPA ID EXEMPT

Generator #	FAA-TAL	State ID	
Customer			
Generator Name	FAA - TANANA	Billing Company	
Site Address	700 NORTH BONIFACE PARKWAY	Site Address	
City ST Zip	ANCHORAGE, AK 99506	City ST Zip	
Contact	KIRBY BROWN	Contact	
Position		Position	
Phone, Fax	(907) 269-1850	Phone, Fax	

B. Shipping Information

Proper Shipping Name COMBUSTIBLE LIQUIDS, N.O.S. (DIESEL FUEL)

DOT ID NA1993 Hazard Class ______ Packing Group III ERG 128 RQ ______

C. Regulatory Information

Name of Material OFF-SPEC FUELS (COMBUSTIBLE)

Generating Process DISCARDED PRODUCT

- ☐ Regulated Radioactive Waste
- ☐ Regulated Infectious or Biological Waste
- ☐ Material Poisonous by Inhalation
- ☐ Regulated Benzene NESHAP Waste
- ☐ TSCA Regulated PCB Waste
- ☐ Regulated Ozone Depleting Substance
- ☐ CERCLA Regulated (Superfund) Waste
- ☐ Hazardous Debris (subjet to LDR)

- ☐ Waste contains Pesticides. PPM ______
- ☐ Waste contains Phenolics. PPM ______
- ☐ Waste contains Dioxins. PPM ______
- ☐ Waste contains Halogens. PPM ______
- ☐ Sorbent Added? Is Biodegradable? ☐
- ☐ EXEMPT Waste? CFR Part ______

Form Code ______
Source Code ______
Origin Code ______
System Code ______
State Codes ______

EPA Codes ______

D. Chemical / Constituent Composition

Constituent	PPM	% Volume
DIESEL FUEL		98-100
USED OIL		0-1

Constituent	PPM	% Volume
SLUDGE		1-2
WATER		1-2

E. Elements / Metals Composition

Method (TCLP, Generator, etc) NONE

	PPM		PPM		PPM		PPM
Aluminum		Chromium	<5	Mercury	>0.2	Sodium	
Antimony		Cobalt		Molybdenum		Sulfur	
Arsenic	<5	Copper		Nickel		Thallium	
Barium	<100	Iodine		Phosphorous		Titanium	
Beryllium		Fluorine		Potassium		Vanadium	
Bromine		Lead	<5	Selenium	<1	Zinc	
Cadmium	<1	Lithium		Silicon			
Chlorine		Manganese		Silver	<5		

F. Reactive Characteristics

- ☐ Explosive
- ☐ Shock Sensitive
- ☐ Pyrophoric
- ☐ Oxidizer
- ☐ Water Reactive
- ☐ Air Reactive
- ☐ Reactive Cyanides
- ☐ Reactive Sulfides
- ☐ Polymerizable

EMERALD ALASKA, INC. **Waste Profile Questionaire #: AK02901-F**

G. Physical Characteristics

# Phases	VAR	Color	VARIES	FlashPt:	pH:
% Liquids	VAR	Odor / Describe	PETROLEUM	☐ <73F (23C)	☐ 0-2 ☐ N/A
% Sludges	VAR	Viscosity		☐ 73-140F (23-60C)	☐ 2.1-4
% Solids	VAR	Density / Units	/	☒ 141-200F (61-93C)	☒ 4.1-10
% Powders	N/A	Specific Gravity		☐ >200F (93C)	☐ 10.1-12.4
% Gases	N/A	BTUs / Lb	>5000	☐ N/A	☐ >= 12.5

H. Comments

Generator's Certification

I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all material described by this profile.

Generator's Authorized Signature: [signature] **Date** 7/24/06

Name (Print) KIRBY BROWN **Title** FAA/NISC

TSDF's Certification EMERALD ALASKA, INC.
2020 VIKING DRIVE
ANCHORAGE, AK 99501

As an authorized representative of Emerald Services, Inc. , I certify, by my signature below, that Emerald Services, Inc. has the necessary permits per WAC 173-303-290(3) and 40CFR 264.12(b) to accept and properly manage the waste stream identified above.

TSDF's Authorized Signature: ______________________ **Date** __________

Appendix E

Ridge Contracting, Inc. Business License

Alaska Department of Commerce, Community, and Economic Development
P.O. Box 110806, Juneau, Alaska 99811-0806

ALASKA BUSINESS LICENSE

The licensee named below holds Alaska Business License Number 289389
covering the period of: December 13, 2005 through December 31, 2007
Line of Business: 23 Construction

RIDGE CONTRACTING, INC.

PO BOX 240121, ANCHORAGE, AK 99524

Owner:
RIDGE CONTRACTING, INC.

This license shall nct be taken as permission to do business in the state without having complied with the other requirements of the laws of the State of Alaska or of the United States.

Alaska Department of Commerce, Community, and Economic Development
Commissioner: William C. Noll

This license must be posted in a conspicuous place at the business location. It is not transferable or assignable.

No. 28532
Effective: 01/03/2005
Expires: 12/31/2006

STATE OF ALASKA

DEPARTMENT OF COMMERCE, COMMUNITY & ECONOMIC DEVELOPMENT
Division of Occupational Licensing

Division of Occupational Licensing

Certifies that

RIDGE CONTRACTING INC

Is A Registered

General Contractor-Excludes Residential

Commissioner: Edgar Blatchford

Appendix F

Permits

DENALI BOROUGH

P. O. Box 480 • Healy, Alaska 99743
Phone (907) 683-1330 • Fax (907) 683-1340
dbgovt@mtaonline.net
www.denaliborough.govoffice.com

David M. Talerico, Mayor

Dan Fleming
Ridge Construction
P.O. 240121
Anchorage, AK 99524

Dear Mr. Fleming,

The Denali Borough Landfill, located at Milepost 282.5 on the Parks Highway is a DEC approved Class II Landfill.

Your request to deposit cut up creosote telephone polls and plastic and felt liners in our landfill has been granted and is DEC approved.

Please follow the conditions given to you by DEC's Kent Monroe in Fairbanks and if you have any questions please feel free to contact him @ 451-2134.

If you have any further questions, feel free to contact our office.

Sincerely,

Eileen Armstrong
Administrative Aide

Cc: Landfill Operator

Appendix G

FAA Standard Operating Procedures

Contents

Appendixes

Table

Figure

Abbreviations

3-D	three-dimensional
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADOT&PF	Alaska Department of Transportation and Public Facilities
API	American Petroleum Institute
ASTM	ASTM International (formerly American Society for Testing and Materials)
AWQC	Ambient Water Quality Criteria
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
°C	degrees Celsius
CCC	continuing calibration criteria
CCV	continuing calibration verification
CEPOA	Corps of Engineers Pacific Ocean Division–Alaska
CFR	Code of Federal Regulations
COC	chain of custody
COR	Contracting Officer's Representative
CQAR	Chemical Quality Assurance Report
DAF	dilution attenuation factor
DGGS	Alaska Department of Geological and Geophysical Surveys
DO	dissolved oxygen
DOT	U.S. Department of Transportation
DPW	Directorate of Public Works
DQO	data quality objective
DQR	Data Quality Report
DRO	diesel-range organics
EAC	expressed assimilative capacity
EDF	Electronic Deliverable Format
EICP	Extracted Ion Current Profile

EPA	U.S. Environmental Protection Agency
EPH	extractable petroleum hydrocarbon
°F	degrees Fahrenheit
FAA	Federal Aviation Administration
GAC	granular activated carbon
GRO	gasoline-range organics
HCl	hydrochloric acid
HDPE	high-density polyethylene
HNO_3	nitric acid
ICP	Inductively Coupled Plasma
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
ICS	interference check samples
ICV	initial calibration verification
ID	inside diameter
IDW	investigation-derived waste
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LT	lower tolerance
MB	method blank
MCL	maximum contaminant level
MDL	method detection limit
mg/L	milligrams per liter
mL	milliliter
MS	matrix spike
MSA	Method of Standard Additions
MSD	matrix spike duplicate
NA	not applicable
NAPL	nonaqueous phase liquid
NTU	nephelometric turbidity unit
OD	outside diameter
OTM	On-site Technical Monitor

OVM	organic vapor meter
oz.	ounce
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
ppm	parts per minute
PT	peat
PVC	polyvinyl chloride
QA	quality assurance
QAO	Quality Assurance Officer
QAPP	quality assurance program plan
QC	quality control
%R	percent recovery
RCAG	remote communication air-to-ground
RCRA	Resource Conservation and Recovery Act
RF	Response Factor
RL	reporting limit
RPD	relative percent difference
RRO	residual-range organics
RSD	relative standard deviation
SOP	standard operating procedure
SPCC	system performance check compounds
SVOC	semivolatile organic compounds
TSCA	Toxic Substances Control Act
TSDF	Treatment, Storage, and Disposal Facility
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
UT	upper tolerance

VOA	volatile organic analyte
VOC	volatile organic compound
VORTAC	very-high frequency, omnidirectional range tactical aircraft control and navigation
VPH	volatile petroleum hydrocarbons
WDOE	Washington State Department of Ecology

Document Title:	Standard Operating Procedures
Site Name:	
Site Location:	
Anticipated Sampling Dates:	
Prepared By:	CH2M HILL Date: October 2005
Address:	301 W. Northern Lights Blvd., Suite 601
City/State/Zip:	Anchorage, AK 99503
Telephone:	(907) 278-2551
Program Manager:	Charles Wilson Phone: (907) 278-2551

****

Approved ______________________________ Date ____________
CH2M HILL Program Manager

Approved ______________________________ Date ____________
CH2M HILL Quality Assurance Officer

Approved ______________________________ Date ____________
Alaska Department of Environmental Conservation

SECTION 1

Project Description

CH2M HILL has been contracted by the Federal Aviation Administration (FAA) to undertake environmental activities at various FAA sites in Alaska. Specific activities to be conducted at these sites may include the following:

- Sampling and analysis of surface and subsurface soil, sediment, surface water, groundwater, and air to evaluate the nature and extent of contamination or monitor remedial processes and progress
- Collect information to develop risk assessments and remedial action alternatives
- Collect information in support of site closure

Since the environmental activities involve multiple sites, the site-specific description, including contamination history, the project objectives, and the scope of work will be covered in each site-specific work plan or other equivalent site-specific documents.

This Standard Operating Procedures (SOP) document presents the quality assurance (QA) and quality control (QC) requirements designed to ensure that environmental data collected from each site will be of the appropriate quality to achieve the project objectives for that site. Specific protocols for sampling, sample handling and storage, chain of custody (COC), laboratory analyses, data handling, and data evaluation will be discussed. The elements included in this SOP are consistent with those specified in the *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (U.S. Environmental Protection Agency [EPA], 1988), the *EPA Requirements for Quality Assurance Project Plans* (EPA, 2001), and the *Requirements for the Preparation of Sampling and Analysis Plans, Appendix I: Shell for Analytical Chemistry Requirements* (U.S. Army Corps of Engineers [USACE], 2001).

The SOP also describes data collection procedures that can be used to document site conditions at a given point in time and to support decisions for site closure. Table 1-1 summarizes the types of data that are typically presented in a site conditions summary report (Geosphere and CH2M HILL, 2005) and references the sections of the SOP that describe the data collection procedures. The recommended formats for the Site Investigation Work Plan and the Site Conditions Summary Report are presented in Appendix A.

The SOP is intended for use by all contractors and subcontractors that provide services associated with the environmental data collection effort. This SOP supplements the work plans and any other site-specific documents. Although the SOP attempts to cover the data collection effort at a number of sites, it may not address future changes in sampling and analytical needs specific to certain sites. If the need for such changes arises, the SOP and the relevant site-specific documents will be updated and submitted to the regulatory agencies charged with project oversight for approval. Only the affected portions of the SOP will be submitted for review.

Table 1- 1

Data to be Included in the Site Conditions Summary Report

Data Type	Data Description	Reference in SOP
Land Status		
	Land use scenario and zoning classification	Work Plan Specific
	Land ownership boundaries and title search results for subject site	Work Plan Specific
	Documentation of the presence or absence of off-site migration	Work Plan Specific
	Land ownership boundaries and title search results for adjacent properties if off-site migration is occurring	Work Plan Specific
	Potential groundwater use	Work Plan Specific
	Current groundwater use scenario	Work Plan Specific
	Professional survey coordinates for wells, property corners, source area limits, etc.	Work Plan Specific
	Source and age of spill	Work Plan Specific
Soils Characterization		
	Stratigraphy description	Section 3.1.2
	Grain size analyses	Section 3.5.1.3
	Unified Soil Classification System (USCS) classification and ASTM soil descriptions	Section 3.1.2.2
	Soil bulk density	Table 4-1
	Specific gravity	Table 4-1
	Soil moisture content	Table 4-1
	Total porosity	Section 3.6.6
	Water filled porosity	Section 3.6.6
	Air filled porosity	Section 3.6.6
	Soil organic carbon content	Table 4-1
Hydrogeology (by stratigraphic unit)		
	Hydraulic conductivity	Section 3.6.1
	Hydraulic gradient	Section 3.6.2
	Aquifer saturated thickness	Section 3.6.3
	Precipitation rate	Section 3.6.4
	Seasonal water table fluctuation	Section 3.6.5
	Heterogeneity and anisotropy	Section 3.6.2
	Calculation of dilution attenuation factor (DAF)	Section 3.6.7

Table 1- 1

Data to be Included in the Site Conditions Summary Report

Data Type	Data Description	Reference in SOP
Source Characterization		
	Three-dimensional (3-D) nonaqueous phase liquid (NAPL)-contaminated volume identified	Work Plan Specific
	Source length	Work Plan Specific
	Source width	Work Plan Specific
	Source saturated thickness	Work Plan Specific
	NAPL characterization (use Extractable Petroleum Hydrocarbon [EPH] data from source area or use fresh fuel assumption)	Section 3.5.6, Tables 4-2 and 4 3
	Dissolved phase plume above Table C values (18 Alaska Administrative Code [AAC] 75) identified	Work Plan Specific
	Dissolved phase plume above Ambient Water Quality Criteria (AWQC) identified--documentation that surface water is or is not impacted	Work Plan Specific
	Mann-Kendall trend analysis for dissolved phase plume	Section 3.7.2
	Source Area Groundwater and Soil Concentrations 95% Upper Confidence Limit (UCL)	
	Benzene	Tables 4-1 and 4-2
	Toluene	Tables 4-1 and 4-2
	Ethylbenzene	Tables 4-1 and 4-2
	Xylenes	Tables 4-1 and 4-2
	Gasoline-range organics (GRO)	Tables 4-1 and 4-2
	Diesel-range organics (DRO)	Tables 4-1 and 4-2
	DRO aromatics	Tables 4-1 and 4-2
	DRO aliphatics	Tables 4-1 and 4-2
	Residual-range organics (RRO)	Tables 4-1 and 4-2
	Naphthalene (polynuclear aromatic hydrocarbon [PAH])	Tables 4-1 and 4-2
	Acenaphthene (PAH)	Tables 4-1 and 4-2
	Fluorene (PAH)	Tables 4-1 and 4-2
	Anthracene (PAH)	Tables 4-1 and 4-2
	Fluoranthene (PAH)	Tables 4-1 and 4-2
	Pyrene (PAH)	Tables 4-1 and 4-2
	Benzo(a)anthracene (PAH)	Tables 4-1 and 4-2
	Chrysene (PAH)	Tables 4-1 and 4-2

Table 1-1

Data to be Included in the Site Conditions Summary Report

Data Type	Data Description	Reference in SOP
	Benzo(b)fluoranthene (PAH)	Tables 4-1 and 4-2
	Benzo(k)fluoranthene (PAH)	Tables 4-1 and 4-2
	Benzo(a)pyrene (PAH)	Tables 4-1 and 4-2
	Indeno(1,2,3-cd)pyrene (PAH)	Tables 4-1 and 4-2
	Dibenz(a,h)anthracene (PAH)	Tables 4-1 and 4-2
Free Product Data		
	Identify if free product is present in monitoring wells	Section 3.1.6
	Document free product thickness during periods of stable and low groundwater	Section 3.2
	Compare to water displacement product thickness for given soil type	Section 3.7.1
	Document detailed assessment of free product mobility as necessary	Section 3.7.1
	Document soil moisture retention properties as necessary	Section 3.7.1
Natural Attenuation Parameters		
	Dissolved oxygen data	Section 3.7.3 and Table 4-2
	Nitrate data	Section 3.7.3 and Table 4-2
	Ferrous iron data	Section 3.7.3 and Table 4-2
	Manganese data	Section 3.7.3 and Table 4-2
	Sulfate data	Section 3.7.3 and Table 4-2
	Methane data	Section 3.7.3 and Table 4-2
	Determination of primary electron acceptor and rate function	Section 3.7.3
Remediation History		
	Excavation, bioventing, air sparging history as appropriate	Work Plan Specific
Risk Characterization		
	4-Phase Cumulative Risk Calculator Model output	Work Plan Specific
Institutional Controls in Place		
	Document all institutional controls that are in place	Work Plan Specific
Long Term Monitoring Plan in Place		
	Document all monitoring plans that are in place	Work Plan Specific
Site Status		
	Complete the Site Status Map form and request the appropriate status	Work Plan Specific

Table 1- 1

Data to be Included in the Site Conditions Summary Report

Data Type	Data Description	Reference in SOP

Reference: Geosphere and CH2M HILL, 2005.

SECTION 2

Project Organization and Responsibility

2.1 Project/Task Organization

The organization chart and descriptive text identifying task managers and individuals charged with specific responsibilities for each site can be found in the site-specific work plans. Lines of authority, as well as the scope of authority given to each key member of the project team, including the extent of his/her authority to initiate and approve corrective actions, are discussed in the work plans. All contractors and subcontractors and the scope of their work assignments are identified.

2.2 Training and Certification Requirements

All personnel engaged in field activities will have completed the Occupational Safety and Health Administration 40-hour health and safety training that meets the requirements of Title 29, Chapter 1910.120, of the *Code of Federal Regulations* and state and local requirements. All project personnel will read the site-specific health and safety plans. Documentation will be maintained to demonstrate that all requirements of the plans are followed.

All laboratories providing analytical services will hold current Alaska Department of Environmental Conservation (ADEC) and USACE validation for the analytical methods relevant to the requirements of this project and current certification under the State of Alaska Underground Storage Tank program. The laboratory managers will be responsible for ensuring that all personnel have been properly trained and are qualified to perform their assigned tasks.

SECTION 3

Field and Sampling Procedures

The field and sampling procedures covered in this section are representative of those anticipated to be conducted at the various sites. Specific needs at certain sites may require that procedures in addition to, or in lieu of, the ones that are described in this section be used. In these cases, the alternate and/or additional procedures will be covered in a site-specific work plan or equivalent document.

3.1 Excavations, Soil Borings, and Monitoring Wells

3.1.1 Utility Clearance

To minimize the possibility of digging or drilling into buried utility lines or other below grade structures, field personnel will complete utility clearances prior to the commencement of projects involving penetration of the ground surface.

The utility clearances will be documented on a form or in the project logbook. For proposed drilling or excavation activities, all FAA, public and privately-owned utility services, including cable television, telephone, natural gas, electricity, military petroleum fuel lines, water and sewer, will be located within a 20-foot radius of the excavation site. For non-active and remote facilities, excavation clearances will be completed on a case-by-case basis with direction from FAA and local utilities personnel.

As a final check before drilling at each location, field personnel will visually inspect the area. Overhead lines and surface features (such as utilidor access vaults, pipe stickups, linear asphalt or concrete patches, and disturbed ground surfaces) that may indicate the possible presence of buried lines will be noted in the field logbook and sketched as appropriate. As a standard practice, one or more photographs will be taken showing the location of the excavation or boring relative to a known or recognizable permanent feature, such as a building or utility pole, and any ground markings indicating buried utilities or other structures. If questions arise regarding an underground utility, or in the event of an emergency, a field team member will contact the FAA project manager and FAA facility supervisor.

3.1.2 Soil Borings

Shallow borings will be drilled with a truck-mounted drill rig using hollow-stem auger drilling methods. In off-road areas, a drill rig mounted on an off-road vehicle may be used.

Field personnel will collect subsurface soil samples from the borings in order to prepare soil descriptions and provide samples for chemical analysis. Samples collected for visual soil descriptions will be obtained from a split-barrel drive sampler, from cuttings, or from a continuous, core-barrel sampler. Visual inspection of the cuttings may be useful for providing information about the characteristics of coarse geologic materials, such as gravels and cobbles, which are normally too large to pass through the drive shoe of a split-barrel sampler.

Borings not converted to wells will be backfilled as specified in the site-specific work plans. Backfill material may include bentonite chips, bentonite pellets, cement-bentonite grout, or clean native fill.

3.1.2.1 Soil Boring Logs

Each soil boring will be logged to provide a record of subsurface conditions encountered during drilling. The logs will be prepared and maintained by the field supervisor overseeing the drilling activities. Observations will be recorded on Soil Boring Log forms (Appendix B) and will include the following:

- **Depth below surface.** Depths recorded on the boring log will be measured from the ground surface.
- **Sample interval.** The top and bottom depth of each collected sample will be recorded on the boring log. Samples include those collected for laboratory analysis, field screening, and lithologic description.
- **Sample recovery.** The length of sample collected by the sampling device will be recorded. Recoveries are typically provided in inches and can also be expressed as a fraction of the total possible recovery for a given sampling device.
- **Sample type and number.** A unique sample number will be given to each sample in accordance with the guidelines specified in this SOP. The sample type will describe the method of sample collection and the type of analysis to be completed. Example sample types include split-spoon, grab, composite, and core.
- **Soil lithologic description.** The lithologic classification will be entered at the depth of each soil change. Additional information, such as the presence of roots, fossils, organic material, wood, and fill, will also be entered at the appropriate depth.
- **Standard penetration test results.** The standard boring log form is based upon the collection of soil samples with a 24-inch split-spoon sampler driven by a 140- or 300-pound hammer. Blow counts are recorded as the number of hammer impacts required to drive the split-spoon sampler a distance of 6 inches. The boring log provides space to record the blow counts for each 6 inches of sample penetration.
- **Comments during drilling.** Observations and measurements will be recorded on the boring log, including field screening results, heaving sands, caving soils, gas pockets, odors, loss of drilling fluids, penetration rates, damaged sampling tubes, rod chatter, and other relevant details. Comments from the driller regarding any significant changes in drilling action and rate will also be noted.
- **Water levels.** Observations of the moisture content of the soils, and particularly of saturated soils, will be noted on the boring log. The approximate depth of the water table or the absence of water will be noted.

3.1.2.2 Soil Classification

Soils will be described by using visual examination and standard field tests as described in this section. Additional guidance for soil classification is provided in ASTM D2487-00 (2002), *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)* and ASTM D2488-00 (2002) *Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).* Common geotechnical analyses, which are described in Table 4-1, can be used for laboratory verification of field soil classifications.

Soils are classified based upon the fraction of each soil sample that will pass a 3-inch sieve. Particles larger than 3 inches are not included in the soil classification. However, the percentage of boulders and cobbles present in the sample will be noted. The relative percentages of sand, gravel, and fines in the portion of the sample with particles smaller than 3 inches will be determined on a dry-weight basis. Care should be taken in interpolating dry-weight percentages from visual observations of volume percentages. If the soil contains greater than 50 percent fines, it will be initially classified as fine-grained. If the soil contains less than 50 percent fines, it will initially be classified as coarse-grained. Standard flowcharts (such as presented in ASTM D2488-00 [2002]) will then be used to determine the soil name and group symbol. Additional information, as described below, is also included in the standard soil description.

- **Color.** The color of the sample will be described. Color can be used to determine geologic origin, correlate stratigraphic units in different borings, and provide clues about possible soil contamination.
- **Moisture content.** The moisture content of the soil will be noted as dry, moist, or wet. Wet, or saturated, soils can indicate the presence of groundwater and should be noted on boring logs.
- **Relative density or consistency.** A number of methods are available for describing relative density or consistency and are often dependent upon the method of sample collection. A number of common field tests are described in ASTM D2488-00 (2002).
- **Descriptive information.** A number of additional observations are also of use when completing soil classifications:
  - **Angularity.** The relative roundness or angularity of coarse particles.
  - **Shape.** The flatness or elongation of coarse particles.
  - **Structure.** Whether soils are stratified, laminated, fissured, etc.
- **Range and maximum particle sizes.** The range in size of sand, gravel, cobbles, and boulders.
- **Hardness.** A measure of the response of coarse particles to a hammer blow (for example, whether the particles crack, fracture, or crumble).
- **Odor.** Organic or unusual odors.
- **Peat.** Highly organic soil composed primarily of vegetable tissue, dark in color, with an organic odor, will be classified as peat (PT).

3.1.3 Monitoring Well Installation

Monitoring wells will be installed using a truck- or all-terrain-vehicle-mounted drill rig and hollow-stem auger methods. Installation methods will comply with *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning* (ADEC, 1992). The typical monitoring well casing will be constructed of a minimum 2-inch-diameter (2.375-inch-outside diameter [OD] by 2.067-inch-ID), Schedule 40, flush-joint threaded, polyvinyl chloride (PVC) pipe. The screen will typically be 10-foot-long, pre-pack screens with slot sizes appropriate for the site geology. Well screens will bridge the water table so that approximately 5 feet of screen is submerged. Casing and screen sections will be coupled with threaded joints; PVC solvent or glue will not be used. Monitoring well construction details for shallow water-table wells are shown in Figures 3-1 and 3-2. Alternate designs for site-specific conditions or objectives may be provided in the site work plan.

When the borehole has been augered to the bottom depth of the well, a pre-packed well screen and a sufficient length of riser pipe capable of reaching above the ground surface will be lowered through the augers to the bottom of the boring. Clean, fine sand will be added as the augers are removed if the borehole is not collapsing completely.

Once the augers have been withdrawn to the top of the screened interval, clean, fine sand will be added very slowly and tamped, if possible, to fill in any remaining voids. The sand will be added until 1 to 2 feet covers the top of the well screen. When sufficient sand has been placed, 1 to 2 feet of bentonite chips or pellets will be installed as a seal. The bentonite will be hydrated as necessary with a minimum amount of clean, potable water. Above the bentonite seal, the borehole annulus will be backfilled with either clean cuttings (defined as cuttings with a headspace reading of less than 50 parts per minute [ppm] on an organic vapor meter [OVM]) or a bentonite grout up to about 5 feet below ground surface (bgs).

From 5 to 3 feet bgs, a second bentonite seal should be placed. After this second bentonite seal has been hydrated, the protective casing (if an aboveground well is installed) will be set into the bentonite seal. The well riser will be cut off to stand 2 feet above the ground surface. The top of the protective casing should extend 6 inches above the top of the riser. A 6-inch block may be set on top of the riser to hold the protective casing (with locking lid on) in place. Cement/bentonite grout will then be poured between the borehole annulus and the outside of the protective casing from 3 feet bgs upward. The grout will extend to the surface and become part of a surface pad, whose form shall already be placed (minimum 2 feet diameter and dug 4 inches into the ground).

Completion of the well shall include the installation of three protective, concrete-filled ballards, installed 3 feet deep, in concrete, in a triangular array around the well. The ballards should extend a minimum of 4 feet above ground. The top of the posts should be mounded with the concrete to prevent water accumulation. Before installation, the aboveground parts of the protective casing and guard posts will be painted with high-visibility paint. Combination or keyed locks will be installed on all new wells and will be set to FAA-defined specifications.

For completion of a flush-mounted well, the upper bentonite seal will extend to the bottom of the roadbox (as determined by the dimensions of the box). The roadbox will be set in place and sealed over the well riser. The annulus between the borehole wall and the box will be filled with cement/bentonite grout to make a smooth surface seal, which will slope

[Insert Figure 3-1]

[Insert Figure 3-2]

gently away from the well. The top of the riser pipe should be about 3 inches below the traffic cover of the roadbox and fitted with a watertight, locking cap.

A reference point on the top of the PVC casing (used as the water-level elevation reference) will be marked with a cut notch and permanent ink. Well completion details will be recorded by field personnel in the field logbook and on a Well Installation Diagram form (Appendix B).

3.1.4 Groundwater Probes

Field personnel may install groundwater probes to investigate site contamination and monitor treatability study system performance. Probe specifications will be provided on an as-needed basis.

3.1.5 Well Development

Newly constructed wells will be developed before being sampled to remove fines from the borehole, enhance the flow of formation water through the well, and provide water samples with a minimal amount of suspended solids. Wells will be developed by surging and pumping using a surge block and a submersible pump. During the development process, groundwater will be monitored for pH, temperature, conductivity, dissolved oxygen (DO), and turbidity.

The following instructions describe the techniques for developing monitoring wells:

- Record the water level and total depth of the well using a water-level indicator. Note any accumulated sediment thickness and record all information in a logbook.
- Remove approximately 1 to 2 pints of water from the well with the submersible pump or disposable bailer. Measure pH, temperature, conductivity, DO, and turbidity.
- Remove sediment from the bottom of the well by lowering the pump or bailer slowly into the well so that the pump or bailer intake is within 1 to 1.5 feet of the bottom of the well or measured sediment accumulation. Slowly raise and lower the bailer or pump (with the pump motor off) to create a mild surging effect at the bottom of the well. This will bring any sediment that has settled at the bottom into suspension. Do not agitate the water violently. A general rule for well development is to start slowly and gently and to gradually increase agitation as the well is developed. After several surge strokes, remove the bailer or turn the pump on and pump out the sediment-laden water. Repeat this process until the accumulated sediment has been removed.
- Develop the well from the bottom of the screened interval upward by alternately using the surge block and the bailer or pump. This will account for settlement that will occur as the filter pack is reworked as a result of surging. Raise and lower the surge block for 2 to 3 minutes, starting roughly 2 to 3 feet above the base of the screen. Remove the surge block and lower the pump so that the intake is 2 to 3 feet above the base of the screen. Turn the pump on and remove water until it becomes clearer, or gently remove several bailers of water. Record water quality parameters for each staged interval and

continue surging and pumping until measurements stabilize according to the following criteria:

- pH: 0.2 standard units
- Temperature: 1.0° Celsius (°C)
- Conductivity: 3 percent
- DO: 10 percent, or 0.2 milligrams per liter (mg/L)
- Turbidity: 10 percent, or 5 nephelometric turbidity units (NTUs)

As the parameters stabilize and the clarity of the water improves, the surge block can subsequently be moved up in 2- to 3-foot intervals and the process repeated until the entire screened interval has been developed, after which pumping should continue at a rate intended to avoid dewatering the screened interval, with water quality parameters recorded at regular intervals.

The well will be considered adequately developed when the water parameters have stabilized as discussed above. If none of these conditions have been achieved after 4 hours of surging and pumping, the decision whether to continue development will be made by the field supervisor.

All well development data will be recorded on a Well Development Log form (Appendix B).

3.1.6 Petroleum Product Pumpdown Testing

If free product is encountered in a monitoring well or probe, a pumpdown test may be performed to yield information on the recoverability of the product. The test may be performed independent of or concurrently with groundwater or product sampling.

The following instructions describe the procedure for pumpdown testing:

- Measure the initial depth to the top of product and top of groundwater using an oil-water interface probe. Note that in small-diameter wells, the interface probe may displace the oil as it is lowered through the oil layer, thereby depressing the groundwater. In this case, multiple groundwater depth measurements should be recorded over several minutes to record the range of groundwater depths.

- Purge the free product from the well to a minimal thickness. The preferred method for removing free product is with a peristaltic pump (for depths less than about 25 feet) or with a low-flow dedicated product purging pump (GeoSquirt or SpillBuddy, for example). These pumps most closely simulate the action of a product skimmer pump. Another method is to use a disposable bailer; however, a bailer tends to surge the well, bringing more product into the well each time the bailer is removed, and generally cannot reduce the product thickness as much as a pump.

- Measure the depth to product and depth to groundwater several times over the next 24 to 48 hours. Measurements should be taken every few minutes immediately after the pump is turned off for the first 30 minutes. After that, measurements can be taken 3 to 4 times a day until the product thickness returns to its initial thickness or the test is terminated. If the aquifer material is relatively permeable sand and gravel soils, the product thickness may rebound quickly, and will rebound more slowly for less permeable silt and clay soils.

- If time permits, repeat the pumpdown test. Repeating the test will confirm the initial test results and provide more information on the amount of mobile product around the well.
- Containerize all free product and purge water in DOT-approved containers and treat or dispose as described in Investigation–Derived Waste (Section 3.9).

3.2 Water Level Surveys

Water levels in each well and in selected groundwater probes will be measured with an electronic sounder. Water levels will be documented in the field logbook. For a water level survey, all water levels in a sampling area will be measured on the same day. The following protocol will be employed while collecting water-level data:

- An electronic sounder will be used to measure water levels in all wells and groundwater probes; an electronic interface probe will be used to measure water levels and the thickness of free product in those wells and groundwater probes where free product is anticipated.
- That portion of the probe cable submerged below fluid levels in wells will be cleaned according to the decontamination procedure described in Section 3.8.
- Interface probes and electronic sounders will be kept clean and will be maintained in accordance with manufacturers' instructions.
- A permanent mark at the top of the PVC well casing groundwater probe will serve as the point of reference for water-level measurements in that well or probe.

3.3 Civil Surveying

An accurate survey of sampling locations and monitoring well elevations is required for mapping the sampling locations and providing a common reference point for water level measurements used in monitoring, groundwater potentiometric surface mapping, and aquifer testing. At sites where benchmarks are available, horizontal control will utilize the Alaska State Plane Coordinate System, NAD83. Local grids or control will also be utilized where necessary or requested. Vertical control will utilize both the NGVD29 (old) datum, the NAVD88 (new) datum, or local datums. Horizontal and vertical surveys will be conducted to third-order accuracy and will be conducted under the supervision of an Alaska Registered Land Surveyor.

Coordinates and elevations of all newly installed monitoring wells will be surveyed. Well elevations will be surveyed at the top of the PVC riser pipe and at the ground surface. The coordinates and elevations of selected prominent features, including manholes, power poles, and fence and building corners at the site, may also be surveyed. All surveying data will be recorded in a bound field logbook. A printout of computerized transit data and a plot of all surveyed locations will be provided.

3.4 Sampling Design

The number and location of samples are specific to each site, and are discussed in the site-specific work plans. The rationale for the sampling design is also described in the work plans. The sampling design is a function of the medium sampled, information about the sampling site, the type of data to be collected, and how the data are to be used. It is an output of the data quality objective (DQO) process, which is described in the site-specific work plans.

3.5 Media Sampling

3.5.1 Soil Sampling

Sampling locations will be as specified in a site-specific work plan, but the exact locations will be determined in the field based on such factors as accessibility and topography. The exact locations will be recorded in the field logbook when sampling is completed. A sketch of the sampling location will be entered into the logbook, if necessary, with any reference points labeled, including distances to the sampling location.

Soil sampling using uncontaminated equipment will be performed as described below. Each sample container will be closed as soon as it is filled. Samples will be chilled using ice packs and processed for shipment to the offsite laboratory.

The sample identification number, location of sampling, number of containers, analysis, and time of collection will be recorded in a sample record logbook.

3.5.1.1 Surface Soil Sampling

Surface soil samples will be collected as grab samples from depths up to 12 inches bgs. The samples will be collected with a stainless-steel hand trowel or equivalent equipment. A hand shovel may be used, if necessary, to expose a fresh or representative surface for sampling.

Samples to be analyzed for volatile components will be collected first, and quickly placed into the designated sample container. Samples to be analyzed for all other analytes will then be placed in the appropriate containers.

Sample containers will be filled as required by the analytical method. For field-preserved methods, such as gasoline-range organics by Method AK101, approximately 25 grams of soil will be placed in a pretared 4-ounce container and preserved with 25 milliliter (mL) of methanol. For unpreserved samples, the sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed to prevent potential contaminant migration from the sample. Pertinent observations made during sampling, such as the presence of odor or staining, will be recorded in the field logbook.

3.5.1.2 Subsurface Soil Sampling

Soil borings will be drilled with a truck-mounted drill rig using hollow-stem auger drilling methods. If necessary because of access restrictions, shallow soil borings may be completed with a hand auger. Oil, grease, or other threading compounds will not be used on any tools that enter the borehole.

Split-barrel sampling will be performed following the procedures described in ASTM D1586-99. Soil samples will be collected with 2-inch or 3-inch-OD, split-barrel samplers driven with a 140- or 300-pound hammer. Because soil samples will be collected for chemical analysis, they must be obtained with split-barrel samplers that have been decontaminated following the procedures specified in this SOP. Soil samples may also be collected on a continuous basis using a core barrel sampler with a new or cleaned Teflon liner.

3.5.1.3 Laboratory Sample Collection

Soil samples submitted for chemical analyses will be collected with a split-barrel drive sampler driven into undisturbed soil or from a continuous core-barrel sampler utilizing a new or cleaned Teflon liner. Volatile samples are always to be collected first. They will be obtained from the split-barrel sampler in a manner that will minimize aeration and the subsequent loss of volatiles, and will be quickly transferred to the appropriate sample containers. Samples to be analyzed for all other analytes will then be placed in the appropriate containers. Sample containers will be filled to the top, taking care to prevent soil from remaining in the lid threads prior to being sealed to prevent potential contaminant migration from the sample. Pertinent observations made during sampling, such as the presence of odor or staining, will be recorded in the field logbook.

Samples for geotechnical analyses will be collected with a split-barrel drive sampler with brass liners or as grab samples, and then sealed in plastic bags.

Excess soil from the borehole will be screened for contamination as described in the next section and handled as potential investigation-derived waste (Section 3.9).

3.5.1.4 Sample Field Screening

Soil samples retrieved from the sample device utilized will be field-screened for organic vapors. The field screening results will be used to make certain preliminary decisions, such as determining the extent of contamination or the need for definitive analysis, as described in the site-specific work plan. Field screening will be completed using a photoionization detector (PID) by the following ambient temperature headspace method:

- A resealable plastic bag will be partially filled with the sample to be analyzed.
- The sample bag will be quickly and tightly sealed.
- Headspace vapors will be allowed to develop in the bag for at least 10 minutes, but no more than 1 hour.
- The sample bag will be agitated for 15 seconds at the beginning of the headspace development period.
- The sample will be warmed to at least 40° Fahrenheit (°F).
- After the headspace development period, the sample will be agitated again.

- The container will be opened a minimal amount to allow for insertion of the probe point.
- The probe point will be inserted to a point about one-half the headspace depth.
- The highest observed probe reading will be recorded. The highest observed reading will usually occur rapidly after probe insertion.

Erratic or fluctuating readings will be noted in the logbook.

3.5.2 Groundwater Sampling

Groundwater sampling may be performed using several devices including submersible pumps, peristaltic pumps, inertial pumps, and bailers. The choice of sampling device will be based on site-specific considerations including the well diameter, depth of groundwater, and well sampling method.

Four methods for well sampling have been identified in this SOP, including the no-purge method, the low flow “minimum aeration” method, the well-volume approach, and the low-permeability formation method. The following sections include summaries and procedures for each method.

If free product (nonaqueous phase liquid [NAPL]) is encountered in a well, the product thickness should be measured using an oil-water interface probe and recorded in the field logbook prior to any purging. The product should then be removed to a minimum thickness using a peristaltic pump or bailer prior to well purging and sampling. Any recovered product should be containerized and disposed as described in Investigation-Derived Waste (Section 3.9). A product pumpdown test should also be conducted as described in Section 3.1.6 after well sampling is complete.

Details regarding the pumping method, parameter readings, purge volumes, and samples collected should be recorded in the field logbook and on a Well Purge and Sampling Field Sheet (Appendix B).

3.5.2.1 No-Purge

The no-purge method involves collecting a water sample from a well without prior purging. A bailer can be used to extract the sample from the water table, taking care not to disturb the water column or stir up sediment in the bottom of the well.

Advantages to this method include less time needed for sampling and elimination of purge water management and disposal costs. Disadvantages include potentially low-biased results for volatile and redox-sensitive parameters if groundwater is stagnant in the well and in contact with air.

This method may be appropriate for wells that are unconfined and screened through the water table, do not contain NAPL, and have been previously sampled using conventional sampling techniques to provide data for comparison (API, 2000).

3.5.2.2 Low Flow “Minimum Aeration”

This method emphasizes minimal stress to the groundwater by low water-level drawdown and low pumping rates in order to collect samples with minimal alterations to water chemistry (EPA, 2002; ASTM D6771-02). This is the preferred method for natural attenuation monitoring, which requires careful measurements of dissolved oxygen and redox-sensitive analytes, such as iron and manganese.

Wells are purged and sampled using a submersible or peristaltic pump and disposable sampling tubing. The pump intake should be placed approximately at the midpoint of the saturated screen length. The well should be purged at a low flow rate (usually less than 1 liter per minute), such that the purging rate does not lower the water level more than 0.3 feet. The purging rate can be controlled as needed using the pump's variable speed flow controller. The water level should be measured frequently during purging to ensure that the water level has not dropped lower than desired.

During purging, pH, electrical conductivity, oxygen-reduction potential, turbidity, and DO will be measured with probes in a flow-through cell or large beaker that is continuously overflowing into a 5-gallon bucket. Field personnel should monitor for air bubbles in the tubing and particulate build-up within the flow-through cell, as this may affect DO, redox, and turbidity measurements. If using a beaker, the pump discharge should be directed to the bottom of the container, and the container should be continuously overflowing during measurements to minimize aeration. Indicator parameters and water level measurements should be recorded in a field notebook or well sampling forms every three to five minutes. Purging is complete once the parameters have stabilized to within the ranges presented in Table 3-1 for three consecutive readings.

Table 3- 1

Criteria for Stabilization of Indicator Parameters during Purging

Field Parameter	Stabilization Criterion
pH	+/- 0.1 pH units
Specific Electrical Conductance	+/- 3 percent Siemens per centimeter
Oxygen-Reduction Potential	+/- 10 millivolts
Turbidity	+/- 10 percent NTUs (for values greater than 10 NTU)
Dissolved Oxygen	+/- 0.3 milligrams per liter

Reference: EPA, 2002.

Once parameters have stabilized, water samples for laboratory analysis should be collected without altering the flowrate or interrupting the flow. The samples should be collected from the pump discharge before water has passed through the flow-through cell or beaker. Sample containers should be filled by allowing the pump discharge to flow gently along the inside wall of the container to minimize turbulence. For dissolved iron and manganese samples, the use of an in-line filter is required (0.45 micron is typically used). Pre-rinse the filter with approximately 25 to 50 mL of pumped groundwater prior to collecting the sample.

Stabilization of water quality parameters is the primary criterion for sample collection by this method. If parameter stabilization is not occurring and the procedure has been strictly followed, the field team leader may elect to collect the sample after a minimum of three or maximum of six casing volumes have been removed (EPA, 2002).

Wells with low recharge rates may require special pumps capable of very low flow rates, such as bladder or peristaltic pumps. If the well is dewatered during purging, then it should be sampled as discussed below for low-permeability formations.

3.5.2.3 Well-Volume Approach

The well-volume approach is based on purging 3 to 6 well volumes prior to sampling. The static water column volume may be calculated using the following formula:

$$V = r^2h(0.163)$$

Where V = static volume of water in well (in gallons)

r = inner radius of well casing (in inches)

h = length of water column (in feet), which is equal to the total well depth minus the depth to water.

0.163 = a constant conversion factor that accounts for the conversion of the casing radius from inches to feet, cubic feet to gallons, and pi (π).

Well purging can be performed using a submersible pump, peristaltic pump, inertial pump, or bailer. Care should be taken not to disturb sediment that may have accumulated in the bottom of the well.

Water quality indicator parameters, including pH, electrical conductivity, oxygen-reduction potential, turbidity, and DO should be taken and recorded every ½ well volume after the removal of 1 to 1 ½ well volumes. Samples can be taken once three successive reading of indicator parameters have stabilized as described in Table 3-1, and at least 3 well volumes have been purged. If parameters have not stabilized within 6 well volumes, the sample is collected after purging 6 well volumes to minimize over pumping effects (EPA, 2002).

3.5.2.4 Low-Permeability Formations

If a well is screened in a low permeability zone, there may be no way to avoid pumping or bailing the well dry. For this case, the sample should be taken after a sufficient amount of water has returned to the well to allow for sampling (typically 90 percent of well volume). A minimum of two hours between purging and sampling should be observed (EPA, 2002).

For this method, a bailer may be used, since many sampling pumps have tubing capacities that would exceed the water volume in the well and cause it to be pumped dry again. A very low-flow device, such as a peristaltic pump, can be used if the groundwater depth is less than approximately 25 feet.

3.5.3 Sediment Sampling

Sediment located above the waterline will be collected as grab samples from about 3 to 6 inches below the sediment surface using a stainless-steel hand trowel or similar implement.

Submerged sediment will be collected as grab samples from about zero to 6 inches below the sediment/water interface, using a long-handled, stainless steel shovel or bottom-sampling dredge.

Following retrieval, samples will be placed in appropriate sample containers in a manner that minimizes aeration of the samples. Samples will be logged and prepared for shipment to the laboratory. Pertinent observations made during sampling, such as odor or sheen, will be recorded in the field logbook.

3.5.4 Surface Water Seep Sampling

Surface water seeps will be sampled from downstream to upstream locations to avoid disturbance to the sampling locations. Field measurements of pH, specific conductance, DO, and temperature will be recorded prior to sample collection from the seeps. Field personnel will take care to avoid or minimize aeration during sample collection. Vials for collection of volatile organic compounds (VOCs) will be filled first. Observations made during sampling, such as odor or sheen and quantity of water present in the seep area, will be recorded in the field logbook.

3.5.5 Surface Water Sampling

Surface water samples will be collected from downstream to upstream locations to avoid disturbance to the sampling locations. Field personnel will collect samples from near the surface by gently filling the containers, taking care to avoid or minimize aeration. For the deeper waters, a boat may be used as the sampling platform. For samples collected beneath the water surface, a depth-integrated sampler will be used.

Surface water field measurements of pH, specific conductance, DO, and temperature will be recorded before sample collection. Vials for collection of volatile components will be filled first. Observations made during sampling, such as odor or sheen, will be recorded in the field logbook.

3.5.6 Petroleum Product Sampling

Petroleum product samples will be collected from wells or probes using a disposable bailer or peristaltic pump. The color and odor of the product will be recorded in a field logbook. Prior to sampling, the product thickness in the well or probe will be measured with an interface probe. Product samples will be segregated from other samples at all times to avoid cross-contamination.

3.5.7 Other Sampled Media

As determined on a project-by-project basis, other media may also be sampled. Other possible media include tar and vapor. Projects requiring the collection of samples from those media will have a site-specific document that will provide detailed instructions regarding the collection of those samples.

3.6 Aquifer Characterization

3.6.1 Hydraulic Conductivity

Field tests can be performed on groundwater monitoring wells to determine the aquifer hydraulic conductivity. Depending on the project objectives, tests can also be designed to measure site-specific vertical and horizontal anisotropy, aquifer discontinuities, vertical hydraulic conductivity of confining beds, well efficiency, turbulent flow, and specific storage and vertical permeability of confining beds. This section describes the typical procedures for aquifer slug and pump tests. In order to generate valid test results, it is important for the practitioner to have a good conceptual understanding of the site hydrogeology (for example, aquifer thickness, lithology, stratification, depth, attitude, continuity, and extent of the aquifer and confining beds) to select appropriate test methods and analyses. Guidance for selecting aquifer test methods is presented in ASTM D4043-96 (2004), *Standard Guide for Selection of Aquifer Test Method in Determining Hydraulic Properties by Well Techniques*.

3.6.1.1 Slug Test

A slug test involves quickly displacing a known volume of water in a well and observing the changes in water level and the time to return to equilibrium. Slug tests provide relatively quick estimates of hydraulic conductivity without producing the large quantities of water generated by pumping tests, which is advantageous in potentially contaminated aquifers. A limitation to slug tests is that they only reflect aquifer conditions near the well and results may be influenced by the well gravel pack, poor well development, and skin effects. Additional guidance for slug tests is provided in ASTM D4044-96 (2002), *Standard Test Method (Field Procedure) for Instantaneous Change in Head (Slug) Tests for Determining Hydraulic Properties of Aquifers*.

Slug tests may be performed by one of three methods: (1) quickly adding or removing a known quantity of water from the well; (2) quickly inserting or removing a solid mechanical slug from below the water table; or (3) quickly increasing or decreasing the air pressure in the well casing. The easiest method is typically to use a mechanical slug – the water in the well will rise or fall by an amount equal to the slug volume.

Before the slug test is conducted, the depth to water will be measured from the top of the well casing riser and referenced to the ground surface. A slug of known volume will then be rapidly lowered into the well. The change in water level will be monitored using a manual water level sounder or a down-well pressure transducer and data logger. Transducers and data loggers provide much higher resolution than manual methods since several measurements per second can be taken in the early part of the test when the groundwater level changes are most rapid. The measurement intervals can be extended to a logarithmic time schedule later in the test when water level changes are slower. After the water level has returned to the static level, the slug will be rapidly raised out of the water. The water level will again be monitored as it returns to the static level. The water level changes during the test will be plotted in the field to ensure that enough data for analysis have been collected. The slug test will be repeated until two tests with enough data have been completed.

3.6.1.2 Pump Test

The typical steps for conducting an aquifer pump test are described below. The specific test parameters, such as pumping rates, number of observation wells, length of test, etc., should be determined based on the understanding of the aquifer system at the site and site-specific objectives. Additional guidance is provided in ASTM D4050-96 (2002), *Standard Test Method (Field Procedure) for Withdrawal and Injection Well Tests for Determining Hydraulic Properties of Aquifer Systems*.

Aquifer pump tests are generally conducted in two phases: a step drawdown test and a continuous rate test. The step drawdown test is used to determine the optimum pumping rate for the continuous rate test and includes four to six steps with each step increasing by some predetermined increment in pumping rate. Each step should last 1 to 2 hours or until equilibrium is attained. The optimum pumping rate will stress the aquifer so that a change in groundwater elevation is detected in observation wells at several distances from the pumping well, but will not cause the water level in the pumping well to be drawn down either below the screened interval (causing cascading water and entrained air in the well) or to the pump inlet level. Once the optimum pumping rate has been determined, a continuous pumping test will typically be conducted for approximately 24 to 48 hours.

Before the pump test is conducted, the depth to water will be measured from the top of the well casing riser and referenced to the ground surface. Pumping will be performed by installing a submersible pump in a well and using a flow valve to regulate the pump discharge rate. A minimum of three observation wells will be monitored during the tests. However, the number of observation wells may be greater, depending on the complexity of the site geology and the specific test objectives. Water levels in the pumping wells and observation wells will be measured with pressure transducers and recorded with data loggers on a logarithmic time schedule.

The field hydrogeologist will provide continuous onsite surveillance during the aquifer test. Field verification of the pumping test data will be conducted periodically by measuring the depth to water with an electric water level probe. Depth-to-water and pumping rate measurements will be taken every hour for the duration of the test. The pumping rate will be documented hourly by using a calibrated flow meter and will be periodically verified with a volume-time measurement.

Water quality will be monitored before, during, and after the test. Samples will be collected from the discharge pipe from the pumping well and analyzed for site-specific contaminants of concern and general water quality parameters (pH, temperature, and specific conductance). When the pumping test is complete, aquifer recovery will be measured for up to 8 hours.

3.6.1.3 Evaluating Slug and Pump Test Data

Hydraulic conductivity and other parameters can be calculated using commercially available software (for example, AQTESOLV < http://www.aqtesolv.com/>). A summary of test methods that are appropriate for different aquifer conditions is presented in ASTM D4043-96 (2004), *Standard Guide for Selection of Aquifer Test Method in Determining Hydraulic Properties by Well Techniques*.

3.6.2 Hydraulic Gradient and Groundwater Flow Direction

The hydraulic gradient is defined as the change in groundwater elevation with the change in distance in a given direction. Graphical techniques often work best to determine the hydraulic gradient and groundwater flow direction. The groundwater elevation will be determined from the depth to groundwater measured in a minimum of three monitoring wells. If not already known, the horizontal locations and elevations of the wells will be surveyed. Groundwater elevations at the measured locations are then plotted graphically to produce a groundwater contour map. For larger sites and greater numbers of wells, a surface contouring program such as Surfer® (Golden Software <http://www.goldensoftware.com/>) can be used. Assuming that the soils are relatively homogeneous, the groundwater flow direction will be perpendicular to the groundwater contours. The hydraulic gradient is then determined as the change in groundwater elevation over a given horizontal distance.

Groundwater gradient and flow direction may be influenced by aquifer heterogeneity and anisotropy. Heterogeneity describes the nonuniform nature of hydrogeologic formations caused by varying grain-size distributions, porosity, cementation, and geologic layer thickness. Anisotropy refers to hydraulic properties that vary with direction. With the exception of fractured bedrock, anisotropy is most often a function of the geometry of the voids within the porous medium. Heterogeneity and anisotropy can be observed on scales varying from individual pore spaces to portions of a site to an entire site. Field activities (for example, drilling soil boreholes and installing wells) and aquifer characterization tests can provide a sense of the heterogeneity and anisotropy at a site. Inadequate consideration of heterogeneity and anisotropy can lead to misinterpretation of hydraulic gradients and groundwater flow directions.

3.6.3 Aquifer Saturated Thickness

For an unconfined aquifer, the saturated thickness is the portion of the aquifer below the water table and above the lower confining unit. For a confined aquifer, the saturated thickness is the portion of the aquifer between two confining units. Determinations of saturated thickness will often require the drilling of deep test holes near the site. These test holes may be additional borings beyond those completed for soil sample collection and monitoring well installation. Alternatively, additional resources can be consulted. The U.S. Geological Survey (USGS) and the Alaska Department of Geological and Geophysical Surveys (DGGS) have published hydrogeologic data and the Alaska Department of Transportation and Public Facilities (ADOT&PF) and municipalities often have libraries of test hole and well logs related to road and utility construction projects. If data from these sources are sufficient, additional test holes are not required.

3.6.4 Precipitation Rate

Historical weather records will be used to determine the precipitation rate (for example, the Western Regional Climate Center's Alaska Climate Summaries <http://www.wrcc.dri.edu/summary/climsmak.html>). If records are not available for a site location, generalized data for a region or area can be used.

3.6.5 Seasonal Water Table Fluctuation

Groundwater elevations often rise and fall in response to seasonal variations in temperature and precipitation. Groundwater elevation data will be collected that are representative of both periods of low water (typically late winter conditions) and high water (typically late spring or autumn). Seasonal fluctuations may be characterized by manually collecting groundwater elevations during regular monitoring events. For more complex sites, transducers and data loggers can be used to collect water level data on a continuous basis.

3.6.6 Porosity

Porosity is the ratio of the volume of void spaces in a rock or sediment to the total volume. Total porosity is a calculated value derived from the lab-determined soil bulk density and specific gravity. The water- and air-filled porosity can be calculated using the moisture content of the soil.

3.6.7 Calculation of Dilution Attenuation Factor

Contaminants being transported by groundwater are subject to dilution and attenuation processes as they move through the soil environment, causing a reduction in the observed contaminant concentrations. Dilution is caused by the spreading of a contaminant plume downgradient of the source area by hydrodynamic dispersion. Attenuation is caused by abiotic oxidation and biodegradation and results in a reduction of contaminant mass in the aquifer. The combined effect of dilution and attenuation is estimated by the dilution attenuation factor (DAF). The DAF is useful because it relates the dissolved concentration in the source area to the dissolved concentration at potential receptor locations downgradient of the source area. The DAF may be used to assess whether soil concentrations are likely to cause groundwater contamination above either the maximum contaminant level (MCL) or a risk-based standard. The DAF is a function of hydraulic conductivity, hydraulic gradient, mixing zone depth, infiltration rate, and source length (ADEC, 2004).

3.7 Source and Plume Characterization

3.7.1 Free Product Mobility

When free product is present in site monitoring wells, the product may be mobile if it is continuously connected throughout the soil pore spaces, has sufficient thickness to overcome pore entry pressure, and has a pressure head or gradient acting upon it. Soil moisture retention curves are available for many soil types to determine the pore entry pressure. Soil moisture retention curves can also be determined by geotechnical tests (ASTM D6836-02, *Standard Test Methods for Determination of the Soil Water Characteristic Curve for Desorption Using a Hanging Column, Pressure Extractor, Chilled Mirror Hygrometer, and/or Centrifuge*). Example water-displacement pressures for several soil types, expressed as thickness of product, are available (Charbeneau *et al.*, 1999).

3.7.2 Dissolved Phase Plume Trend Analysis

The stability of the dissolved phase plume may be assessed by conducting a Mann-Kendall trend analysis of contaminant concentrations. The Mann-Kendall test (Gilbert, 1987) is a non-parametric test for detection of a trend in a time series. The test has no distributional assumptions. It permits irregularly spaced measurement periods and avoids biased estimates based on outliers in the data. To evaluate plume stability using the Mann-Kendall test, four or more independent sampling events are required

3.7.3 Natural Attenuation Parameters

Observed changes in groundwater geochemistry can provide evidence that biodegradation is occurring at a site. These observations can be used to estimate the mass of contaminants that are biodegraded through natural attenuation. This evaluation requires that a clean well, located upgradient of the contaminant source area, be used as a reference for background geochemistry. Groundwater near the center of a contaminant plume would be expected to have depleted levels of electron acceptors and raised levels of metabolic by-products compared to the groundwater at the background well location. Natural attenuation parameter analyses are described in Table 4-2.

Stoichiometric relationships can be used to determine the mass of contaminants degraded by biodegradation processes. The term "expressed assimilative capacity" (EAC) refers to the amount of intrinsic hydrocarbon mineralization resulting from aerobic and anaerobic biodegradation that can be accounted for by observed changes in concentrations of electron acceptors and metabolic by-products. The stoichiometric expressions for determining EACs are available (Wiedemeier *et al.*, 1999).

Additional sources are available for more in-depth discussions of methods of determining biodegradation rates, including the following documents:

- *Regression Techniques and Analytical Solutions to Demonstrate Intrinsic Bioremediation* (Buscheck and Alcantar, 1995)
- Biodegradation Rates for Fuel Hydrocarbons and Chlorinated Solvents in Groundwater (Suarez and Rifai, 1999)
- Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies (Newell *et al.*, 2002)

3.8 Equipment Decontamination

Decontamination of sampling equipment must be conducted consistently to ensure the quality of the samples collected. All equipment that comes into contact with potentially contaminated samples will be decontaminated. Disposable equipment intended for one-time use that is factory wrapped generally does not need to be decontaminated prior to use, unless evidence of contamination is present.

3.8.1 Sampling Equipment

Media sampling equipment, including split-barrel samplers, bailers, spoons, trowels, and pumps used to collect samples for chemical analyses, will be decontaminated before each use. The decontamination procedure will consist of the following steps:

- Non-ionic detergent wash
- Potable water rinse
- Distilled/deionized water rinse
- Air drying
- Wrapping sampler in new aluminum foil (shiny side out)

Exterior surfaces and accessible interior portions of submersible, centrifugal, and bladder pumps will be cleaned before each use, using the above-mentioned steps. Pumps, however, will not need to be wrapped in aluminum foil.

The wastewater from the decontamination activities will be disposed of according to the methods described in Section 3.9 of this SOP.

3.8.2 Field Measurement Equipment

Field measurement equipment will be kept as clean as possible to facilitate accurate performance and reduce cross-contamination. If necessary, field personnel will wrap field measurement equipment in plastic in order to keep the instruments clean. The outside of the instruments may be cleaned with a damp cloth. Sampling probes that are immersed in sample media will be decontaminated with a non-ionic detergent wash and rinsed in distilled water. The probes will be cleaned daily and stored overnight according to the manufacturer's recommended procedures.

3.8.3 Personnel

Personnel decontamination shall be completed as detailed in the health and safety plan (Appendix C).

3.8.4 Heavy Equipment

Procedures for the decontamination of heavy equipment will be developed on an as-needed basis and will depend upon facilities present at a given project site.

3.9 Investigation-Derived Waste

Investigation-derived waste (IDW) generated during implementation of this plan may include the following:

- IDW soil, consisting of drill cuttings and soil produced during well installation
- IDW water from drilling, monitoring well and groundwater probe development and sampling, equipment decontamination, and remediation system moisture separators

- IDW nonaqueous phase liquid (NAPL) from purging and sampling monitoring wells
- Other IDW consisting of personal protective equipment (PPE) and spent sampling materials (sample tubing)

Procedures for handling IDW are described in the following sections.

3.9.1 Soil IDW

IDW soil will be screened as it is being generated. If the IDW soil has a headspace PID reading of less than 50 parts per million by volume or does not appear to contain contamination through observations of staining or odor, the IDW soil may be returned to or spread in the vicinity of the borehole from which it originated. If the IDW soil is deemed contaminated, the soil will be placed in 55-gallon steel drums and staged at a project-specific location designated for soil IDW storage. Only cuttings from one location will be placed in each drum; drill cuttings from different locations will not be composited. The drums will be labeled on the top of their lids using a paint marker or indelible marker with the date of generation, boring identification number, drum contents, project contract number, and name and telephone number of the designated contact. Treatment or disposal methods for soil IDW will be evaluated on a site-specific basis and will be described in the site work plans.

3.9.2 Water IDW

All produced IDW water from purging, sampling and decontamination activities will be containerized, filtered though a sediment filter and granular activated carbon (GAC) canister, and discharged onsite within the area of contamination so it will infiltrate back into the soil. A sediment filter is required to remove particulates greater than 10 microns from the water and prevent clogging of the GAC filter. Water can be pumped through the filter system at 5 gallons per minute or less, or gravity fed though the system.

Breakthrough of contamination in the GAC effluent (the point when measurable contaminants are first detected in the effluent) typically occurs for fuel hydrocarbons when the weight of the contaminants in the influent is equal to approximately 10 percent of the weight of the activated carbon (or, for example, 3 pounds of hydrocarbons for a GAC with 30 pounds of activated carbon). Assuming the influent concentration is less than the solubility of diesel fuel (about 5 mg/L), the quantity of water that can be filtered with a GAC canister with 30 pounds of activated carbon is approximately 72,000 gallons (5 mg/L x 2.205×10^{-6} lbs/mg x 3.785 L/gal = 4.173×10^{-5} lbs/gal; 3 lbs/4.173×10^{-5} lbs/gal = 71,891 gallons). Other contaminants such as low molecular weight hydrocarbons and chlorinated solvents will generally achieve breakthrough more quickly, and should be addressed in the site-specific work plans. The field staff should collect discharge water that has been filtered periodically, at least twice during the filtration of each batch of water, in a bucket or other container. Observations should be made and recorded with respect to appearance, odor, and presence or absence of sheen, as an additional means of ensuring that the GAC filtration system is operating properly. The GAC filter should be disposed or regenerated by an approved facility prior to breakthrough.

No sheen or free product shall be filtered through the GAC canister, as this will rapidly exhaust the treatment capacity. If sheen or free product is observed on the drums of water prior to treatment, sorbent pads will be used to remove the product so that only water with dissolved-phase hydrocarbons is passed through the filter. The sorbent pads would then be placed in a drum and disposed of as oily wastes by an approved waste facility.

With approval from the FAA and ADEC, purge water and well development water with no visible product (sheen, globules, free-phase), will be discharged directly to the ground surface without filtering in an area of soil that is contaminated with the same petroleum contaminants of concern.

3.9.3 NAPL IDW

Free product and oily wastes will be containerized in a DOT-approved container and disposed at an approved waste facility. Shipping and manifesting requirements are described in Section 3.9.5.

3.9.4 PPE IDW

PPE and disposable sampling equipment will be disposed of in onsite dumpsters at the project sites or at the local landfill, unless specified differently in the site-specific work plan.

3.9.5 Hazardous Waste and Materials

Hazardous wastes or material generated during the project activities will be handled in accordance with industry standards and state and federal regulations. Applicable regulations include, but are not limited to the following: the Resource Conservation and Recovery Act: 40 Code of Federal Regulations (CFR) Parts: 260, 261, 262, 263, 268, and 279; the Toxic Substances Control Act: 40 CFR Part 761, the Hazardous Materials Transportation Act: 49 CFR Part: 171-179, Alaska Statues and Regulations: 46.03, 18 Alaska Administrative Code (AAC) 60, 18 AAC 62, and Canadian Import and Export Hazardous Regulations.

3.9.5.1 Shipping Requirements

Field personnel will ensure that all wastes shipped from FAA stations are specifically identified on shipping papers. Resource Conservation and Recovery Act (RCRA) hazardous wastes must be transported utilizing a uniform hazardous waste manifest and will be manifested separately from non-RCRA wastes. A non-hazardous waste manifest will be utilized for non-RCRA wastes. PCBs will be shipped using a uniform hazardous waste manifest and will be manifested separately from all other items. When possible, manifests will be pre-printed before mobilization to the field. The FAA requires 48 hours to review and approve pre-printed manifests. In cases where items are added or changed in the field, a copy of the manifest will be transmitted to FAA by FAX allowing reasonable time for FAA review and approval. Some non-hazardous articles such as scrap mental can be shipped on a straight-bill-of-lading. The field team leader is responsible for ensuring that the FAA receives legible copies of all shipping papers. All hazardous materials, which cannot be recycled or otherwise used, will be manifested to a Treatment, Storage, and Disposal Facility (TSDF) permitted by the EPA or the equivalent state agency. The TSDF will meet all requirements for TSDF as identified in 40 CFR Parts 264-268.

3.9.5.2 Manifests

All hazardous materials, substances, or wastes identified for handling and removal from the site will be packaged, labeled, marked and manifested according to applicable state and federal regulations (40 CFR 263). Verification of the accuracy and completeness of the manifests is the responsibility of the field team leader. All personnel responsible for preparing or reviewing manifests will have received a minimum of 40 hours of training pursuant with the requirements of 49 CFR Parts: 171-179 and training pursuant with 40 CFR Parts: 260, 261, 262, 263, 268, 279. The field representative is subject to removal from field activities if the field representative's knowledge of the regulations listed above is questioned by the Contracting Officer. The FAA Contracting Officer's Representative (COR) or On-site Technical Monitor (OTM) will sign the manifest after verification of the accuracy and completeness of the manifest and approval by designated FAA personnel. The field team leader will ensure that the FAA receives the correct generator copies of all manifests. The original generator copy of the hazardous waste manifest, signed by all transporters and the TSDF, and certificates of disposal, destruction, and/or treatment, will be provided to the FAA. The following information will be written in Block 3 of the manifest, under "Generator's Name and Mailing Address":

Federal Aviation Administration, SA PSU
700 North Boniface Parkway
Anchorage, AK 907-269-1150

All manifests will be numbered using the following format. The first 3 fields of the 5-digit manifest number will be the 3-letter station designator, such as AKN for King Salmon, which will immediately identify the manifest as originating in King Salmon. The remaining 2 fields will be numbers such as 01, 02, 03, etc., which will identify the individual manifest number (for example BET05). FAA will provide these numbers to the field team leader. The field team leader will not assign a manifest number that has not been provided by the FAA.

The field team leader is responsible for obtaining necessary profiles, preparing exception reports when required by 40 CFR 262.42 and 40 CFR 761.215, preparing Land Disposal Restriction Notification forms, and assuring the waste (both hazardous and solid) is ultimately disposed at the designated facility. RCRA and non-RCRA wastes will be manifested separately. Toxic Substances Control Act (TSCA) wastes, such as PCBs and asbestos will also be manifested separately. All manifests, shipping papers, and profiles will be submitted to FAA for a review a minimum of two full working days prior to shipment off site. The Contractor will provide ADEC a copy of the manifest within the time limit specified by 18 AAC 60 and 62.

3.9.5.3 Container Identification

All containers shipped under FAA manifests will be numbered using the following format. The first 2 fields of the 10-digit container number will be the last 2 digits of the year, such as 03. The next five fields will be the Manifest number, such as, ZAN01. The next field will be a dash, with the final 2 fields representing the individual container number, such as 01 (for example 03ZAN01-01). All container numbers will be represented on the manifest or continuation sheet.

3.9.5.4 Transportation

All transporters that handle, transport, or store materials included under this task order will possess hazardous materials transportation permits from the EPA or equivalent state agency. The permits will be current and the transporter will comply with all applicable regulations for handling and transporting hazardous materials. The Transporter must notify CH2M HILL immediately of any delays, problems, or violations of transport regulations that may occur during transport of materials.

3.10 Field Quality Control Samples

Quality control samples will be collected to monitor accuracy, precision, and the presence of field contamination for definitive analytical methods to be performed by the contracted primary laboratory. All field QC samples will be sent double-blind to the laboratory along with regular field samples. They will be labeled similar to regular field samples to disguise them.

3.10.1 Field Duplicate Samples

A field duplicate is an independent sample collected as close as possible to the original sample from the same source under identical conditions and is used to document sampling and analytical precision. Field duplicates will be collected at a minimum frequency of one per 10 samples (10 percent) for each matrix and for each type of analysis. The sampling locations for field duplicate samples will be recorded in the field logbook.

3.10.2 Equipment Rinsate Blanks

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring deionized water over the decontaminated equipment. Equipment rinsate blanks will be collected at a minimum of one per 20 samples (5 percent) each day that sampling equipment is decontaminated in the field. The equipment blanks will be analyzed by the laboratory for the same parameters specified for the corresponding matrix.

3.10.3 Trip Blanks

Trip blanks are used to monitor for contamination during sample shipping and handling, and for cross-contamination through volatile component migration among the collected samples. They are prepared in the laboratory by pouring organic-free water into a volatile component sample container. They are then sealed, transported to the field, stay sealed while volatile component samples are taken, and transported back to the laboratory in the same cooler as the volatile component samples. One trip blank should accompany each volatile component sample cooler.

3.10.4 Matrix Spike/Matrix Spike Duplicate

Matrix spike (MS) and matrix spike duplicate (MSD) samples consist of duplicate field sample aliquots spiked by the laboratory with analytes of concern to evaluate the effects of the matrix on the recoveries of these analytes. The need for MS/MSD samples will be specified on a project basis in the site-specific work plans. When required, MS/MSDs will be collected at the frequency of one per 20 samples (5 percent) of each matrix collected from each site, and designated on the COC for use as MS/MSD samples by the laboratory. The duplicate aliquots for MS/MSD analyses should be collected simultaneously or in immediate succession with the parent sample. They will be treated in exactly the same manner as the parent sample during storage and shipment. The sampling locations for the MS/MSD samples will be documented in the field logbook.

3.11 Sample Documentation and Tracking

3.11.1 Sample Labeling

Sample containers should be labeled with the following information:

- Project name
- Sampler's initials
- Date and time of collection
- Site location
- Sample number
- Preservation
- Method of analysis

Sample labels should not be placed on tared jars used for field-preserved analyses of soil samples, as this will affect the jar weight and bias the final results. These samples should be labeled using an indelible marker by writing directly on the sample bottle lids.

Sample identification and tracking procedures will incorporate the sample numbering system outlined below. The sample number should be written without dashes, commas, or spaces. Samples requiring multiple analyses and/or multiple containers will use a single number for all containers. A list of FAA station identifiers is provided in Appendix D. If the sample location is not at a facility identified in the list of facility identifiers, the identifier for the nearest facility with an identifier should be used. Additional numbers/letters may be added to the end of the code. The sample identification system is shown in Table 3-2.

Groundwater sample numbers are assigned sequentially by sampling round, by using the same well number. For example, MW001T01, MW001T02, and MW001T03 are the numbers for the groundwater samples from the initial and two successive rounds of groundwater samples obtained from Monitoring Well Number 001 at the Tank Farm. Duplicate samples for groundwater should use a fictional well number. Each sample obtained in the borehole will be assigned a sequential number starting with the surface sample. This includes samples that are only screened in the field. Samples sent to the laboratory must maintain the original number assigned and cannot be renumbered.

Trip blanks and equipment blanks do not need the final two digits. The blanks should be numbered sequentially for each station for each year. An example of a sample identification number is described in Table 3-3.

Table 3- 2

Sample Identification System

1. FAA Station Identifier		For example, TAL	
2. Year (last two digits)		For example, 03	
3. Sample Collection Method/Location			
Surface Soil Sample	SL	Subsurface Soil Sample	SS
Sediment Sample	SD	Monitoring Well	MW
Private Well	PW	Surface Water	SW
Drum	DR	Wipe Sample	WP
Trip Blank	TB	Equipment (Rinsate) Blank	EB
Observation Well	OW	Pump Test Well	PT
Storage Tank	ST	Transformer	TR
Asbestos Containing Material	AS	Sump	SP
Monitoring Probe	MP		
4. Location/Well Number		001-999	
5. Facility Identifier			
RCAG	C	Flight Service Station	F
Non-Directional Beacon	N	Quarters Area	Q
Runway/Runway Aids	R	Shop/Power/Storage	S
Tank Farm	T	VORTAC	V
Other	M		
6. Sample Number		01-99	
7. Number/Letter Identifiers		Optional Identifiers for Contractor's Use	

RCAG = Remote communication air-to-ground
VORTAC = Very-high frequency, omnidirectional range tactical aircraft control and navigation

Table 3- 3

Sample Identification System Examples

Example No. 1: TAL00MW001Q01

Code	Identification
TAL	= Tanana Station
00	= Sample collected in 2000
MW	= Monitoring well
001	= Sample location number 1
Q	= Sample location is near the living quarters
01	= The first sample from that location

Example No. 2: TAL00MP003R02

Code	Identification
TAL	= Tanana Station
00	= Sample collected in 2000
MP	= Sample collected from monitoring probe
003	= Monitoring probe number 3

Table 3- 3

Sample Identification System Examples

Example No. 1: TAL00MW001Q01	
Code	**Identification**
TAL	= Tanana Station
00	= Sample collected in 2000
MW	= Monitoring well
001	= Sample location number 1
Q	= Sample location is near the living quarters
01	= The first sample from that location
R	= The well is located near Runway-associated facilities/equipment
02	= The second round of sampling from MP003

3.11.2 Field Logs

The project field supervisor will be required to maintain a field logbook of daily activities. A separate logbook will be used for each project. It will be bound with consecutively numbered pages. All entries will be legibly written in black ink. Any entry errors are corrected by drawing one solid line through the incorrect entry followed by the user's initials and date. The bottom of each page is signed and dated by the individual making the entries. Factual and objective language will be used. All entries will be complete and accurate enough to allow reconstruction of each field activity. Activities should be recorded contemporaneously.

The field logbook cover will include the following information:

- Job name, contract and delivery order numbers
- Site activity name
- Start date
- End date of last logbook entry

Daily entries of the following minimum information will be recorded in the logbook as shown in Appendix B, Daily Sampling Log:

- Date and time, expressed in 24-hour (military) format
- Sampling start/stop times
- Weather conditions
- Personnel present
- Level of personal protection
- Field observations
- Site identification (visual sketches where appropriate)
- Location of sampling points (visual sketches where appropriate)
- Description of sample
- Sample identification number
- Number of samples taken

- Time of sample collection
- Number of QA/QC samples taken
- Type of field instrumentation
- Names of people collecting samples
- Decontamination procedures
- Any visitors to site and their level of protection
- All calibrations done
- Any other field instruments
- Any general observations or notes
- Any deviations from the sampling plan

3.11.3 Photographs

Photographs will be taken in the field to document sampling locations and conditions. Photographs of all samples will be taken with the sample number and depth clearly visible. A photographic log will be kept in which the date, location, and direction the photographer is facing (if appropriate) will be recorded. Photographs and/or slides and their negatives will be labeled, placed in a binder, and submitted at the end of the project.

3.11.4 Documentation Control

Project files will be maintained by the project task manager. Documents will be kept in the project files. Project personnel may keep their own duplicate files; however, all original documents will be placed in the official project file. Field logs of boring, sampling, and well installation activities will be maintained by the field supervisor and submitted to the task manager after the field effort.

3.12 Other Field Procedures

Other field procedures may be utilized for certain projects. Information pertaining to those procedures will be provided in the site-specific work plan or equivalent document.

SECTION 4

Sample Handling and Custody Requirements

4.1 Containers and Preservatives

The project laboratory will provide the required sample containers for all samples. All containers will have been cleaned and certified to be free of the analytes of concern for the project. No sample containers will be reused. Preservatives, if required, will be added by the laboratory prior to shipment of the sample containers to the field. The adequacy of preservation will be verified by the laboratory upon receipt of the samples, and additional preservative will be added, if necessary.

The containers, minimum sample quantities, required preservatives, and maximum holding times are shown in Tables 4-1 through 4-3.

Table 4- 1

Sample Collection Summary–Soil/Sediment

Parameter	Analytical Method[a]	Container[b]	Preservative	Maximum Holding Times
Gasoline-Range Organics	AK101	1 x 4-ounce (oz.) tared amber glass, Teflon-lined septa lid	Add 25 mL methanol to ~ 25 grams sample so that the sample is submerged, <25°C	28 days to analysis
Diesel-Range Organics	AK102	1 x 4-oz. wide-mouth amber glass, Teflon-lined lid	4+/-2°C	14 days to extraction 40 days to analysis
Residual-Range Organics	AK103	1 x 4-oz. wide-mouth amber glass, Teflon-lined lid	4+/-2°C	14 days to extraction 40 days to analysis
Volatile Petroleum Hydrocarbons (Gasoline-Range Organics Aromatic/Aliphatic)	WDOE[c]	1 x 2-oz. tared amber glass, Teflon-lined septa lid	4+/-2°C	14 days to analysis
Extractable Petroleum Hydrocarbons (Diesel-Range Organics Aromatic/Aliphatic)	WDOE[c]	1 x 4-oz. wide-mouth amber glass, Teflon-lined lid	4+/-2°C	14 days to extraction 40 days to analysis
Benzene, Toluene, Ethylbenzene, and Xylenes	8021B	1 x 4-oz. tared amber glass, Teflon-lined septa lid	Add 25 mL methanol to ~ 20 grams sample so that the sample is submerged, <25°C	14 days to analysis

Table 4- 1

Sample Collection Summary–Soil/Sediment

Parameter	Analytical Method[a]	Container[b]	Preservative	Maximum Holding Times
		lid	submerged, <25°C	
Volatile Organic Compounds	8260B	1 x 4-oz. tared amber glass, Teflon-lined septa lid	Add 25 mL methanol to ~ 25 grams sample so that the sample is submerged, <25°C	14 days to analysis
Organochlorine Pesticides/ Polychlorinated Biphenyls	8081A/8082	1 x 4-oz. glass	4+/-2°C	14 days to extraction 40 days to analysis
Organophosphorus Pesticides	8141A	1 x 4-oz. glass	4+/-2°C	14 days to extraction 40 days to analysis
Semivolatile Organic Compounds	8270C	1 x 4-oz. glass	4+/-2°C	14 days to extraction 40 days to analysis
Polynuclear Aromatic Hydrocarbons	8270C SIM	1 x 4-oz. glass	4+/-2°C	14 days to extraction 40 days to analysis
Dioxins/Furans	8290	1 x 4-oz. glass	4+/-2°C, store in dark	30 days to extraction 45 days to analysis
Metals	6010/6020/ 7000	1 x 4-oz. glass	4+/-2°C	24 hours for Cr VI; 28 days for mercury; 6 months for all others
Total Organic Carbon	9060A	1 x 4-oz. glass	4°C	14 days to extraction 40 days to analysis
Geotechnical Analyses				
Grain Size Analysis	ASTM D422-63 (2002)	1 x 8-oz. glass	NA	6 months
Soil Bulk Density	ASTM D2937-04	Shelby tube or brass sleeve	NA	6 months
Specific Gravity	ASTM D854-02	1 x 4-oz. glass	NA	6 months
Soil Moisture Content	ASTM D2216-05	1 x 4-oz. glass	3 to 30°C	As soon as practicable

[a]Unless otherwise specified, method numbers refer to EPA's *Test Methods for Evaluation of Solid Waste, Physical and Chemical Methods*, SW-846, 3rd edition, Revision 4, 1996.
[b]All glass containers have polytetrafluoroethylene-lined lids.
[c]Washington State Department of Ecology Method, 1997.

Notes:

Table 4- 1

Sample Collection Summary–Soil/Sediment

Parameter	Analytical Method[a]	Container[b]	Preservative	Maximum Holding Times

^{o}C = degrees Celsius
mL = milliliter
NA = not applicable

Table 4- 2

Sample Collection Summary–Aqueous/Liquid

Parameter	Analytical Method[a]	Container[b,c]	Preservative	Maximum Holding Times
Gasoline-Range Organics	AK101	2 x 40-mL amber glass, Teflon-lined septa lid	No headspace HCl to pH<2 4+/-2°C	14 days to analysis
Diesel-Range Organics	AK102	1 x 1-liter amber glass, Teflon-lined lid	HCl to pH<2 4+/-2°C	14 days to extraction 40 days to analysis
Residual-Range Organics	AK103	1 x 1-liter amber glass, Teflon-lined lid	HCl, H_2SO_4, or HNO_3 to pH<2, 4+/-2°C	7 days to extraction 40 days to analysis
Volatile Petroleum Hydrocarbons (Gasoline-Range Organics Aromatic/Aliphatic)	WDOE[e]	2 x 40-mL amber glass, Teflon-lined septa lid	No headspace HCl to pH<2 4+/-2°C	14 days to analysis
Extractable Petroleum Hydrocarbons (Diesel-Range Organics Aromatic/Aliphatic)	WDOE[e]	1 x 1-liter amber glass, Teflon-lined lid	HCl to pH<2 4+/-2°C	14 days to extraction 40 days to analysis
Benzene, Toluene, Ethylbenzene, and Xylenes	8021B	2 x 40-mL amber glass, septa lid	HCl to pH<2, 4+/-2°C; no headspace	14 days to analysis
Volatile Organic Compounds	8260B	2 x 40-mL amber glass, septa lid	HCl to pH<2, 4+/-2°C; no headspace	14 days to analysis
Volatile Organic Compounds	524.2 (Drinking water)	2 x 40-mL amber glass, septa lid	HCl to pH<2, 4+/-2°C; no headspace	14 days to analysis

Table 4- 2

Sample Collection Summary–Aqueous/Liquid

Parameter	Analytical Method[a]	Container[b,c]	Preservative	Maximum Holding Times
Organochlorine Pesticides/	8081A	1 x 1-liter amber glass	4+/-2°C	7 days to extraction 40 days to analysis
Polychlorinated Biphenyls	8082	1 x 1-liter amber glass	4+/-2°C	7 days to extraction 40 days to analysis
Organophosphorus Pesticides	8141A	1 x 1-liter amber glass	5< pH <9 with sulfuric acid or sodium hydroxide, 4+/-2°C	7 days to extraction 40 days to analysis
Semivolatile Organic Compounds	8270C	1 x 1-liter amber glass	4+/-2°C	7 days to extraction 40 days to analysis
Polynuclear Aromatic Hydrocarbons	8270C SIM	1 x 1-liter amber glass	4+/-2°C	7 days to extraction 40 days to analysis
Dioxins/Furans	8290	1 x 1-liter amber glass	If pH >9 adjust to pH 7-9 with sulfuric acid, 4+/-2°C, store in dark	30 days to extraction 45 days to analysis
Nitrite and Nitrate	352.2	500-mL polyethylene	H_2SO_4 to pH <2 4+/-2°C	28 days
Sulfate	300.0	125-mL polyethylene	4+/-2°C	28 days
Methane	RSK175	3 x 15-mL, glass, Teflon-lined septa lid	4+/-2°C; H_2SO_4 to pH<2	28 days for analysis
Dissolved Metals	6010/6020/7000	1 x 125-mL HDPE	Field filtered with 0.45 micron filter, HNO_3 to pH<2 4+/-2°C	28 days for mercury 6 months for all others
Total Metals[d] (except Chromium VI)	6010/6020/7000	1 x 250-mL HDPE	HNO_3 to pH<2 4+/-2°C	28 days for mercury 6 months for all others
Chromium VI	7196A	1 x 500-mL HDPE	4+/-2°C	24 hours
Natural Attenuation Parameters:				
Dissolved Oxygen	Field Method – DO probe or Hach Colorimetric OX-2P	NA	NA	NA

Table 4- 2

Sample Collection Summary–Aqueous/Liquid

Parameter	Analytical Method[a]	Container[b,c]	Preservative	Maximum Holding Times
Nitrate + Nitrite	300.0	1 X 500-mL HDPE	H_2SO_4 (pH<2) 4+/-2°C	28 days
Dissolved Iron	200.7	1 X 500-mL HDPE	Field filtered with 0.45 micron filter, HNO_3 (pH<2), 4+/-2°C	180 days
Dissolved Manganese	200.7	1 X 500-mL HDPE	Field filtered with 0.45 micron filter, HNO_3 (pH<2), 4+/-2°C	180 days
Sulfate	300.0	1 X 500-mL HDPE	4+/-2°C	28 days
Methane/Ethane/ Ethene	RSK175	3 x 15-mL, glass, Teflon-lined septa lid	4+/-2°C; H_2SO_4 to pH<2	28 days for analysis

[a]Unless otherwise specified, method numbers refer to EPA's *Test Methods for Evaluation of Solid Waste, Physical and Chemical Methods*, SW-846, 3rd edition, Revision 4, 1996.
[b]All glass containers have polytetrafluoroethylene-lined lids.
[c]Triple the amount per laboratory for samples designated for matrix spike/matrix spike duplicate.
[d]Water samples will be analyzed for total metals (unfiltered samples). Filtered samples for dissolved metals analysis will be collected on a project-by-project basis.
[e]Washington State Department of Ecology Method, 1997.

Notes:
°C = degrees Celsius
HCl = hydrochloric acid
HDPE = high-density polyethylene
HNO_3 = nitric acid
mL = milliliter
NA = Not applicable

Table 4- 3

Sample Collection Summary–Free Product

Parameter	Analytical Method	Container	Preservative	Maximum Holding Times
Extractable Petroleum Hydrocarbons	WDOE[a]	20-mL VOA	None	NA
Volatile Petroleum Hydrocarbons	WDOE[a]	20-mL VOA	None	NA

Table 4- 3

Sample Collection Summary–Free Product

Parameter	Analytical Method	Container	Preservative	Maximum Holding Times
Hydrocarbons				

[a]Washington State Department of Ecology Method, 1997.

Notes:
VOA = volatile organic analyses

Table 4- 4

Sample Collection Summary–Vapor

Parameter	Analytical Method	Container	Preservative	Maximum Holding Times
Total Petroleum Hydrocarbons (Gasoline)	T0-3[a]	SUMMA Passivated Canister	None	28 days
Total Non-Methane Petroleum Hydrocarbons	T0-12	SUMMA Passivated Canister	None	28 days
Volatile Organic Compounds	T0-14A	SUMMA Passivated Canister	None	25 days

[a]Analytical measurement of low-range petroleum products (gasoline) with petroleum hydrocarbon compounds corresponding to an alkane range of C_6 to C_{10}.

4.2 Chain of Custody

Procedures must be taken to preserve and ensure the integrity of all samples from the time of collection through analysis. Records of the custody of samples must be maintained both in the field and in the laboratory. A sample is considered to be in someone’s custody if it is in his or her physical possession or view, locked up, or kept in a secured and restricted area. Until the samples are shipped, their custody will be the responsibility of the sampling team leader.

COC records document sample collection and shipment to the laboratory. A COC form will be completed in duplicate, as a minimum, for each sampling event. The original COC form will be delivered with the sample shipping cooler, and the copy will be retained in the field documentation files. The COC form will identify the contents of each shipment and maintain the custodial integrity of the samples. All COC forms will be signed and dated by the responsible sampling team personnel. The “relinquished by” box will be signed by the responsible sampling team personnel, and the date, time, and air bill number (if applicable) will be noted on the COC.

Custody seals will be placed across the front and back edges of each sample cooler lid to maintain its integrity until it is opened by the laboratory. The shipping coolers containing the samples will be sealed with a custody seal any time they are not in someone's possession or view before shipping. All custody seals will be signed and dated by the responsible sampling team personnel.

The following information must be documented on the COC as a minimum:

- Project name, project number, and project manager's name
- Unique sample identification (no dashes, spaces, or commas)
- Date and time of sample collection
- Matrix
- Number of sample containers
- Analyses required
- Designation of MS/MSD samples
- Preservative used
- Name and signature of sampler, receiver
- Bill of lading or transporter tracking number (if applicable)
- Requested turnaround time

Custody must be maintained at the laboratory once samples are received until all tests are completed. This will be accomplished using an internal custody system that requires samples to be kept in a secured and restricted area when not in use, and to be checked out and checked back in by the analysts who use them. Internal custody records must be maintained by the laboratory as part of the documentation file for each sample.

4.3 Sample Packaging and Transport

To minimize the potential for degradation and to maintain a temperature of about 4°C, samples will be chilled in a cooler with an ice substitute (for example, blue ice) or ice in a resealable plastic bag. The COC form, and QA sample form, if required, will be filled out in indelible ink, placed in a resealable plastic bag, and taped to the inside lid of the shipping cooler. It is anticipated that most project samples will be environmental samples in small volumes. Environmental samples are samples with contaminant concentrations significantly reduced by normal environmental weathering processes such as volatilization to the air, degradation caused by exposure to sunlight and microbes, or simple mixing with soil or groundwater. As such, the samples present little shipping hazard in terms of corrosiveness, flammability, and explosiveness.

The following procedures will be followed in packing environmental samples:

- Check the sample container caps to make sure they are tightened properly. (Samples for volatile components must be discarded and recollected if the cap is loose.)

- Tape over the drain hole on the inside of the cooler.

- Place a layer of cushioning material in the bottom of the cooler.
- Enclose each bottle in a separate, clear, plastic bag and seal each bag. Place the bottles upright in the cooler so that they will not touch against each other during shipment.
- Place additional cushioning material around sample bottles, and fill voids between bottles.
- Place ice substitute between samples and over the containers to preserve them at approximately 4°C. (Note: loose bagged ice is not acceptable if coolers are transported by commercial aircraft)
- Fill the cooler with cushioning material.
- Tape the cooler drain shut from the outside of the cooler.
- Place completed COC form inside a resealable bag and tape the bag to the inside lid of the cooler.
- Close and latch the cooler. Wrap a strong adhesive tape around the ends of the cooler to secure it, making sure to cover the spigots at the bottom and any open space between the lid and the cooler. Tape the cooler latch closed with strapping tape.
- Seal the cooler with custody seals in two places, on the front and the rear, and seal the cooler with strapping tape. The signature on the custody seals should match the signature on the COC.
- Attach the completed shipping label to the top of the cooler; print “Laboratory Samples” and “This End Up” on the top of the cooler, and put upward-pointing arrows on all four sides. Place “Fragile” and “Chill, Do Not Freeze” labels on at least one side.

If the coolers are not to be delivered by hand to the project laboratory but shipped to the laboratory, the samples will be packaged for shipment according to DOT regulations. Marking and labeling procedures will be consistent with DOT regulations. The method of shipment, courier name(s), and other pertinent information will be entered on the COC form. Air bills will be properly completed, and copies will be retained and placed in the project file.

For environmental samples, no DOT marking, labeling, or shipping papers are required, and there are no DOT restrictions on the mode of transportation.

For hazardous samples, the following procedures must be followed:

- Place the sample container inside a 1-quart- or 1-gallon-size paint can. Fill the void space with vermiculite. Place the paint can in a cooler and pack as described above.
- Complete a carrier-approved air bill or shipper’s certification for restricted articles, providing the following information in the order listed:
  - “Flammable Liquid, No. UN 1993” or “Flammable Solid, No. UN 1325”
  - “Limited Quantity” (or “Ltd. Qty.”)
  - Net weight or net volume of total sample material in cooler
  - “Laboratory Samples”

  - "Cargo Aircraft Only"
- Affix a corporate address label to the cooler with the address of the laboratory.

DOT regulations do not apply to transport by government-owned vehicles, including aircraft.

4.5 Transfer of Custody and Shipment

When transferring the samples, the individuals relinquishing and receiving the samples will sign, date, and note the time on the COC form. If the samples are required to be shipped, the primary or QA laboratory coordinators will be notified of when and how samples were sent. Notification will include the following information:

- Date of shipment
- Name of shipping company
- Air bill number
- Number of coolers
- Name, phone number, and facsimile number of point of contact
- Estimated date of shipment arrival
- Type of samples (water, sediment, or soil)

On receipt of each sample cooler and after verification of the COC records, the primary or QA laboratory will provide a cooler receipt form documenting any discrepancies such as, but not limited to, the following:

- Inappropriate sample containers or preservation
- Broken sample containers
- Cooler temperature outside range of 2 to 6°C (where applicable)
- Missing COC form or QA sample form
- Errors on COC or QA sample form
- Missing custody seals

The laboratory will notify CH2M HILL of any such discrepancies within 24 hours of its receipt of the samples.

SECTION 5

Data Quality Objectives and Quality Assurance Program

The DQOs for each site are specified in a site-specific work plan or equivalent document. They are the basis for the design of the data collection plan, and as such, they specify the type, quality, and quantity of data to be collected, and how the data are to be used to make the appropriate decisions for the project. The DQOs are developed through a seven-step process, each step of which derives valuable criteria that are used to establish the final data collection design. The first five steps of the process identify mostly qualitative criteria such as what problem has initiated the project and what decision it attempts to resolve. They also define the type of data to be collected, where and when the data will be collected, and a decision rule that defines how the decision will be made. The sixth step defines quantitative criteria expressed as limits on decision errors that can be tolerated by the decision maker. The final step is the development of the data collection design based on the criteria developed in the previous six steps. The final output of the process is a data collection design that meets the qualitative and quantitative needs of the specific project.

5.1 Data Categories

Both screening and definitive data may be generated for projects covered by this SOP. Screening data are generated by rapid analytical methods, and involve less rigid sample preparation than that required for definitive data. Quantitation from a screening method is usually imprecise. Definitive data are generated by rigorous analytical methods using standardized calibration and quality controls, and are reported on specified deliverables. The data are analyte-specific, and both identification and quantitation are definite. Screening data will be confirmed with definitive data at a minimum 10 percent frequency.

The QC requirements specified in the remainder of this section will apply to definitive data only.

5.2 Precision, Accuracy, Representativeness, Completeness, and Comparability

Data quality will be evaluated based on their precision, accuracy, representativeness, completeness, and comparability.

5.2.1 Precision

Precision is a measure of reproducibility of analytical results. It can be defined as the degree of mutual agreement among individual measurements obtained under similar conditions. Total precision is a function of the variability associated with both sampling and analysis. Precision will be evaluated as the relative percent difference (RPD) between field duplicate sample results or between the MS/MSD results. Field duplicates will comprise 10 percent of the sampling effort. MS/MSD samples will be field designated at a 5 percent frequency. (These frequencies may vary according to the project needs, as defined in the site-specific work plan or equivalent document.)

5.2.2 Accuracy

Accuracy is the degree of agreement between a measured value and the "true" or expected value. As such, it represents an estimate of total error from a single measurement, including both systematic error (or “bias”) and random error that may reflect variability due to imprecision. Accuracy is evaluated in terms of percent recoveries determined from results of MS/MSD and laboratory control sample (LCS)/laboratory control sample duplicate (LCSD) analyses. Surrogate recoveries from samples analyzed for organic parameters are also used to assess accuracy.

5.2.3 Representativeness

Representativeness is the degree to which sample data accurately reflect the characteristics of a population of samples. It is achieved through a well-designed sampling program, and by using standardized sampling strategies and techniques and analytical procedures. Factors that can affect representativeness include site homogeneity, sample homogeneity at a single point, and available information around which the sampling program is designed. The use of multiple methods to measure an analyte can also result in non-representativeness of sample data.

5.2.4 Completeness

Completeness is a measure of the amount of valid measurements (that is, not rejected) compared to the total amount generated. It will be determined for each method, matrix, and analyte combination. The completeness goals of each project are optimized to meet the DQOs. The goals for this project are indicated in Tables 5-10 and 5-11.

5.2.5 Comparability

Comparability is the confidence with which one data set can be compared to another. It is achieved by maintaining standard techniques and procedures for collecting and analyzing samples and reporting the analytical results in standard units. Results of QA samples will provide additional information for assessing data comparability.

5.3 Method Detection Limits, Reporting Limits, and Instrument Calibration Requirements

5.3.1 Method Detection Limits

The method detection limit (MDL) is the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero. Each participating laboratory will determine the MDL for each method, matrix, and analyte for each instrument that will be used to analyze samples. The MDLs will be initially determined prior to analyzing samples, and will be redetermined at least once every 12 months. Where multiple instruments are used, the MDL of the least sensitive instrument will be used for reporting purposes.

The MDL determinations will be conducted as follows:

- Spike seven replicates of matrix (reagent water for aqueous methods, Ottawa sand for soil methods) with an analyte concentration equivalent to either instrument signal/noise ratio of 2.5 to 5, or 3 times the standard deviation of replicate measurements of the analyte in reagent water, or the region of the standard curve where there is a significant change in sensitivity (that is, a break in the slope).
- Prepare and analyze the seven replicate spikes.
- Calculate the MDL as 3.14 times the standard deviation of the seven replicate results.
- If the spike level used in the first step is more than 10 times the calculated MDL, repeat the process using a smaller spike level.

5.3.2 Reporting Limits

The calculated MDL may not be more than the reporting limit (RL). When calibrating instruments, a standard at a concentration equal to or less than the RL must be included. Analytes at concentrations greater than the laboratory's MDL, but less than the RL will be flagged as estimated with a "J" qualifier. Analytes that are not detected at or above the laboratory's MDL will be reported as not detected at the RL, and flagged "U." Reporting limits, as well as sample results shall be reported to 2 significant figures if less than 10 (regardless of the unit) and to 3 significant figures otherwise. They shall be reported on a dry-weight basis for soil samples.

5.3.3 Instrument Calibration

Laboratory instruments shall be appropriately calibrated by qualified personnel prior to sample analysis according to the procedures specified in each method. Calibration shall be verified at the specified intervals throughout the analysis sequence. The frequency and acceptance criteria for calibration are specified for each analytical method. When multi-point calibration is specified, the concentrations of the calibration standards should bracket those expected in the samples. Samples should be diluted, if necessary, to bring analyte responses within the calibration range. Data that exceed the calibration range cannot be reported by the laboratory. Those that are below the lowest calibration point must be flagged as estimated with a "J" qualifier. When the shape of the calibration curve requires that a quadratic or higher order equation be used, the number of additional standards specified in the method must be analyzed. The initial calibration curve shall be verified as accurate with a standard purchased or prepared from an independent second source. The initial calibration verification involves the analysis of a standard containing all the target analytes, typically in the middle of the calibration range, each time the initial calibration is performed, unless specified otherwise for a particular method in the SOP.

For Method 8082, the initial five-point calibration will be performed using a mixture of Aroclor-1016 and Aroclor-1260 to evaluate the linearity of the detector response. For the remaining Aroclors, a mid-level standard will be analyzed to aid in pattern recognition. If any of these remaining Aroclors is positively identified in a sample, five-point calibration will be performed for that Aroclor, and sample quantitation will be performed using the five-point calibration.

5.4 Elements of Quality Control

Laboratory QC checks are used to provide indications of the state of control that prevailed at the time of sample analysis. QC checks that involve field samples, such as matrix and surrogate spikes and field duplicates, also provide an indication of the presence of matrix effects. Field-originated blanks provide a way to monitor for potential contamination that field samples are subjected to. The SOP specifies requirements for method blanks (MBs), laboratory control samples, surrogate spikes, and MS/MSD samples that must be followed by laboratories participating in the data collection effort. Laboratory QC samples (blanks and LCS) must be included with each preparation or analytical batch of 20 or fewer environmental samples (including MS/MSD samples) of similar matrix. Each preparation or analytical batch should be identified in such a way as to be able to associate environmental samples with the appropriate laboratory QC samples.

5.4.1 Method Blank

Blanks are used to monitor each preparation or analytical batch for interference and/or contamination from glassware, reagents, and other potential contaminant sources within the laboratory. A MB is analyte-free matrix (laboratory reagent water for aqueous samples or Ottawa sand for soil samples) to which all reagents are added in the same amount or proportions as are added to samples. It is processed through the entire sample preparation and analytical procedures along with the samples in the batch. There should be at least one MB per preparation or analytical batch. If a target analyte is found at a concentration that exceeds the reporting limit, corrective action must be performed to identify and eliminate the contamination source. All associated samples must be reprepared and/or reanalyzed after the contamination source has been eliminated. No analytical data may be corrected for the concentration found in the blank.

5.4.2 Laboratory Control Sample

The LCS/LCSD will consist of analyte-free matrix (laboratory reagent water for aqueous samples or Ottawa sand for soil samples) spiked with known amounts of analytes that come from a source different than that used for calibration standards. Target analytes specified in the SOP will be spiked into the LCS/LCSD. The spike levels should be less than or equal to the mid-point of the calibration range. If LCS/LCSD recoveries and relative percent difference between the recoveries are outside the specified control limits, corrective action must be taken, including sample repreparation and/or reanalysis, if appropriate. If more than one LCS/LCSD sets are analyzed in a preparation or analytical batch, the results of all the sets must be reported.

Only Aroclors 1016 and 1260 need be spiked into the LCS/LCSD for Method 8082. All target analytes must be spiked for all other methods.

5.4.3 Surrogates

Surrogates are organic analytes that behave similarly as the analytes of interest but that are not expected to occur naturally in the samples. They are spiked into the standards, and into the samples and QC samples prior to sample preparation. Recoveries of surrogates are used as an indicator of accuracy, method performance, and extraction efficiency. If surrogate recoveries are outside the specified control limits, corrective action must be taken, including sample repreparation and/or reanalysis, if appropriate.

5.4.4 Matrix Spike/Matrix Spike Duplicates

A sample matrix fortified with known quantities of specific compounds is an MS. It is subjected to the same preparation and analytical procedures as the native sample. Target analytes specified in the SOP are spiked into the sample. MS recoveries are used to evaluate the effect of the sample matrix on the recovery of the analytes of interest. An MSD is a second fortified sample matrix. The RPD between the results of the MSDs is used as a measure of the precision of sample results. Only project-specific samples designated on the COC will be spiked. The spike levels will be less than or equal to the mid-point of the calibration range.

For metals analysis, it is not necessary to spike sodium, potassium, calcium, and magnesium into aqueous samples, or sodium, potassium, calcium, magnesium, iron, manganese, and aluminum into soil samples. The native concentrations of these low-toxicity metals are usually relatively high.

Multicomponent pesticides need not be spiked into the MS/MSD for Method 8081A.

Only Aroclors 1016 and 1260 need be spiked into the MS/MSD for Method 8082.

5.4.5 Internal Standards

Some methods require the use of internal standards to compensate for losses during injection or purging or losses due to viscosity effects. Internal standards are compounds that have similar properties as the analytes of interest, but are not expected to occur naturally in the samples. A measured amount of the internal standard is added to the standards, and to the samples and QC samples following preparation. When the internal standard results are outside the control limits, corrective action must be taken, including sample reanalysis, if appropriate.

5.4.6 Interference Check Samples

The interference check samples (ICS) are used in inductively coupled plasma analyses to verify background and interelement correction factors. They consist of two solutions, A and B. Solution A contains the interfering analytes, and Solution B contains both the analytes of interest and the interfering analytes. Both solutions are analyzed at the beginning and at the end of each analytical sequence. When the ICS results are outside the control limits, corrective action must be taken, including sample reanalysis, if appropriate.

5.4.7 Retention Time Windows

Retention time windows for gas and liquid chromatographic analyses must be established by replicate injections of the calibration standard over multiple days as described in the appropriate method. The absolute retention time of the calibration verification standard at the start of each analytical sequence will be used as the centerline of the window. In order for an analyte to be reported as positive, its retention time must be within the window.

5.4.8 Field Duplicate Samples

A field duplicate is an independent sample collected as close as possible to the original sample from the same source under identical conditions. It is used to document sampling and analytical precision. Field duplicates will be collected at a minimum frequency of one per 10 samples (10 percent) for each matrix and for each type of analysis. The sampling locations for field duplicate samples will be recorded in the field logbook.

5.4.9 Equipment Rinsate Blanks

Equipment rinsate blanks will be collected to evaluate field sampling and decontamination procedures by pouring deionized water over the decontaminated equipment. Equipment rinsate blanks will be collected at a minimum of one per 20 samples (5 percent) each day that sampling equipment is decontaminated in the field. The equipment blanks will be analyzed by the laboratory for the same parameters specified for the corresponding matrix.

5.4.10 Trip Blanks

Trip blanks are used to monitor for contamination during sample shipping and handling, and for cross-contamination through volatile component migration among the collected samples. They are prepared in the laboratory by pouring organic-free water into a volatile component sample container. They are then sealed, transported to the field, stay sealed while volatile component samples are taken, and transported back to the laboratory in the same cooler as the volatile component samples. One trip blank should accompany each volatile component sample cooler.

5.5 Additional Quality Control Requirements

5.5.1 Holding Time

The holding time requirements specified in this SOP must be met. For methods requiring both sample preparation and analysis, the preparation holding time will be calculated from the time of sampling to the completion of preparation. The analysis holding time will be calculated from the time of completion of preparation to the time of completion of the analysis, including any required dilutions, confirmation analysis, and reanalysis. For methods requiring analysis only, the holding time is calculated from the time of sampling to completion of the analysis, including any required dilutions, confirmation analysis, and reanalysis.

5.5.2 Confirmation

Confirmation analysis must be carried out as specified for specific methods when the result is at or above the reporting limit. The result designated as the primary result will be reported, except that for Method 8290, the result obtained from the DB-225 column will be reported. All calibration and QC requirements must be met when confirmation analysis is carried out.

5.5.3 Cleanup Procedures to Minimize Matrix Effects

In order to maintain the lowest possible reporting limits, appropriate cleanup procedures should be employed when necessary. Methods for sample cleanup include, but are not limited to, gel permeation chromatography, silica gel, alumna, florisil, mercury (sulfur removal), sulfuric acid, and acid/base partitioning. MBs, MS/MSDs, and laboratory control samples must be subjected to the same cleanup procedures performed on the samples to monitor the efficiencies of these procedures.

5.5.4 Sample Dilution

Dilution of a sample results in elevated reporting limits and ultimately affects the usability of the data related to potential actions at the sampling site. It is important to minimize dilutions and maintain the lowest possible reporting limits. When dilutions are necessary due to high concentrations of target analytes, lesser dilutions should also be reported in order to fully characterize the sample for each analyte. The level of the lesser dilution should be such that it will provide the lowest possible reporting limits without having a lasting deleterious effect on the analytical instrumentation.

5.5.5 Standard Materials and Other Supplies and Consumables

Standard materials must be of known high purity and traceable to an approved source. Pure standards must not exceed the manufacturer's expiration date or one year following receipt, whichever comes first. Solutions prepared by the laboratory from the pure standards must be used within the expiration date specified in the laboratory's standard operating procedure (SOP).

All other supplies and consumables must be inspected prior to use to ensure that they meet the requirements specified in the appropriate SOP. The laboratory's inventory and storage system should ensure their use within the manufacturer's expiration date, and storage under proper conditions.

5.6 Reporting Limits and Analytical Requirements

The methods to be used and the RL objectives are listed in Tables 5-1 through 5-9. The accuracy, precision, and completeness objectives are listed in Table 5-10 and 5-11. Calibration and QC requirements are specified in Tables 5-12 through 5-22.

Table 5- 1

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
Aluminum	100	10
Antimony	50	0.2
Arsenic	2.0	1
Barium	20	30
Beryllium	5	0.5
Cadmium	2	1
Calcium	200	20
Chromium VI (7196A)	10	2
Chromium (total)	10	2
Cobalt	60	1
Copper	10	2
Iron	100	10
Lead	2	1
Magnesium	200	20
Manganese	10	1
Mercury (7470A/7471A)	0.2	0.2
Nickel	40	4
Silver	10	2
Selenium	2	1
Sodium	1,000	100
Potassium	1,000	200
Thallium	2	1
Vanadium	5	2.5
Zinc	20	2

[a]Mercury by Method 7470A/7471A and chromium VI by Method 7196A; all others by Method SW6010, SW6020, or the corresponding series 7000 method that will achieve the reporting limit.

Table 5- 2

Reporting Limit Objectives
Method AK101/AK102/8021B

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)	Reporting Limits Air (parts per billion per volume)
Gasoline-Range Organics (AK101)	100	1	0.05
Diesel-Range Organics (AK102)	250	10	NA
Benzene, Toluene, Ethylbenzene, and Xylenes (8021B)	1.0	0.025	NA

Notes:
NA = not applicable

Table 5- 3

Reporting Limit Objectives
Method 8081A

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
4,4'-DDD	0.020	0.0033
4,4'-DDE	0.020	0.0033
4,4'-DDT	0.020	0.0033
Aldrin	0.010	0.0017
Alpha-BHC	0.010	0.0017
Chlordane	0.010	0.0017
Delta-BHC	0.010	0.0017
Dieldrin	0.020	0.0033
Endosulfan I	0.020	0.0033
Endosulfan II	0.020	0.0033
Endosulfan sulfate	0.020	0.0033
Endrin	0.020	0.0033
Endrin aldehyde	0.020	0.0033
Gamma-BHC (Lindane)	0.010	0.0017
Heptachlor	0.010	0.0017
Heptachlor epoxide	0.010	0.0017
Methoxychlor	0.10	0.017
Toxaphene	1.0	0.17
B-BHC	0.01	0.0017

Table 5- 4

Reporting Limit Objectives
Method 8082

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
Aroclor –1016	0.5	0.033
Aroclor –1221	0.5	0.067
Aroclor –1232	0.5	0.033
Aroclor –1242	0.5	0.033
Aroclor –1248	0.5	0.033
Aroclor –1254	0.5	0.033
Aroclor –1260	0.5	0.033

Table 5- 5

Reporting Limit Objectives
Method 8141A

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
Azinphos methyl	0.10	5.0
Bolstar	0.070	3.5
Chlorpyrifos	0.070	5.0
Coumaphos	0.20	10
Demeton-O and Demeton-S	0.12	6.0
Diazinon	0.20	10
Dichlorvos	0.80	40
Disulfoton	0.070	3.5
Ethoprop	0.20	10
Fensulfothion	0.080	4.0
Fenthion	0.080	5.0
Merphos	0.20	10
Mevinphos	0.50	25
Naled	0.50	25
Parathion methyl	0.12	6.0
Phorate	0.040	2.0
Ronnel	0.070	3.5
Stirophos	80	40

Table 5- 5

Reporting Limit Objectives
Method 8141A

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
Takuthion	0.070	5.5

Table 5- 6

Reporting Limit Objectives
Methods SW8260B/TO-14A/TO-3

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)	Reporting Limits Vapor (parts per billion by volume)
1,1-Dichloroethene	1.0	0.010	0.50
1,1-Dichloroethane	1.0	0.010	0.50
1,1,1-Trichloroethane	1.0	0.010	0.50
1,1,2-Trichloroethane	1.0	0.010	0.50
1,1,2,2-Tetrachloroethane	1.0	0.010	0.50
1,2-Dichloroethane	1.0	0.010	0.50
1,2-Dichloropropane	5.0	0.010	0.50
1,2-Dibromo-3-chloropropane	1.0	0.010	NA
1,2-Dibromoethane (EDB)	1.0	0.010	NA
1,2-Dichlorobenzene	1.0	0.010	0.50
1,2,3-Trichlorobenzene	1.0	0.010	NA
1,2,4-Trichlorobenzene	1.0	0.010	0.50
1,2,3-Trichloropropane	1.0	0.010	NA
1,2,4-Trimethylbenzene	1.0	0.010	0.50
1,3,5-Trimethylbenzene	1.0	0.010	0.50
1,3-Dichlorobenzene	1.0	0.010	0.50
1,4-Dichlorobenzene	1.0	0.010	0.50
1,3-Dichloropropane	1.0	0.010	NA
1,1-Dichloropropene	1.0	0.010	NA
1,1,1,2-Tetrachloroethane	1.0	0.010	NA
2,2-Dichloropropane	1.0	0.010	NA
2-Butanone	2.0	0.010	2.0
2-Chlorotoluene	1.0	0.010	NA
4-Chlorotoluene	1.0	0.010	NA
Acetone	2.0	0.010	2.0
Benzene	1.0	0.010	0.50
Bromobenzene	1.0	0.010	NA
Bromochloromethane	1.0	0.010	NA
Bromodichloromethane	1.0	0.010	2.0
Bromoform	1.0	0.010	2.0
Bromomethane	1.0	0.010	0.50
Carbon tetrachloride	1.0	0.010	0.50
Chlorobenzene	1.0	0.010	0.50

Table 5- 6

Reporting Limit Objectives
Methods SW8260B/TO-14A/TO-3

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)	Reporting Limits Vapor (parts per billion by volume)
Chloroethane	1.0	0.010	0.50
Chloroform	1.0	0.010	0.50
Chloromethane	1.0	0.010	0.50
cis-1,3-Dichloropropene	1.0	0.0050	0.50
cis-1,2-Dichloroethene	1.0	0.010	0.50
Dibromochloromethane	1.0	0.010	2.0
Dibromoethane	1.0	0.010	NA
Dichlorodifluoromethane	1.0	0.010	NA
Ethylbenzene	1.0	0.010	0.50
Hexachlorobutadiene	1.0	0.010	0.50
Isopropylbenzene	1.0	0.010	NA
Methylene chloride	2.0	0.010	0.50
n-Butylbenzene	1.0	0.010	NA
n-Propylbenzene	1.0	0.010	NA
Naphthalene	1.0	0.010	NA
p-Isopropyltoluene	1.0	0.010	NA
sec-Butylbenzene	1.0	0.010	NA
Styrene	1.0	0.010	0.50
tert-Butylbenzene	1.0	0.010	NA
Tetrachloroethene	1.0	0.010	0.50
Toluene	1.0	0.010	0.50
o-Xylene	1.0	0.010	0.50
p,m-Xylenes	1.0	0.010	0.50
trans-1,2-Dichloroethene	1.0	0.010	2.0
trans-1,3-Dichloropropene	1.0	0.0050	0.50
Trichloroethene	1.0	0.010	0.50
Trichlorofluoromethane	1.0	0.010	NA
Vinyl chloride	1.0	0.010	0.50
Total petroleum hydrocarbon-gasoline	NA	NA	0.050

Notes:
NA = not applicable

Table 5- 7

Reporting Limit Objectives
Method 8270C

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
1,2-Dichlorobenzene	5.0	0.33
1,3-Dichlorobenzene	5.0	0.33
1,2,4-Trichlorobenzene	5.0	0.33
2,4-Dimethylphenol	5.0	0.33
2,4-Dichlorophenol	5.0	0.33
2,4,5-Trichlorophenol	20	0.80
2,4,6-Trichlorophenol	5.0	0.33
2,4-Dinitrophenol	20	0.33
2,4-Dinitrotoluene	5.0	0.33
2,6-Dinitrotoluene	5.0	0.33
2-Chloronaphthalene	5.0	0.33
2-Chlorophenol	5.0	0.33
2-Methylnaphthalene	5.0	0.33
2-Methylphenol	5.0	0.33
2-Nitroaniline	50	0.80
2-Nitrophenol	5.0	0.33
3,3-Dichlorobenzidine	5.0	0.33
3-Nitroaniline	20	0.33
4,6-Dinitro-2-methylphenol	20	0.80
4-Bromophenyl phenyl ether	5.0	0.33
4-Chloro-3-methylphenol	5.0	0.33
4-Chloroaniline	5.0	0.33
4-Chlorophenyl phenyl ether	5.0	0.33
4-Methylphenol	5.0	0.33
4-Nitroaniline	20	0.80
4-Nitrophenol	20	0.33
Acenaphthene	5.0	0.33
Acenaphthylene	5.0	0.33
Anthracene	5.0	0.33
Benzo(a) anthracene	5.0	0.33
Benzo(a) pyrene	10	0.33
Benzo(b)fluoranthene	10	0.33
Benzo(g,h,i) perylene	5.0	0.33
Benzo(k)fluoranthene	10	0.33
Benzoic acid	5.0	0.33

Table 5- 7

Reporting Limit Objectives
Method 8270C

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
Benzyl alcohol	5.0	0.33
bis(2-Chloroethoxy)methane	5.0	0.33
bis(2-Chloroethyl)ether	10	0.33
bis(2-Chloroisopropyl)ether	5.0	0.33
bis(2-Ethylhexyl)phthalate	5.0	0.33
Butylbenzyl phthalate	5.0	0.33
Chrysene	10	0.33
di-n-Butyl phthalate	5.0	0.33
di-n-Octyl phthalate	5.0	0.33
Dibenzo(a,h) anthracene	10	0.33
Dibenzofuran	5.0	0.33
Diethylphthalate	5.0	0.33
Dimethylphthalate	5.0	0.33
Fluoranthene	5.0	0.33
Fluorene	5.0	0.33
Hexachlorobenzene	10	0.33
Hexachlorobutadiene	5.0	0.33
Hexachlorocyclopentadiene	5.0	0.33
Hexachloroethane	5.0	0.33
Indeno(1,2,3-c,d)pyrene	10	0.33
Isophorone	5.0	0.33
n-Nitroso-di-n-propylamine	10	0.33
n-Nitrosodiphenylamine	5.0	0.33
Naphthalene	5.0	0.33
Nitrobenzene	5.0	0.33
Pentachlorophenol	50	0.80
Phenanthrene	5.0	0.33
Phenol	5.0	0.33
Pyrene	5.0	0.33

Table 5- 8

Reporting Limit Objectives
Method PAH SIM 16

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (micrograms per kilogram)
Acenaphthylene	0.015	1.5
Acenaphthene	0.015	1.5
Fluorene	0.015	1.5
Phenanthrene	0.031	1.5
Anthracene	0.015	1.5
Pyrene	0.015	1.5
Benzo(a) anthracene	0.015	1.5
Chrysene	0.015	1.5
Benzo(b)fluoranthene	0.015	1.5
Benzo(k)fluoranthene	0.015	1.5
Benzo(a) pyrene	0.015	1.5
Indeno(1,2,3-c,d)pyrene	0.015	1.5
Dibenzo(a,h) anthracene	0.01	1.5
Benzo(g,h,i) perylene	0.015	1.5
Naphthalene	0.015	1.5

Table 5- 9

Reporting Limit Objectives
Method 8290

Analyte	Reporting Limits Liquid (picograms per liter)	Reporting Limits Solid (nanograms per kilogram)
2,3,7,8-TCDD	5.0	1.0
1,2,3,7,8-PeCDD	50	5.0
1,2,3,4,7,8-HxCDD	50	5.0
1,2,3,6,7,8-HxCDD	50	5.0
1,2,3,7,8,9-HxCDD	50	5.0
1,2,3,4,6,7,8-HpCDD	50	5.0
OCDD	100	10
2,3,7,8-TCDF	10	1.0
1,2,3,7,8-PeCDF	50	5.0
2,3,4,7,8-PeCDF	50	5.0
1,2,3,4,7,8-HxCDF	50	5.0
1,2,3,6,7,8-HxCDF	50	5.0
2,3,4,6,7,8-HxCDF	50	5.0
1,2,3,7,8,9-HxCDF	50	5.0
1,2,3,4,6,7,8-HpCDF	50	5.0
1,2,3,4,7,8,9-HpCDF	50	5.0
OCDF	100	10

Table 5- 10

Reporting Limit Objectives
Washington State Department of Ecology (WDOE) Methods

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
VPH Fractions – each aliphatic or aromatic carbon range	50.0	5.0
VPH Fractions – individual target	5.0	0.5

Table 5- 10

Reporting Limit Objectives
Washington State Department of Ecology (WDOE) Methods

Analyte	Reporting Limits Liquid (micrograms per liter)	Reporting Limits Solid (milligrams per kilogram)
compounds		
EPH Fractions – each aliphatic or aromatic carbon range	50.0	5.0
EPH Fractions – individual target compounds	5.0	0.5

Notes:
EPH = Extractable Petroleum Hydrocarbon
VPH = Volatile Petroleum Hydrocarbon

Table 5- 11

Accuracy, Precision, and Completeness Objectives–Liquid and Solid

Method	Analyte	Accuracy Liquid (% R)	Precision Liquid (% RPD)	Completeness Liquid (%)	Accuracy Solid (% R)	Precision Solid (% RPD)	Completeness Solid (%)
6020B/7000	Metals	80-120	≤ 20	90	75-125	≤ 40	90
AK101	Gasoline-Range Organics	60-120	≤ 20	90	50-150	≤ 40	90
	Surrogate	50-150	NA	NA	50-150	NA	NA
AK102	Diesel-Range Organics	75-125	≤ 30	90	50-150	≤ 40	90
	Surrogate	50-150	NA	NA	50-150	NA	NA
8021B	Benzene, Toluene, Ethylbenzene, and Xylenes	70-133	≤ 20	85	60-143	≤ 30	85
	Surrogate	70-130	NA	NA	70-130	NA	NA
8081A/8082	Organochlorine Pesticide/ Polychlorinated Biphenyl	60-140	≤ 30	90	50-150	≤ 40	90
	Surrogate	40-140	NA	NA	40-140	NA	NA
8141A	Organophosphorus Pesticide	60-140	≤ 20	90	50-150	≤ 30	90
	Surrogate	40-140	NA	NA	50-150	NA	NA
8260B	Volatile Organic Compounds	70-130	≤ 15	90	60-140	≤ 25	90
	Surrogate	70-130	NA	NA	70-130	NA	NA
8270C	Semivolatile Organic Compounds	12-127	≤ 30	90	12-127	≤ 40	90
	Acid Surrogate	35-140	NA	NA	35-140	NA	NA
	Base/Neutral Surrogate	45-135	NA	NA	45-135	NA	NA
8290	Dioxin/Furan	NA	≤ 20 (MS/MSD) ≤ 25 (Lab Dup) ≤ 30 (Field dup)	85	NA	≤ 20 (MS/MSD) ≤ 25 (Lab Dup) ≤ 40 (Field dup)	85
WDOE	Volatile Petroleum Hydrocarbons	70-130	≤ 25	90	70-130	≤ 25	90
	Surrogate	60-140	NA	NA	60-140	NA	NA
WDOE	Extractable Petroleum Hydrocarbons	50-150 (MS/MSD) 70-130 (LCS)	≤ 25	90	50-150 (MS/MSD) 70-130 (LCS)	≤ 25	90
	Surrogate	60-140	NA	NA	60-140	NA	NA

Notes:
LCS = laboratory control sample
MS/MSD = matrix spike/matrix spike duplicate
NA = not applicable
RPD = relative percent difference

Table 5- 12

Accuracy, Precision, and Completeness Objectives–Vapor

Method	Analyte	Accuracy Vapor (% R)	Precision Vapor (% relative percent difference)	Completeness Vapor (%)
TO-14A	Volatile Organic Compounds	70-135	≤ 20	90
TO-3	Total Petroleum Hydrocarbon–Gasoline	70-135	≤ 20	90

TABLE 5- 13

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action[a]
Initial calibration (minimum 1 standard and a blank)	Daily initial calibration prior to sample analysis	NA	NA
Initial calibration verification (second source)	Daily after initial calibration	All analytes within ±10% of expected value	Correct problem then repeat initial calibration
Calibration blank	After every calibration verification	No analytes detected ≥ RL	Correct problem then analyze calibration blank and previous 10 samples
Calibration verification (Instrument Check Standard)	After every 10 samples and at the end of the analysis sequence	All analyte(s) within ±10% of expected value and RSD of replicate integrations <5%	Repeat calibration and reanalyze all samples since last successful calibration
Method blank	One per analytical batch	No analytes detected ≥ RL	Correct problem then reprep and analyze method blank and all samples processed with the contaminated blank
ICS	At the beginning of an analytical run	Within ±20% of expected value	Terminate analysis; correct problem; reanalyze ICS; reanalyze all affected samples
LCS for the analyte	One LCS per analytical batch	All analytes within limits specified in Accuracy, Precision, and Completeness table	Correct problem then reprep and analyze the LCS and all samples in the affected Air Force Center for Environmental Excellence analytical batch
Dilution test	Each new sample matrix	1:5 dilution must agree within ±10% of the original determination	Perform post digestion spike addition
Post digestion spike addition	When dilution test fails	Recovery within 75-125% of expected results	Correct problem then reanalyze post digestion spike addition
MS/MSD	One MS/MSD per every 20 project samples per matrix	All analytes within limits specified in Accuracy, Precision, and Completeness table	None
MDL study	Once per 12 month period	Detection limits established shall be ≤ ½ the RLs in Table 5-1	None
Results reported between MDL and RL	None	None	None

Notes:
ICS = interference check samples
LCS = laboratory control sample
MS/MSD = matrix spike/matrix spike duplicate

TABLE 5- 13

Quality Control Check	Frequency	Acceptance Criteria	Corrective Action[a]

NA = not applicable
RL = reporting limit

Table 5- 14

Calibration and Quality Control Requirements for Method 6020

Quality Control Check	Frequency	Criteria	Corrective Action
Initial calibration (a blank and at least one standard)	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	NA	NA
ICV (second-source standard)	Immediately following each initial calibration	All analytes within ±10% of expected value	Correct problem and repeat initial calibration
Calibration blank	After every calibration verification (ICV and CCV)	No analytes detected at or above the reporting limit	Correct the problem, then reanalyze previous 10 samples
CCV	After every 10 samples and at the end of the analysis sequence	All analytes within ±10% of expected value	Recalibrate and reanalyze all samples since the last acceptable CCV
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem and re-prep and reanalyze all associated samples
Interference check standard	At the start and end of each analytical sequence or twice during an 12-hour period, whichever is more frequent	All analytes within ±20% of expected value	Correct the problem, recalibrate, reanalyze ICS and all affected samples
Matrix Spike/Matrix Spike Duplicate	One set per 20 project-specific samples	All analytes within limits specified in Accuracy Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	All analytes within limits specified in Accuracy, Precision, and Completeness table	Correct the problem, and re-prep and reanalyze the LCS/LCSD and all samples in the analytical batch
Dilution test	Each new sample matrix	Result from 1:5 dilution must be within ±10% of	Perform post-digestion spike addition

	matrix	the undiluted sample result (applies only if undiluted sample result is at least 25 times the RL)	addition
Post-digestion spike addition	When dilution test fails	Recovery within 75-125% of expected value	None

Notes:
CCV = continuing calibration verification
ICV = initial calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
NA = not applicable

Table 5- 15

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (a blank and at least five standards)	Before initial sample analysis, every 24 hours, whenever modifications are made to the analytical system, or when continuing calibration verification fails	Correlation coefficient of linear regression is ≥ 0.995	Correct the problem and repeat the initial calibration
ICV (second-source standard)	Immediately following each initial calibration	All analytes within ±10% of expected value	Correct the problem and repeat initial calibration
Calibration blank	After every calibration verification (ICV and CCV)	No analytes detected at or above the reporting limit	Correct the problem, then reanalyze previous 10 samples
CCV	After every 10 samples and at the end of the analysis sequence	All analytes within ±20% (±10% for Cr VI) of expected value	Recalibrate and reanalyze all samples since the last acceptable CCV
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem and re-prep and reanalyze all associated samples
Matrix Spike/Matrix Spike Duplicate	One set per 20 project-specific samples	All analytes within limits specified in Accuracy, Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	All analytes within limits specified in Accuracy, Precision, and Completeness table	Correct the problem, and re-prep and reanalyze the LCS/LCSD and all samples in the analytical batch
Dilution test (not applicable to Cr VI)	Each new sample matrix	Result from 1:5 dilution must be within ±10% of the undiluted sample result (applies only if undiluted sample result is at least 25 times the reporting limit)	Perform recovery test
Recovery test (not applicable to Cr VI)	When dilution test fails	Recovery within 85-115% of expected value	Analyze all samples by MSA

Notes:
CCV = continuing calibration verification
ICV = initial calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate

MSA = Method of Standard Additions

Table 5- 16

Calibration and Quality Control Requirements for Methods 8021B and TO-3

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	If the % relative standard deviation is ≤ 20%, the average relative response factor may be used for quantitation; otherwise use calibration curve with coefficient of correlation or ≥ 0.995	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard), not applicable to Method TO-3	Immediately following each initial calibration	All analytes within ±15% of expected value	Correct the problem and repeat initial calibration
CCV	At the start of each analytical sequence and after every 10 samples, and at the end of the sequence	Analytes within ±15% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem and reprep and reanalyze all associated samples
Surrogate spike (not applicable to Method TO-3)	Every standard, sample, method blank, MS/MSD, and LCS/LCSD	Surrogates in samples, method blank, MS/MSD, and LCS/LCSD within limits specified in Accuracy, Precision, and Completeness table	Correct the problem and reanalyze (reprep if necessary)
MS/MSD (not applicable to Method TO-3)	One set per 20 samples	Within limits specified in Accuracy, Precision, and Completeness table	None
LCS/LCSD (not applicable to Method TO-3)	At least one set per analytical batch	Within limits specified in Accuracy, Precision, and Completeness table	Correct the problem, and re-prep and reanalyze the LCS/LCSD and all samples in the analytical batch
Second column confirmation (not applicable to Method TO-3)	All samples with results above the reporting limit objectives must be confirmed within the holding time	Confirmation to be done using second column of dissimilar phase and retention characteristics (or gas chromatography/mass spectrometry if sample concentration is sufficiently high). All calibration and quality control acceptance criteria specified for primary analysis must be met in the confirmation analysis.	Failure to perform confirmation will result in potential re-sampling and analysis at no cost to the project

CCV = continuing calibration verification

Table 5- 16

Calibration and Quality Control Requirements for Methods 8021B and TO-3

Quality Control Check	Frequency	Criteria	Corrective Action

LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate

Table 5- 17

Calibration and Quality Control Requirements for Methods AK101 and AK102

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	% relative standard deviation ≤ 25%	Correct the problem and repeat the initial calibration
CCV	At the start of each analytical sequence and after every 10 samples, and at the end of the sequence	%D ≤ 25%	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem and reprep and reanalyze all associated samples
Surrogate spike	Every standard, sample, method blank, MS/MSD, and LCS/LCSD	Surrogates in samples, method blank, MS/MSD, and LCS/LCSD within limits specified in Accuracy, Precision, and Completeness table	Correct the problem and reanalyze (reprep if necessary)
MS/MSD	One set per 20 samples	Within limits specified in Accuracy, Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in Accuracy, Precision, and Completeness table	Correct the problem, and reprep and reanalyze the LCS/LCSD and all samples in the analytical batch

Notes:
CCV = continuing calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate

Table 5- 18

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum five points) for single-response pesticides; single-point calibration for Toxaphene and Chlordane; multi-point calibration for Aroclors 1016 and 1260 only, but include mid-point standard for all other Aroclors for pattern recognition; if a specific Aroclor is found in any sample, quantitation for that Aroclor must be done using 5-point calibration	Prior to sample analysis, or when calibration verification fails	To use average relative response factor for quantitation of any analyte, % relative standard deviation must be ≤ 20%; otherwise use calibration curve with coefficient of correlation ≥ 0.995	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)– pesticides and Aroclors 1016 and 1260 (or Aroclors identified in samples)	Once for each multipoint initial calibration	All analytes within ±15% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Continuing calibration verification (CCV)– pesticides and Aroclors 1016 and 1260 (or Aroclors identified in samples)	At the start of each analytical sequence, after every 12 hours or 10 samples, whichever is more frequent, and at the end of the sequence	All analytes within ±15% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Endrin/DDT breakdown check (not applicable when analyzing for Aroclors/polychlorinated biphenyls only, not applicable to Method 8141A)	At start of each 12-hour period	Breakdown of either Endrin or DDT ≤ 15%	Evaluate injector port and take corrective action; recalibrate and reanalyze affected samples if necessary
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem and reprep and reanalyze all associated samples
Surrogate spike	Every standard, sample, method blank, MS/MSD, and LCS/LCSD	Surrogates in samples, method blank, MS/MSD, and LCS/LCSD within limits specified in corresponding Accuracy, Precision, and Completeness table	Correct the problem and reanalyze (reprep if necessary)

Table 5- 18

Quality Control Check	Frequency	Criteria	Corrective Action
MS/MSD	One set per 20 project-specific samples	Within limits specified in corresponding Accuracy, Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in corresponding Accuracy, Precision, and Completeness table	Correct the problem, and reprep and reanalyze the LCS/LCSD and all samples in the analytical batch
Second column confirmation	All samples with results above the reporting limit objectives must be confirmed within the holding time	Confirmation to be done using second column of dissimilar phase and retention characteristics (or gas chromatography/mass spectrometry if sample concentration is sufficiently high). All calibration and quality control acceptance criteria specified for primary analysis must be met in the confirmation analysis.	Failure to perform confirmation will result in potential resampling and analysis at no cost to the project

Notes:
CCV = continuing calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate

Table 5- 19

Calibration and Quality Control Requirements for Methods 8260B and TO-14A

Quality Control Check	Frequency	Criteria	Corrective Action
Bromofluorobenzene Tuning	Prior to initial calibration and calibration verification (every 12 hours)	Refer to criteria listed in the method	Retune instrument and verify
Multipoint initial calibration (minimum five points for Method 8260B; minimum 3 points + humid zero air for Method TO-14A)	Prior to sample analysis, or when calibration verification fails	Method 8260B: SPCCs average RF ≥ 0.30[a] and %RSD for RFs for CCCs ≤ 30% and one option below: Option 1: Mean %RSD for all analytes ≤ 15% with no individual analyte RSD > 30%, if using average relative response factors Option 2: Least squares regression r ≥ 0.995 Method TO-14: RSD for each analyte ≤ 30%	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)	Once for each multi-point initial calibration	All analytes within ±20% of expected value for Method 8260B, ±30% of expected value for Method TO-14A	Correct the problem and repeat initial calibration
CCV	At the start of each analytical sequence, after every 12 hours	Method 8260B: SPCCs average RF ≥ 0.30[a] and %D for RFs for CCCs ≤ 20% All other analytes within ± 20% of expected value Method TO-14: Relative percent difference for each analyte ≤ 30%	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV

Table 5- 19

Calibration and Quality Control Requirements for Methods 8260B and TO-14A

Quality Control Check	Frequency	Criteria	Corrective Action
Internal Standards (not applicable to Method TO-14A)	Each sample, method blank, MS/MSD and LCS/LCSD	Retention time within ±30 seconds from retention time of the daily CCV standard	Inspect mass spectrometer and gas chromatographer for malfunctions; reanalyze all affected samples
		EICP area within -50% to +100% of the daily CCV standard	
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem, then reprep and reanalyze all associated samples
Surrogate spike (not applicable to Method TO-14A)	Every standard, sample, method blank, MS/MSD and LCS/LCSD	Surrogates in samples, method blank and LCS/LCSD within limits specified in Accuracy, Precision, and Completeness table	Correct the problem and reanalyze (reprep if necessary)
MS/MSD (not applicable to Method TO-14A)	One set per 20 project-specific samples	Within limits specified in Accuracy, Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in Table 5-10	Correct the problem, then reprep and reanalyze the LCS/LCSD and all samples in the analytical batch

[a]SPCC average relative response factor ≥ 0.10 for bromoform, chloromethane, 1,1-dichloroethane.

Notes:
CCC = continuing calibration criteria
CCV = continuing calibration verification
EICP = Extracted Ion Current Profile
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate
RF = Response Factor
RSD = relative standard deviation
SPCC = system performance check compound

Table 5- 20

Calibration and Quality Control Requirements for Method 8270C and PAH SIM 16

Quality Control Check	Frequency	Criteria	Corrective Action
Derafluorotriphenyl-phosphine Tuning	Prior to initial calibration and calibration verification (every 12 hours)	Refer to criteria listed in the method	Retune instrument and verify
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	SPCCs average RF ≥ 0.050 and %RSD for RFs for CCCs ≤ 30% and one option below: Option 1: Mean %RSD for all analytes ≤ 15% with no individual analyte RSD > 40%, if using average relative response factors Option 2: Least squares regression r ≥ 0.995	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)	Once for each multi-point initial calibration	All analytes within ±30% of expected value	Correct the problem and repeat initial calibration
CCV	At the start of each analytical sequence, after every 12 hours	SPCCs average RF ≥ 0.050 and %D for RFs for CCCs ≤ 20% All other analytes within ± 20% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Internal Standards	Each sample, method blank, MS/MSD and LCS/LCSD	Retention time within ±30 seconds from retention time of the daily CCV standard Extracted ion current profile area within -50% to +100% of the daily CCV standard	Inspect mass spectrometer and gas chromatographer for malfunctions; reanalyze all affected samples
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit	Correct the problem, then reprep and reanalyze all associated samples
Surrogate spike	Every standard, sample, method blank, MS/MSD and LCS/LCSD	At least two surrogates per fraction in samples, method blank and LCS/LCSD within limits specified in Accuracy, Precision, and	Correct the problem and reanalyze (reprep if necessary)

Table 5- 20

Calibration and Quality Control Requirements for Method 8270C and PAH SIM 16

Quality Control Check	Frequency	Criteria	Corrective Action
		Completeness table	
MS/MSD	One set per 20 project-specific samples	Within limits specified in Accuracy, Precision, and Completeness table	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in Accuracy, Precision, and Completeness table	Correct the problem, then reprep and reanalyze the LCS/LCSD and all samples in the analytical batch

Notes:
CCC = continuing calibration criteria
CCV = continuing calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate
RSD = relative standard deviation
SPCC = system performance check compounds

Table 5- 21

Calibration and Quality Control Requirements for Method 8290

Quality Control Check	Frequency	Criteria	Corrective Action
Perfluorokerosene Tuning	Prior to initial calibration and calibration verification (every 12 hours)	Refer to criteria listed in the method	Retune instrument and verify
Multipoint initial calibration (minimum five points)	Prior to sample analysis, or when calibration verification fails	Unlabeled standards RSD ≤ 20%; internal standards RSD ≤ 30%; ion ratios for unlabeled and internal standards within method specifications	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)	Once for each multipoint initial calibration	Unlabeled standards %D ≤ 20%; internal standards %D ≤ 30%; ion ratios for unlabeled and internal standards within method specifications	Correct the problem and repeat initial calibration
CCV	At the start of each analytical sequence, after	Unlabeled standards %D ≤ 20%; internal	Correct the problem, then recalibrate and reanalyze all

Table 5- 21

Calibration and Quality Control Requirements for Method 8290

Quality Control Check	Frequency	Criteria	Corrective Action
	every 12 hours	standards %D ≤ 30%; ion ratios for unlabeled and internal standards within method specifications	samples since the last acceptable CCV
Internal Standards	Each sample, method blank, MS/MSD, and laboratory duplicate	40-135% recovery	Inspect mass spectrometer and gas chromatographer for malfunctions; reanalyze all affected samples
Method blank	At least one per analytical batch	No analytes detected at or above the estimated detection limit	Correct the problem, then reprep and reanalyze all associated samples
MS/MSD	One set per 20 project-specific samples	RPD ≤ 20%	None
Laboratory duplicate	At least one set per analytical batch	RPD ≤ 25%	Correct the problem, then reprep and reanalyze the original sample and laboratory duplicate
Second-column confirmation	Samples with 2,3,7,8-tetrachlorodibenzofuran concentrations >estimated detection limit	Confirmation to be done on DB-225 column; DB-225 result to be reported	Failure to perform confirmation will result in potential resampling and analysis at no cost to the project

Notes:
CCV = continuing calibration verification
MS/MSD = matrix spike/matrix spike duplicate
RPD = relative percent difference
RSD = relative standard deviation

Table 5- 22

Calibration and Quality Control Requirements for Washington State Department of Ecology (WDOE) Methodology for Volatile Petroleum Hydrocarbon Fractions

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum six concentration levels)	Prior to sample analysis, or when calibration verification fails	%RSD ≤ 20% Or r ≥ 0.990	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)	Once for each multi-point initial calibration	All individual analytes within ±15% of expected value Hydrocarbon ranges within ±30% of expected value	Correct the problem and repeat initial calibration
CCV	At the start and end of each analytical sequence and after every 10 samples	All individual analytes within ±15% of expected value Hydrocarbon ranges within ±30% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Internal Standards	Each sample, method blank, MS/MSD and LCS/LCSD	Retention time within ±3 standard deviations from retention time of the daily CCV standard EICP area within –50% to +200% of the daily CCV standard	Inspect instrument for malfunctions; reanalyze all affected samples
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit specified in Table 5-9	Correct the problem, then reprep and reanalyze all associated samples
Surrogate spike	Every standard, sample, method blank, MS/MSD and LCS/LCSD	Surrogates in samples, method blank and LCS/LCSD within limits specified in Table 5-10	Correct the problem and reanalyze (reprep if necessary)
MS/MSD	One set per 20 project-specific samples	Within limits specified in Table 5-10	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in Table 5-10	Correct the problem, then reprep and reanalyze the LCS/LCSD and all samples in the analytical batch

Notes:
CCV = continuing calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate

Table 5- 22

Calibration and Quality Control Requirements for Washington State Department of Ecology (WDOE) Methodology for Volatile Petroleum Hydrocarbon Fractions

Quality Control Check	Frequency	Criteria	Corrective Action

RSD = relative standard deviation

Table 5- 23

Calibration and Quality Control Requirements for Washington State Department of Ecology (WDOE) Methodology for Extractable Petroleum Hydrocarbon Fractions

Quality Control Check	Frequency	Criteria	Corrective Action
Multipoint initial calibration (minimum six concentration levels)	Prior to sample analysis, or when calibration verification fails	%RSD ≤ 20% Or r ≥ 0.995	Correct the problem and repeat the initial calibration
Initial calibration verification (second-source standard)	Once for each multi-point initial calibration	Hydrocarbon ranges within ±15% of expected value	Correct the problem and repeat initial calibration
CCV	At the start and end of each analytical sequence and after every 10 samples	Hydrocarbon ranges within ±15% of expected value	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Mass Discrimination Check	Prior to sample analysis, the first aliphatic hydrocarbon CCV must be checked for mass discrimination	Mass discrimination <30%	Correct the problem, then recalibrate and reanalyze all samples since the last acceptable CCV
Fractionation Check	At least one per analytical batch	Percent recovery of each analyte in standard must be ±30%	Correct the problem, then reprep and reanalyze all associated samples
Method Blank	At least one per analytical batch	No analytes detected at or above the reporting limit specified in Table 5-9	Correct the problem, then reprep and reanalyze all associated samples
Surrogate spike	Every standard, sample, method blank, MS/MSD and LCS/LCSD	Surrogates in samples, method blank and LCS/LCSD within limits specified in Table 5-10	Correct the problem and reanalyze (reprep if necessary)
MS/MSD	One set per 20 project-specific samples	Within limits specified in Table 5-10	None
LCS/LCSD	At least one set per analytical batch	Within limits specified in Table 5-10	Correct the problem, then reprep and reanalyze the LCS/LCSD and all samples in the analytical batch

Notes:
CCV = continuing calibration verification
LCS/LCSD = laboratory control sample/laboratory control sample duplicate
MS/MSD = matrix spike/matrix spike duplicate
RSD = relative standard deviation

SECTION 6

Calibration Procedures and Frequency

6.1 Field Calibration Procedures

Field equipment will be calibrated each day before the start of work, or more frequently, as needed. Any instrument "drift" from prior calibration should be recorded in a field notebook. Calibration will be in accordance with procedures and schedules outlined in the particular instrument's operations manual.

Calibrated equipment will be uniquely identified by using either the manufacturer's serial number or other means. A label with the identification number and the date when the next calibration is due will be physically attached to the equipment. If this is not possible, records traceable to the equipment (showing the equipment identification) will be readily available for reference. In addition, the results of calibrations and records of repairs will be recorded in a logbook.

Scheduled periodic calibration of testing equipment does not relieve field personnel of the responsibility of employing properly functioning equipment. If an individual suspects an equipment malfunction, the device shall be removed from service, tagged so that it is not inadvertently used, and the appropriate personnel notified so that a recalibration can be performed or a substitute piece of equipment can be obtained.

Equipment that fails calibration or becomes inoperable during use will be removed from service and either segregated to prevent inadvertent use or tagged to indicate it is out of calibration. Such equipment will be repaired and satisfactorily recalibrated. Equipment that cannot be repaired will be replaced.

6.2 Laboratory Calibration Procedures

Laboratory instruments will be appropriately calibrated by qualified personnel prior to sample analysis. The requirements specified in Section 5.3.3 and Tables 5-12 through 5-22 of this SOP must be followed. Otherwise, the method specifications will be followed. Only certified standards of known purity may be used for calibration. Calibration will be verified at specified intervals throughout the analysis sequence as specified for each analytical method in Tables 5-12 through 5-22.

SECTION 7

Analytical Procedures

The parameters to be measured, the required methods, and reporting limits are listed in Tables 5-1 through 5-9. Since the SOP is applicable to many projects, it attempts to present a comprehensive list of methods and analytes that are expected to be used for the various sites. A particular site may use only one or a combination of the methods and analytes. The SOP may not address future changes in analytical needs specific to certain sites. If the need for such changes arises, the SOP and the relevant site-specific documents will be updated and submitted to the regulatory agencies charged with project oversight for approval. Only the affected portions of the SOP will be submitted for review.

The allowed sample preparation methods, if not incorporated in the analytical method, are in Table 7-1. Analytical and preparation methods for the Method 7000 series are provided in this table as alternate methods to Method 6020. These methods will be allowed, provided the reporting limit objectives are met. Once a method is chosen, it must be used throughout the duration of the project to maintain data comparability.

The calibration and QC requirements specified for each method will be followed. These are discussed in Sections 5.3.3 and 6.2 and in Tables 5-12 through 5-22. Appropriate corrective action will be taken when acceptance criteria are not met. If corrective action is not effective, and data quality is potentially impacted, the occurrence must be documented in a corrective action report and in the data package case narrative. The laboratory manager or a designated person must notify the CH2M HILL project manager or designee.

Table 7- 1

Sample Preparation Methods

Analytical Method	Parameter	Preparatory Methods
8021B	Benzene, toluene, ethylbenzene, and xylenes (water and soil)	5030BB, 5031, 5035
8081A/8141A	Organochlorine and organophosphorous (3550B not allowed for organophosphorous) pesticides (water and soil)	3510C, 3520C, 3540C, 3541, 3545, 3550B
8082	Polychlorinated biphenyls (water and soil)	3510C, 3520C, 3540C, 3541
8260B	Volatile organics (water and soil)	3585, 5021, 5030BB, 5031, 5032, 5035
8270C	Semivolatile organics (water and soil)	3510C, 3520C, 3535, 3540C, SW3541, 3545, 3550B
6010	Metals by ICP (water and soil)	3005A, 3010A, 3015, 3050B, 3051
6020	Trace metals by ICP-MS (water and soil)	3005A, 3010A, 3015, 3050B, 3051
7041	Antimony (water and soil)	(See analytical method), 3005A
7060A	Arsenic (water and soil)	(See analytical method), 3050B
7131A	Cadmium (water and soil)	3015, 3020A, 3050B, 3051
7191	Chromium (water and soil)	3015, 3020A, 3050B, 3051
7421	Lead (water and soil)	3015, 3020A, 3050B, 3051
7521	Nickel (water and soil)	3015, 3020A, 3050B, 3051
7740	Selenium (water and soil)	(See analytical method), 3050B
7841	Thallium (water and soil)	3015, 3020A, 3050B, 3051
7911	Vanadium (water and soil)	3015, 3020A, 3050B, 3051

Notes:
ICP = Inductively Coupled Plasma
ICP-MS = Inductively Coupled Plasma-Mass Spectrometry

SECTION 8

Data Management, Reporting, and Assessment

8.1 Data Management and Archival

CH2M HILL will have a system for maintaining, controlling, and archiving field records and will require that the primary laboratories maintain a similar system for laboratory records. This system will facilitate retrieval of any documentation that affects reported analytical results.

All raw data will be maintained on file in the laboratory, and will be available upon request. Complete documentation of sample preparation and analysis and associated QC information will be maintained in a manner that allows easy retrieval in the event that additional information is required. The following minimum documentation should be kept for each project:

- Original work order, COC records, and other pertinent documents received with the samples
- Records of communication between the laboratory, field, and the client
- Any associated corrective action reports
- Laboratory data reports
- Laboratory logbooks and all raw sample preparation and analytical data
- Electronic data and all pertinent SOPs

Field records to be retained as a minimum shall include correspondence, COC records, field notes, field equipment performance records, maintenance logs, field procedures, corrective action reports, field personnel files, and project-related reports.

Field and laboratory record retention will be for a period specified in the site-specific work plan or equivalent document.

8.2 Primary Laboratory Data Reduction, Review, and Reporting

8.2.1 Data Reduction and Review

Data reduction will be done manually or using appropriate application software. Quantitation procedures specified for each method must be followed. If data reduction is done manually, the documentation must include the formulas used. Any application software used for data reduction must have been previously checked for accuracy. Documentation on the software must be maintained on file in the laboratory. All documentation of data reduction must allow recreation of the calculations.

All data will undergo two levels of review at the laboratory prior to release. The analyst performing the tests shall initially review 100 percent of the data. After the analyst's review has been completed, 100 percent of the data shall be reviewed independently by a senior analyst or by the section supervisor for accuracy, compliance with calibration and QC requirements, holding time compliance, and for completeness. Analyte identification and quantitation must be verified. Calibration and QC results will be compared with the applicable control limits. Reporting limits should be reviewed to make sure they meet the project objectives. Results of multiple dilutions should be reviewed for consistency. Any discrepancies must be resolved and corrected. Laboratory qualifiers will be applied when there are nonconformances that could potentially affect data usability. These qualifiers must be properly defined as part of the deliverables. All issues that are relevant to the quality of the data must be addressed in a case narrative. A final data review will be conducted by the Laboratory Manager or Client Services representative to ensure that all required analyses were performed on all samples, and that all documentation is complete. Data review performed by the laboratory personnel must be documented.

8.2.2 Hardcopy Deliverables

The hardcopy laboratory data report will contain the components and information listed below in a logical format, such as that used by the EPA Contract Laboratory Program.

8.2.2.1 Cover Sheet

A cover sheet containing the following information will be included in the hardcopy laboratory data report:

- Title of report and laboratory document (contract) number
- Project name, site location, and project number
- Name and location of the laboratory, and of any second-site or subcontracted laboratory
- Client name and address
- Statement of data authenticity and official signature and title of person authorizing report release

8.2.2.2 Table of Contents

The laboratory data report should be organized in a format that facilitates identification and retrieval of data. A table of contents should be included for this purpose.

8.2.2.3 Case Narrative

The case narrative should contain a table summarizing samples received, providing correlation between field sample identification and laboratory identification numbers, and analytical test methods performed. If a second-site or subcontracted laboratory was used, the table should show which analytical test methods were performed by each laboratory. Samples that were received but not analyzed should be identified. Any holding time, calibration, or QC deviations should be noted. Corrective actions taken by the laboratory in connection with these deviations should be discussed. The case narrative should also discuss any other information, such as sample temperature outside acceptable range, presence of air bubbles in volatile organic analyte (VOA) sample containers, presence of multiple sample phases, or other visible signs of sample nonhomogeneity, which could potentially affect the quality of the data. Definitions of data qualifiers used should be included.

8.2.2.4 Analytical Results

The information listed below will be included in each analytical data report as a minimum. The listed items need not be presented all in one place, or repeated, if noted elsewhere in the report.

- Project name and project number
- Field identification number
- Laboratory identification number
- Sample preservation or condition at receipt
- Sample matrix
- Sample collection date
- Date received
- Date prepared
- Date analyzed
- Time of analysis, if holding time is less than or equal to 48 hours
- Sample preparation and analysis methods used
- Preparation, analysis, or other batch reference number
- Analyte name
- Result for each analyte (dry weight basis for soils/sediments/sludges), with correct number of significant figures
- Sample-specific reporting limit (adjusted for sample size, dilution/concentration, moisture content)
- Method quantitation limit (lowest-level standard concentration)
- Method detection limit
- Units of concentration
- Data qualifiers, if used
- Dilution factors (each analytical report should reflect factor resulting from use of nonroutine sample aliquot and any dilutions or concentrations; if both diluted and undiluted sample results are available, both should be reported)
- Percent solids for soils/sediments/sludges

- Sample aliquot analyzed
- Final extract volume
- Confirmation results
- Chromatograms (for gas chromatography fuel methods only)

8.2.2.5 Quality Control Documentation

The following minimum information must be included in the laboratory data report:

- Surrogate percent recoveries and acceptance limits
- MS/MSD spike concentrations, native sample results, spiked sample results, percent recoveries, RPDs between the MS and MSD results, and acceptance limits
- LCS/LCSD results, spike concentrations, percent recoveries, RPDs between the LCS and LCSD recoveries, and acceptance limits
- MB results
- ICP interference check sample true and measured concentrations and percent recoveries
- Method of standard addition results (if applicable)
- Postdigestion spike recoveries (if applicable)
- Initial calibration summary, including standard concentrations, response factors, average response factors, and relative standard deviations, or correlation coefficients, if applicable
- Initial and continuing calibration verification summary, including expected and recovered concentrations, or percent differences
- Internal standard recoveries for Method 8290; internal standard retention times and areas, including those of continuing calibration verifications (CCVs) and corresponding control limits for Methods 8260B and 8270C
- Any other method-specific QC sample results
- Any deviations from the method-specific acceptance criteria
- Any other method-specific QC sample results

8.2.2.6 Sample Management Records

COC records, cooler receipt forms, discrepancy forms, communication, and other records generated to document sample custody, transfer, analysis, and disposal should be included in the laboratory data report.

8.2.3 Electronic Deliverables

Concurrent with the submittal of the hardcopy deliverables, the laboratory shall deliver two electronic copies of the data produced using the USACE North Pacific Division Laboratory

Electronic Deliverable Format (EDF) version 1.2a. The data shall be delivered in the EDF format along with a printed error-free summary log generated with the consistency tool check. There shall be no discrepancies between the hardcopy reports and the electronic reports. If any discrepancies are identified, no payment will be made for the analysis of the affected samples. The electronic deliverables shall be on compact discs. Each disc shall be identified with the project name, identification number, report number, date, name of the laboratory, and a point of contact.

8.3 Data Quality Assurance

Depending on project-specific requirements, data quality assessment may be performed by CH2M HILL on the laboratory's data. The data quality assessment will involve data verification and data review.

8.3.1 Data Verification

The process will verify that the documentation submitted by the laboratory is complete and compliant with the requirements of the contract. During this process, it will be verified that:

- Data for all samples submitted to the laboratory have been provided.
- The correct methods were used.
- All the specified deliverables have been submitted.

8.3.2 Data Review

Data review will consist of inspecting the sample management documentation, such as COC records and cooler receipt forms, for any deviations that might affect data quality. Expired holding times, elevated sample temperature upon receipt, broken custody seals, and other indications of compromised sample integrity will be noted.

The data will be evaluated for compliance with the method specifications. The results of blanks, field and laboratory duplicates, surrogates, MS/MSD, and LCS/LCSD will be compared with the specifications. Qualifier flags will be applied to data with suspect quality implications.

The data review process will be patterned after the *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review* (EPA, 1999) and *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA, 2004) substituting the QC requirements specified in this SOP for those specified in the Guidelines. The flagging criteria in Tables 8-1 and 8-2 will be used. The qualifier flags are defined in Table 8-3.

8.3.3 Data Quality Report

The results of the data verification and review will be summarized in a Data Quality Report (DQR). The DQR will contain the following information:

- List of all samples organized by analytical method, indicating which were qualified, and directing the reader to subsequent tables of specific qualifications

- List of discrepancies related to sampling, field/laboratory documentation and/or reporting, such as VOA vials with bubbles, missing data, COC discrepancies, that have data quality implications
- Table of qualifications related to sample shipping/receipt conditions (elevated cooler temperatures, broken containers, improper preservation)
- Table of qualifications due to exceeded holding time
- Table of rejected (R-flagged) data and reason for rejection
- Table of qualifications related to blank results
- Table of qualifications due to surrogate recovery deviations
- Table of qualifications due to MS/MSD recovery/RPD deviations
- Table of qualifications due to LCS/LCSD recovery/RPD deviations
- Table of qualifications due to field and laboratory duplicate deviations
- Table of qualifications due to results being less than the reporting limit
- Table comparing analytical results with project-specific reporting limits

Table 8- 1

Flagging Conventions for Organic Methods

Quality Control Check	Evaluation	Flag	Samples Affected
Holding Time	Holding time exceeded for extraction or analysis	J- positive results; UJ nondetects	Sample
	Holding time exceeded by a factor of two	J- positive results; R nondetects	
Sample Preservation	Sample not preserved	J- positive results; UJ nondetects	Sample
Sample Integrity (8021B, 8260B, AK101)	Bubbles in VOA vial used for analysis	J- positive hits ; UJ nondetects	Sample
Temperature	> 6 degrees Celsius	J- positive results ; UJ nondetects	All samples in same cooler
Laboratory Control Sample (laboratory control sample/ laboratory control sample duplicate)	%R > UT	J+ positive results	All samples in preparation batch
	%R < LT	J- positive results, UJ nondetects	
Method Blank	Convert blank concentration to solid units, if applicable; multiply the highest blank concentration by 5 (10 for common lab contaminants)	U positive sample results < 5x (10x for common lab contaminants) highest blank concentration	All samples in preparation batch or analytical batch, whichever one applies, associated with method blank
Equipment Blank Field Blank Ambient Blank			All samples, same site, matrix and date (water) or all samples, same site, matrix (soil) associated with equipment blank
Trip Blank			All samples shipped in the same cooler as the trip blank
Matrix Spikes			
% Recoveries	%R > UT	J+ positive results	Matrix spike analytes in parent sample and field duplicate, if any
	%R < LT	J- positive results, UJ nondetects	

Table 8- 1

Flagging Conventions for Organic Methods

Quality Control Check	Evaluation	Flag	Samples Affected
RPD	RPD > UT	J positive results	Matrix spike analytes in parent sample and field duplicate, if any
Surrogates			
8021B; AK101; AK102; 8081A; 8082; 8141A; 8260B	%R > UT	J+ positive results	All analytes in sample
	%R < LT and none < 10%	J- positive results; UJ nondetects	
	%R < 10%	J- positive results; R nondetects	
8270C	2 or more surrogates in same fraction with %R > UT	J+ positive results	All analytes in same fraction in sample
	2 or more surrogates in same fraction with %R < LT but not <10%	J- positive results; UJ nondetects	
	2 or more surrogates in same fraction with %R <10%	J- positive results; R nondetects	
Field/laboratory duplicates	Concentration of reported analytes are > 5 times RL in either sample and RPD > UT	J positive results	Duplicate samples
	One or both sample results < 5 times the RL and a difference of ±2 times RL for liquid (±4 times for solid)	J positive results; UJ nondetects	
Confirmation (8021B; 8081A; 8141A)	RPD between primary and confirmation results > 25%	J positive results	Sample

Notes:
Spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of 2 or more.
For methods requiring confirmation, the qualification applies to primary analysis results (either of the two columns/detectors may be designated as the primary column/detector).
Where one MS recovery meets acceptance criteria and the other MS of the pair does not, professional judgment may be used to determine if the parent sample should be qualified for matrix effects by comparing the matrix spike recoveries to other quality control results within the batch or sample site.
Qualifier may not apply in cases where a surrogate coelutes with a nontarget analyte.

Table 8- 1

Flagging Conventions for Organic Methods

Quality Control Check	Evaluation	Flag	Samples Affected

Qualifier may not apply in cases where low surrogate recoveries are due to sample dilution.

LT = lower tolerance
%R = percent recovery
RPD = relative percent difference
UT = upper tolerance

Table 8- 2

Flagging Conventions–Minimum Data Evaluation Criteria for Inorganic Methods

Quality Control Check	Evaluation	Flag	Samples Affected
Holding Time	Holding time exceeded for extraction, digestion, or analysis	J- positive results; R nondetects for mercury; UJ nondetects for all other analytes	Sample
	Holding time for digestion or analysis exceeded by a factor of 2	J- positive results; R nondetects	
Sample Preservation	Sample preservation requirements not met. (If sample preservation was not done in the field, but was performed at the laboratory upon sample receipt, no flagging is required.)	J- positive results; R nondetects	Sample
Temperature	> 6 degrees Celsius	J- positive results; UJ nondetects	Samples in same cooler
Laboratory Control Sample	%R > UT	J+ positive results	All samples in preparation batch

Table 8- 2

Flagging Conventions–Minimum Data Evaluation Criteria for Inorganic Methods

Quality Control Check	Evaluation	Flag	Samples Affected
	%R < LT	J- positive results; UJ nondetects	
Calibration Blank (initial calibration blank, continuing calibration blank) Method Blank	Convert blank concentration to solid units, if applicable; multiply the highest blank concentration by 10	U positive sample results < 10x highest blank concentration	All samples in preparation batch or analytical batch, whichever one applies, associated with method blank or calibration blank
Equipment Blank			All samples, same site, matrix and date (water) or all samples, same site, matrix (soil) associated with equipment blank
Matrix Spikes	%R > UT %R < LT	J+ positive results J- positive results UJ nondetects	All samples from same site as parent sample
	Relative Percent Difference > UT	J positive results	
Field/Laboratory Duplicates	Concentration of reported analytes are > 5 times RL in either sample and RPD > UT	J positive results	Duplicate samples
	One or both sample results < 5 times the RL and a difference of ±2 times RL for liquid (±4 times for solid)	J positive results UJ nondetects	

Notes:
Spike recovery limits do not apply when sample concentration exceeds the spike concentration by a factor of 2 or more.

LT = lower tolerance
%R = percent recovery
RL = reporting limit
UT = upper tolerance

Table 8- 3

Qualifier Flag Definitions

J	Analyte was present but reported value may not be accurate or precise.
J+	Analyte was present but reported value may be biased high.
J-	Analyte was present but reported value may be biased low.
R	This result has been rejected.
U	This analyte was analyzed for but not detected at the specified detection limit.
UJ	The analyte was not detected above the detection limit objective. However, the reported detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

SECTION 9

Performance Evaluations and Audits

9.1 Performance Evaluations

Performance evaluations of the laboratories using performance evaluation samples may be done during the laboratory validation process. Laboratory performance throughout the duration of the project may also be monitored through the use of QA samples.

9.2 External Audits

Announced and unannounced audits of the field operations and of the laboratories may be conducted during any stage of the project.

9.3 Internal Audits

Annual audits of the laboratory shall be conducted by the laboratory's Quality Assurance Officer (QAO). The audits shall verify, at a minimum, that written standard operating procedures are being followed; standards are traceable to certified sources; documentation is complete; data review is being done effectively and is properly documented; and data reporting, including electronic and manual data transfer, is accurate and complete. All audit findings shall be documented in QA reports to management. Necessary corrective actions shall be taken within a reasonable time frame. The QAO shall verify that such actions are effective and complete and shall document their implementation in an audit closeout report to management.

SECTION 10

Preventive Maintenance

The primary objective of a preventive maintenance program is to promote the timely and effective completion of a measurement effort. The maintenance program should be designed to minimize the downtime of crucial sampling and/or analytical equipment due to expected or unexpected component failure. In implementing this program, efforts should be focused in the following primary areas:

- Establishment of maintenance responsibilities
- Establishment of maintenance schedules for major and/or critical instrumentation and apparatus
- Establishment of an adequate inventory of critical spare parts and equipment.

10.1 Maintenance Responsibilities

Maintenance of laboratory instruments is the responsibility of the participating laboratory. Generally, the laboratory manager or supervisor of a laboratory is responsible for the instruments in his or her work area. This responsible person will establish maintenance procedures and schedules for each instrument.

Maintenance responsibilities for field equipment are assigned to the field team leader for specific sampling tasks. However, the field team using the equipment is responsible for checking the status of the equipment prior to use and reporting any problems encountered. The field team is also responsible for ensuring that critical spare parts are included as part of the field equipment checklist. Nonoperational field equipment should be removed from service and a replacement obtained.

All field instruments will be properly protected against inclement weather conditions during the field investigation.

10.2 Maintenance Schedules

The effectiveness of any maintenance program depends to a large extent on adherence to specific maintenance schedules for each piece of equipment. Other maintenance activities are conducted on an as-needed basis. Manufacturers' recommendations should provide the primary basis for establishing maintenance schedules. Manufacturers' service contracts may be used for implementing the scheduled maintenance.

Each analytical instrument should be assigned an instrument logbook. All maintenance activities will be documented in this logbook. The information to be entered includes:

- Date of service
- Person performing service

- Type of service performed and reason for service
- Replacement parts installed (if appropriate)
- Date of next scheduled service
- Any other useful information

10.3 Spare Parts

In addition to a schedule for maintenance activities, an adequate inventory of spare parts is required to minimize equipment downtime. The inventory includes those parts and supplies that:

- Are subject to frequent failure
- Have limited useful lifetimes
- Cannot be obtained in a timely manner should failure occur

Field managers and the respective laboratory managers are responsible for maintaining an adequate inventory of spare parts. In addition to spare parts and supply inventories, an in-house source of backup equipment and instrumentation should be available.

SECTION 11

Data Assessment

11.1 Data Quality Assurance

All data generated for this project will be evaluated according to the procedures discussed in Section 8.3, using the QA acceptance criteria specified in Tables 5-12 through 5-22. Limitations on data usability will be assigned, if appropriate, as a result of the data verification and review process described in Section 8.3.

11.2 Reconciliation with Data Quality Objectives

Projects may include multiple investigation areas with varying tasks and objectives. The procedure for data reconciliation will be a function of the project objectives specific to each investigation area and will be addressed in a site-specific work plan or equivalent document. Statistical data analysis consistent with the approaches recommended in the *Guidance for Data Quality Assessment, Practical Methods for Data Analysis* (EPA, 2000), will be performed when appropriate to achieve the objectives being sought in a particular investigation area. The specific statistical technique that will be used will be addressed in a site-specific work plan or equivalent document.

SECTION 12

Corrective Action

Corrective action may be required as a result of deviations from field and/or analytical procedures. Deficiencies identified in audits and data quality assessments may also call for corrective action.

The SOP has specified specific corrective action to be taken when deviations from calibration and QC acceptance criteria occur. These are listed in Tables 5-12 through 5-22. The type of action to be taken in other situations would require judgment on the part of somebody directly involved with the situation. There should be a mechanism in place in the laboratory to allow for supervisory review of all deviations or deficiencies. A corrective action reporting system that requires immediate documentation of deviations or deficiencies and for supervisory review of the actions taken to correct them should be established. The corrective action report should include as a minimum:

- The type of deviation or deficiency
- The date of occurrence
- The impact of the deviation or deficiency, such as samples affected
- The corrective action taken

The only time that a corrective action report may be waived is when a deviation or deficiency is immediately corrected and its impact is precluded. An example would be an unacceptable initial calibration that is repeated before samples are analyzed.

Each corrective action report must be reviewed and approved by a person of authority, such as the field team leader or laboratory supervisor. Corrective action reports that could potentially affect data quality must be brought to the attention of the CH2M HILL Project Manager. Copies of corrective action reports must be maintained in the project files.

SECTION 13
References

American Petroleum Institute (API). *No-Purge Groundwater Sampling.* Bulletin No. 12. October 2000.

Alaska Department of Environmental Conservation (ADEC). *Cleanup Levels Guidance*. January 2004.

Alaska Department of Environmental Conservation (ADEC). *Recommended Practices for Monitoring Well Design, Installation, and Decommissioning.* April 1992.

Buscheck, T.E. and C.M. Alcantar. "Regression Techniques and Analytical Solutions to Demonstrate Intrinsic Bioremediation." *Intrinsic Bioremediation*. Battelle Press. San Diego, CA. Pgs. 109-116. 1995.

Charbeneau, Randall, R. Johns, L. Lake, and M. McAdams. *Free-Product Recovery of Petroleum Hydrocarbon Liquids*. API Publication No. 4682. 1999.

Geosphere and CH2M HILL. *Draft Report. Site Conditions Summary Report for Risk Calculations and Site Status Determination. Technical Background Document.* May 26, 2005.

Gilbert, R. O. *Statistical Methods for Environmental Pollution Monitoring*. Van Nostrand Reinhold, New York. 1987.

Newell, C.J., H.S. Rifai, J.T. Wilson, J.A. Connor, J.A. Aziz, and M.P. Suarez. *Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies.* EPA 540/S-02/500. November 2002.

Suarez, M.P. and H.S. Rifai. "Biodegradation Rates for Fuel Hydrocarbons and Chlorinated Solvents in Groundwater." *Bioremediation Journal* 3(4):337-362. 1999

U.S. Army Corps of Engineers (USACE). *Requirements for the Preparation of Sampling and Analysis Plans, Appendix I: Shell for Analytical Chemistry Requirements.* EM 200-1-3. February 1, 2001.

U.S. Environmental Protection Agency (EPA). *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.* October 2004.

U.S. Environmental Protection Agency (EPA). *Ground-Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA 542-S-02-001.* May 2002.

U.S. Environmental Protection Agency (EPA). *EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5*. March 2001.

U.S. Environmental Protection Agency (EPA). *Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9*. July 2000.

U.S. Environmental Protection Agency (EPA). *USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review.* October 1999.

U.S. Environmental Protection Agency (EPA). *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P*. April 1999.

U.S. Environmental Protection Agency (EPA). *Test Methods for Evaluation of Solid Waste, Physical and Chemical Methods*, SW-846, 3rd edition, Revision 4. 1996.

U.S. Environmental Protection Agency (EPA). *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, Interim Final*. October 1988.

Washington State Department of Ecology (WDOE). *Analytical Methods for Petroleum Hydrocarbons*. Publication No. ECY97-602. June 1997.

Wiedemeier, T. H., H. S. Rifai, C. J. Newell, and J. T. Wilson. *Natural Attenuation of Fuels and Chlorinated Solvents in the Subsurface.* John Wiley and Sons, Inc. New York. 1999.

Appendix H

Health and Safety Plan

Ridge Contracting

Health and Safety Program

2006

Table of Contents

Section Page

Table of Contents, Cont.

Ridge Contracting Inc.: Commitment to Implement the Health and Safety Program

The objectives of our Health and Safety Program are to provide a safe workplace for our employees and to have no Lost-Time-Accidents each year. Part of the system for achieving this objective is to have a Corporate Health and Safety Program in place.

This Corporate Health and Safety Program is hereby approved by Ridge Contracting, Inc. (RCI) management and should be used in its entirety and without unauthorized exceptions by all RCI subsidiaries, joint ventures, offices, projects and subcontractors.

We, the undersigned, support this program as a basic corporate document for all of our employees. The program is to be implemented in conjunction with more specific written health and safety documents to help maintain an accident-free workplace.

____
Drew McLaughlin, President

1.0 Introduction

Ridge Contracting, Inc.,(RCI) is headquartered in Anchorage, Alaska

This Corporate Health and Safety Program is intended to be the controlling document regarding health and safety for all RCI projects and personnel, including subcontractors. It is intended to be used in conjunction with contract requirements, site-specific health and safety plans, activity hazard analysis and various types of training to comprise the RCI Health and Safety Program.

This program is required specifically by hazardous waste operation covered by 29 CFR 1910.120 (b). Written programs are also required by various other OSHA regulations, including the General Duty Clause, which says all employees must be offered a safe work environment. This program is the foundation for providing that safe work environment.

RCI has chosen to implement this Health and Safety Program, to the degree appropriate, on all their projects and employee activities, from routine office work to responding to spills of hazardous chemicals. Management has shown its support of this program by their written endorsement on the first page of this document. It is the responsibility of each RCI Manager to be familiar with this document and to implement and enforce its premises to the degree reasonable and prudent on each project.

1.1 Plan Rationale

Some reasons for having a quality health and safety program are obvious; other reasons are just as valid but may not be so obvious. The following constitute our reasons for implementing this formal Health and Safety Program throughout our organization.

- Employee well being; it is reassuring to work in a safe environment.

- Compliance with regulations; we can be cited for not having a program and plans in place.

- We can also be cited for not complying with our written program and plans.

- Lower insurance rates; insurance and workers compensation rates are tied directly to injury, damage, lost time accidents and the citation experience of the company. We want our rates to be as low as possible.

- Major clients seriously consider accident and injury rates in their evaluation and selection of contractors; we want our health and safety history to be an asset, not a liability.

- Third-party lawsuits often hinge on how well we describe, implement and enforce our written Health and Safety Program. We want to be able to defend ourselves, if necessary.

- The quality of a health and safety program is a very strong indicator of a project's management success, i.e., a well-run health and safety program typically indicates good project management (and vice versa).

- An effective health and safety program simply saves us money.

1.2 Health and Safety Policy and Goals

RCI management is committed to providing safe working conditions to every RCI employee.

No job is so urgent that we cannot take the time to do it safely. We expect all RCI supervisors to accept this statement and our workers to expect no less from us. We expect our employees to help us achieve our goals of no lost-time accidents or damage to the environment or property by implementing the premise that all safety hazards will be considered and controlled to the extent possible.

RCI will provide its employees the proper training and equipment to perform their duties safely and in conformance with applicable state and federal regulations. RCI managers and supervisors are responsible for understanding, implementation, and maintaining the highest possible level of Health & Safety.

1.3 Organization of This Document

This Health and Safety Program is organized for ease of use. Redundancies have been reduced to the extent possible. Regulatory citations are provided for each topic. These regulations must be read and understood before attempting to comply with Health and Safety issues.

- Section 1.0 provides an overview on how the Health and Safety Program operates.
- Section 2.0 contains information on safety and health organization and responsibilities.
- Section 3.0 contains an overview of our health and safety program. These sections also refer to Appendices containing additional information on each topic.
- A detailed Table of Contents is included so sections can be quickly identified and located.

1.4 Types of Work Performed by RCI

RCI performs a variety of work. The following is a brief description of the types of work done and their particular hazards.

- Office Work – Obvious hazards include repetitive motion injuries and eye fatigue. Experience has proved office work also involves injuries due to lifting, slips, trips and falls. Many sections of this document apply.

- Construction – RCI performs a variety of construction work, including road-building, demolition, rock-crushing, and vertical construction. The hazards are numerous and varied, since construction involves a wide range of tools, equipment and activities. Various sections and appendices will apply to different construction projects.

- Hazardous Waste Operations – RCI may provide construction-based support for these types of projects. These are specialty projects requiring special training, annual physical exams, and the ability to deal with the truly hazardous physical situations, chemicals and unknowns. These operations generally require a Project-Specific Health and Safety Plan.

- Contaminated Site Remediation – RCI may provide construction-based support for these types of activities. Work involving remediation, typically involves a variety of activities, including the use of heavy equipment, trenching and working with hazardous wastes. Typically, contaminated soils must be excavated, hauled or treated in place. The hazards include a combination of those found at construction and hazardous waste sites.

- Electrical and Wire Communications – This work involves working in attics, on poles, in vaults and utilities, beneath floors, etc. Hazards include: slips, trips and falls from ladders, electrical shock, repetitive motion injuries, and even exposure to dust, fibers or asbestos. Many sections apply, but this document does not include all the regulations and safety procedures that apply to electrical work.

- Marine and Open-Water Activities – RCI may perform work in marine environments that may involve the use of small powerboats, rafts or cross streams routinely. Several parts of Section 3 cover these hazards.

2.0 Organization and Responsibilities

a) Health and Safety Manager – The RCI Health and Safety Manager is located in Anchorage. The Corporate Health and Safety Manager prepares and distributes the company safety and health policies and procedures. All designated project safety personnel have lines of communication at least indirectly to, and may receive direction from the Corporate Health and Safety Manager.

b) Project Managers – Project managers have full responsibility for understanding and implementing the appropriate degree of employee protection and accident prevention on their project. They may delegate authority to expedite and facilitate any application of the program, but they are ultimately responsible for providing for safe working conditions on their project. The Project Managers also must provide the budget necessary to maintaining an appropriate Health & Safety Program at each of their projects.

c) Project Supervisor/Foreman – Supervisors, foremen and other project supervisory personnel are responsible for the specific work methods and safety procedures for work performed under their direction. They must understand, implement and document regulatory and safety requirements applicable to the work and follow any directives relating to safety, as instituted by the project manager or health and safety staff consistent with company policy, client requirements and appropriate regulatory codes.

d) Project Health and Safety Officers – These individuals are responsible for determining on-site project health and safety needs, hazard identification and control, Safety Plan implementation, PPE selection, and decontamination. They also determine applicable regulations and have authority to stop unsafe practices. They typically report to a level outside of project supervision, preferably the Health and Safety Manager, so they can operate independently. Health & Safety Officers are not in other employee's line of authority; therefore they will work through supervisors to implement and correct problems.

e) Subcontractors – Subcontractors performing work for RCI have definite safety responsibilities. These responsibilities should be defined by their subcontract, as well as by federal, state and municipal laws. We expect subcontractors and their personnel to participate in all RCI safety activities.

f) Employees – All employees must understand and comply with basic safety rules and regulations applicable to their work, and contribute to the general safety of their fellow workers. It is the responsibility of project management to provide safe work conditions. It is the responsibility of each employee to support project management and work in a safe manner, protect themselves and fellow workers against injuries, and to report all safety hazards, injuries and near misses at once. Each employee must be aware that there is a Corporate Health and Safety Program, and that it is available for review, as necessary, as well as understand the applicable health and safety rules. Employees are also expected to know the name of their Site Health and Safety Officer.

3.0 Health and Safety Program Overview

These sections cover most of the areas of health and safety requirements for the types of work we do. In some cases, these sections can serve as our Accident Prevention/Health and Safety Program. The applicable regulations are also called out in the section title when appropriate. The Health & Safety Department can provide copies of the actual regulations, should they be needed.

3.1 Recording and Reporting Occupational Injuries (OSHA 1904)

There are several types of recordkeeping required; these include:

- OSHA Form 200 – kept onsite and update as necessary

- OSHA Supplementary Form for Injuries – to be completed when we have an injury

- Records for hazardous waste operations employees - these include medical, training, symptoms of exposure, etc.

- Workers compensation records – must be filed with the appropriate state worker's compensation carrier immediately.

- Internal health and safety reporting – there are several forms for this.

- Survey of Occupational Injuries – this form is required for selected subsidiaries at the end of each year.

Completion of OSHA Form 200 is required at all RCI facilities which have 11 or more employees and which will be active for three months or more. These forms will be kept on site and updated within five days when we have a reportable or lost-time accident.

The OSHA Form 200 will be signed and posted during February of each year with results from the previous year. The supplementary form for injuries does not need to be completed separately when our internal forms are completed, since our forms include all the required information.

We may be asked to complete a Log of Occupational Injuries by the Bureau of Labor Statistics. This requirement is mandatory and the forms to be completed are included with the package sent by the Department of Labor.

Please see appendix H for the RCI Accident Investigation Procedures

3.2 OSHA Inspections, Citations and Proposed Penalties (1908.7, 1910.217)

Occasionally, Occupational Safety & Health Administration (OSHA), FBI, ADEC or EPA inspectors will show up at a site or facility. They usually arrive unexpectedly, often as the result of a phone call or report from someone. We shouldn't be upset by a surprise inspection if the site is in good order, but there are some things we can do to help ourselves. These include the following:

- Let Them Inspect – You may ask them to wait for a supervisor or health and safety person they are not more than an hour or so, but do not turn the inspectors away. They have a badge and can inspect anyway if they suspect immediate hazards. Notify the Superintendent or Foreman that they are on site.

- Go With Them – Don't let them inspect or talk with any employee without being accompanied by a supervisor or safety person.

- Take Pictures – Take pictures of everything the inspectors take photos of and what the inspectors do while on-site.

- Don't Volunteer Information – self-explanatory, but hard to do

- Do not tape-record their questions!

- Request an exit interview; ask what they found;

- Fix every problem they mention as soon as you can; while they are there, if possible.

- Follow-up on any citation or fine; try to get the fine eliminated.

- Write a detailed report on the inspection as soon as the inspector leaves and send a copy to the Project Manager.

- Don't talk to anyone's attorney or inspector except RCI's about any matter unless you have notified a manager; never speak with them alone.

3.3 Walking and Working Surfaces (1910.23)

Floors, yards, shops and other working surfaces must be kept orderly, clean, dry, etc. This includes no protrusions, nails, holes, trip hazards, and loose or rotten boards. The obstruction of aisleways is prohibited, as is blocking or locking exits. Fire hazards must be removed daily, if possible.

Covers for pits, manholes, etc. must be kept in place and marked, and people excluded if covers are loose or the area is otherwise dangerous. Floors must not be overloaded and railings must be provided for all exposed stairs and openings. Floor load capacity must be posted in a conspicuous place. Further details about working surfaces can be obtained under Regulation 1910.23.

3.4 Ladders (1910.25, .26, .27 and .29)

Ladder use is common for most projects. The regulations should be consulted for further detail. Mobil ladders and man-lifts have separate, specific requirements that must be reviewed before using these devices. General ladder requirements are outlined as follows:

- Ladders must be the proper type for the job.

- Ladders are not working platforms; they are intended to get from one height to another.

- Ladders must be used properly; this is sometimes complex and varies with the situation.

- Ladders are not to be modified or repaired and should be inspected before each use.

- Always face the ladder when using it.

- Mobile ladders must be in good repair and are not intended to support more than 250 pounds.
- They must also have working brakes.

- Ladders should extend 24 inches above the top brace point and must be tied off, if necessary.

3.5 Scaffolding (1910.28)

Scaffolds must be provided for work that cannot be done from the ground, man-lifts or from ladders, in accordance with the regulations. Scaffolds must be able to support four times the intended weight and have toe-boards and railings. Scaffold regulations are quite complex and are different for construction of new tanks rather than for standard scaffolding requirements. The regulations should be consulted for technical questions on scaffolding.

3.6 Emergency Plans (1910.38, .120, .165 and 1926.35)

Several regulations require emergency or contingency plans, including those listed above.

Emergency plans basically consist of a method to alert personnel of the emergency, escape routes and procedures, gathering places, counting heads and various post-response actions. Other types of plans will typically be site-specific, including those for confined spaces, trenching and excavating.

3.7 Noise (1910.95 and 1926.52)

Construction site or other noise can rise to unhealthy levels, no matter how you try to prevent it. When noise cannot be reduced to safe levels, employees must wear hearing protection. Not all sounds have the same effect on hearing. The three significant factors in noise are:

1. Intensity means loudness of sound and is measured in decibels (dB).

2. Pitch refers to frequency of sound waves. A high-frequency (high-pitched) whistle is generally more harmful than the low-frequency sound (low-pitched).

3. Length of exposure refers to the time one is subjected to a noise. Continual exposure to certain noises can be more harmful than occasional bursts of offensive sound.

Since some job sites are noisy by nature, and engineering controls are often not feasible, hearing protection devices (ear plugs / ear muffs) must be worn when employees are required to work in a noise hazard environment. Hearing tests (audiograms) will be conducted initially and annually to complete the employee's health records when the employee is assigned to work in a high-noise environment. These hearing tests are required by OSHA when the job sites noise levels average 85 dB or more for an 8-hour workday. Noise measurements are the responsibility of the company, and may also be monitored by OSHA to confirm the company reading.

Radios may interfere with instructions or warnings that are frequently given on construction job sites, therefore radios are not permitted on most job sites. The following information is provided as a guideline to ensure that employees are tested annually when job site noise levels average 85 dB or above.

When employees are routinely exposed to noise levels exceeding 85 dB on a time-weighted average (TWA) for the entire workday, a Hearing Conservation Program will be implemented.

When in doubt concerning noise levels at a site, a portable decibel meter is used to measure noise levels and determine the next step in hearing protection.

3.8 Non-Ionizing Radiation (1910.97)

Electromagnetic radiation, one form of non-ionizing radiation is defined as the radio frequency region, which also includes microwave radiation. The permissible non-ionizing radiation protection guide is 10-millawatt per cm^2 (mw/cm^2), averaged after a six-minute period whether the radiation is continuous or not.

There are also exposure standards for sunlight, another source of non-ionizing radiation, in the American Conference of Government Industrial Hygienic ACGIH manual, as well as for lasers and radar transmitters. These sources should be consulted where non-ionizing radiation is a potential hazard.

3.9 Compressed Gas Cylinders (1910.101, .6)

Compresses Gas is defined as gas under 40 or more pounds of pressure. Some sites may handle compressed air cylinders. These cylinders may contain flammable or non-flammable gas under high pressure. Several safety rules apply to handling compressed gas cylinders. These include:

- Cylinders must be strapped upright so they will not fall, even during minor earthquakes or during transport.
- Caps must always be on cylinders when they are not in use.
- Oxygen cylinders must not be stored near flammable gas cylinders.
- Pressure must always be relieved from the regulator before it is removed.
- No smoking around cylinders.
- Cylinders must not be located near high-use passageways.
- Our personnel should not transport or move cylinders to or from the site.
- Disposal of cylinders or purging of gas under pressure should be discussed with experts before attempting on-site.
- Periodic Visual inspections are mandatory.
- Our employees are not allowed to fill or purge compressed gases without special training.
- Compressed gas must be shipped under hazmat transportation regulations

3.10 Hazardous Waste Operations and Emergency Response (1910.120 and 1926.65)

This work includes spill response, routine hazardous waste site clean-ups, underground and above-ground fuel tank work, and handling hazardous and toxic wastes for consolidation or transport. It also includes working with toxic wastes such as PCB.

Several other health and safety aspects apply entirely or to some extent to the hazardous waste requirements. These include trenching and excavating, confined space entry, emergency response plans, respiratory protection plan, training, etc.

When we work with hazardous wastes or a spill, some or all of these rules apply. For each such project we will write or prepare a site-specific health and safety plan that discusses how we will handle all these topics.

3.11 Personnel Protective Equipment (1910.32 - .36 and 1926.24)

3.11.1 Personnel Protective Equipment (PPE)

Personal protective equipment (PPE) is worn to some extent on nearly all jobs. This section does not attempt to cover all types of PPE. Basically, the PPE worn is determined by the job or activity hazard analysis. The Site Health and Safety Officer, in conjunction with the Site Supervisor(s) and employees involved typically recommend the type of PPE. Common sense input such as consideration of the temperature, humidity, sunlight, weather, light conditions, etc., is appropriate as all influence PPE selection. Once the PPE is selected, it is mandatory that all employees wear the level of PPE selected. Other considerations include:

- Engineering and Administrative controls available
- Availability
- Sizes
- Cost
- Decontamination requirements
- Employee preference

The company only provides PPE that is job-specific and cannot be used at home, i.e. no parkas, underwear, etc., and typically no prescription lenses are paid for by the company.

We use administrative controls and engineering controls to the extent possible before employing PPE.

3.11.2 Respiratory Protection (1910.134)

Our employees may occasionally be required to wear respirators. Because we may undertake atmosphere hazard projects, some of our employees may routinely use respiratory protection, including performing Level A, B & C work and use different types of supplied–air respirators. To ensure the crew select and use respirators properly RCI has developed a Respiratory Protection Program. This program must be read and understood by all employees.

See Appendix G

Respirator protection regulations mandate a pulmonary functions test and a physician's opinion is available for each employee before fit-testing and using a respirator.

3.12 Medical Surveillance (1910.120)

Medial exams, under the auspices of a medical Surveillance Plan, are required for all workers who perform services at a Hazardous Waste Site.

3.13 Sanitation (1910.1410

Sanitation regulations apply to all permanent places of employment. Clean, cool drinking water and suitable sanitary facilities must be provided at each work site. Common problems include failure to pump toilets, dirty or fowl smelling facilities and no facilities at some remote sites. Company policy includes providing facilities for workers to wash their hands and face frequently.

3.14 Signs and Markings (1910.144 and .145)

There are numerous requirements for color-coding to mark physical hazards. There are also many requirements for signs, including size, configuration, location, etc. Workers at all sites must be made aware of the signs, tags and survey tape and what they mean. Consistent compliance with signs and markings by supervisors results in employee participation and compliance.

3.15 Confined Space Entry (1910.146)

A confined space is defined as a place which is difficult to enter or leave (or rescue someone), and is not intended for regular occupancy. Entry to a confined space is defined as crossing the plane of the entry portal of a permit-required space with any part of your body.

Before employees enter a new work area or site, the site will be surveyed for possible confined spaces. If any are found, a determination must be made as to whether the space is permit-required and if entry is required. If no entry is anticipated, the entrance will be physically blocked and signs prohibiting use of the area installed. If entry is required, a competent person will determine if the space is permit-required. If so, the entry crew must be trained and certified and an entry permit completed and complied with.

Workers expected to enter permit-required spaces will be trained either internally or by a qualified vendor.

3.16 Lock-Out and Tag-Out of Stored Energy (1910.141, 1926.404)

Employees may be required to work in areas with the potential for the release of stored energy. This includes such areas as inside large tanks, which have automatic in-flow capacity, working near electrical energy, or where the start-up machinery could cause damage or injury. The most common potential hazard is electrical energy. Procedures for locking out and tagging electrical energy are found in the regulations cited above.

Lockout/tag out or other suitable control of energy must be discussed with employees at all work sites, because there is electrical energy in use, and therefore, hazard potential universally present.

Another mechanism for controlling electrical energy is the Ground Fault Circuit Interrupter (GFCI). This device trips to the off position anytime there is a surge of energy or a short. GFCI's should be used between regular plug-ins where water is in use (sinks, bathrooms, etc.) and between the plug and the outlet whenever a generator or any other source not a part of permanent wiring is used as a power source.

3.17 Medical Service, First Aid and CPR (1910.151 and .146)

RCI personnel are expected to work at some of the most remote sites in North America; places where there is no professional medical assistance within days of an injury if the weather is bad.

Therefore, we expect most of our personnel, and all of our supervisors, to be trained in CPR and First Aid and updated annually in both. Our approach to First Aid is to stabilize the injured until professional help arrives. We do not provide medicines, oxygen or perform other activities that are associated with emergency medical technician (EMT) work unless we have a currently certified EMT with the proper equipment on-site.

Small convenience kits (not First Aid kits) will be found in each vehicle and piece of heavy equipment on a site. Larger (the size depending on the number and distribution of the crew) First Aid kits will be distributed at key locations around the site (crew break-shack, office trailer, decontamination area, etc.). The location of kits will be discussed in safety meetings and will be shown on site maps. First Aid kits at an active field site will be inspected weekly and the contents replenished or replaced at that time. Office First Aid kits will be inspected and updated monthly.

Burn kits, eye wash units (both individual units and pressurized stations), blankets and stretchers will be provided as necessary and strategically placed to be most usable in case of an emergency. Site-specific emergency procedures are discussed in the Contingency Planning section of each project's Site Specific Health & Safety Plan.

Medical facilities will be contacted at each site. The local health professional may be a Nurse Practitioner, a Physician's Assistant or an EMT. They will be told in advance what activities we are involved with and the types of contamination injured workers could have on their clothing. Any First Aid rendered will be immediately reported in writing to the Project Superintendent.

3.18 Fire Extinguishers (1910.15)

In most workplaces, we expect employees to be able to use portable fire extinguishers to put out small fires.

Appropriate training will be given to these employees in fire prevention and use of portable extinguishers. This training will typically be brief and include how to recognize the four types of fires and how to use the specific types of extinguishers available.

We realize it is more hazardous to fight fires inside buildings and only include very small fires, i.e. electrical shorts, wastebasket fires, grease burning in skillets, etc., in those we would attempt to extinguish.

Portable extinguishers will be the ABC type and located throughout the work areas in conspicuous locations known by workers in the area. Portable extinguishers will be visually inspected as to location, charge, etc. on a monthly basis. All extinguishers will be inspected annually by a certified inspector. It is our goal to have a portable fire extinguisher in each vehicle and piece of heavy equipment, although this is not mandated by law or company policy.

3.19 Portable Power Tools, Hand Tools and Machine Guarding (1910.241, .243 and .244)

On many projects, employees are required to use portable power tools, hand tools, and various type of machinery. The employer will provide employees with safe tools, or employees may use their own power tools on the job. Both employees using tools and their supervisors are responsible for regular inspections and safe use of tools.

3.20 Welding Operations (1910.253 and .254)

Welding is a common activity with potential for serious accidents resulting in fires, destruction of property or serious injury.

Personnel on any project that involves cutting, burning or any type of welding should review and understand welding safety procedures. Where welding is not covered by a specific health and safety plan, an activity hazard analysis must be completed before beginning this task. Of particular concern are fires resulting from slag or hot metal landing in a remote spot and smoldering for hours and fire breaking out hours after welding is complete.

3.21 Asbestos Awareness (1910.100 and 40 CFR Part 61)

RCI does not perform asbestos abatement, but personnel may be required to work near asbestos or asbestos- containing materials (ACM), or in areas containing ACM. These employees will have specific training and be certified in the level of work that they are required to perform.

When workers are required to perform repair or maintenance work in ACM areas, they will receive 16 hours of awareness training. Employees required to work in inside areas where ACM is present with the potential to be disturbed, will be briefed as to the hazards of asbestos.

When the work involves sampling of surfaces for ACM, the proper PPE, including tyveks, gloves and a respirator will be worn. Care will be taken to properly decontaminate and prevent ACM from leaving the area where it is found or otherwise contaminating nearby work areas.

3.22 Bloodborne Pathogens (1910.1030, .1510

When it is reasonably expected that employees will be exposed to blood or other potentially infectious material while using First Aid supplies or performing CPR, appropriate PPE will be provided. Possible exposure to bloodborne pathogens (BBP) will be discussed at least briefly with all RCI personnel. The awareness briefing will include potential sources of BBP, basic protection from such sources (gloves, face mask, aprons, etc.), and methods of disposal of any potential sources of BBP. Health and safety personnel will undergo specific BBP training before going to a remote work site.

3.23 Ionizing Radiation (1910.1096)

Our employees occasionally work with ionizing radiation, either at sites that have radioactive contamination or simply with instruments that have radioactive components. When we work with radioactive contamination at a site, each site has specific radiation worker training which our employees must attend.

We will provide radiation worker training when we are purposely working with Radon gas or NORMS clean-up projects. There are often state regulations that require specific training, certification and specific work procedures.

Typically, instruments with radioactive components require only an employee briefing on how to avoid exposure during replacement of parts, and how to dispose of the radioactive component.

3.24 Hazard Communication (1910.1200)

Federal law requires all employees to be told in advance of the physical and chemical hazards of their work environment. This is the Hazard Communication or Workers' Right to Know Act. Total compliance is difficult to achieve at a complex work site. RCI has a two-pronged approach to compliance:

1) Have a well-organized, written approach to compliance, and

2) Keep workers constantly updated through safety meetings Hazard Analysis and extemporaneous discussions of the hazards related to specific activities.

For activities not covered in this Health and Safety Program or a site-specific plan (there will be many on a complex site), we request that a Site Health and Safety Officer or Line Supervisor complete an Activity Hazard Analysis Form. See Appendix A for a sample Activity Hazard Analysis form.

The Activity Hazard Analysis forms the basis for a Site Safety Meeting or extemporaneous discussions on understanding hazards and control. We must have suitable discussion of the hazards present at each work site, including office work. This can typically be covered in briefing with employees. These briefings must be formal. Employees should sign an attendance sheet. The topics discussed must be recorded and filed.

Some states require a Hazard Communication Poster. No certificate of training is offered employees since the hazards are continually changing, but each worker must answer in the affirmative should they be asked if they are trained in hazard communication. See also Appendix A.

3.25 Subcontractor and Owner-Operator (1926.16, .20)

RCI has the responsibility to inform our subcontractors about the hazards of the work -place we have identified, and our procedures for controlling those hazards. Subcontractors performing work for RCI also have specific safety responsibilities. These responsibilities are defined by the subcontract, as well as by federal, state and municipal laws, and our project-specific health and safety plan. The following items will be reviewed and initiated prior to subcontractors beginning work on a project.

- Subcontractor personnel must comply with all federal and state safety codes, laws or contract requirements applicable to the project safety, whether or not these requirements are stated in their internal safety procedures.

- The subcontractor's written Health & Safety Plan (if available) will be reviewed by the RCI Project Manager and Health & Safety Officer. Should the subcontractor not have an existing Health & Safety Plan, RCI's will govern.

- The Corporate Health & Safety Program will be reviewed with the subcontractor; specific parts of the program that affect the subcontractor will be discussed as applicable.

- Subcontractors will name a responsible individual to be their safety representative. This person will handle the subcontractor's health & safety items and will be the safety contact for RCI.

- Each subcontractor is legally responsible for the safety of their employees and is required by OSHA regulation to furnish a safe work environment for their employees. However, we are still partially responsible if we control the site and the subcontractor's work.

- Project Management or the RCI Health & Safety Officer will meet with the subcontractors periodically to review any safety items of concern. Subcontractors are expected to hold safety meetings or attend ours when they are held.

- RCI Project Management or the Health and Safety Department will review any special safety rules that the subcontractor's employees are required to follow while working on our projects.

- Subcontractors are responsible for good housekeeping in their work area. They will be required to remove their own debris, as well as keep their work area(s) clean and safe.

- RCI, when acting as a subcontractor, will not allow a prime contractor to assume responsibility for the health & safety of our personnel. It is against our stated policy to do so. If the prime contractor insists on being responsible for site safety, we will request a written statement identifying what they are responsible for, that we will receive copies of all our monitoring results, and that they will fully support and share information with us in case of a lawsuit or citation emanating from work at that site.

3.27 Accident Protection Program (1926.20)

On construction projects, as well as several other types of contracts, an Accident Prevention Program is typically required in order to fully comply with the provisions. The Accident Prevention Program must include:

- designation of a competent person;
- regular inspections of the job site;
- permit only trained personnel to operate equipment and machinery;
- provide a safe, sanitary work place;
- applicable items from other regulatory sections; and
- state-specific requirements

Typically, preparing a site health and safety plan for the project covers all these items. This plan includes the items shown above, plus all applicable sections of this Health and Safety Program. See appendix H for the Accident Investigation Procedures

3.28 Training (1926.21, 1910.120)

All employees must be trained in the work they are expected to do, and in the recognition, avoidance or prevention of unsafe conditions in the work place. Training may be done in any number of formal and informal ways, the key being the end result, i.e., the employee can safely perform the designated work. Employees will also be trained as to the applicable regulations that apply to their work.

RCI employees will be trained to evaluate or characterize their work place, recognize the hazards present, control those hazards through administrative or engineering controls that apply, and finally, use the necessary PPE to reduce the effect of hazards that couldn't be foreseen or prevented. Typically, an employee-training roster will be kept by each subsidiary to track training, both required and voluntary. Each project will be evaluated and individual training needs must be implemented. See Appendix J for the Equipment Qualification Form

3.29 Paints and Painting; Lead-Based Paint (1915.35, 1926.62)

We occasionally work on projects that involve removing, collecting, storing, disposing of, or otherwise working with lead-based paints. We will try to identify areas that contain lead-based paint and avoid disturbing these areas or call in a trained crew to remove this paint. If we work with (remove) lead-based paint, special regulations apply, including specific training and certification, air monitoring, disposal etc. When working with lead-based paint, supervisors and all crew need to understand and follow the RCI Lead Compliance Program. Disposal of paint wastes is complex and must be handled by a person trained in Hazardous Waste Transportation.

See Appendix F for the RCI Lead Compliance Program

3.30 Safety Meetings (1910.266)

Periodically, ranging from daily to monthly, safety meetings are held on all projects; one is always held before the project begins and when job conditions or activities change.

Safety meetings are intended to be very specific and instructive. They are part of our Hazard Communication Program and are used to keep the crew alert to the hazards that may change on a daily basis. The topics discussed, attendees and other pertinent information is documented on the form in Appendix B, and filed for future reference in the health and safety files. On jobs involving office work or recordkeeping, we still hold periodic health and safety meetings to document compliance with the Hazard Communication Program and other standards.

3.31 Good Housekeeping (1926.25, 1910.141)

Good housekeeping is critical for the prevention of accidents and legally required by several regulations. Listed below are some of the accidents that frequently result from inadequate housekeeping.

- Tripping over loose objects on floors, stairs and platforms;
- slipping on wet, greasy or dirty floors;
- bumping against projecting or misplaced materials;
- puncturing or scratching hands or other parts of the body on protruding nails, hooks, or rods;
- blocking fire exits;
- creating fire hazards; and
- injuries from falling objects.

Employees tend to take housekeeping for granted and may slack off from time to time. Housekeeping is the one area of accident prevention in which all employees share responsibility. The following are areas to emphasize in our housekeeping efforts:

- Work areas – avoid unnecessary clutter. Replace tools immediately, clean up after yourself – police the area at the end of each day.
- Tools and equipment – avoid overcrowding; provide racks or containers for tools, jigs, and fixtures. Inspect them before and after use, repair, sharpen and clean
- Aisles – keep free of material, finished parts and scrap. Inspect and clean each day and make sure exits are not blocked.
- Floors – make sure they are vacuumed, swept and scrubbed regularly; spills must be cleaned immediately.
- Employee facilities – keep personal belongings in lockers; washrooms must be cleaned regularly. The area around desks must be kept free of clutter. There are many benefits to good housekeeping, including;
- It reduces operating costs – once a housekeeping system has been established, less time and effort are required to keep the work are clean.
- It increases production – delays and interference from excess materials, lost tools, etc., are avoided.
- It lowers accident rates - Trip, slip and falling hazards are removed.
- It reduces fire hazards – fires may result from, or are spread by, poor housekeeping conditions.
- Avoids citations and penalties - It's a citable offense to have a messy work area.

Containers will be provided to safely accumulate debris and garbage. Debris that constitutes a fire hazard will be removed immediately and no paper materials will be stacked within two feet of the ceiling. Work debris and garbage will be collected daily and placed in bear-proof containers (at some sites) and eventually taken to an appropriate disposal area.

3.32 Sanitation and Drinking Water (1926.27 D, 1910.141

Suitable sanitary facilities will be maintained at all work places. Bathroom facilities for separate sexes will be maintained for crews of 10 or more. Sanitary facilities will be kept clean and free of noxious odors. Employees must help by cleaning up after themselves and helping cleaning sanitary facilities, if necessary.

Portable toilets will be pumped regularly and be lockable. There will also be facilities for washing hands and face at each work place.

Suitable drinking water will be provided; the water will be free of coliform bacterial and not have a bad taste or odor. Paper cups or running fountains will be provided to prevent germ transference among workers. Water will be cool in warm weather. If showers are required, warm water will also be available.

3.33 Marine Vessel and Over-Water Operations (1926.106)

RCI employees may work on or ride marine and freshwater vessels. Certain rules apply to both small and large vessel safety. Personnel who expect to be on marine vessels should review and possibly carry a copy of these safety rules with them, or post them near the crew break area, if it is an RCI-controlled vessel. Basic rules include:

- PFDs will be worn where there is any danger of falling overboard or while working in or near running water more than three-foot deep.
- Ring buoys with 90-ft. of line will be provided for every 200-ft. of ship or shoreline drop off points.
- Skiffs will be available for rescue when a crew is working near or over water.
- An Activity Hazard Analysis will be completed for each new boating or marine operation

3.34 Fall Protection (1926.104, .500)

Fall protection is required where there is a potential exposure to a drop of six feet or more. Fairly complex rules apply to fall protection. The rules must be implemented in any operation involving the need for fall prevention or protection.

3.35 Materials Handling

Materials handling is required on nearly all projects involving construction. Basic rules include the following:

- Tag lines are always required

- Activity Hazard Analysis must be completed for each new activity
- Trained managers must oversee each complex operation
- Eye contact with operations is mandatory before entering materials handling working areas
- Only one person will give signals to the operator

3.36 Heavy Equipment Operations (1926.600 - .602)

Heavy equipment is involved to some extent on most construction projects. Some basic rules of operating or working in or near heavy equipment, vehicles or materials handling equipment are as follows.

- All equipment will be properly maintained according to manufacturer's instructions.
- All equipment will be inspected before use each day.
- Equipment will be repaired immediately if safety is potentially compromised by a defect.
- People on the ground around equipment will wear orange vests and get the visual attention of the operator before moving into the work area.
- The swing zone of all operating equipment will be marked and respected.
- All trucks and heavy equipment will have operating back-up alarms, fire extinguishers and First Aid kits.
- Speed limits will be respected at all times.
- Seat belts will be buckled at all times.
- Nobody will ride in a bucket or on equipment where there are no seats for passengers.
- During an emergency, equipment will always be shut down and hydraulics disengaged, if there is time.

See also Appendix C for Heavy Equipment Operations and Appendix I for Equipment Inspection Forms

3.37 Clearing and Grubbing (1926.604)

The work site will be examined for physical, biological and chemical hazards before cleaning and grubbing begins. These hazards will be removed or reduced to the extent possible. Biological hazards such as poison ivy or oak, poisonous animals such as snakes and stinging insects will be considered prior to beginning. Physical safety hazards will be identified; weather; lighting and other work conditions will be identified.

A safety meeting or hazard analysis will be completed before beginning, especially if axes, saws or climbing tools are being used. Chainsaws are inherently dangerous power tools; therefore, we have some specific guidelines for their care and use.

3.38 Excavation and Trenching (1926.650)

On projects where excavations of four feet or more are dug, special procedures apply. If "exposure" exists, a trained competent person must be appointed. Daily inspections by that person must be documented. The trench must be sloped or shored if people are required to work in it. Many states have separate rules for trenching or excavating. See also Appendix D.

3.39 Hepatitis A and B

Employees may travel, live or work in Alaska Bush communities or in foreign countries which have a high incidence of Hepatitis A or B. For those who take an annual physical, RCI encourages them to get a Hepatitis A and B vaccine.

3.40 Alcohol and Other Drug Program (49 CFR .199)

RCI's drug and alcohol program is mandatory for all employees on Department of Transportation projects (trucking, pipeline company projects, etc.) or when the contract requires this program. The program can be implemented on any project with concurrence of the Program Manager and the Health and Safety Manager.

For the general employee group, testing for drugs and alcohol is mandatory if the employee is alleged to be at fault in an accident with significant damage or resulting in injury to themselves or another person.

As a rule, non-prescription drugs are not allowed on a project site. Prescription drugs that could possibly influence safety on the job must be reported on the Employee Health and Safety Questionnaire Form. Alcohol is allowed in moderation after work, but not within five hours of going to work. Project personnel will not have alcohol during the work.

Employees will be notified at least 30 days prior to being asked to participate in our drug program. We reserve the right to ask potential employees to participate in our drug program immediately.

3.41 Health and Safety Quality Control

Quality Control (QC) can be defined as proving we do what we said we were going to do. QC applies to all areas, particularly health and safety. To ensure we have quality built into our Health and Safety Program, the following applies:

- say what we are going to do (i.e. write a program, work plan, etc.);
- make a checklist of the identifiable QC points in the written plan;
- inspect regularly to see how we are doing;
- write out non-conformances, assign them to someone; and set a date for their resolution; and
- check periodically to see that the system is working.

Procedures are found throughout this document. The level of QC employed will depend on many factors, including the visibility of the project, the budget, complexity, etc., but there will always be a certain level of quality built into each project and documented. The QC Department should review or prepare project QC plans.

3.42 Employee Orientation

All RCI and subsidiary employees are provided a health and safety orientation at the beginning of their assignment and at least once per year. This orientation is different for each office or site, but involves at least the following items:

- Name of the designated Health and Safety person at their location;
- appropriate dress for the job;
- prescription medicines;
- Health and Safety Program review;
- emergency alert system, including escape routes and gathering areas;
- emergency phone numbers;
- hazard communication compliance;
- preventing accidents, reporting near-misses and incidents;
- hearing conservation program;
- First Aid / CPR;
- general safety rules;
- electrical safety;
- clean work place;
- fire alarm and extinguisher locations, inspection schedule and use;
- reporting dangerous conditions;
- First Aid kits/eye wash stations;
- drug and alcohol policy;
- confined space work;
- required PPE;
- driving and driver record;
- buddy system;
- general safety items (theft, parking, leaving building, etc.);
- health and safety posters;
- medical exams;
- routine H&S inspections;
- designated smoking areas;
- fuel storage and flammable container marking;
- recordkeeping and record confidentiality;
- potential physical hazards of the facility and work station;
- potential chemical hazards;
- violence in the workplace; and
- ergonomics and repetitive motion disorders.

Typically, a Health and Safety Department representative will present the orientation. Workers will sign the New Employee Safety Orientation Checklist Form after the briefing.
Employees are urged to participate in the Health and Safety Program by asking questions, reading material, staying alert, and reporting potential safety problems throughout their work with us.

3.43 Spill and Contamination Reporting

These spills are typically encountered or caused by our employees at a construction or remediation site. We want all employees to understand our legal and ethical responsibilities for reporting contamination or a release, as the consequences for not properly reporting can be significant.

Spill identification and who is responsible for reporting contamination found at a site are complicated and can get us in trouble with our clients or get us cited for non-compliance. It is best to check with the Project Manager, Health and Safety Department Manager, or the Environmental Compliance Manager if in doubt. Reporting quantities and procedures may differ in each state.

3.44 Utility Clearance Procedures (1926.652, .955)

A key part of some construction projects involves working around buried or overhead utility lines. It is important that utility clearance be planned into each project when it applies, as the results of an accident here can be catastrophic. State and contract rules should also be reviewed, since they may be stricter than these procedures.

In summary, survey all work areas for overhead and underground hazards. Don't dig until we have a mark on the ground and some idea of how deep the utility is. Also, be aware that some maps and some marked locates are not accurate. Be sure the operator is extremely careful around utilities and that the operator knows what to do in case a utility is touched or damaged. Understand and use the 2x5 Rule.

3.45 Disciplinary Action Guidelines for Health and Safety Violations

Supervisors are allowed considerable flexibility in correcting safety violations. We also have a Standard of Conduct that we hold all of our employees to. These standards and the guidelines regarding discipline are found in appendix J.

3.46 Repetitive Motion Injuries

Repetitive motions, including typing, can cause cumulative trauma disorders (CTD), tendentious and other trauma to the hands and wrists. These disorders cause more than $100 billion of insurance costs each year. The cost of each CTD case averages $100,000.

Cumulative trauma disorder such as carpal tunnel syndrome can be caused by non-repetitive activities such as holding one position for extended periods, direct pressure on the nerves or tendons, work in cold temperatures, or vibration from hand-held power tools.
CTD's can also be caused by your hobbies or by the way you sleep. Nearly all repetitive and CTD's can be prevented, if detected early. The following summarizes our program to prevent and treat CTD.

- Employees should be told the symptoms of CTD and encouraged to discuss them with supervisors. They include: pain, numbness, tingling, burning or aching in a particular area, especially the inner wrist.
- Employees should tell the company about any pre-existing symptoms of CTD when they are hired or when they first occur.

- Symptoms may be constant or intermittent. Usually, certain activities trigger the symptoms. For example, each time you wax the car, your wrist maybe sore the next day.
- Regardless of the frequency or cause, you must report symptoms to management and seek help as soon as you experience symptoms.
- A key prevention action is maintaining variety in what you do.
- Changing your seat height or posture can help.
- Take breaks before you get “tired” or symptoms occur.
- If possible, don’t do things that hurt your extremities (pay someone to wax the car).
- Relax, both mentally and physically; mental and physical stress contributes to CTD.
- Avoid extreme joint positions and pressure to your joints or tendons.
- Don’t use too much force in any repetitive or non-repetitive activity.
- Keep your hands warm when you work.
- Rest frequently during exposure to vibrations.
- Supervisors will act immediately if symptoms of CTD are reported to prevent a serious injury.

If we know about potential CTD problems at an early stage, we can get you professional help or treatment before a serious problem develops. Supervisors or experts will discuss repetitive motion injuries at safety meetings.

3.47 Workplace Violence

Violence in the workplace has become more common in recent years. It is the leading cause of fatalities among women in the workplace. We propose the following approach to prevent serious incidents due to workplace violence.

- All supervisory personnel will be trained in recognizing and preventing workplace violence.
- All personnel will be treated with respect and dignity. Nobody will be reprimanded in front of others.
- Nobody will be allowed to possess large knives, guns, rifles, etc., on site or in company-provided quarters.
- Everyone will be encouraged to maintain a positive attitude.
- Everyone, from managers to the newest temporary employee, will observe their fellow workers for signs of impending problems.
- It’s your obligation to report possible problems discretely to the proper person. Despondence, threats, etc. nearly always precede workplace violence.
- Layoffs and terminations are to be handled discreetly and positively, if at all possible, with at least two supervisors in audience.
- Never approach or challenge a distraught fellow employee (especially if they are armed).
- Lie flat or crawl under desks, close and lock doors, etc., at the first hint of violence.
- Know when and how to call for help and do so without hesitation.

Refer personnel problems to the Human Resources Department; most of us are not trained to handle these types of problems. See appendix J for more information.

3.48 Cold and Heat Stress

Both cold and heat can be problems at work sites, depending on the season, location and the PPE workers are required to wear. Our employees are likely to work in the temperature extremes that put them at risk for heat or cold stress. High humidity in some locations exacerbates temperature stress to humans, especially when they are wearing non-breathable PPE.

Interior Alaska is one of the coldest regions in North America during winter, with temperatures reaching –84°F; on the other hand, summer temperatures in the Interior can reach 80-85°F. The temperature extremes, plus the necessity to wear special protective equipment such as impervious suits, rubber boots and gloves, make awareness of cold and heat stress vital.

Both heat and cold stress produce diminished mental and physical capacity, cause one to make mistakes, and greatly increase the chance of injury or damage to equipment.

Our first line of defense is using workers familiar with the local conditions whenever possible. Next, we make sure they are dressed properly for the weather, whether hot or cold. Temperature stress takes precedent over most other requirements for protective clothing and equipment. We may have to stop work, work different shifts, increase break time, etc., to prevent both temperature stress and over-exposure to chemicals. We may waive the requirements for hard-toe boots when it is very cold or waive wearing hard hats and rubber boots when it is very warm to prevent thermal stress.

The line supervisor and the Health and Safety Representative are responsible for preventing thermal stress. They may accomplish this by monitoring a representative worker, asking them questions, observation, or simply taking frequent breaks and advising workers to drink plenty of liquids, and to add or remove one of the layers of clothing they normally wear.

Training in the form of safety meetings and informal discussions will occur as needed to ensure workers are properly informed, dressed appropriately, and recognize symptoms of thermal stress in themselves and their “buddy”. The buddy system is used on all projects, one of the purposes being to recognize symptoms of any type of thermal stress in their associates.

3.49 Existing Medical Problems and Prescriptions

For several reasons, RCI needs to know our employee’s medical history, specifically any past or present injuries, back problems, repetitive motion symptoms, etc. This form also requests information on whether or what kind of prescription drugs or medicines an employee is taking. This information is necessary in case of emergency treatment, as well as in assigning people to safety-sensitive jobs such as driving and should be updated as conditions change.

3.50 Site Hazard Evaluation and Inspection

All work sites have hazards. We, the employers, along with every single employee, have a responsibility to identify specific workplace hazards and determine how to eliminate, reduce or protect our employees from these hazards. As a rule, an Activity Hazard Analysis Form will be completed for each task. This form will be used to list the known hazards of the task, how to control the hazard and provides the formal opportunity to discuss the hazards and their control with the team members involved.

A trained health and safety person will evaluate each workplace at least once each year. Also, most workplaces should have a cursory inspection daily and a planned weekly inspection. The weekly inspection should follow a checklist prepared from the safety plan and site-specific information, plus previous inspection records for the particular work area.

Results of all inspections should be recorded, with unresolved items having personnel assigned and target dates for resolving outstanding issues. The list of unresolved issues should be a “rolling” list, with old ones staying on the list until resolved and new ones added with each inspection. The record of this inspection is our “proof” we continually attempt to identify and resolve health and safety issues of our work site, and will be invaluable to us in case we ever have an injury or lawsuit. We must have these in our files. See also Appendix E.

3.51 Vehicle Operations

Many of our projects require employees to drive company or government vehicles during work. Since vehicle accidents are one of the major sources of damage and injury in the work place, our goal is to prevent accidents, or reduce the severity of those accidents we do have, to the extent possible. Each subsidiary must implement and enforce a Vehicle Safety Program, which may be more stringent than the corporate program. The following procedures constitute the Corporate Vehicle Safety Program.

- Driver records will be checked with the state DMV; it is a condition of employment if any employee is required to drive company vehicles, rental cans or heavy equipment.
- Drivers and operators must have valid drivers license, including commercial drivers license, if required. Valid drivers’ licenses are also required for driving company ATV’s.
- A DUI within the past two years will prevent an employee from being authorized to drive.
- Three or more moving violations in the past year are also cause for not authorizing a driver.
- As an authorized driver, you must do the following:
  - Inspect the vehicle each day before you drive; be sure there is a valid registration, tag, inspection sticker, etc., in the vehicle. Check the brakes, headlights and signal lights for problems.
  - Speed limits must be obeyed; moving violations can be grounds for termination if serious or repeated.
  - Buckle your seat belt and insist passengers also wear them.
  - Report all accidents, incidents immediately to a supervisor.
  - If you have an accident, do not admit fault; call supervisor.
  - Be sure the police are called if you have an accident, except in certain circumstances (very minor damage, it is dangerous to wait, etc.)
  - Carry insurance information in the vehicle at all times.
  - Accept the insurance coverage on rental cars.

Other vehicle safety procedures may apply that are specific to a certain states or offices.

3.52 Unexploded Ordnance

RCI have projects in areas (e.g., military bases) potentially involving unexploded ordnance (UXO) on a routine basis. A thorough and accurate site-assessment by qualified personnel must be conducted. The data thus developed will form the basis of a written, detailed work plan for intrusive operations and for possible removal and demolition of the UXOs. Detailed, site-specific procedures will be prepared for each UXO project. These will be part of the site health and safety plan.

3.53 Back Problems and Lifting

Nearly 80 percent of American workers have some sort of back injury or problem during their working careers. These injuries can range from temporary pain to extensive long-term, lost-time incidents. Our approach is to prevent back injuries. To do this we have the following procedures:

a) We want to know about pre-existing back injuries of our employees. This will enable us to properly assign work that involves lifting. Appendix 51 has some helpful hints for preventing back injuries.

b) To prevent injuries, we teach and promote good lifting habits. These include:

- Don't lift anything that is too heavy; use machinery or request additional assistance.
- Think ahead; plan your lifting.
- Keep your feet apart – shoulder width.
- Bend your knees; don't bend at the waist.
- Use your abdominal muscles to help you lift.
- Use your legs; they are the strongest muscles of the body.
- Keep the load close to you.
- Don't twist; keep your back straight and upright when lifting.

c) Back conditioning exercises and warming up may help prevent injuries.

d) We do not promote nor provide back braces, since there is controversy over whether they help or not.

A Project Health and Safety Status Report will be completed weekly (sometimes monthly) and sent to the Project Manager and/or the Corporate Health and Safety Manager. Items of non-conformance must be followed up and fixed in a short period of time.

3.54 Slips, Trips and Falls

Virtually every worker trips over something in the workplace every year; usually the trip or fall does not cause an injury to the employee. Most of the time, these slips are preventable and result from tripping hazards, slick floors, ice on walkways, wearing the wrong type of shoes, etc. Each year trips and falls result in more than a billion dollars of lost-time, medical bills, and reduced efficiency. The following are some of the ways we can prevent accidents due to slips and falls.

- Talk about this topic at every safety meeting. Make it a point to discuss slips and falls during fall, winter and spring.
- Remove or correct trip hazards immediately.
- Encourage employees to think in the present, don't daydream, don't rush, etc.
- Wear the proper type of shoes; leather soles are hazardous during icy conditions.
- No open toed shoes are permitted.
- We should inspect our work area on a regular basis, including stairs, steps, walkways, and do what is necessary to provide safe walking surfaces for our workers. This is especially important after storms, rain, when floors are waxed, etc. Constant vigilance will pay off. Neglect will undoubtedly result in falls, injuries and lost-time.

The Corporate Health and Safety Department can provide training materials on proper lifting and can give safety meetings and demonstrations on this topic.

3.55 Employee Insurance

Typically full-time employees have company insurance which covers them to varying degrees, whatever they are doing, all the time. On the other hand, all workers are covered by some type of workers compensation insurance. The latter only covers accidents, injuries or illnesses that are work-related. The following applies to both insurance and workers compensation.

Employees must let their supervisors know about any accident, injury or even near-misses (e.g. slipped and fell but didn't result in any injury). In the case of First Aid rendered, emergency treatment or symptoms of a job-related problem, we want to notify our workers compensation carrier in writing immediately. This simply gets the event into the workers compensation system; it doesn't result in a claim or any negative implications. This also helps protect the company and the employee in case of a follow-up injury or exacerbation of an original minor injury. A good example is if an employee "tweaks" their back at work and reports it; we turn it in to workers compensation. The back gets gradually worse and after six months, there is a major problem. We, the employer, have done our job by reporting it promptly (there are consequences for not reporting accidents). The employee is covered because their original injury is properly in the system. Most reported injuries do not result in a claim.

If you have any questions on insurance, contact The Human Resources Department. If you have any questions about workers compensation, speak with the Site Manager, who will call the state workers compensation carrier.

3.56 Unruly Visitors to the Workplace

When dealing with the public, they are often drunk, belligerent or otherwise unruly. Our policy is to not argue with unruly people. We will simply call security or the police if a person acts in a threatening or otherwise unruly manner, or is obviously drunk or under the influence of an illegal drug.

Appendix A

Hazard Communication Program

Ridge Contracting, Inc.
CORPORATE HEALTH AND SAFETY PROGRAM

Corporate Hazard Communication

Table of Contents

Attachments

Tables

Summary

The Ridge Contracting Incorporated [RCI] Hazard Communication Program is summarized as follows:

1. We have read and understand the State (AAC 15.0101) and Federal (29 CFR 1910.1200) laws on Hazard Communication. We have used the State of Alaska Hazard Communication Kit to prepare this Hazard Communication Program.

2. RCI enrolls all operations employees who may work at a hazardous waste or spill site to an appropriate 8-, 24- or 40-hour course in Hazardous Waste Operations and Emergency Response. At least four hours of this course is spent discussing Hazard Communications, including how to understand the terms found in an MSDS. This constitutes RCI's basic training in Hazard Communication. Office workers receive one-hour per year of basic Hazard Communication Training. Safety Meetings held at hazardous waste work sites will be used to discuss specific chemical or physical hazards present on-site.

3. RCI has inventoried all its chemicals (see Table 1) and will update this list annually or when new chemicals are introduced.

4. All fuels (except day tanks) at a work site will be labeled properly as to their contents.

5. Workers will know the location of MSDSs and PADS at each work location. They can read them during their breaks and before work.

6. RCI will review its Hazard Communication Program on an annual basis, updating as necessary

TABLE 1 Chemical Inventory List

Date: ____________________ Name of Preparer: ____________________________

Department/Project: ____

Product Name	Product/ CAS/UN Number	Manu- facturer Name	Comment	MSDSs on hand
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Ridge Contracting, Inc.

CORPORATE HAZARD COMMUNICATION
WORKERS RIGHT TO KNOW

1.0 INTRODUCTION AND OVERVIEW

The RCI Hazard Communication Program is designed to transmit information regarding the hazards due to chemical and physical agents present in the workplace to those employees who may be affected. The step-by-step process in developing our Hazard Communication Program is as follows:

a. We have reviewed the federal and state Hazard Communication Rules.

b. We have identified a staff member responsible for developing, implementing, and monitoring the Hazard Communication Program. This Program Coordinator is Drew McLaughlin.

c. We have developed, and will continue to update, an inventory of the chemicals and physical agents present in our specific work areas and project sites. This list will be used as a basis for obtaining Material Safety Data Sheets (MSDS), Physical Agent Data Sheets (PADS), and conducting employee training.

d. We have obtained and have a copy of current MSDSs and PADS for the hazardous chemicals and physical agents at each specific workplace. We have organized them alphabetically. We have assured they are available to employees during their workshifts. The copies are in a clearly-marked three-ring binder at rest areas and command posts.

e. We have assured that original and secondary containers have their contents properly labeled (excluding day tanks).

f. We have written a plan for an ongoing Hazard Communication Program.

g. We have conducted (or intend to conduct) employee training for all personnel.

h. We will ensure that:
   - New and present employees are trained;
   - Any chemicals we work with in the field, and any new chemicals, are received with proper labels and MSDS; and,
   - Current employees will be retrained through site safety meetings when new or different hazardous chemicals or physical agents are encountered into the workplace or site.

2.0 CHEMICAL AND PHYSICAL AGENT INVENTORY

2.1 CHEMICALS COVERED

Each employee is encouraged to walk around their area and look for potentially hazardous chemicals including those not in containers. It is RCI's responsibility to determine whether a chemical is hazardous. As a user of some chemicals, RCI relies on the evaluation received from suppliers through labels on containers and MSDSs. RCI has a list of chemicals in its facility and will prepare one for each worksite that has the potential for being hazardous (e.g. "flammable" or "causes skin irritation"). Substances generated in work operations, such as fumes and dust or heavy-duty cleaners on sites or in maintenance closets, may be considered hazardous.

Chemicals considered to be hazardous are those:

- Regulated by OSHA in 29 CFR Part 1910, Subpart Z, *Toxic and Hazardous Substances* (see Appendix A);
- Included in the American Conference of Governmental Hygienist (ACGIH) latest edition of Threshold *Limit Values for Chemical Substances and Physical Agents in the Work Environment* (see Appendix B, ACGIH Manual);
- National Toxicology Program, annual report on carcinogens; and,
- Suspected or confirmed carcinogens by the National Toxicology Program in the latest edition of the *Annual Report on Carcinogens* (see ACGIH manual).

Appendix A lists the chemicals found in the above sources. The fact that a chemical is not listed does NOT mean it's not hazardous. Any chemical that presents a potential health or physical hazard to which employees may be exposed must be included in the Hazard Communication Program. Basic criteria for being hazardous areas includes:

- Corrosive—Less than 2.5 or greater than 12.0 pH;
- Flammable—flash point less than 100º F;
- Reactive—reacts to shock, temperature, or water; and,
- Toxic—has a listed dose or Permissible Exposure Limit.

RCI will review the list annually or on a site-specific basis to determine which items are exempted. A number of items are exempt. For example, rubbing alcohol at a first-aid station is exempt because it is intended for personal use by employees. If there is any question regarding a particular chemical, it will be included in the Hazard Communication Program.

2.2 LISTING CHEMICALS

All hazardous chemicals known or suspected to be present at a site or the normal workplace will be listed using the name that appears on the appropriate MSDS and/or label for the chemical. The list may include common or trade names, MSDS reference numbers, etc. (see Table 1). The list will be compiled for each individual work area, including the shop and the main office area.

The list will be an inventory of everything for which a material safety data sheet must be obtained or is available. It is part of the written program, and will be available to employees upon request at each work site. The list will be maintained and updated by each Project

Supervisor or area representative. The Program Coordinator will maintain a master list of new chemicals and products arriving at the site or area and will immediately add them to the list.

3.0 PHYSICAL AGENTS

3.1 INTRODUCTION

In addition to chemical substances, the list of hazards will include hazardous Physical Agents. PADS will be available for applicable hazards. Physical Agents include any of the following that are present in work places at levels which could be hazardous:

- Noise
- Hand-Arm Vibration
- Heat Stress
- Cold Stress
- Ultraviolet Radiation
- Ionizing Radiation
- Non-Ionizing Radiation
- Microwave/Radio Frequency Radiation
- Lasers

The Hazard Communication Program will include the following areas:

- The Chemical Inventory (see Table 1)
- The Physical Agent Inventory (see Table 2)
- The Employee Training Program (see Company Safety Program) will cover the hazards of hazardous Physical Agents in the workplace and the necessary safety precautions. See also Appendix B, Training Program Outline.
- The file of MSDSs will include PADS for hazardous physical agents present in the workplace.

Again, supervisors are responsible for listing and obtaining MSDS (if available) for any physical hazards in their specific work sites. Since some physical agents are difficult to measure, the following guidelines may help you decide if the Site-Specific Hazard Communication Program needs to include any of these physical agents.

3.2 NOISE

If there are any operations that create so much noise that you have to stand less than five (5) feet from a person and raise your voice to be heard by the person doing that operation, then it is likely the noise levels exceed 85dBA. If this noise level is continuous through the work shift, then noise should be included in the Site-Specific Hazard Communication Program. Of course, if intermittent loud noises are present, such as pile driving, then noise must be addressed. RCI also has a written Hearing Conservation Program that should be consulted.

3.3 HEAT STRESS

Heat Stress will be included in RCI's Site-Specific Hazard Communication Program if the workplace has a relative humidity of 60% of greater, air movement is minimal, air temperature exceeds 70º F, employees are dressed in protective coveralls, and the potential for stress from heat is at the worksite.

3.4 COLD STRESS

Cold Stress will be included in the Site-Specific Hazard Communication Program if employees work outside in the winter or in cold buildings, or drive vehicles and operate equipment outside of population centers.

3.5 MICROWAVE/RADIO FREQUENCY

If employees use or maintain equipment that generate microwaves or radio frequency (RF) like heat sealers, glue dryers, radar installations, or broadcasting towers, then microwave/radio frequency will be included in our Site-Specific Hazard Communication Program
Microwave ovens used for heating food are not included.

3.6 IONIZING RADIATION.

If the State Department of Health Radiological Section or the federal government requires monitoring of employees radiation exposure due to their use of x-ray equipment or radioactive substances, ionizing radiation will be included in the Site-Specific Hazard Communication Program.

3.7 ULTRAVIOLET RADIATION.

Ultraviolet radiation will be included in our Site-Specific Hazard Communication Program if welding, use of plasma torches, or ultra-violet ray mercury discharge lamps occur at a workplace.

3.8 HAND-ARM VIBRATION.

Use of hand-held vibrating tools (such as chainsaws, jackhammers, chippers, grinders, or brush cutters) for more than one-hour per day will be discussed. Information will be included in the Site-Specific Hazard Communication Program.

3.9 Laser

If Class III or IV lasers are used at a specific job site, MSDSs on the hazards of lasers will be included in the Site-Specific Hazard Communication Program and legally discussed in safety meetings.

TABLE 2 Physical Agent Inventory

Job Site: ______________________________ Date: ________________________________

Prepared by: ____

Physical Agent	Source	MSDS

4.0 LABELING

The manufacturer, importer, or distributor of a product is responsible for the initial labeling of containers, but the company supervisor at each worksite is responsible for:

- Making sure all containers of hazardous substances are properly labeled, tagged, marked, and include the identity of the hazardous component with an appropriate hazard warning. Container labels for chemicals must also include the name and address of the manufacturer or distributor.
- Inspecting all incoming/outgoing shipments to be sure any hazardous materials are labeled.
- Obtain a label or label information for any unlabeled containers. These should be obtained from the manufacturer or distributor (RCI's Safety Department will help). All containers of hazardous material at each worksite (except those for immediate use) must be labeled, tagged, or properly marked.
- Ensure the crew doesn't remove or deface existing labels on containers, unless the container itself is marked with required information. The Site Supervisor is responsible for ensuring each container is labeled properly and for setting up a system to make sure this is accomplished, with help from the Safety Department.
- Supervisors will instruct their employees on labeling portable receptacles or accumulation points for potentially hazardous substances such as lube oils and antifreeze. Containers for immediate or day use do not need to be labeled; all others must be properly labeled.
- Most containers in their original condition are properly labeled and comply with OSHA and DOT shipping requirements. All containers in our inventory, except those for immediate use, must contain: (1) the name of the chemical; (2) the primary hazard; and, (3) how to protect oneself from the hazard(s).
- Nonhazardous materials are to be labeled. Supervisors will encourage employees to ensure that containers of nonhazardous materials are clearly labeled.

5.0 MATERIAL SAFETY DATA SHEET (MSDS)

5.1 INTRODUCTION

A common-sense approach will be employed toward obtaining MSDSs. The frequency and duration of use will be considered. For example, it may not be necessary to have a data sheet for a can of cleanser to use to clean the sink in an employee restroom.

The MSDS is a detailed information bulletin prepared by the manufacturer or importer of a chemical that describes the physical and chemical properties, physical and health hazards, routes of exposure, precautions for safe handling and use, emergency and first-aid procedures, and control measures. Information on an MSDS aids in the selection of safe products and helps prepare employers and employees to respond effectively to both daily exposure situations and to emergency situations.

5.2 REQUIREMENTS FOR MSDSs

RCI's policy is to maintain a complete and accurate MSDS for each hazardous chemical used at a work site. While MSDSs are not required to be physically attached to a shipment, they must accompany or precede the shipment. When the manufacturer/supplier fails to send an MSDS with a shipment labeled as a hazardous chemical, RCI must obtain one from the chemical manufacturer or distributor as soon as possible. Similarly, if the MSDS is incomplete or unclear, the manufacturer or distributor will be contacted for clarification or to obtain missing information. (See Table 3 for an example of a letter requesting an MSDS).

5.3 SECTIONS OF AN MSDS AND THEIR SIGNIFICANCE

OSHA specifies the information to be included in an MSDS, but does not prescribe the precise format for an MSDS. The MSDS must be in English and include at least the following:

5.3.1 Chemical Identity

- The chemical and common name(s) will be provided for single chemical substances; and,
- An identity on the MSDS will be cross-referenced to the identity found on the label.

5.3.2 Hazardous Ingredients

- For a hazardous chemical mixture that has been tested to determine its hazards, the chemical and common names of the ingredients associated with the hazards, and the common name of the mixture will be listed.
- If the chemical is a mixture that has not been tested as a whole, the chemical and common names of all ingredients determined to be health hazards and comprising one (1) percent or greater of the composition will be listed.
- Chemical and common names of carcinogens will be listed only if they are present in the mixture at levels of 0.1 percent or greater.
- All components of a mixture that may present a hazard must be listed. MSDSs for hazardous components will satisfy this requirement and will be physically attached to the mixtures MSDS.
- Chemical and common names of all ingredients determined to be health hazards and comprising less than 1 percent (0.1 percent for carcinogens) of the mixture will also be listed if they can exceed an established Permissible Exposure Limit (PEL) or Threshold Limit Value (TLV) or present a health risk to exposed employees in these concentrations.

5.3.3 Physical and Chemical Characteristics

The physical and chemical characteristics of the hazardous substance will be listed. These include items such as: boiling and freezing points; density; vapor pressure; specific gravity; solubility; volatility; and, the product's general appearance and odor. These characteristics provide important information for designing safe and healthful work practices.

5.3.4 Fire and Explosion Hazard Data

The compound's potential for fire and explosion will be described. Also, the fire hazards of the chemical and the conditions under which it could ignite or explode will be identified. Recommended extinguishing agents and fire-fighting methods will also be included.

5.3.5 Reactivity Data

This section presents information about chemical incompatibility or reactions with other chemicals and substances. Information on any hazardous decomposition products, such as carbon monoxide, will be included.

5.3.6 Health Hazards

The acute and chronic health hazards of the chemical, together with signs and symptoms of exposure, will be listed. In addition, any medical conditions that are aggravated by exposure to the compound will be included. The specific types of chemical health hazards defined in the standard include: carcinogens, corrosives, toxins, irritants, sensitizers, mutagens, teratogens, and effects on target organs (i.e. liver, kidney, nervous system, blood, lungs, mucous membranes, reproductive system, skin, eyes, etc.).

6.0 UNLABELED PIPES

To ensure that employees working on unlabeled pipes have been informed of hazardous material contained within, RCI has established the following policy:

Prior to starting work on unlabeled pipes, employees are to contact ____________________________ for the following information:

- Chemical in the pipe;
- Potential hazards; and,
- Safety precautions that should be taken.

7.0 MULTI-EMPLOYER WORKSITES

If the employees of any other employer on this worksite (such as contractor employees) may be exposed to hazardous chemicals or physical agents while at the workplace, it is the responsibility of the RCI supervisor to hold a meeting with the other employer(s) to:

- Either provide them with copies of the MSDS and PADS or information of the location and availability of MSDS and PADS for the substances and agents their employees may be exposed to while working;
- Inform the employer(s) of any precautionary measures necessary during normal operating conditions or emergencies;
- Inform the employer(s) of the labeling system used at the worksite;
- Obtain MSDS or PADS for any hazardous chemicals or physical agents that the other employer(s) may bring on the worksite; and

- Invite these other employees to our scheduled and unscheduled site safety meetings.

8.0 HAZARD COMMUNICATION PROGRAM CHECKLIST

- Table 3 is a sample letter for requesting an MSDS.
- Tables 4 and 5 are checklists of items that we use to verify we are complying with our own Hazard Communication Program, both at our home office and at field sites.
- Table 6 is a MSDS Checklist.
- Appendix A is a list of toxic/hazardous substances.
- Appendix B is a list of resources and references.
- Appendix C is an outline that covers all the topics required to be included in Hazard Communication training.

TABLE 3 Sample Letter Requesting An MSDS

[*Today's Date*]

ABC Manufacturing Company
1357 Prime Avenue
Springfield, MA 02110

Dear Sir:

RCI requires employees be provided Material Safety Data Sheets (MSDSs) for all Hazardous substances used at their facilities and to make these MSDSs available to employees potentially exposed to hazardous substances.

We are requesting a copy of the MSDS for your product ______________[*name*] listed as Stock Number __________. We also request any additional information, supplemental MSDSs, or other relevant data concerning the health and safety aspects of this product that your company or supplier has.

Please send us the MSDS and any other relevant information within ten (10) days from your receipt of this letter. Delays in receiving MSDS information may prevent us from using your product. Send the requested information to the attention of ________, Health and Safety Manager, RCI.

Please be advised that if we do not receive the MSDS on the above chemical before ______[*date*], we may have to notify OSHA of our inability ot obtain this information. It is our intent to comply with all provisions of the Hazard Communication Standard. The MSDSs are integral to this effort.

Your cooperation and timely response to this request is greatly appreciated. If you have any questions concerning this matter, please contact _________ at (907) _ – __________.

Sincerely,

NAME
Health & Safety Director

cc: file

TABLE 4 Annual Corporate Training Checklist

	TRAINING CHECKLIST	Yes/No	Comments
1	Establish training program.		
2	Identify employees who need training.		
3	Ensure new employees are trained before their first assignment.		
4	Employees are informed of the specific information, regulations, and training requirements of the Hazard Communication Standard and their rights under the law.		
5	Employees are informed of RCI's written program and training requirements.		
6	Employees are informed of the different types of chemicals and the hazards associated with their specific-worksite.		
7	Employees know how to detect the presence or release of hazardous chemicals in their workplace.		
8	Employees are trained in the use of proper work practices, personal protective equipment and clothing, and engineering controls to reduce or eliminate their exposure to the chemicals in their work area.		
9	Employees are trained in emergency and first-aid procedures and signs of exposures.		
10	Each of the potentially-hazardous chemicals in each workplace are listed on the hazardous chemical list.		
11	Supervisors know how to update the hazardous chemical list.		
12	Employees know how to obtain a Material Safety Data Sheet (MSDS) for each hazardous chemical in the workplace.		
13	Employees can explain how to use a Material Safety Data Sheet [MSDS].		
14	Employees are informed of the list of hazardous chemicals and MSDSs and where they are located.		

15	Labels and their warnings are explained to employees.		
16	A system is developed to ensure that all incoming hazardous chemicals are checked for proper labels and data sheets and that employees are informed.		
17	Evaluations are made on the effectiveness of the training program and a method is in place to keep track of who has received training.		

Signature Date

TABLE 5 Hazardous Communication Program Checklist

	Activity	**Yes/No**	**Comments**
1	Written Program prepared.		
2	Program reviewed annually.		
3	New employees trained.		
4	Hazard lists prepared and/or updated.		
5	Employees have read Program.		
6	MSDS in-house, easily available.		
7	All chemicals are labeled properly.		
8	Hazard Communication Safety Meeting(s) held.		

TABLE 6 MATERIAL SAFETY DATA SHEET and CHECKLIST

	You must ensure that each MSDS contains the following information:	**Complete**	**Incomplete**
1	Product or chemical identity used on the label.		
2	Manufacturer’s name and address.		
3	Chemical and common names of each hazardous ingredient.		
4	Name, address, and phone number for hazard and emergency information.		
5	Preparation or revision date.		
6	The hazardous chemical’s physical and chemical characteristics, such as vapor pressure and flashpoint.		
7	Physical hazards, including the potential for fire, explosion, and reactivity.		
8	Known health hazards.		
9	OSHA permissible exposure limit (PEL), ACGIH threshold limit value (TLV) or other exposure limits.		
10	Emergency and first-aid procedures.		
11	Whether OSHA, NTP or IARC lists the ingredient as a carcinogen.		
12	Precautions for safe handling and use.		
13	Control measures, such as: engineering controls, work practices, hygienic practices, or personal protective equipment required.		
14	Primary routes of entry.		
15	Procedures for spills, leaks, and clean-up.		

Appendix A

TOXIC AND HAZARDOUS SUBSTANCES

Chemicals Established As Hazardous

According to the OSHA *Hazard Communication Standard (1910.1200)*, a hazard determination must consider the chemicals listed in the following sources to be hazardous:

- Chemicals regulated by OSHA in *29 CFR Part 1910, Subpart Z*.
- *Threshold Limit Values for Chemical Substances and Physicals in the Work Environment*, American Conference of Governmental Industrial Hygienists (latest edition).
- National Toxicology Program, *Annual Report on Carcinogens* (latest edition).
- *International Agency for Research on Cancer Monographs* (latest edition).

Appendix A lists the chemicals found in the above sources. The fact that a chemical is not listed in this Appendix does NOT mean it is not hazardous. Any chemical that presents a potential health or physical hazard to which employees may be exposed must be included in the Hazard Communication Program.

Chemical List

CHEMICAL NAME

A

ACETALDEHYDE
ACETIC ACID
ACETIC ANHYDRIDE
2-ACETOAMINOFLUORENE
ACETONE
ACETONITRILE
ACETYLENE
ACETYLENE DICHLORIDE
ACETYLENE TETRABROMIDE
ACETYSALICYLIC ACID (ASPIRIN)
ACROLEIN
ACRYLAMIDE
ACRYLONITRILE
ACTINOMYCIN C*
AFLATOXINS
ALDRIN
ALLYL ALCOHOL
ALLYL CHLORIDE
ALLYL GLYCIDYL ETHER (ACE)
ALLYL PROPYL DISULFIDE
ALUMINA
ALUMINUM ALKYLS
ALUMINUM METAL OXIDE
ALUMINUM SOLUBLE SALTS
ALUMINUM WELDING FUMES
3-AMINO 1,2,4-TRIAZOLE
1-AMINO-2METHYL-ANTHRA-QUINONE
2-AMINO-5-(5-NITRO-2-FURYL)-1,3,4-THIADIAZOLE
2-AMINO-5-NITROTHIAZIDE
2-AMINOANTHRAQUINONE
4-AMINOBIPHENYL
2-AMINOETHANOL
2-AMINOPYRIDINE
AMITROLE
AMMONIA
AMMONIUM CHLORIDE FUME
AMMONIUM SULFAMATE
AMOSITE
ANILINE
ANILINE HYDROCHLORIDE
ANISIDINE (O,P-ISOMERS)
ANTHOPHYLITE
ANTIMONY AND COMPOUNDS
ANTIMONY TRIOXIDE, HANDLING & USE
ANTIMONY TRIOXIDE, PRODUCTION
ANTU
ARAMITE
ARGON
ARSENIC & SOLUBLE COMPOUNDS
ARSENIC AND CERTAIN ARSENIC COMPOUNDS
ARSENIC TRIOXIDE, PRODUCTION
ARSINE
ASBESTOS
ASBESTOS (DUSTS)
ASPHALT (PETROLEUM) FUMES
ATRAZINE
AURAMINE
5-AZACYTIDINE
AZERINE
AZATHIOPRINE
AZINPHOS-METHYL

B

B-PROPIOLACTONE
BARIUM, SOLUBLE COMPOUNDS
BAYTEX
BENOMYL
BENZ (A) ANTHRACENE
BENZENE
BENZIDINE AND ITS SALTS
BENZO (A) PYRENE
BENZO (B) FLUORANTHENE
BENZOTRICHLORIDE
BENZOYL PEROXIDE
BENZYL CHLORIDE
BENZYL VIOLET 4B
BERYL ORE
BERYLLIUM AND CERTAIN BERYLLIUM COMPOUNDS
BERYLLIUM OXIDE
BIPHENYL
BIS (CHLOROETHYL) ETHER
BIS-CHLOROMETHYL ETHER
BISCHLOROETHYL NITROSOUREA
BISMUTH TELLURIDE
BISMUTH TELLURIDE (SE-DOPED)
BORATES, TETRA, SODIUM (SALTS)
BORATES, TETRA, SODIUM DECAHYDRATE
BORATES, TETRA, SODIUM PENTAHYDRATE
BORON OXIDE
BORON TRIBROMIDE
BORON TRIFLUORIDE
BROMACIL
BROMINE
BROMINE PENTAFLUORIDE
BROMOCHLOROMETHENE
BROMOFORM
1,3-BUTADIENE
BUTANE
BUTANETHIOL
2-BUTOANONE
2-BUTOXYETHANOL
BUTYL ACRYLATE
BUTYL MERCAPTAIN
BUTYLAMINE
B-BUTYROLACTONE

C

CADMIUM
CADMIUM CHLORIDE
CADMIUM OXIDE
CADMIUM OXIDE, FUME AS CD
CADMIUM OXIDE, PRODUCTION
CADMIUM SULFIDE
CALDIUM CARBONATE/MARBLE

Calcium cyanamide
Calcium cyclamate
Calcium hydroxide
Calcium oxide
Calcium silicate
Camphor, synthetic
Caprolactam, dust
Caprolactam, vapor
Captafol
Captan
Carbaryl
Carbofuran
Carbon black
Carbon dioxide
Carbon disulfide
Carbon monoxide
Carbon tetrabromide
Carbon Tetrachloride
Carbonyl chloride
Carbonyl fluoride
Catechol (Pyrocatechol)
Cellulose (paper fiber)
Cesium hydroxide
Chlorambucil
Chlordane
Chlordecone (Kepone)
Chlorinated camphene
Chlorinated diphenyl oxide
Chlorine
Chlorine dioxide
Chlorine trifluoride
Chlormadinone Acetate
1-Chloro,2,3-epoxy-propane (epichlorohydrin)
2-Chloro-1,3-butadiene
1-Chloro-1-nitropropane
2-Chloro-6-(trichloromethyl) pyridine
4-Chloro-ortho-phenylenediamine
Chloroacetaldehyde
2-Chloroaceto-phenone
Chloroacetyl chloride
Chlorobenzene
Chlorobenzilate
O-Chlorobenzylidene malononitrile
Chlorobromomethane
Chlorodifluoro-methane
Chlorodiphenyl (42%) chlorine
Chlorodiphenyl (54%) chlorine
2-Chloroethanol
1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea
Chloroethylene
Chloroform
Chloromethyl methyl ether
Chloropentafluroethan e
Chloropicrin
2-Chloroprene
O-Chlorostyrene
Chlorothalonil
O-Chlorotoluene
Chlorpyrifos
Cholesterol
Chromite ore processing
Chromium
Chromium (calcium chromate)
Chromium (II) compounds
Chromium (III) compounds
Chromium (VI) water insoluble
Chromium oxide
Chromium, (IV) compounds water
Chromium, metal
Chromyl chloride
Chrysene
Chrysotile
Chrysotile-dust
Cinnamyl anthranilate
Cisplatin
Citrus red no. 2
Clofibrate
Clopidol
Coal tar pitch volatiles
Cobalt carbonyl
Cobalt hydrocarbonyl
cobalt, metal, dust & fume
Coclonite
Copper
Cotton dust, raw
Cresol, all isomeres
Crocidolite
Crocidolite-dust
Crotonaldehyde
Crufomate
Cumene
Cuperferron
Cyanamide
Cyanogen
Cyanogen chloride
Cycasin
Cyclamates
Cyclohexamine
Cyclohexane
Cyclohexanol
Cyclohexene
Cyclopentadiene
Cyclopentane
Cyclophosphamide
Cyhexatin

D

2,4-D (dichlorophenoxy acetic acid)
D2-Naphthylamine
Dacarbazine
Dapsone
Daunomycin
DDT and associated substances
Decarborane
Demeton
D1-(2-Ethylhexyl) adipate
D1-(2-Ethylhexyl) phthalate
D1-Sec, octyl phthalate
Diabenz (a,h) acridine
Diacetone alcohol
Diallate
2,4-Diaminoanisole and its sulfate
4,4'-Diamiodiphenyl ether
1,2-Diaminoethane

2,4-DIAMINOTOLUENE
DIAZINON
DIAZOMETHANE
DIBENZ (A,H) ACRIDINE
DIBENZ (A,H) ANTHRACENE
DIBENZ (A,J) ACRIDINE
DIBENZO (A,E) PYRENE
DIBENZO (A,H) PYRENE
DIBENZO (A,I) PYRENE
DIBENZO (C,O) CARBAZOLE
DIBORANE
1,2-DIBROMO-3-CHLOROPROPANE
1,2-DIBROMOETHANE (ETHYLENE DIBROMIDE)
DIBUTYL PHOSPHATE
DIBUTYL PHTHALATE
1,1-DICHLORO-1-NITROETHANE
3,3'-DICHLORO-4,4'-DIAMINO-DIPHENYL ETHER
1,3-DICHLORO-5,5-DIMETHYL HYDANTOIN
DICHLOROACETYLENE
O-DICHLOROBENZENE
3,3'-DCHLOROBENZIDINE AND ITS DIHYDROCHLORIDE
DICHLORODIFLUORO-METHANE (FLUROCARBON 12)
DICHLORODIPHENYL-TRICHLOROETHANE
1,1-DICHLOROETHANE
1,2-DICHLOROETHANE
DICHLOROETHYL ETHER
1,1-DICHLOROETHYLENE
1,2-DICHLOROETHYLENE
DICHLOROFLUROMETHANE
DICHLOROMETHANE (METHYLENE CHLORIDE)
1,2-DICHLOROPROPANE
DICHLOROPROPENE
2,2-DICHLOROPROPIONIC ACID
DICHLOROTETRAFLURO-ETHANE
DICHLORVOS
DICOFOL
DICROTOPHOS
DICYCLOHEXYLAMINE
DICYCLOPENTADIENE
DICYCLOPENTADIENYL IRON
DIELDRIN
DIEPOXYBUTANE
DIETHANOLAMINE
DIETHYL ETHER
DIETHYL KETONE
DIETHYL PHTHALATE
DIETHYL SULFATE
DIETHYLAMINE
DIETHYLAMIOETHANOL
DIETHYLENE TRIAMINE
1,2-DIETHYLHYDRAZINE
DIETHYLSTILBOESTROL
DIETHYLSTILBOESTROL DIPROPIONATE
DIFLUORODIBROMO-METHANE
DIGLYCIDYL ETHER (DSG)
DIHYDROSAFROLE
DIHYDROXYBENZENE
DIISOBUTYL KETONE
DIISOPROPYLAMINE
3,3'-DIMETHOXYBENZIDINE
DIMETHOXYMETHANE
DIMETHYL ACETAMIDE
DIMETHYL CARBAMYL CHLORIDE
DIMETHYL SULFATE
DIMETHYL-1,2-DIBROMO-2-DICHLORETHYL PHOSPHATE
2-6-DIMETHYL-4-HEPTANONE
DIMETHYLAMINE
DIMETHYLAMIOBENZENE
DIMETHYLANILINE
DIMETHYLBENZENE
3,3-DIMETHYLBENZIDINE
DIMETHYLFORMAMIDE
1,1-DIMETHYLHYDRAZINE
1,2-DIMETHYLHYDRAZINE
DIMETHYLPHTHALATE
DINOTOLMIDE
DINOTRO-O-CRESOL
3,5-DINOTRO-O-TOLUAMIDE
DINITROBENZENE
2,4 DINITROTOLUENE
1,4-DIOXANE
DIOXANE, TECH, GRADE
DIOXATHION
DIPHENYL
DIPHENYLAMINE
DIPHENYLMETHANE DIISOCYANATE
DIPROPYL KETONE
DIPROPYLENE CYLCOL METHYL ETHER
DIQUAT
DIRECT BLACK 38
DIRECT BLUE 6
DIRECT BROWN 95
DISULFIRAM
DISULFOTON
2,6-DITERT, BUTYL-P-CRESOL
DIURON
DIVINYL BENZENE
DYHYDROXYMETHYL FURATRIZINE

E

2,3-EPOXY-1-PROPANOL
1,2-EPOXYPROPANE
ETHANE
ETHANETHIOL
ETHANOL
ETHANOLAMINE
ETHINYLOESTRADIOL
ETHION
2-ETHOXYETHANOL
2-ETHOXYETHYL ACETATE
ETHYL ACETATE
ETHYL ACRYLATE
ETHYL ALCOHOL
ETHYL AMYL KETONE
ETHYL BENZENE
ETHYL BROMIDE
ETHYL BUTYL KETONE
ETHYL CHLORIDE
ETHYL ETHER
ETHYL FORMATE
ETHYL MERCAPTAIN
ETHYL METHANESULFONATE
ETHYL SILICATE
ETHYLAMINE
ETHYLENE
ETHYLENE CHLOROHYDRIN
ETHYLENE DIBROMIDE
ETHYLENE DICHLORIDE
ETHYLENE GLYCOL (VAPOR)

ETHYLENE GLYCOL DINITRATE
ETHYLENE GLYCOL METHYL ETHER ACETATE

F
FENAMIPHOS
FENSULFOTHION
FENTHION
FERBAM
FERROVANADIUM DUST
FIBROUS GLASS DUST
FLUORIDES, AS F
FLUORINE
FLUROTRICHLOROMETHANE
FONOFOS
FORMALDEHYDE
FORMAMIDE
FORMIC ACID
2-(2-FORMYLHYDRAZINO)-4-(5-NITRO-2-FURYL)THIAZOLE
FURFURAL
FURFURYL ALCOHOL

G
GASOLINE
GERMANIUM TETRAHYDRIDE
GLUTARALDEHYDE
GLYCERIN MIST
GLYCIDALDEHYDE
GLYCIDOL
GLYCOL MONOETHYL ETHER
GRAPHITE (NATURAL, SEE DUSTS)
GRAPHITE (SYNTHETIC)
GYPSUM
GYROMITRIN

H
K
KAOLIN
KEPONE
KETENE

L
L.P.G. (LIQUEFIED PETROLEUM GAS)
LASIOCARPINE
LEAD ACETATE
LEAD ARSENATE, AS PB

ETHYLENE GLYCOL MONOMETHYL ETHER
ETHYLENE OXIDE
ETHYLENEDIAMINE
ETHYLENEIMINE
HANIUM
HELIUM
HEPTACHLOR
HEPTANE (N-HEPTANE)
2-HEPTANONE
3-HEPTANONE
HEXACHLOROBENZENE
HEXACHLOROBUTADIENE
HEXACHLOROCYCLO-PENTADINE
HEXACHLOROCYCLO-HEXANE
HEXACHLOROETHANE
HEXACHLORONAPH-THALENE
HEXAFLUROACETONE
HEXAMETHYL PHOSPHOR-AMIDE
HEXANE (N-HEXANE)
2-HEXANONE
HEXONE
HEXYLENE GLYCOL
HYDRALAZINE AND ITS HYDROCHLORIDE
HYDRAZINE
HYDRAZINE SULFATE
HYDRAZOBENENE
HYDROGEN
HYDROGEN BROMIDE
HYDROGEN CHLORIDE
HYDROGEN CYANIDE
HYDROGEN FLUORIDE, AS F
HYDROGEN PEROXIDE
HYDROGEN SELENIDE
HYDROGEN SULFIDE
LEAD CHROMATE
LEAD PHOSPHATE
LEAD SUBACETATE
LEAD, INORG., DUSTS & FUMES
LIMESTONE
LINDANE
LITHIUM HYDRIDE

M
M-CRESOL

ETHYLENETHIOUREA
ETHYLIDENE CHLORIDE
ETHYLIDENE NORBORNENE
ETHYNODIOL DIACETATE

HYDROGENATED TERPHENYLS
HYDROQUINONE
4-HYDROXY-4-METHYL-2-PENTONE
2-HYDROXYPROPYL ACRYLATE

I
INDENE
INDENO (1,2,3-CD) PYRENE
INDIUM, COMPOUNDS
IODINE
IODOFORM
IRON OXIDE FUME
IRON PENTACARBONYL
IRON SALTS
IRON-DEXTRAN COMPLEX
ISOAMYL ACETATE
ISOBUTYL ALCOHOL
ISONICOTINIC ACID
ISOOCTYL ALCOHOL
ISOPHORONE
ISOPHORONE DIISOCYAN-ATE
ISOPHOSPHAMIDE
ISOPROPOXYETHANOL
ISOPROPYL ACETATE
ISOPROPYL ALCOHOL
ISOPROPYL ETHER
ISOPROPYL GLYCIDYL ETHER
ISOPROPYLAMINE

M-DINITROBENZENE
M-XYLENE
M-XYLENE 1,1-DIAMINE
MAGNESITE
MAGNESIUM OXIDE FUME
MALATHION
MALEIC ANHYDRIDE
MANGANESE CYCLOPENTADIENYL TRICARBONYL
MANGANESE TETROXIDE

MANGANESE, DUST & COMPOUNDS
MANGANESE, FUME
MARBLE/CALCIUM CARBONATE
MEDROXYPROGESTERONE ACETATE
MEGESTROL ACETATE
MELPHALAN
MERCURY, ALKYL COMPOUNDS
MERCURY, ARYL & INORGANIC COMPOUNDS
MERCURY, VAPOR
MERPHALAN
MESITYL OXIDE
MESTRANOL
METHACRYLIC ACID
METHANE
METHANETHIOL
METHOMYL
METHOXSALEN
METHOXY-DDT
METHOXYCHLOR
2-METHOXYETHANOL
2-METHOXYETHYL ACETATE
4-METHOXYPHENOL
METHYL 2-CYANO-ACRYLATE
METHYL ACETATE
METHYL ACETYLENE
METHYL ACETYLENE-PROPADINE MIXTURE
METHYL ACRYLATE
METHYL ALCOHOL
METHYL AMYL ALCOHOL
METHYL BROMIDE
METHYL CELLOSOLVE
METHYL CHLORIDE
METHYL CHLOROFORM
METHYL DEMETON
METHYL ETHYL KEONE
METHYL ETHYL KETONE PEROXIDE
METHYL FORMATE
METHYL HYDRAZINE
METHYL IODIDE
METHYL ISOAMYL KETONE
METHYL ISOBUTYL CARBINOL
METHYL ISOBUTYL KETONE
METHYL ISOCYANATE
METHYL ISOPROPYL KETONE
METHYL MERCAPTAN
METHYL METHACRYLATE
METHYL METHANE-SULPHONATE
METHYL N-AMYL KETONE
METHYL N-BUTYL KETONE
METHYL PARATHION
METHYL PROPYL KETONE
METHYL SILICATE
METHYL STYRENE
2-METHYL-1-NITROANTHRA-QUINONE
5-METHYL-3-HEPTANONE
5-METHYL-D-ANISIDINE
METHYLACRYLONITRILE
METHYLAL
METHYLAMINE
2-METHYLAZIRIDINE
METHYLAZOXYMETHANOL ACETATE
METHYLCYCLOHEXANE
METHYCYCLOHEXANOL
METHYLCYCLOPENTA-DIENYL, MANGANESE TRICARBONYL
4,4-METHYLENE BIS (2-CHLOROANILINE)
4,4’-METHYLENE BIS (2-METHYL ANILINE)
METHYLENE BIS (4-CYCLOHEXYLISO-CYANATE)
4,4’-METHYLENE BIS (N,N-DIMETHYL) BENZENAMINE
METHYLENE BISPHENYL ISOCYANATE
METHYLENE CHLORIDE
4,4-METHYLENE DIANILINE
METHYLTHIOURACIL
METRIBUZIN
MEVINPHOS
MICHLER’S KETONE
MIREX
MITOMYCIN C
MOCA
MOLYBOENUM
MOLYBOENUM, SOLUBLE COMPOUNDS
MONOCROTALINE
MONOCROTOPHOS
MORPHOLINE
5-(MORPHOLINOMETHYL)-3-[(5-NITROFUR-FURYLIDENE) AMINO]-2-OXAZOLIDINONE
MUSTARD GAS
MUSTARD OIL

N

N[4-(5-NITRO-2-FURYL)-2-)-2-THIAZOLYL] ACETAMIDE
N,N-BIS (2-CHLOROETHYL)-2-NAPHTHYLAMINE
N,N-DIACETYL BENZIDINE
N,N-DIMETHYLANILINE
N-AMYL ACETATE
N-BUTYL ACETATE
N-BUTYL ALCOHOL
N-BUTYL GLYCIDYL ETHER (BSG)
N-BUTYL-LACTATE
2-N-DIBUTYLAMINO-ETHANOL
N-ETHYLMORPHOLINE
N-ISOPROPYLANILINE
N-METHYL ANILINE
N-METHYL-N-NITRO-N-NITROSOGUANIDINE
N-NITROSO-N-ETHYLUREA
N-NITROSO-N-METHYLUREA
N-NITROSO-N-METHYL-URETHANE
N-NITROSODI-N-BUTYLAMINE
N-NITROSODI-N-PROPYLAMINE
N-NITROSODI-ETHANOLAMINE
N-NITROSODIETHYLAMINE
N-NITROSOMETHYLVINYL-AMINE
N-NITROSOMORPHOLINE
N-NITROSONICOTINE
N-NITROSOPIPERIDINE
N-NITROSOPYRROLIDINE
N-NITROSOSARCOSINE

N-PHENYL-BETA-NAPHTHYLAMINE
N-PROPYL ACETATE
N-PROPYL NITRATE
NAFENOPIN
NALED
NAPHTHALENE
1,5-NAPHTHALENEDIAMINE
2-NAPHTHYLAMINE
NEON
NICKEL AND NICKEL COMPOUND
NICKEL CARBONYL
NICKEL HYDROXIDE
NICKEL OXIDE
NICKEL SUBSULPHIDE
NICKEL SULFIDE
NICKEL SULFIDE ROASTING, FUME AND DUST
NICKEL, METAL
NICKEL, SOLUBLE COMPOUNDS
NICOTINE
NIRIDAZOLE
NITRAPYRIN
NITRIC ACID
NITRIC OXIDE
NITRILOTRIACETIC ACID
5-NITRO-O-ANISDINE
5-NITRO-ORTHO-ANISIDINE
5-NITROACENAPHTHENE
NITROBENZENE
2,4-NITRODIPHENYL
NITROETHANE
NITROGEN DIOXIDE
NITROGEN MUSTARD HYDROCHLORIDE
NITROGEN MUSTARD N-OXIDE AND ITS HYDROCHLORIDE
NITROGEN TRIFLUORIDE
NITROGLYCERIN
NITROMETHANE
1-NITROPROPANE
2-NITROPROPANE
NITROTOLUENE
NONANE
NORETHISTERONE
NORETHYNODREL

O

O-CRESOL
O-METHYLCYCLO-HEXANONE
O-SEC-BUTYLPHENOL
O-TOLIDINE
O-TOLUIDINE
O-XYLENE
OCHRATOXIN A
OCTACHLORO-NAPHTHALENE
OCTANE
OESTRADIOL-17B-AND ASSOCIATED COMPOUNDS
OESTRONE
OIL ORANGE SS
ORTHO-AMINOAZO-TOLUENE
ORTHO-ANISDINE AND ITS HYDROCHLORIDE
ORTHO-ANISDINE HYDROCHLORIDE
ORTHO-DIANISIDINE
ORTHO-PHENYLPHENOL AND ITS SODIUM SALT
ORTHO-TOLIDINE
ORTHO-TOLIDINE AND ITS HYDROCHLORIDE
OSMIUM TETRAOXIDE
OXALIC ACID
OXYGEN DIFLUORIDE
OXYMETHALONE
OZONE

P

P-ANISIDINE
P-BENZOQUINONE
P-CRESIDINE
P-CRESOL
P-DICHLOROBENZENE
P-DINITROBENZENE
P-NITROANILINE
P-NITROCHLOROBENZENE
P-NITROSODIPHENYLAMINE
P-PHENYLENE DIAMINE
P-TERT-BUTYLTOLUENE
P-XYLENE
PARA-BENZOQUINONE DIOXIME
PARA-CRESIDINE
PARA-DIMETHYLAMINO-AZO-BENZENE
PARAQUAT
PARATHION
PENTANE
PERCHLOROMETHYL MERCAPTAN
PERCHLORYL FLUORIDE
PETASITENINE
PHENACETIN
PHENAZOPYRIDINE (2,6-DIAMINO-3-PHYLAZOPYRIDINE)
PHENAZOPYRIDINE HYDROCHLORIDE
PHENELZINE AND ITS SULFATE
PHENOBARBITAL AND ITS SODIUM SALT
PHENOL
PHENOXYBENZAMINE
PHENOXYBENZAMINE HYDROCHLORIDE
PHENYL CYCLIDYL ETHER
PHENYL ETHER
PHENYLHYDRAZINE
PHENYTOIN
PHOSPHINE
PHOSPHORIC ACID
PHOSPHORUS (YELLOW)
PHOSPHORUS PENTACHLORIDE
PHOSPHORUS TRICHLORIDE
PHTHALIC ANHYDRID
PICLORAM
PICRIC ACID
PINDONE
PIPERAZINE DIHYDROCHLORIDE
2-PIVALYL-1,3-INDANDIONE
PLASTER OF PARIS
PLATINUM, SOLUBLE SALTS
PLATINUM METAL
POLYBROMINATED BIPHENYLS
POLYCHLORINATED BIPHENYLS
POLYCHLORINATED BIPHENYLS (54% CHLORINE)
POLYCHLOROBIPHENYLS (42% CHLORINE)

POLYTETRAFLUORO-ETHYLENE, DECOMPOSITION PRODUCTS
PONCEAU 3R
PONCEAU MY
PORTLAND CEMENT
POTASSIUM CYANIDE
POTASSIUM HYDROXIDE
PROCARBAZINE
PROCARBAZINE HYDROCHLORIDE
PROGESTERONE
PROPANE
1,3-PROPANE SULTONE
PROPANE SULTONE
PROPARGYL ALCOHOL
2-PROPIOLACTONE
PROPIONIC ACID
PROPOXUR
PROPYL ALCOHOL
PROPYLENE
PROPYLENE DICHLORIDE
PROPYLENE GLYCOL DINITRATE
PROPYLENE GLYCOL MONOMETHYL ETHER
PROPYLENE OXIDE
PROPYLENEIMINE
PROPYLTHIOURICIL
PROPYNE
PYRETHRUM
PYRIDINE

Q
QUINONE

R
RDX
RESERPINE
RESORCINOL
RHODIUM, INSOLUBLE COMPOUNDS, AS RH
RHODIUM, SOLUBLE COMPOUNDS, AS RH
RHODIUM, METAL
RIFAMPICIN
RONNEL
ROSIN CORE SOLDER PYROLYSIS, AS FORMALDEHYDE
ROTENONE (COMMERCIAL)
ROUGE
RUBBER SOLVENT (NAPHTHA)

S
SACCHARIN
SAFROLE
SEC-AMYL ACETATE
SEC-BUTYL ACETATE
SEC-BUTYL ALCOHOL
SEC-HEXYL ACETATE
SELENIUM COMPOUNDS
SELENIUM HEXAFLUORIDE
SELENIUM SULFIDE
SENKIRKINE
SESONE
SILANE
SILICON
SILICON CARBIDE
SILICON TETRAHYDRIDE
SILVER, METAL
SILVER, SOLUBLE COMPOUNDS
SODIUM 2,4-DICHLOROPHENOXYETHYL SULFATE
SODIUM AZIDE
SODIUM BISULFITE
SODIUM CYCLAMATE
SODIUM FLUOROACETATE
SODIUM HYDROXIDE
SODIUM METABISULFITE
SPIRONOLACTONE
STARCH
STERIGMATOCYSTIN
STIBINE
STODDARD SOLVENT
STREPTOZOTOCIN
STRYCHNINE
STYRENE
STYRENE, MONOMER
SUBTILISINS
SUCROSE
SULFALLATE
SULFAMETHOXAZOLE
SULFOTEP
SULFUR DIOXIDE
SULFUR HEXAFLUORIDE
SULFUR MONOCHLORIDE
SULFUR PENTAFLUORIDE
SULFUR TETRAFLUORIDE
SULFURIC ACID
SULFURYL FLUORIDE
SULPROFOS
SYSTOX

T
2,4,5-T (TRICHLOROPHEN-OXY ACETIC ACID)
TANTALUM
TCDD
TEDP
TELLURIUM AND COMPOUNDS
TELLURIUM HEXAFLUORIDE
TEMEPHOS
TEPP
TER-BUTYL ALCOHOL
TERPHENYLS
TERT-BUTYL ACETATE
TERT-BUTYL CHROMATE, AS CR03
TESTOSTERONE AND ASSOCIATED COMPOUNDS
1,1,2,2-TETRACHLORO-1,2-DIFLUORETHANE
1,1,1,2-TETRACHLORO-2,2,-DIFLUOROETHANE
TETRACHLORODIBENZO-PARA-DIOXIN
1,1,2,2-TETRACHLORO-ETHANE
TETRACHLOROETHYLENE
TETRACHLOROMETHANE
TETRACHLORO-NAPHTHALENE
TETRACHLORUIN PHOS
TETRAETHYL LEAD
TETRAHYDROFURAN
TETRAMETHYL LEAD
TETRAMETHYL SUCCINONITRILE
TETRANITROMETHANE
TETRASODIUM PYROPHOSPHATE
TETRYL (2,4,6-TRINITRO-PHENYL-METHYL-NITRAMINE)
THALLIUM, SOLUBLE COMPOUNDS

THIOACETAMIDE
4,4-THIOBIS(6-TERT,BUTYL-M-CRESOL)
4,4'-THIODIANILINE
THIOGLYCOLIC ACID
THIOUREA
THIRAM
THORIUM DIOXIDE
TIN, ORGANIC COMPOUNDS
TIN, OXIDE & INORGANIC COMPOUNDS
TIN, METAL
TITANIUM DIOXIDE
TOLUENE
TOLUENE-2, 4-DIISO-CYANATE (TDI)
TOXAPHENE
TREOSULPHAN
TRIBUTYL PHOSPHATE
1,1,2-TRICHLORO-1,2,2-TRIFLUOROMETHANE
TRICHLOROACETIC ACID
1,2,4-TRICHLOROBENZENE
1,1,1-TRICHLOROETHANE
1,1,2-TRICHLOROETHANE
TRICHLOROETHYLENE
TRICHLOROFLUORO-METHANE
TRICHLOROMETHANE
TRICHLORONAPHTHALENE
TRICHLORONITROMETHANE
TRICHLOROPHENOL
1,2,3-TRICHLOROPROPANE

X
XYLENE (O-M-P-ISOMERS)
XYLIDINE

Y
YTTRIUM

TRICYLCLOHEXYLTIN HYDROXIDE
TRIETHYLAMINE
TRIFLUOROBROMO-METHANE
TRIHYDRATE
TRIMELLITIC ANHYDRIDE
TRIMETHYL BENZENE
TRIMETHYL PHOSPHITE
TRIMETHYLAMINE
2,4,5-TRIMETHYLANILINE
2,4,6-TRINITROPHENOL
2,4,6-TRINITROPHENYL-METHYLNITRAMINE
2,4,6-TRINITROTOLUENE (TNT)
TRIOTHOCRESYL PHOSPHATE
TRIPHENYL AMINE
TRIPHENYL PHOSPHATE
TRIS(1-AZIRIDINYL) PHOSPHINE SULFIDE
TRIS(2,3-DIBROMOPROPYL) PHOSPHATE
TRIS (AZIRIDINYL)-PARA-BENZOQUINONE
TRP-P-1
TRP-P-2
TRYPAN BLUE
TUNGSTEN, SOLUBLE COMPOUNDS
TUNGSTEN, INSOLUBLE COMPOUNDS
TURPENTINE

Z
ZEARALENONE
ZINC CHLORIDE FUME
ZINC CHROMATE
ZINC OXIDE, FUME

U
URACIL MUSTARD
URANIUM (NATURAL), SOLUBLE & INSOLUBLE COMPOUNDS
URETHANE

V
VALERADEHYDE
VANADIUM, RESPIRABLE DUST & FUME
VEGETABLE OIL MISTS
VINCRISTINE SULPHATE
VINYL ACETATE
VINYL BENZENE
VINYL BROMIDE
VINYL CHLORIDE
VINYL CYANIDE
VINYL CYCLOHEXENE DIOXIDE
VINYL TOLUENE
VINYLIDENE CHLORIDE
VM & P NAPTHA

W
WARFARIN
WELDING FUMES (NOC)
WOOD DUST (CERTAIN HARDWOODS AS BEACH & OAK)
WOOD DUST, SOFTWOOD

ZINC STEARATE
ZIRCONIUM COMPOUNDS
ZINC CHROMATE
ZINC OXIDE, FUME
ZINC STEARATE
ZIRCONIUM COMPOUNDS

Attachment B

Resources and References

REFERENCES

The following reading materials may provide useful information on hazard communication, on properties of hazardous materials in the workplace, on how to cope with and guard against occupational exposure to chemical hazards, and on strategies for meeting worker training and education needs.

Adams, R.M. **Occupational Contact Dermatitis**. Philadelphia: J.B. Lippincott Company, 1969.

Allocco, Michael A. "Chemical Risk Assessment and Hazard Control Techniques." **National Safety News** 131:69-73, April 1985.

Altwater, Thomas S. "The Hazard Communications Dilemma." **Professional Safety** 30:13-18, January 1985.

American Conference of Governmental Industrial Hygienists (ACGIH). **Documentation of the Threshold Limit Values**. Cincinnati: ACGIH, 1986.

Arena, J.M. **Poisoning: Toxicology, Symptoms, Treatment**, 4th ed., Springfield, IL: Charles C. Thomas, 1979.

Baselt, R.C. **Biological Monitoring Methods for Industrial Chemicals.** Davis, CA: Biomedical Publications, 1980.

Block, J.B. **The Signs and Symptoms of Chemical Exposure**. Springfield, IL: Charles C. Thomas, 1980.

Bluestone, Miuir et al. "Chemical Companies Face up to Hazard Communication." **Chemical Week** 137(20):56-61, November 20, 1985.

Brady, J.R. "The Material Safety Data Sheet: Is it a Reliable Tool or Regulatory Torture?" **Occupational Health and Safety News Digest** 2:1-4, 1986.

Brower, J. **Training Needs: Short-Term and Long-Term Effectiveness**. Presentation at Hazard Communication Compliance Seminar. New York: Executive Enterprises, Inc., 25-26 February 1986.

Brown, Howard B. "OSHA's Hazard Communication Regulation, Part II. Labeling Requirements, Employee Training Program Execution" **Plant Engineering** 39 (6): 71-73, March 28, 1985.

Carriere, Regina. "Chemical Handling Training Aided by MSDS Information Chart" **Occupational Health and Safety** 54 (3): 36-39, March 1985.

Chemical Manufacturers Association (CMA). Chemical Referral Center, 2501 M Street, N.W., Washington, DC 20037. In Washington Metro Area, telephone (202) 887-1315; Outside Washington, DC, telephone (800) 262-8200.

Clansky, Kenneth, ed. **Chemical Guide to the OSHA Hazard Communication Standard**. Burlingame, CA: Roytech Publications, Inc., 1988.

Clayton, G.D. and Clayton, F.E., eds. **Patty's Industrial Hygiene and Toxicology**. New York: John Wiley and Sons, 1981.

de C. Hinds, Richard and Duvall, Mark N. "Compliance with OSHA's Hazard Communication Standard." **Toxic Substances Journal** 5: 275-294, 1985.

Dinman, B.D. **The Nature of Occupational Cancer: A Critical Review of Present Problems**. Springfield, IL: Charles C. Thomas, 1974.

Doull, J., et al., eds. **Casarett and Doull's Toxicology: The Basic Science of Poisons**, 2nd ed. New York: Macmillan Publishing Co., 1980.

Dresibach, R.H., ed. **Handbook of Poisoning**. Los Altos, CA: Lange Medical Publications, 1983.

Effron, William S. "Hazard Communication in the Workplace." **Professional Safety** 29 (8): 30-34, August 1984.

Federal Advisory Council on Occupational Safety and Health (FACOSH). Joint Labor-Management Effort. **Guidance Manual for Implementation of the Federal Hazard Communication Program.** March 1987.

Fisher, A.A. **Contact Dermatitis**, 2nd ed. Philadelphia: Lea and Febiger, 1972.

Gosselin, H.C. and Hodge, H.C. et al. **Clinical Toxicology of Commercial Products**. Baltimore: Williams & Wilkins Co., 1984.

Grant, W.M. **Toxicology of the Eye.** Springfield, IL: Charles C. Thomas, 1985.

Hamilton, A. and Hardy, H.L. **Industrial Toxicology.** 3rd ed. Acton, MA: Publishing Sciences Group, Inc., 1974.

Hayes, W. Jr. **Pesticides Studied in Man**. Baltimore, Williams & Wilkins Co., 1982.

Hughes, M.P. "Hazard Communication: What Does Labeling Have to Do with It?" **National Safety and Health News** 133 (5): 48-50, May 1986.

International Agency for Research on Cancer (IARC) Monographs. New York: World Health Organization (WHO), 1972-1983. Order from WHO Publications Center, 49 Sheridan Avenue, Albany, NY. 12210.

International Labor Office. **Encyclopedia of Occupational Health and Safety**, 2 vols. Geneva, Switzerland: International Labor Office, 1983.

International Technical Information Institute (ITI). **Toxic and Hazardous Industrial Chemicals Safety Manual for Handling and Disposal with Toxicity and Hazard Data**. Tokyo: ITI, 1979.

Jimeno, Julius C. “Federal Hazard Communication Program” **Applied Industrial Hygiene** 3 (1): F-33-F-34, January 1988.

Levy, Susan R. “Industrial health Education Needs: A Feasibility Study.” **Journal of Occupational Medicine** 26 (7): 534-536, July 1984.

Loomis, T.A. **Essentials of Toxicology**, 3rd ed. Philadelphia: Lea & Febiger, 1978.

Lowry, George C. and Lowry, Robert C. **Handbook of Hazard Communication and OSHA Requirements**. Chelsea, MI: Lewis Publishers, 1985.

Michigan Departments of Labor and Public Health. **The Michigan Right to Know Law and Amendments to Act 154**. Lansing, Michigan, 1986.

Miller, Hobart G. “Consistent, Accurate Data Needed for Preparing MSDS.” **Occupational Health and Safety** 55 (4): 31-34, April 1986.

National Academy of Sciences (NAS). **Medical and Biologic Effects of Environmental Pollutants** series (Arsenic, Chlorine and Hydrogen Chloride, Chromium, Copper, Fluorides, Lead, Manganese, Nickel, Nitrogen Oxides, Ozone and other Photochemical Oxidants, Particulate Polycyclic Organic Matter, Selenium, Vanadium, Vapor Phase Organic Pollutants). Washington, DC: NAS Printing and Publishing Office, 2101 Constitution Avenue, N.W.

National Fire Protection Association. **Fire Protection Guide on Hazardous Materials**. Quincy, MA: National Fire Protection Association, 1986.

National Toxicology Program (NTP). **Annual Report on Carcinogens**. Order from NTP, Department of Health and Human Services, P.O. Box 12233 B-204, Research Triangle Park, NC 27709, (919) 541-3991.

NIOSH. **Guide to Industrial Respiratory Protection**, by N. J. Bollinger and R. H. Shultz. NIOSH Publication No. 87-116, U.S. Department of Health and Human Services, Public Health Service (DHHS/PHS) National Institute for Occupational Safety and Health (NIOSH): September 1987.

NIOSH/OSHA. **Occupational Health Guidelines for Chemical Hazards**, by F. Mackinson, ed. NIOSH Publication No. 81-123. Washington, DC.: Government Printing Office, 1981.

OSHA, U.S. Department of Labor. *29 Code of Federal Regulations (CFR) Part 1910*. **Hazard Communication; Final Rule**. Washington, DC: *Federal Register* 52 (163): 31852-31886, 24 August 1987.

OSHA/NIOSH. **OSHA Medical Surveillance Requirements and NIOSH Recommendations for Employees Exposed to Toxic Substances and other Work Hazards.** Washington, DC: Government Printing Office, 1980.

Powers, P.W. **How to Dispose of Toxic Substances and Industrial Wastes**. Park Ridge, NJ.: Data Corporation, 1976.

Proctor, N.H. and Hughes, J.P. **Chemical Hazards of the Workplace**. Philadelphia: J.P. Lippincott Co., 1978.

Royal Society of Chemistry. **Laboratory Hazards Bulletin**. London, England: Royal Society of Chemistry.

Sax, N.I. **Dangerous Properties of Industrial Materials.** New York: Van Nostrand Reinhold, 1984.

Silk, Jennifer. "Hazard Communication: Where Do We Go From Here?" **Applied Industrial Hygiene** 3 (1): F-27-F-28, January 1988.

Sittig, Marshall. **Handbook of Toxic and Hazardous Chemicals and Carcinogens**. Park Ridge, NJ: Noyes Publications, 1985.

U.S. Coast Guard. **Chemical Hazards Response Information System (CHRIS)**. Michael Parnarouskis, Chief. Mail Code G-MTH-1, 2100 2nd Street, S.W., Washington, DC 20593, (202) 267-1577.

U.S. Department of Defense (DOD). **Hazardous Materials Information System**. DOD Manual No. 6050. 5-M, 1985. Write to: Defense Logistics Agency, Attn.: DLA-SCT, Miss Lisa Sadler, Cameron Station, Alexandria, VA 22304 (703) 274-4228.

U.S. Environmental Protection Agency (EPA). **Hazardous Chemical Reporting: Emergency Planning and Community Right to Know Programs**. Washington, DC: *Federal Register*, 30, January 1987.

Virginia Department of Labor and Industry. **Hazard communication Standard (1910.1200): An Information Manual**. Richmond, Virginia, June 1986.

Walters, D.B., ed. **Safe Handling of Chemical Carcinogens, Mutagens, Teratogens, and Highly Toxic Substances**, 2 vols. Ann Arbor: Science Publishers, Inc. 1980.

Weiss, G., ed. **Hazardous Chemical Data Book**. Park Ridge, NJ: Noyes Data Corporation, 1986.

Windholz, M., ed. **Merck Index: An Encyclopedia of Chemicals and Drugs**. Rahway, NH: Merck and Co., Inc., 1983.

World Health Organization (WHO). **Evaluation of Carcinogenic risk of Chemicals to Man**, 31 vols. New York: International Agency for Research on Cancer (IARC) Monographs, 1973-1983. (Order from WHO Publications Center, 49 Sheridan Avenue, Albany, NY 12210).

Zenze, C., ed. **Occupational Medicine: Principles and Practical Applications**. Chicago: Yearbook Medical Publishers, 1974.

_____. "Updating Records, Training Employees Aid in Day-to-Day Compliance Efforts." **Occupational Health and Safety News Digest** 2 (8): 16, August 1986.

_____. **Disposition of Toxic Drugs and Chemicals in Man**. Davis, CA: Biomedical Publications, 1982.

_____. **Guide for Safety in the Chemical Laboratory**, 2nd edition. New York: Van Nostrand Reinhold Co., 1972.

_____. **How to Prepare for Workplace Emergencies.** Washington, DC: Government Printing Office. 1985 (revised).

_____. **Index of Signs and Symptoms of Industrial Diseases**. by B.A. Fay and C.E. Billings. NIOSH Publication No. 002, 1983.

_____. NIOSH Alert. **Preventing Entrapment and Suffocation Caused by the Unstable Surfaces of Stored Grain and other Materials**. NIOSH Publication NO. 88-102, December 1987.

_____. NIOSH Alert. **Preventing Vision Disturbances and Acute Physical Stress Due to Dimethylethylamine (DMEA) Exposure**. NIOSH Publication No. 88-103, December 1987.

_____. NIOSH Alert. **Reducing the Potential Risk of Developing Cancer from Exposure to Gallium Arsenide in the Microelectronics Industry.** NIOSH Publication No. 88-100, October 1987.

_____. **NIOSH Current Intelligence Bulletins** (Include data on a variety of chemicals, such as asbestos, chloroprene and epichlorohydrin). NIOSH Publication No. 87-118, September 1987.

_____. **Occupational Diseases: A Guide to the Work Relatedness of Disease**, by S. Kuznetz and M. Hutchinson, eds. NIOSH Publication No. 79-116, 1979.

_____. **Occupational Diseases: A Guide to Their Recognition**, by M. Key, et. al, eds., NIOSH Publication No. 77-181, 1977.

_____. **Pocket Guide to Chemical Hazards.** NIOSH Publication No. 85-114, February 1987.

_____. **Safety and Health Guide to the Chemical Industry**. Washington, DC: Government Printing Office, 1986.

_____. **The Condensed Guide to Chemical Hazards**. Washington, DC: Government Printing Office, December 1985.

_____. **The Hazards Chemicals Data Manual**. Washington, DC: Government Printing Office, December 1985.

_____. **The Industrial Environment—Its Evaluation and Control**. NIOSH Publication NO. 74-117, 1973.

_____. **TLVs Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes for 1985-86**. Cincinnati: ACGIH.

______. **Toxic and Hazardous Substances.** *29 CFR Part 1910*, Subpart Z, 676-9992, 1987 (revised).

Attachment C

Training Program Outline

Training Program Outline

The following outline covers all the topics that are required to be included in Hazard Communication Training.

I. The requirements of the Hazard Communication regulations.

  A. Material Safety Data Sheets must be:

    1. posted or on-file for each hazardous substance in the workplace;

    2. accessible to employees during each workshift.

  B. All containers of hazardous substances must have a label:

    1. which includes the identity of the hazardous chemicals, appropriate hazard warnings;

    2. shipped containers must also have the name and address of the manufacturer or importer.

  C. Employees must be trained on the hazardous substances in their work area:

    1. at the time of initial assignment;

    2. whenever a new hazard is introduced.

  D. A written program detailing how all this will be accomplished must be developed by the employer and be available to employees.

  E. A poster must be displayed.

II. The location and availability of the written program, MSDS, and hazardous chemical inventory.

  A. The written Hazard Communication program and list of hazardous chemicals is kept: ____________________________.

  They are available for review by any employee during their workshift.

B. The Material Safety Data Sheets are kept __________________________ and are organized by (Dept., brand name). They may be reviewed by any employee during the workshift.

III. Explanation of labeling system and Material Safety Data Sheets.

IV. The operations in your work area where hazardous chemicals are present are:

A.

B.

C.

D.

V. You may detect the presence or release of a hazardous chemical in your work area by:

A.

B.

C.

D.

VI. If an agency inspector asks are you trained in hazard communications, please say “yes”.

VII. The physical and health hazards of the chemicals in your workplace are:

A. (substance)

1. (Health Hazard)

2. (Physical Hazard)

3. (Protective Measures)

a. (Safe Work Practices)

b. (Protective Clothing or Equipment)

c. (Emergency Procedures)

Appendix B

Safety Meeting Procedures

RCI
CORPORATE HEALTH & SAFETY PROGRAM

Appendix B: Safety Meeting Procedures

Table of Contents

Attachments

Safety meetings are critical to a successful Health and Safety Program. We emphasize having good ones. The following are some of the things to concentrate on in order to have effective safety meetings.

A good safety meeting coordinator is like a good supervisor; they must be familiar with the procedures and topics to be covered in the safety meetings and have the ability to communicate effectively with others. In many ways, the supervisor is training workers all day when they provide direction on how to perform various jobs, correct employees and show them proper procedures and is typically well suited to conduct safety meetings. Site safety personnel are also good sources of safety meeting topics and presenters.

Conducting a safety meeting is a more focused activity than many supervisory tasks. A couple of old slogans are useful:

1.0 BE PREPARED

Know your subject. Prepare yourself by reading, talking to safety experts and other supervisors and observing any problems in how workers are currently dealing with the particular topic on the job. Assemble examples; make noted the day before on the site, prepare materials and anything else you can think of that will help you get the message across.

2.0 THE KISS RULE

The KISS principle (Keep It Simple, Stupid) is a good one for conducting safety meetings. You have a particular message that you must get across the group, so it is important to deliver that message in a way that everyone will understand. Don’t give people more than they can absorb at one time.

While each meeting should and will be different, the following guidelines will help you hold the participants’ attention and make your meetings flow more smoothly. You will also be more relaxed and confident when you get used to following a general format.

3.0 THE MEETING - WHAT, WHY, WHEN AND WHERE

- Begin the meeting by explaining what you’ll cover and why it’s important. Try to use an anecdote or other “warm-up” to get people interested and relaxed.
- Position the meeting in terms of company safety objectives. Mention any relevant safety trends at the company or in the industry or any applicable regulations. Emphasize top management’s commitment to safety and endorsement of this Safety Meeting Program.
- Keep your tone informal during the meeting. It encourages participants to feel less distant and more involved in what’s going on. A little humor may be appropriate, especially in a long meeting where workers may being to feel overwhelmed by all they’re learning. Let them know you appreciate that this is an effort.

- Stick to your agenda. Be flexible enough to respond to questions or concerns you haven't though of, but don't let the meeting go off into unrelated areas. If a lot of questions or concerns are voiced on a certain topic, note it as one that might require its own Safety Meeting.
- Give examples of violations of safety rules and their consequences. Be as dramatic as possible while keeping your examples realistic. Hammer away at the risks to which employees expose themselves and others by not following the rules and not taking advantage of the engineering controls, protective equipment, etc., available to them.
- Summarize continually as you go along. Try to connect any "theoretical" subjects (handling spills, proper lifting techniques, etc.) with actual events or tasks in your work unit. Be sure people see the value of what you're talking about.
- Refer to specific examples whenever possible. Demonstrate with labels, protective clothing, etc. Make your meetings as "show and tell" as possible.
- Ask regularly for examples and questions. If anyone is skeptical about the importance or relevance of your topic, deal with it immediately. If possible, get other workers to explain to the skeptic and the group why they think this safety issue is important to them.
- End each Safety Meeting with a wrap-up that summarizes what was covered. It's also valuable to thank the participants for their interest and involvement.
- Be specific about what you expect employees to do as a result of this meeting. Remind them how what they've leaned will keep them safe and healthy.
- Plan a positive ending for the meeting. Send participants off with some encouraging words as an incentive to really put what they've learned to work on the job. If you've scheduled the next Safety Meeting in an ongoing program, remind them of the time, place, and topic.
- Keep meetings brief. Short, concentrated meetings are typically more effective than longer, more leisurely ones.

4.0 CONDUCTING AN INFORMAL MEETING

An informal Safety Meeting is more like a casual "Oh, by the way," discussion than the formal type of presentation just covered. It may last only 5 to 10 minutes and may involve fewer people. It is less likely to include outside experts, audiovisuals, and handouts.

The informal meeting is often used to introduce a relatively simple new procedure or substance or to correct problems you've spotted on the job.

But just because the meeting is brief and informal, doesn't mean it doesn't need preparation. You don't need a detailed agenda, but you should make notes or prepare a checklist to make sure you cover everything important.

Once you've explained the procedure or problem, demonstrate how to do it correctly. Ask for and encourage questions and discussion, and, if appropriate, provide opportunities for hands-on practice.

5.0 KEEPING SAFETY MEETING RECORDS

It's important to keep records of all Safety Meetings for your reference, for you company's protection, and for OSHA and other regulatory agencies that may want to inspect you company's compliance with training requirements.

Keep track of the date and topic of each meeting, as well as who attended. This is particularly important when your meeting deals with an area where additional training is explicitly required by law, such as the Hazard Communication Standard. In fact, Hazard Communication Standard training programs—or lack thereof—generated the fourth largest number of OSHA violations.

You don't need elaborate Safety Meeting records, but you do need something on paper. The easiest way to do this is to have a sign-up sheet at each Safety Meeting, with your name, the date, and the topic at the top. Have each employee sign that he or she has attended the session, including any employee ID numbers. Use the form CDC-3 or CDC-4 to record safety meetings.

When you consult with your manager and with your safety professionals on setting up your program schedule, find out if they want any reports on your safety meetings. If so, get specific information from them on exactly what they want in a report, whether they want one on each meeting or on the overall schedule, etc.

If such reports have been requested, be sure to submit them promptly while the experience is still fresh in your mind. Many companies use the results of safety meetings as a key part of their safety planning and training program.

6.0 SAFETY MEETING SCHEDULE

A recommended schedule for Safety Meetings for the project referenced above is as follows:

- First week of a project: Daily
- Next two weeks of a project: Every third day
- Continuing weeks of a project: One/week unless it's a very dynamic site; then continue daily meetings.

Meetings will also be held when:

- Site conditions change
- Work changes or begin new task
- A near miss accident or injury occurs
- Severe weather conditions are a factor
- Unusual events (earthquake, vapor release, etc.) occur.

Attachment A
Safety Meeting Report

PROJECT: ______________ **DATE:**_________________ **TIME:** _________________

TOPICS: ____

TRAINING AIDS: ____

____

PERSON CONDUCTING MEETING: ____

PERSONNEL IN ATTENDANCE: (Please Print)

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

_____________________ _____________________ _____________________

NUMBER OF PERSONNEL ABSENT: ________

NOTE: ADDITIONAL NAMES AND COMMENTS ON REVERSE SIDE.

DISCUSSION ITEM(S): ____

____

____

RECOMMENDATIONS: ____

____

____

RCI
CORPORATE HEALTH & SAFETY PROGRAM

Appendix C: Heavy Equipment Operations

RCI
CORPORATE HEALTH & SAFETY PROGRAM

Appendix C: Heavy Equipment Operations

HEAVY EQUIPMENT OPERATIONS

1.0 MOTOR VEHICLES

Motor vehicles under this subpart are vehicles that are operated within an off-highway jobsite that is not open to public traffic. Vehicles that are used both on and off the highway are covered by this subsection.

Material handling equipment, including the following equipment is excluded:

- Scrapers;
- Loaders
- Crawler or wheel tractors
- Bulldozers
- Off-highway
- Graders
- Agriculture and industrial tractors;
- Excavating equipment; and
- Lift trucks and stackers

Separate safety rules are provided for this type of equipment. See Earthmoving Equipment and Excavating Equipment below.

1.1 REQUIRED SAFETY DEVICES

Motor vehicles under this section must have the following safety devices in operable condition:

- Brakes

  Sevice brake, emergency brake, and parking brake systems. Common components may be used in these systems.

- Lights

  Operable brake lights. Additionally, when visibility conditions require additional light, a minimum of two headlights and taillights are required. The number of taillights may be for a combination of vehicles.

- Audible Warning Devices

  Audible warning device at the operator’s station. Vehicles having an obstructed rear-view must also have a reverse signal alarm that is audible over the surrounding noise level when there is no observer to signal that it is safe to back up.

- Windshield and Power Wipers

  Vehicles with cabs must have windshields and power wipers. Any cracked or broken glass must be replaced. Defoggers or defrosters are required in vehicles that operate in areas or conditions that cause fog or frost.

- Cab Shields

  A cab shield or canopy is required in haulage vehicles whose payload is loaded by crane, power shovels, loaders or similar equipment. The cab shield or canopy must protect the operator from shifting or falling material.

- Seat Belt

  All vehicles must have seat belts and anchorages that meet the Department of Motor Vehicle's Federal Motor Vehicle Safety Standards.

- Fenders

  Fenders are required on rubber tired motor vehicle equipment. Mud flaps may be used instead of fenders for motor vehicle equipment that is not designed for fenders.

1.2 MISCELLANEOUS REQUIREMENTS

Tools that are transported in the same compartment as employees must be secured to prevent movement. Also, any vehicle used to transport employees must have an adequate number of seats and the seats must be securely fastened.

1.3 SPECIAL REQUIREMENTS FOR DUMP TRUCKS

There are several additional safety standards for vehicles with dump bodies and devices. These standards are designed to prevent the accidental lowering or starting of these devices. Trucks with dump bodies must have a support mechanism that is permanently attached and can be locked in position. Operating levers that control hoisting or dumping devices on haulage bodies must have a latch or other device that prevents accidental starting or tripping of the mechanism. Also, trip handles for tailgates must be arranged so that the operator will be in the clear when dumping.

1.4 PRE-SHIFT SAFETY CHECK

You must check, at the beginning of each shift, the following parts, equipment and accessories of vehicles that are being used in order to determine that they are in safe operating condition and free of apparent damage that could cause failure while in use. Any defect must be corrected before the vehicle is placed in service.

- Emergency brakes;
- Service brakes, including trailer brake connections;
- Parking system (hand brakes);
- Tires;
- Horn;
- Steering mechanism;
- Coupling devices;
- Seat Belts;
- Operating Controls;

- Safety Devices;
- Lights;
- Reflectors;
- Windshield wipers;
- Defrosters; and
- Fire extinguishers

2.0 MECHANIZED EQUIPMENT-GENERAL REQUIREMENT

The following general safety standards apply to all mechanized equipment used in construction. This regulations is directed at equipment that is motorized or self-propelled. There are additional requirements for specific types of equipment including earthmoving equipment, excavating equipment and pile driving equipment. These requirements are discussed below.

2.1 GENERAL SAFETY REQUIREMENTS

Equipment used in construction under this section must have the following safety devices and the following safety procedures must be followed:

- Lights or Reflectors

  Lights or reflectors, or barricades with lights or reflectors, are required for equipment that is left unattended at night, is adjacent to a highway, or is located in a construction area where work is in progress.

- Tire Rack or Cage

  A safety tire rack, cage or equilivant protection is required when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rims or similar devices.

- Parking and Blocking of Equipment

  Before employees may work under or between equipment that is suspended or held aloft by slings, jacks, or hoists, it must be blocked or cribbed to prevent falling or shifting. Bulldozer and scraper blades, end-loader buckets, dump bodies, and any other similar equipment must also be blocked or fully lowered when not in use or when it is being repaired. Additionally, the controls should be in neutral, the motor stopped and the brakes set, unless the work performed required otherwise.

- Cab Glass

  Cab glass must be in safety glass, or its equivalent, which produces no visible distortion.

- Bumper or Derail Blocks

  Bumper or derail blocks are required on spur railroad tracks if a rolling cart can come into contact with other cars being worked on, a building or work area.

In addition to the above requirements, batteries and equipment used in the vicinity of power lines are subject to the requirements of Subpart K .

3.0 MATERIAL HANDLING EQUIPMENT

Material handling equipment includes earthmoving equipment, excavating equipment and lifting and hauling equipment.

3.1 EARTHMOVING EQUIPMENT

Earthmoving equipment includes, but is not limited to, scrapers, loaders, crawler or wheel tractors, off-highway trucks, graders, and agricultural and industrial tractors. The promulgation of specific regulations for compactors and rubber tired "skid – steer" equipment is reserved by OSHA. The following safety standards apply to earthmoving equipment:

- Seat Belts

  Seat belts, meeting the requirement of the Society of Automotive Engineers, are required for all earthmoving equipment, except those designed for stand-up operation only or for equipment, which does not have a roll-over protective structure or adequate canopy protection. You, as the employee, must ensure that employees use seat belts.

- Brakes

  There must be a service brake system that can stop and hold the equipment fully loaded, as specified by the Society of Automotive Engineers. Self-propelled rubber tire off-highway equipment manufactured after January 1, 1972, must have brake systems that meet the standards set forth by the Society of Automotive Engineers Recommended practices.

- Fenders

  Fenders, meeting the standards of the Society of Automotive Engineers, are required on all wheels of pneumatic tired earth-hauling equipment whose maximum speed exceeds 15 M.P.H. Pneumatic tired earth-hauling equipment for purposes of this fender requirement includes trucks, scrapers, tractors, and tailing units.

- Alarms

  Rollers, compactors, front-end loaders, bulldozers and other bi-directional machines must have a horn that can be operated on an as-needed basis when the machine is moving in either direction. The horn must be distinguishable from the surrounding noise level and must be in operating order.

  Any earthmoving equipment that is used in reverse, and has an obstructed rearview, must have a reverse signal alarm that is distinguishable from the surrounding noise level, or an employee signaling that it is safe to go in reverse.

- Scissor Point Guards

  Front-end loaders with scissors points that are a hazard to the operator when in use must be guarded.

You should note, that although there are no specific requirements in this section for rollover protective structures, the requirements for overhead protection in Subpart W (see Chapter 29) apply to the extent they are required by that section.

This equipment can only be moved on access roadways and grades that are constructed and maintained to safely accommodate the movement of these vehicles and equipment. In addition, emergency access ramps and berms must be constructed to restrain and control runaway vehicles.

3.2 EXCAVATING EQUIPMENT

Crawler or wheels tractors and agricultural and industrial tractors must have seat belts for the operators on the operator seat. Seat belts are required even though the tractors are equipped with attachments such as backhoes or breakers that are used for excavating or other work.

The safety requirements, ratios or limitations covered in Power Crane and Shovel Association Standards No. 1, and No. 2 of 1968, and No. 3 of 1969 must be compiled with and applies to cranes, machines and attachments.

3.3 LIFTING AND HAULING EQUIPMENT

- Lifting and hauling equipment for the purposes of this section includes lifting and
- Hauling equipment, such as industrial trucks, not covered under Subpart N (see Chapter 22). All industrial trucks must meet the applicable requirements of design, construction, stability, inspection, testing, and maintenance operations as provided in the American National Standards Institute Safety Standards for Powered Industrial trucks. In addition to the general safety requirements applicable to all equipment, industrial trucks with lifting and hauling equipment must also meet the following requirements.

3.4 RATE CAPACITY POSTING

Rate capacity must be posted on the vehicle so that it is clearly visible to the operator. Alternate rated capacities must also be posted for equipment that has removable counterweights that are provided by the manufacturer. The manufacturer's written approval is required for any modifications or additions that affect the capacity or safe operation of the equipment. However, the original safety factor may not be reduced. If any modifications or changes are made, the changes must be reflected in the capacity, operation, and maintenance instruction plates, tags, or decals. The rate capacity cannot be exceeded. Where a load is lifted together by two or more trucks working in unison, then the total load is proportioned and the total load carried by any one truck cannot exceed that truck's capacity.

3.5 STEERING KNOB

Only steering or spinner knobs that prevent road reaction form causing the steering wheel to spin can be attached to the steering wheel. The steering knob must be mounted within the periphery of the wheel.

3.6 RIDING ON TRUCKS

Where riding of trucks is authorized, you must provide a safe place to ride. Unauthorized personnel cannot ride on powered industrial trucks.

3.7 LIFTING CARRIAGES OR FORKS FOR LIFTING PERSONNEL

In addition to the general safety standards for lifting and hauling equipment, the following additional requirements apply to trucks equipped with vertical only; or vertical and horizontal controls elevatable with the lifting carriages or forks for lifting personnel:

- A safety platform firmly secured to the lifting carriage and/or fork must be used;
- Personnel on the platform must be able to turn off power to the truck; and
- You must provide protection from falling objects if operating conditions make it a necessity.

4.0 PILE DRIVING EQUIPMENT

Safety Requirements

The following general safety requirements apply to all pile driving equipment:

- Broilers, Piping Systems and Pressure Vessels

  Systems that are used with or are part of pile driving equipment must meet the applicable standards of American Society of Mechanical Engineers.

- Overhead Protection

  Protection that does not block the operator's vision and meets other OSHA requirements (see Chapter 22) must be provided. The protection must be the equivalents of 2-inch planking.

- Stop Blocks

  Stop blocks must be provided for the leads to prevent the hammer from being raised against the head block.

- Blocking Device

  At all times when employees are working under the hammer, a blocking device that can support the weight of the hammer must be provided for placement in the leads under hammer.

- Guards

  To prevent the cable from jumping out of the sheaves, guards must be used across the top of the head block.

- Leads

  Fixed leads must have an attachment point, such as a ladder or rings, where a safety belt or lanyard can attach. Leads that are finished with loft platforms must be protected by standard guardrails. When leads must be inclined in the driving of batter piles, the leads must be stabilized.

- Hoses

  Steam hoses that lead to a steam hammer or jet pipe, and air hammer hoses, must be attached securely to the hammer with a minimum of ¼ inch diameter chain or cable to prevent whipping if the joint at the hammer is broken.

- Safety Chains

  Each hoes connection is required to have a safety chain to prevent the line from trashing around if the coupling is disconnected.

- Steam Line Controls

  Steam line controls must contain two shutoff valves, one of which must be a quick acting lever that is within easy reach of the hammer operator.

- Stability Devices

  Where necessary to maintain the stability of pile driver rigs, guys, outriggers, thrust outs, or counterbalances stability devices are required.

- Additional Requirements for Pile Driving From Barges and Floats

  The following additional requirements apply to pile driving that is conducted on barges or floats:

  - Signals

    Engineers and winch men can only accept signals from the designated signalman.

  - Excavated Pit

    When piles are being driven in an excavated pit, the walls of the pit must be sloped to the angle of repose or sheet-piled and braced.

  - Cutting Tops of Driven Piles

    When cutting off tops of driven piles, pile driving operations must be suspended, except where the cutting operations are located at a distance of at least 2 times the length of the longest pile for the driver.

  - Ladders and Bulkhead Curbs

    All access pits must be provided with ladders and bulkhead curbs when driving jacked piles to prevent material from falling into the pit.

  - Employee Restrictions

    Employees must be kept clear when piling is being hoisted into the leads. When steel tube piles are being "blown out", employees must be kept well beyond the range of falling materials.

In addition to these requirements for pile driving from barges and floats, the requirement below (see marine operations and equipment) regarding marine operations and equipment apply to barges and floats supporting pile-driving operations.

5.0 SITE CLEARING

- Employee Safety

Employees engaged in site clearing must be protected from irritants and toxic plants and must be instructed in available first aid treatment.

- Overhead Protection

  Equipment used in site clearing must be equipped with rollover guards that meet the safety requirements for rollover guards. Rider operated equipment must also be equipped with an overhead and rear canopy guards meeting the following requirements:

  - The overhead covering on the canopy structure must be at least a 1/8 inch steel plate or a ¼ inch woven wire mesh with openings no greater than 1 inch; and
  - Opening in the rear of the canopy structure must be covered with at least ¼ inch woven wire mesh with opening no greater than 1 inch.

6.0 FORKLIFTS

6.1 INTRODUCTION

This requirement has been established to ensure the safe operation of forklifts within military facilities.

6.2 RESPONSIBILITIES

Supervision:

It is the responsibility of supervision to ensure that operators are properly trained and instructed to operate each make and model of forklift that they are required to operate at each specific work site.

Operator:

It is the responsibility of the operator to notify supervision if the equipment malfunctions in any way and to operate the equipment in accordance with the manufacturer's safe operations requirements manual and the following general rules and guidelines:

- Only trained, authorized personnel may operate on forklifts or powered hand trucks.
- Passengers are not permitted on forklifts unless the forklift is specifically designed to carry passengers.
- While the forklift is not in use, it shall be turned off, forks lowered to ground level, and the brakes set.
- Operate only specifically approved forklift in hazardous areas.
- Immediately report any accident or damage to supervision.
- Disabled or malfunctioning forklifts must always be towed, never pushed.
- Do not use the powered hand truck or forklift to push other equipment, vehicles, or carts.
- Do not exceed the load limits displayed on the forklift.

- Manufacturer's standard operating procedures and safe operating practices shall be permanently affixed to each forklift.
- Never use modified forks or "home made" fork extensions.

6.3 REQUIREMENT

Fork Lift Operator

- Operators must always wear a seat belt.
- Forklifts shall not be used as personnel elevators unless a properly secured platform, approved by the HSE group, is used
- Spread the forks and tilt the load toward the carriage and backrest before moving.
- Unless an emergency arises, never get off the forklift until it has come to a complete stop.
- Avoid quick or jerky stops
- Avoid wet or slippery floors. If slippery floors must be traversed, proceed with extreme caution.
- Face the direction of travel
- Stop completely before changing direction
- Avoid sudden moves in any direction
- Keep the load flush against the carriage and backrest and centered on the forks.
- Check overhead clearance when approaching piping, conduits, crane booms, or other overhead obstructions
- Slow down when approaching intersections, turns, doorways, or pedestrians. Keep to the right when approaching other vehicles or equipment. At blind corners, come to a complete stop, sound the horn, then proceed with caution.
- Keep the load as low as possible, both for balance (low center of gravity) and for visibility. If the load is so big it that obstructs visibility, drive in reverse
- Place loads safely on pallets or fasten them securely
- Approach docking plates at an angle. Make sure that plate is sturdy and securely anchored, and that the equipment being loaded or unloaded is chocked or otherwise supported
- Keep the load upgrade when going up or down ramps, and proceed slowly

Pre – use Safety Inspection

Forklifts shall be given a pre-use safety inspection by a competent person prior to initial use of the equipment on each shift. This pre-inspection shall be documented.

Battery-Powered Forklift and Hand Trucks

- Charging Batteries
- Turn the charger off before connecting it to the batteries

- Park the hand trucks with the handle upright before connecting the charger
- Turn the charger off before disconnecting it from the battery
- Changing Batteries
- Only trained employees or experienced mechanics shall change batteries
- Put a bag or some insulating cover on top of a battery when handling it with a hoist to prevent chains from coming into contact with connectors and causing sparks
- Do not smoke near or pass a flame over the top of a battery
- Smoking is prohibited in battery storage areas
- Never allow metal objects to fall across the top of the battery
- Always have a cover over the battery after it is installed in a lift truck
- Only the person in charge of battery maintenance should take tests or readings
- Keep your feet to the side when hoisting a battery that is being changed or moved.
- Never connect the battery to a line on the charger. Have a trained employee or an electrician do it.
- Operating Battery-Powered Hand Trucks
- Use both hands on the control handle when traveling with the load in front
- When traveling with the load behind, use one hand, walk to the side, and keep your arms straight
- Carry only loads that are balanced
- Travel at a speed that allows full control of the truck and the load
- Be aware of blind corners and foot traffic
- Yield right-of-way to pedestrians, vehicles, and other equipment

6.4 TRAINING

- Each operator (full-time, part-time, seasonal, substitute, and occasional – regardless of experience) must be trained
- Training shall consist of a combination of:
  - Formal instruction (lecture, discussion, interactive computer learning, videotape, or written material)
  - Practical (hands-on) training (demonstrations and practical exercises performed by the trainer and trainee)
  - Evaluations of the operator’s performance in the workplace
- Only certified instructors shall be allowed to conduct forklift training
- The training program shall consist of the following requirements and shall be based upon both classroom and hands-on training:
- Lift Truck Related Topics:

  - All operating instructions, warnings, and precautions for the particular type of lift truck
  - Differences between a lift truck and an automobile
  - Controls and instrumentation; location, what they do, and how they work
  - Engine or motor operation
  - Steering and maneuvering
  - Visibility (including restrictions due to loading)
  - Fork and attachment adaption, operation, and use limitations
  - Capacity of the forklift
  - Stability of the forklift
  - Pre-use inspection
  - Refueling, charging, and re-charging batteries
  - Operating limitations
  - Any other instructions, warning, or precautions for the particular type of equipment
- Workplace Related Topics
  - Surface conditions where the equipment will be operated
  - Composition of loads to be carried and load stability
  - Load manipulation, stacking, and unstacking
  - Pedestrian traffic in areas where the equipment will be operated
  - Narrow aisles and other places where the equipment will be operated
  - Hazardous (classified) locations where the equipment will be operated
  - Ramps and other sloped surfaces that could effect equipment stability
  - Closed environments (where buildup of equipment exhaust can occur)
  - Other unique or potentially hazardous work environment conditions
- Re-evaluation and Re-training:

Re-evaluation and re-training shall be conducted at a minimum of every 36 months to ensure that the operator retains the necessary knowledge and skills.

Re-evaluation and re-training is also required to be provided when any one of the following conditions exist:

- The operator has been observed to operate the equipment in an unsafe manner.
- The operator has been involved in an accident or near-miss accident
- The performance evaluation reveals that the operator is not operating the equipment safely
- The operator is assigned to a different type of forklift

- Workplace conditions change (i.e., different paving), which could effect the safe operation of the equipment.

Certification of Operators:

Certification of operators shall consist of documentation of the following:

- Training and evaluation was conducted by a trained, knowledgeable and experience instructor
- Training was conducted in a formal classroom and hands-on environment
- Training covered the specific equipment and work area
- Training covered all applicable subject matter
- Name of the operator
- Date of evaluation
- Date of training
- Identity of person or persons performing the training

Training courses for forklift operators are:

- ITCCDR/045, “Powered Industrial Vehicles: Forklift”
- ITCCDR/071, “Forklifts and Cranes”
- VEH/003, “Powered Industrial Trucks (forklifts) – Initial”

The following Equipment Operator Qualification Form shall be used to certify that those employees have the competence to operate the stated piece of machinery.

Ridge Contracting Inc.

Equipment Operator Qualification Form

Make	Model	Attachments

	NAME
1	
2	
3	
4	
5	
6	
7	
8	
9	

These RCI employees through past experience, personal observation and training are qualified to operate the piece of equipment stated above.

Name Title Date

Appendix D

Trenching and Excavating Procedures

RCI
CORPORATE HEALTH & SAFETY PROGRAM

Appendix D: Trenching and Excavation Procedures

TABLE OF CONTENTS

RCI

TRENCHING AND EXCAVATION PROCEDURES

1.0 PURPOSE

This program provides the requirements for activities involving excavations in accordance with 29 CFR 1926, Subpart P – Excavations.

2.0 SCOPE

These requirements are applicable to all operations.

3.0 DEFINITIONS

Benching: A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

Competent Person: A competent person is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Excavation: Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Hazardous Atmosphere: An atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Protective Systems: A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

Sloping: A method of protecting employees from cave-ins by excavation to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Support System: A structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Trench: A narrow excavation made below the surface of the ground. In general the depth is greater than the width, but the width of a trench measured at the bottom is not greater than 15 feet. If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet or less, the excavation is also considered to be a trench.

4.0 RESPONSIBILITIES

4.1 Competent Person

The competent person(s) shall be responsible for:

- Day to day oversight of open excavations and trenches.
- Conducting soil classifications
- Selection of protective systems
- Conducting daily inspections of open excavations and trenches; and
- Providing the Health and Safety Officer with all required documentation on a daily basis

4.2 Line Management

The Project Manager (PM) shall be responsible for:

- Ensuring compliance with this procedure
- Providing the necessary resources for compliance with this procedure; and
- Designating competent personnel in consultation with the Project Health and Safety Manager

4.3 Health and Safety Personnel

The Health and Safety Officer (HSO) shall be responsible for:

- Providing oversight on the implementation of the requirements contained in this procedure
- Conducting periodic reviews of open trenches and excavations
- Consulting with the project manager and competent person on excavation issues; and
- Maintaining required records

5.0 PROCEDURES

The following sections provide the general requirements governing activities in and around open excavations and trenches as well as the requirements for the selection and use of protective systems. The requirements are presented in Section 5.1 and 5.2 respectively.

5.1 Designation of Competent Person

Prior to the start of any excavation work, the project manager shall designate a competent person to fulfill the requirements of this procedure.

5.2 General Requirements

- Surfaces surrounding open trenches and excavations shall have all surface hazards removed.
- All utilities shall be located and cleared prior to initiating digging. Public or facility utility groups shall be utilized where possible for this purpose. In the absence of either, the

HSO shall specify the procedures to be used to clear utilities in consultation with the project health and safety manager and project manager. When the excavation is open, utilities shall be supported and protected from damage. Clearance and support methods shall be documented on the daily inspection checklist.

- Where structural ramps are used for egress, they shall be installed in accordance with 1926.651(c)(1).
- Stairways, ladders, or ramps shall be provided as means of egress in all trenches 4 feet or more in depth. Travel distance shall be no more than 25 feet between means of exit.
- Employees exposed to vehicular traffic shall wear traffic vests.
- No employee shall be permitted under loads being lifted or under loads being unloaded from vehicles.
- When vehicles and machinery are operating adjacent to excavations warning systems such as stop logs or barricades shall be utilized to prevent vehicles from entering the excavation or trench.
- Scaling or barricades shall be used to prevent rock and soils from falling on employees.
- Excavated and loose materials shall be kept at least 3 feet from the edge of excavations.
- Walkways or bridges with standard railing shall be provided at points employees are to cross over excavations or trenches.
- Barriers shall be provided to prevent personnel from inadvertently falling into an excavation.

5.3 Hazardous Atmospheres

Where atmospheres containing less than 19.5 percent oxygen or other types of hazardous atmospheres may exist the following requirements shall be implemented.

- Atmospheric testing shall be done prior to employees entering excavations 4 feet or greater in depth.
- Testing methods shall be listed on the daily inspection checklist and results documented daily in field logs.
- Control measures such as ventilation and PPE shall be used to control employee exposure to hazardous atmospheres below published exposure limits.
- Ventilation shall be used to control flammable and combustible vapors to below 10 percent of their lower explosive limit.
- Testing shall be repeated as often as necessary to ensure safe levels of airborne contaminants.
- Emergency equipment shall be provided and attended when the potential for a hazardous atmosphere exists. This equipment shall include but not be limited to emergency breathing apparatus, harnesses, lifelines, and basket stretchers. Required equipment will be listed on the daily inspection checklist and reviewed daily.

5.4 Protection from Water Hazard

When water has collected or is collected in excavations and trenches the following requirements shall be applied.

- Employees shall not work in excavations in which water has, or is, accumulating without the use of additional protection such as special support systems or water removal.

- Water removal shall be monitored by a competent person.
- Barriers such as ditches and dikes shall be used to divert runoff from excavations and trenches.
- Trenches shall be re-inspected prior to re-entry after water accumulation due to heavy rainfall or seepage.

5.5 Stability of Adjacent Structures

When excavating or trenching near an adjacent structure, the following practices shall be implemented.

- Support systems such as shoring, bracing, or underpinning shall be provided where the stability of buildings, walls, or other structures is endangered by excavation.
- Excavations bases or footings of foundations shall be prohibited unless support systems are used, the excavation is in stable rock, a professional engineer (PE) has determined the structure is sufficiently removed from the site as to not pose a hazard, or the PE determines that the excavation shall not pose a hazard to employees due to the structure.
- Support systems shall be used when it is necessary to undermine sidewalks, pavements, and appurtenant structures.
- Surcharge load sources and adjacent encumbrances shall be listed with their evaluation date on the daily inspection checklist.

5.6 Daily Inspections

Inspections shall be performed daily on all excavations, adjacent areas, and protective systems before personnel enter the trench. The checklist provided in Attachment A or equivalent shall be used.

5.7 Soil Classifications

To perform soil classifications, the competent person shall use a thumb test, pocket penetrometer, or shear vane to determine the unconfined compressive strength of the soils being excavated. In soils with properties that change (i.e., one soil type mixed with another within a given area) several tests may be necessary. When different soil types are present, the overall classification shall be that of the type with the lowest unconfined compressive strength. Classifications shall result in a soil rating of Stable Rock, Type A, Type B, or Type C in daily inspection checklist. The soils analysis checklist provided in Attachment B or equivalent shall be used for soil classifications.

5.8 Sloping and Benching

All sloping and benching shall be done in accordance with 29 CFR 1926.652, Appendix B. Selection of the sloping method and evaluation of the surface surcharge loads shall be made by a competent person familiar with the requirements contained therein. Sloping and benching methods and specifications shall be listed on the daily inspection checklist.

5.9 Protective Systems

Protective systems are required on all excavations over 5 feet in depth or in excavations less than 5 feet when examination by a competent person of the ground reveals conditions that may result in cave-ins.

Selection and installation of protective systems shall be done in accordance with 29 CFR 1926.652, Appendices C & D, or manufacturer's data for shoring and shielding systems. Selection of a protective system shall be made based upon soil classification and job requirements by a competent person. Protective systems and specifications shall be listed on the daily inspection checklist.

6.0 TRAINING

Competent persons shall have an adequate combination of experience and training to classify soil types and select protective systems as outlined in 29 CFR 1926.652. Training and experience pertaining to qualification as a competent person shall be documented and include the following:

- General safety practices related to working in or near open excavations
- Inspection requirements and techniques
- Classification of soils in accordance with 1926.652, Appendix A
- Uses, limitations, and specifications of protective systems in accordance with 1926.652

7.0 REFERENCES

OSHA (U.S. Department of Labor, Occupational Safety and Health Administration) 29 CFR 1926, Subpart P, Excavations.

ATTACHMENT A

DAILY EXCAVATION INSPECTION CHECKLIST

DAILY EXCAVATION INSPECTION CHECKLIST
To be completed by a "Competent Person"

Site Location ____
Date______________ Time ___________ Competent Person _________________________
Soil Type(s) ____
Soil Classification(s)_______________ Excavation depth ________ Excavation width ________
Type of protective system used _________________________________

Indicate for each item by circling Y (Yes), N (No). Address in Comments, Not Applicable (N/A.)

I. **General Inspection of Job Site**

A.	Surface encumbrances removed or supported	Y	N	N/A
B.	Employees protected from loose rock or soil that could pose a hazard by falling or rolling into the excavation.	Y	N	N/A
C.	Hard hats worn by all employees.	Y	N	N/A
D.	Spoils, materials, and equipment set back at least 2 feet from the edge of the excavation.	Y	N	N/A
E.	Barriers provided at all remotely located excavations, wells, pits, shafts, etc.	Y	N	N/A
F.	Walkways and bridges over excavations 4 feet or more in depth are equipped with standard guardrails.	Y	N	N/A
G.	Warning vests or other highly visible clothing provided and worn by all employees exposed to public vehicular traffic.	Y	N	N/A
H.	Warning system established and utilized when mobile equipment is operated near the edge of the excavation.	Y	N	N/A
I.	Employees prohibited from working on the faces of sloped or benched excavations above other employees.	Y	N	N/A

II. **Utilities**

A.	Utility companies contacted and/or utilities located.	Y	N	N/A
B.	Exact location of utilities marked when approaching the utilities.	Y	N	N/A
C.	Underground installations protected, supported, or removed when excavation is open.	Y	N	N/A

III. **Means of Access and Egress** Y N N/A

A.	Lateral travel to means of egress no greater than 25 feet in excavations 4 feet or more in depth.	Y	N	N/A
B.	Ladders used in excavations secured and extended 3 feet above the edge of the trench.	Y	N	N/A

C.	Structural ramps used by employees designed by a competent person.	Y	N	N/A
D.	Structural ramps used for equipment designed by a registered professional engineer (RPE).	Y	N	N/A
E.	Ramps constructed of materials of uniform thickness, cleated together on the bottom, equipped with a no-slip surface.	Y	N	N/A
F.	Employees protected from cave-ins when entering or exiting the excavation.	Y	N	N/A

IV. **Wet Conditions**

A.	Precautions taken to protect employees from the accumulation of water.	Y	N	N/A
B.	Water removal equipment monitored by a competent person.	Y	N	N/A
C.	Surface water or runoff diverted or controlled to prevent accumulation in the excavation.	Y	N	N/A
D.	Inspections made after every rainstorm or other hazard increasing occurrence.	Y	N	N/A

V. **Hazardous Atmosphere**

A.	Atmosphere within the excavation tested where there is a reasonable possibility of an oxygen deficiency, combustible or other harmful contaminant exposing employees to a hazard.	Y	N	N/A
B.	Ventilation.	Y	N	N/A
C.	Testing conducted often to ensure that the atmosphere remains safe.	Y	N	N/A
D.	Emergency equipment, such as breathing apparatus, safety harness and line, and basket stretcher readily available where hazardous atmospheres could or do exist.	Y	N	N/A
E.	Safety harness and life line used and individually attended when entering deep confined excavations.	Y	N	N/A

VI. **Support Systems**

A.	Materials and/or equipment for support systems selected based on soil analysis, trench depth and expected loads.	Y	N	N/A
B.	Materials and equipment used for protective systems inspected and in good condition.	Y	N	N/A
C.	Materials and equipment not in good condition have been removed from service.	Y	N	N/A
D.	Damaged materials and equipment used for protective systems inspected by a Registered Professional Engineer (RPE) after repairs and before being placed back into service.	Y	N	N/A
E.	Protective systems installed without exposing employees to the hazards of cave-ins, collapses or from being struck by materials or equipment.	Y	N	N/A

F.	Members of support systems securely fastened to prevent failure.	Y	N	N/A
G.	Support systems provided to insure stability of adjacent structures, buildings, roadways, sidewalks, walls, etc.	Y	N	N/A
H.	Excavations below the level of the base or footing approved by an RPE.	Y	N	N/A
I.	Removal of support systems progresses from the bottom and members are released slowly as to note any indication of possible failure.	Y	N	N/A
J.	Backfilling progresses with removal of support system.	Y	N	N/A
K.	Excavation of material to a level no greater than 2 feet below the bottom of the support system and only if the system is designed to support the loads calculated for the full depth.	Y	N	N/A
L.	Shield system placed to prevent lateral movement.	Y	N	N/A
M.	Employees are prohibited from remaining in shield system during vertical movement.	Y	N	N/A

VII. **Comments**

ATTACHMENT B

SOILS ANALYSIS CHECKLIST

SOILS ANALYSIS CHECKLIST

This checklist must be completed when soil analysis is made to determine the soil type(s) present in the excavation. A separate analysis must be performed on each layer of soil in excavation walls. A separate analysis must also be performed if the excavation (trench) is stretched over a distance where soil type may change.

Site location: ____

Date:____________ Time:___________ Competent Person:___________________________

Where was the sample taken?____

Excavation: Depth:_______________ Width:________________ Length:_________________

VISUAL TEST

Particle type:	_____ Fine Grained (cohesive) _____ Coarse grained (sand or gravel)	
Water conditions:	_____ Wet _____ Dry _____ Surface water present _____ Submerged	
Previously disturbed soils?	_____ Yes _____ No	
Underground Utilities?	_____ Yes _____ No	
Layered soils?	_____ Yes _____ No	
Layered soil dipping Into excavation?	_____ Yes _____ No	
Excavation exposed to vibrations?	_____ Yes _____ No	
Crack-like openings or spallings observed?	_____ Yes _____ No	
Conditions that may create a hazardous atmosphere?	_____ Yes _____ No	

If yes, identify condition and source:____

Surface encumbrances	_____ Yes _____ No
Work to be performed near public vehicular traffic?	_____ Yes _____ No
Possible confined space exposure?	_____ Yes _____ No

MANUAL TEST

Plasticity	_____ Cohesive ______ Non-cohesive
Dry Strength:	_____ Granular (crumbles easily) ______ Cohesive (broken with difficulty)

NOTE: The following unconfined compressive strength tests should be performed on undisturbed soil.

THUMB TEST (used to estimate unconfined compressive strength of cohesive soil)

Test performed: _____ Yes _____ No

_____ Type A (soil indented by thumb with very great effort)

_____ Type B (soil indented by thumb with some effort

_____ Type C (soil easily penetrated several inches by thumb with little or no effort). If soil is submersed, seeping water, subjected to surface water, runoff, exposed to wetting.

PENETROMETER OR SHEARVANE (used to estimate unconfined compressive strength of cohesive soil)

Test performed: _____ Yes _____ No

_____ Type A (soil with unconfined compressive strength of 1.5 tsf or greater)

_____ Type B (soil with unconfined compressive strength of 0.5 tsf to 1.5 tsf)

_____ Type C (soil with unconfined compressive strength of 1.5 tsf or less). If soil is submerged, seeping water, subject to surface water, runoff, exposed to wetting.

WET SHAKING TEST (used to determine percentage of granular and cohesive materials). Compare _____ to soil textural classification chart to determine soil type.

Test performed _____ Yes _____ No

_____ Type A (clay, silty clay, sandy clay, clay loam, and in some cases silty clay, loam and sandy clay loam)

_____ Type B [angular gravel (similar to crushed rock), silt, silt loam, sandy loam, and in some cases clay loam and sandy clay loam]

_____ Type C (granular soil including gravel, sand and loamy sand)

_____ % granular _____ % cohesive ______ % silt

NOTE: Type A – no soil is Type "A" if soil is fissured; subject to vibration; previously disturbed; layered dipping into the excavation on a slope of 4H:1V.

SOIL CLASSIFICATION

_____ Type A

_____ Type B

_____ Type C

SELECTION OF PROTECTIVE SYSTEMS

_____ Sloping, Specify angle:______

_____ Timber Shoring

_____ Aluminum Hydraulic Shoring

NOTE: Although OSHA will accept the above tests in most cases, some states will not. Check your state's safety requirements for trenching regulations.

APPENDIX E

ACTIVITY HAZARD ANALYSIS FORM

Activity/Definable Work Phase:_____________________________________ Date:_________________________ Prepared By/Date:______________/____________

Principal Steps	Potential Hazards	Degree of Risk	Probability of Occurrence	Recommended Controls

Equipment to be Used	Inspection Requirements	Training Requirements

Crew has been adequately briefed on the task and its hazards? Yes___ No___ if no, explain.

Crew has proper training and certification, fit tests, physical exams, if required, etc. Yes__ No__
If no, please explain:

Proper PPE is available and will be used? □Yes □No
If no, please explain:

Personnel Signatures: We, the following, understand how the task is to be done, how to do it safely, and who to go to if we have any questions on safety.

____________________;____________________;____________________;____________________;____________________
;____________________;____________________;____________________;____________________

Legend: The degree of risk/probability of occurrence

H = high risk	H = high probability of the risk occurrence
M = moderate risk	M = moderate probability of risk occurrence
L = low risk	L = low probability of risk occurrence

Note: As a rule, we do not proceed on a task or activity with H/H degree and probability

Comments: ____
____
____

The listed hazard risks and controls are acceptable:

______________________________ ______________________________
Project Superintendent Site Safety and Health Officer

RIDGE CONTRACTING, INC.
Certified HUBZone

LEAD COMPLIANCE PROGRAM

P. O. Box 24-0121
Anchorage, Alaska 99524
Phone: (907) 222-7518
Fax: (907) 272-2290
www.ridgecontracting.org

Table of Contents

LEAD COMPLIANCE PROGRAM

I. Purpose

The purpose of this document is to manage lead containing materials. The information presented in this document represents minimum safety requirements.

II. Policy

To ensure that employee exposures to lead are minimized and that Ridge Contracting and those individuals on the jobsite are in compliance with Federal OSHA regulations. Engineering, work practice, and/or administrative controls shall be instituted to reduce employee exposure to below the *OSHA Action Level*.

III. Applicable Regulations

In addition to this document, the following regulations contain applicable information.

- 29 CFR 1910.1025 General Industry Lead Standard Occupational S&H Standards
- 29 CFR 1926.62 Lead Construction Standard Occupational S&H Standards
- 29 CFR 1910.134 Respiratory Protection Occupational S&H Standards

IV. Definitions

Action Level – This is an OSHA occupational exposure limit (without regard to the use of respirators) for airborne contaminants. For lead it is 30 micrograms per cubic meter of air (30µg/M^3) for an 8-hour Time-Weighted Average (TWA). The AL is the level at which an employer must begin compliance activities as set forth in the OSHA standard

Affected Employee - This refers to any employee whose exposure is at or above the Action Level.

ALARA - As Low as Reasonably Achievable. Ridge policy is to keep employee chemical exposure as low as feasible.

HEPA - A High Efficiency Particulate Air Filters capable of filtering 0.3 micron particles with 99.97 percent efficiency.

Lead- Metallic lead, all inorganic lead compounds (e.g., laboratory reagents, solder), and organic lead soaps. All other organic lead compounds, such as tetraethyl lead, are excluded from this definition.

Lead Paint- Paint containing greater than 0.06 % (600 ppm) lead.

Medical Surveillance- Consists of medical examinations as well as blood sampling for lead and zinc protoporphyrin, if applicable. This is performed by or under the supervision of a physician.

Permissible Exposure Limit (PEL) - An OSHA occupational exposure limit (without regard to the use of respirators) for airborne contaminants. For lead it is 50 micrograms per cubic meter of air (50 $\mu g/m^3$) for an 8-hour Time-Weighted Average (TWA). Exposure to airborne lead above the PEL triggers requirements such as housekeeping, engineering controls, showers, change and lunch rooms, area posting, personal protective equipment, and respiratory protection.

PPE- Personal Protective Equipment. Safety equipment worn by Ridge Contracting employees and those individuals in the immediate working area will include safety glasses, respirators, coveralls, leather gloves, leather boots, hard hats and any other means necessary to ensure our safety guidelines are met.

V. Hazards of Lead

A. Ways in which lead enters the body

1. When lead is scattered in the air as a dust or fume particle, it can be inhaled and absorbed into the blood stream through the lungs and upper respiratory tract. Inhalation of lead is considered the most important source of occupational exposure.

2. Lead can also enter via the digestive system if it enters the mouth and is swallowed. As an example, lead can be ingested by handling cigarettes, food, etc., with lead contaminated hands.

3. Lead (except for some organic compounds not covered by this program) is not absorbed through the skin.

B. Effects

1. Short term (acute) overexposure. Large doses of lead may cause seizures, coma, and death from cardio-respiratory arrest. Short term occupational exposures leading to these effects are unusual but possible.

2. Long-term (chronic) overexposure may result in damage to the blood-forming, nervous, urinary, and reproductive systems. Some common symptoms of overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, insomnia, headache, nervous irritability, muscle and joint pain, and tremors.

When lead gets into the body it is only partly eliminated. The majority of the lead is stored in the bones and other tissues. As exposure to lead continues, the amount stored in the body increases if more lead is absorbed than is excreted. Consequently, continuous exposure to low levels of lead can, over time, cause lead to accumulate in the body and lead poisoning may result.

VI. Examples of Possible Sources of Lead Exposure

• Lead-Containing Paint (banned 1977): Sanding, scraping, burning, welding, ingestion.

• Drinking Water: Some water sources, lead solder in pipes (banned in 1986)

• Metallic Lead: Soldering, sawing, cutting, etc.

• Soil: Automobile exhaust, paint chips, etc.

• Miscellaneous: Tin cans (banned in USA), spent shell casings, fishing sinkers, etc.

VII. Responsibilities

A. Employees

1. Follow lead safety procedures.

2. Notify supervisor of tasks or procedures that may cause lead exposure.

B. Supervisors

1. Inform the Health and Safety Manager of all upcoming work that may involve the disturbance of lead-containing materials.

2. Submit for approval to the Health and Safety Department any proposed procurement of lead-containing materials.

3. Review bid specifications for discloser of all hazardous lead materials that may be encountered, and the party responsible for their mitigation.

4. Ensure site layout is adequate; i.e. proper signage, wind direction, lighting, etc.

5. Ensure that all Ridge Contracting employees have received appropriate training.

6. Ensure that Ridge Contracting employees follow established safety procedures and that engineering controls are properly functioning.

7. Notify the Health and Safety Department of employees who may have a potential exposure to airborne lead, as well as operations or changes that may produce or increase lead exposure to employees.

8. Ensure that Ridge Contracting employees who perform work that may have a potential to exceed the Action Level (Controlled Operation) are in a medical surveillance program and have had a base-line blood lead sample prior to starting work.

C. Health and Safety Department

1. Conducts initial exposure assessments and workplace monitoring to determine an employee's potential exposure to airborne lead.

2. Recommends appropriate engineering and administrative controls to ensure that airborne lead levels do not exceed the OSHA Action Level.

3. Recommends appropriate personal protective equipment (PPE).

4. Notifies supervisors and the employees of personal lead air monitoring results within two days of their receipt.

5. Conducts or provides training for employees who perform any tasks in which there is a potential exposure to airborne lead at any level.

6. Provides respirators and filters, and conducts/ensures annual respirator fit-tests for employees who use respiratory protection to reduce lead exposure.
7. Performs annual checks of HEPA ventilation systems/vacuums used for the control of airborne lead.
8. Manages and updates the Ridge Contracting Lead Compliance Program.
9. Identifies employees who should be considered for the Medical Surveillance Program.

Personal and area air sampling results collected by subcontractors shall be submitted to Ridge Contracting, when applicable, for collection, retention, and distribution to the lab for review. Copies of the results collected by Ridge Contracting will be forwarded to the subcontractors, when applicable.

D. Health Services Group

1. Maintains a medical surveillance program as described in 29 CFR 1910.1025.
2. Maintains biological monitoring and medical records, as well as making them available to affected employees and/or their authorized representatives.

F. Waste Management Group

1. Determines if lead-containing wastes should be classified as "hazardous waste".
2. Determines how lead-containing wastes are to be packaged.
3. Selects an EPA approved disposal site.
4. Manifests hazardous lead-containing waste to the disposal site.
5. Maintains disposal records.

VIII. Exposure Monitoring

Ridge Contracting will perform personal exposure monitoring to determine the lead exposure levels for employees who perform tasks that involve working with lead or its compounds. Tasks that have been monitored and found to be below the Action Level will be re-monitored periodically or whenever there is a change in process, control, or changes in personnel that may change the level of exposure to lead. Tasks that have been monitored and found to be above the Action Level shall be stopped immediately until engineering and/or work practice controls (including administrative controls) are implemented to reduce and maintain employee exposures to below the Action Level.

In accordance with 29 CFR 1910.1020 Ridge Contracting maintains accurate records of all data used to conduct employee exposure assessments. Results of airborne lead exposure monitoring will be provided to employees by their supervisor within two days of their receipt from the lab.

IX. Controlled Operations

If any given task has the potential to exceed the relative Action Levels than that task shall not be performed without appropriate engineering and/or administrative controls in place. Employees performing these tasks will not eat, drink, smoke etc., while performing these tasks. They will also wash their hands before taking breaks or otherwise leaving the area. Showering may be required, if the PEL is exceeded.

A. Administrative Controls

1. Lead Awareness Training
2. Respirator Training
3. Work performed in designated area with warning signs.
4. Written procedures

B. Engineering Controls

1. Exhaust Ventilation – i.e.(HEPA) vacuum systems
2. Replacement – i.e. the use of zinc instead of lead, manual cutting instead of torch cutting
3. Isolation – i.e. keeping uninvolved employees away from the hazards

X. Personal Protective Equipment

Ridge Contracting will provide its employees with personal protective clothing and equipment that is appropriate for the hazard at no cost to the employee. This PPE includes:

1. Disposable coveralls (including head and foot covering)
2. Hearing Protection

3. Safety Glasses (including face shields, vented goggles and welding masks)
4. Safety Shoes and Gloves
5. Hard Hats and Helmets
6. Respirators ***(any employee wearing a respirator must be fit tested and have signed off that they have read and understood the Ridge Contracting Respiratory Protection Program.)***
7. Body protection (including chaps, and welding leathers)

XI. Decontamination

It is important to avoid the contamination of personal clothing and to ensure that lead contaminated materials do not leave the work area unless they are bagged and sealed. Disposable coveralls, gloves, shoe covers etc., shall be used whenever it is possible to contaminate personal clothing during lead work. All contaminated materials will be double bagged in 6-mil plastic bags, identified as lead contaminated, and disposed of properly. Ridge Contracting Inc. will supply a washing facility for anyone entering the contamination zone. These individuals will be required to wash their hands and face before leaving the area. If requested, a shower can be set up for full body washing capabilities. Otherwise wash buckets with clean water, powder soap and clean towels will be used.

XII. Housekeeping

Accumulations of lead shall be minimized to the extent practical in all areas where lead is used. Work surfaces in areas where the sanding, grinding, or cutting of lead containing materials is performed shall be cleaned at least once per shift to prevent the accumulation of lead dust. Dry sweeping or "blowing down" work surfaces and floors are prohibited. Dedicated vacuums equipped with HEPA filters and labeled "Caution - contains lead" will be used to clean work surfaces. Vacuuming is the preferred method of cleaning. Wet sweeping, shoveling, or wiping may not be used except where vacuuming has been tried and does not work. Vacuums shall be used and emptied in a manner which minimizes the re-entry of lead into the workplace.

XIII. Waste Disposal

Lead and its compounds are considered hazardous waste if the Soluble Threshold Limit Concentration (STLC) exceeds 5.0 milligrams per liter (mg/l) or the Total Threshold Limit Concentration (TTLC) exceeds 1,000 milligrams per kilogram (mg/kg). All hazardous wastes will be manifested, transported and disposed of according to the applicable state and federal requirements.

XIV. Medical Surveillance

All employees and who have a potential exposure to significant (i.e., >30 g/m^3) amounts of airborne lead shall have a base-line blood lead sample taken by a HSG prior to starting work. Personnel with a baseline blood lead level exceeding 25ug/100 ml shall not perform work that may expose them to airborne lead.

XV. Purchasing Lead-Containing Materials

If the purchase of lead containing materials is necessary then under Ridge Contracting policy the purchasing agent must notify our Health and Safety Office and have those items entered into our database immediately. This process is done to ensure proper tracking of the lead containing materials.

XVI. Training

1. Employees who have a potential exposure to airborne lead at less than the OSHA Action Level are required to take Lead Hazard Communication training.

2. Employees who perform work in "Controlled Operations"(section IX) or other tasks which could potentially result in exposures above the OSHA Action Level are required to take Lead Awareness Training. The OSHA Lead Standard, 29 CFR 1910.1025 is discussed in this course and must be understood by all participants.

3. Supervisors will identify the employees who work with or handle lead and make sure that they perform all of the necessary training.

RESPIRATORY PROTECTION PROGRAM

Created for:

RIDGE CONTRACTING, INC.
Certified HUBZone

P.O. Box 24-0121
Anchorage AK 99524-0121

Created by:

Satori Group, Inc.
1310 E 66th Ave #2
Anchorage AK 99518
www.gosatori.com
907-332-0456 P
907-332-0457 F

I. Introduction:

The control of occupational disease caused by breathing contaminated air should be accomplished through engineering control measures. For example, general and local ventilation, isolation of a process, or substitution of a less hazardous material are all effective engineering controls that should be used to eliminate or reduce airborne hazards. Respirators should not be used if engineering controls are feasible.

The issuance of respirators to employees plays a significant role in employee health and safety at Ridge Contracting, Inc. (herein RCI). Because of the importance of proper respirator selection, fitting, and medical surveillance as well as the need to meet regulatory requirements, supplying a respirator to an employee should be done as specified in this manual.

Purpose

The purpose of this Respiratory Protection Program is to:

- Provide written procedures that can be used to administer an effective respiratory protection program which will prevent exposure to airborne contaminants and thus maintain employee health.
- Outline specific information to facilitate:
  - Appropriate respirator selection.
  - Employee respirator training, fit-testing, care and use.
  - Medical surveillance to evaluate an employee's health and ability to wear a respirator.
- Meet the requirements of a written respiratory protection program as outlined in the revised 1998 Occupational Safety and Health Administration (OSHA) standard 29 CFR 1910.134.

Scope

The Respiratory Protection Program includes all respirators. Definitions of respirator types and related items are listed in Appendix C. Examples include:

- Dust mask respirators
- Half-face chemical cartridge respirators.
- Full-face chemical cartridge respirators.
- Powered-air purifying respirators (PAPR).
- Air-line respirators, also known as supplied air respirators.
- Self-contained breathing apparatus (SCBA).

Statement of Responsibilities

- **Ridge Contracting, Inc.**
  RCI is responsible for ensuring the safety of its employees and for complying with all applicable requirements of state and federal regulations. Because of the importance the administration places on safety, employees at all levels to are encouraged to promote positive attitudes regarding safety, incorporate safety into their work practices, and cooperate fully in the implementation of safety-related programs.

- **Supervisors**
  Whenever employees are exposed to airborne contaminants, RCI must ensure that employees are protected. Supervisors will ensure that:

  - Employees receive approval to wear respirators from an Occupational Medicine physician, receive training, fill out appropriate paperwork, and are fit-tested (are certified before respirators are used.
  - Approved respirators and cartridges are needed.
  - Proper respirators and cartridges are used, based on the job hazards.
  - Employee respirators are inspected and maintained on a regular basis.

- **Environmental Health and Safety**

  To assist in maintaining oversight and technical consultation on environmental, and health and safety issues, RCI has contracted Satori Group, Inc. (here in Satori) to develop the Respiratory Protection Program and will assist RCI in meeting the program objectives. RCI will:
  - Designate a program administrator (with Satori's guidance).
  - Develop and monitor the Respiratory Protection Program.
  - Assist employees and supervisors with hazard assessments and respirator selection.
  - Provide respirator certification, training, fit-testing and recordkeeping.

- **Employees**

  Employees are responsible for:
  - Observing all practices and procedures contained in the Respiratory Protection Program.
  - Ensuring correct respirator and cartridge combinations are used for specific jobs or tasks.
  - Attending designated training sessions.
  - Reporting hazardous or unsafe conditions to their supervisor(s).
  - Observing all other general safety practices.

- **Occupational Medicine**
  Occupational Medical Physicians are responsible for:
  - Performing necessary medical tests.
  - Granting approval for respirator usage.
  - Retaining necessary confidential medial records.

Checklist to Obtain a Respirator at RCI.

Summarized below are the general steps or procedures necessary to properly and legally obtain a respirator at RCI:

- The supervisor and/or employee will contact the program administrator to assess the employee's need for a respirator. A Medical Questionnaire for Respiratory Protective Equipment form will be sent to the employee for completion.
- The employee completes the Medical Questionnaire (Appendix A) and gives it to an Occupational Medicine clinic for a medical review.
- The employee schedules an appointment at an Occupational Medicine clinic for an initial exam to determine fitness to wear a respirator. The Occupational Medicine physician reviews the questionnaire and completes an initial exam.
- Once approval is granted, the employee is given the Medical Approval for Respirator Use form (last page of the Medical Questionnaire). This form, signed by the Occupational Medicine physician, signifies that the employee can wear a respirator. Occupational Medicine will also send a copy of the Medical Approval for Respirator Use form to RCI.
- Employees exposed to non-hazardous levels of airborne contaminants who wear only dust mask type respirators may be granted specific exemptions to the Respiratory Protection Program requirements. See "Voluntary Dust Mask Use" in Section III.

II. MEDICAL EVALUATION

A medical evaluation is required by OSHA's Respiratory Protection Standard (29CFR 1910.134) for employees who wear respirators. OSHA required that the medical evaluation consist of, at minimum, completion of the Medical Questionnaire for Respiratory Protective Equipment by the employee and review of the questionnaire by a licensed health care professional. This requirement is intended to assure that employees are physically able to wear a respirator. As a result, any employee requiring a respirator must participate in the Occupational Medicine Program and receive medical approval from the Occupational Medicine Physician **prior** to respirator use.

Participation in the Occupational Medicine Program requires completion of a Medical Questionnaire for Respiratory Protective Equipment. Once this has been completed, a medical evaluation can be scheduled.

The Medical Questionnaire for Respiratory Protective Equipment must be completed and returned to Occupational Medicine for review. The employee should then schedule an appointment at Occupational Medicine for an initial exam to determine fitness to wear a respirator. Once approved, copies of the written Medical Approval for Respirator Use will be forwarded to the employee and to RCI for their records.

III. RESPIRATOR APPROVAL, SELECTION, AND PURCHASE

Approval

All respirators used by employees must be approved by the National Institute for Occupational Safety and Health (NIOSH) and carry the NIOSH approval label.

Selection

Proper respirator selection depends on the type of contaminant, expected airborne concentration, and other factors such as oxygen concentration. Potential inhalation hazards must be assessed before the correct respirator can be selected.

Satori will assist RCI in the evaluation and measurement of job hazards and ultimately recommend the type of respirator to be used. Supervisors shall ensure that proper respirators and cartridges are used, based on the employee's job hazard assessment.

Purchase

RCI will purchase and maintain respirators/cartridges only after completion of training and fit testing. This will ensure that the proper respirator/cartridge is selected for the job and that the appropriate hazard assessment and training have been completed.

Voluntary Dust Mask Use

Employees who voluntarily use dust mask respirators will not be required to have a medical review or respirator training. However, all voluntary dust mask users must read a short training policy sheet titled, "Instructions for Voluntary Dust Mask Respirator Use" (see Appendix B). The following conditions must exist in order for dust mask respirators to be used ***voluntarily.***

- Exposure to airborne contaminants is below OSHA permissible exposure limits (PEL's)
- Exposure is only to non-toxic nuisance material (plant dust, agar dust, etc.)
- There is ***no*** exposure to airborne infectious disease agents
- The dust mask is not worn to reduce exposure to gases or vapors

IV. RESPIRATOR TRAINING AND FIT-TESTING

All respirator users are required to have annual training and fit-testing. Initial and recertification classes are held frequently.

Training classes will provide employees with information about:

- Workplace respiratory hazards
- Proper respirator selection and use
- Proper respirator fit

- Respirator limitations and inspection techniques
- Chemical cartridge end of service life indicators
- Respirator donning
- Respirator seal checks
- Proper respirator maintenance (cleaning)
- Proper respirator storage

V. RESPIRATOR LIMITATIONS

Cloth/paper dust mask respirators used voluntarily are limited to use with nuisance dusts only.

Air purifying respirators (defined in Appendix C) must NOT be used in:

- Atmospheres that are oxygen deficient (<19.5% oxygen).
- Atmospheres that are immediately dangerous to life or health (IDLH).
- Atmospheres that contain a contaminant whose concentration exceeds the assigned protection factor (rating) of the respirator.
- Atmospheres that contain a contaminant which has poor warning properties.

Emergency situations often required the highest level of respiratory protection. Atmospheres which have not been characterized (monitored) should be treated as though they are immediately dangerous to life and health (IDLH). Supplied-air respirators such as the self-contained breathing apparatus (SCBA) or air-line respirator may be used in these atmospheres. However, emergency situations and IDLH entry must be handled on a case-by-case basis by RCI. This will ensure that appropriate hazard assessments and mandatory training and fit-testing have been performed.

VI. RESPIRATOR CARTRIDGE CHANGE-OUT SCHEDULES

The service life of a cartridge is the length of time the absorbing material in a chemical cartridge is effective in keeping contaminants out of the respirator. To ensure that chemical cartridges are replaced before the service life ends, a cartridge change-out schedule must be developed and followed. Listed below are OSHA-recognized ruled of thumb that can be used to estimate cartridge service life:

- If the chemical's boiling point is >70°C (158°F) and the concentration is less than 200 ppm you can expect a service life of 8 hours at a normal work rate.
- Service life is inversely proportional to work rate.
- Reducing concentration by a factor of 10 will increase the service life by a factor of 5.
- Humidity above 85% will reduce service life by 50%.

In the absence of change-out schedule for specific operations, cartridges should be changed-out at the end of each day or work shift.

VII. RESPIRATOR MAINTENANCE

Cleaning

Employees are responsible for ensuring that their respirators are used and stored in a clean condition. Disposable dust masks can be reused, but should be discarded when dirty. Alcohol wipe pads may be used on half-face, full-face and air supplied respirators needing light cleaning.

Respirators that need thorough cleaning should be taken apart and washed in warm water with a mild commercial detergent. Detergents are available at RCI or in any field decontamination area. After cleaning, respirators should be dried, reassembled and stored in their box or a plastic bag. Once stored, respirators should not have objects resting against them.

Any respirator that is shared must be cleaned and disinfected after each use.

Replacement Parts

All respirators should be inspected before each use and again when reassembled after cleaning. Any parts that are defective should be replaced with the manufacturer's replacement parts.

SCBA Air Quality and Inspection

Compressors used to fill self-contained breathing apparatuses (SCBA) should be tested quarterly. The compressors' air must be tested for carbon dioxide, carbon monoxide, oxygen concentration and hydrocarbon condensate. Compressor air filters should be changed per the manufacturer's guidelines.

SCBA's should be inspected monthly. The units must be inspected for proper function and also to confirm that a minimum cylinder air capacity of 90% is maintained. Cylinders with air capacity falling below this level must be refilled.

VIII. RECORDKEEPING

Ridge Contracting, Inc.

RCI maintains respirator training and fit-testing records for all its employees enrolled in the Respiratory Protection Program. These files include:

- Employee name and job description.
- Supervisor name and department.
- Anticipated respiratory hazards.

- Respirator type, manufacturer, model, size and approval number.
- Previous certification date (training and fit-testing).
- Type of agent used in fit-testing.
- Initials of person performing fit-testing.

Occupational Medicine

Occupational Medicine will maintain the Medical Questionnaire for Respiratory Protective Equipment.

Supervisors

Supervisors of employees voluntarily using dust mask respirators should maintain a record of employees give the "Instructions for Voluntary Dust Mask respirator Use at RCI" policy.

IX. PROGRAM EVALUATION

Ridge Contracting, Inc.:

RCI will contract Satori to periodically evaluate the Respiratory Protection Program. Satori will ensure that:

- Written respirator procedures exist.
- Records are complete for employee fit-tests and training.
- Employees have completed a medical evaluation prior to fit-testing.
- The written program is reviewed and updated to reflect necessary changes.
- Employees are surveyed on the effectiveness of the respiratory protection program during annual training.

Supervisors

Supervisors are responsible for ensuring that:

- Employees have been trained in respirator use.
- Employees wear the correct respirators.
- Workplace hazards have been reviewed.
- Provisions of the written Respiratory Protection Program are implemented.
- Respirators and cartridges are properly maintained.

APPENDIX A

FORMS

- Medical Questionnaire for Respiratory Protective Equipment
- Medical Approval for Respirator Use
- Respiratory Protective Equipment Recertification Medical Questionnaire
- Respirator Prescription

Medical Questionnaire For Respiratory Protective Equipment

To the employee: Can you read (check one): ☐Yes ☐No
You must be allowed to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, only the Occupational Medicine health care professionals may review your answers. Your supervisor must tell you how to deliver or send this questionnaire to the Occupational Medicine physician who will review it.

Section 1. **The following information must be provided by every employee who has been selected to use any type of respirator (please print).**

Part A. Personal Information

1. Today's date: ____________________
2. Your Name: ____
   Last First MI
3. Soc. Sec. No.: ____________________
4. Birthdate: ____________________
5. Job Title: ____
6. Supervisor ____
7. Department: ____
8. Building: ____
9. Wk Ph No: ____
10. Gender ☐Male ☐Female
11. Your height ____________ ft. ________ in.
12. Your weight __________ lbs.
13. Has your employer told you how to contact the health care professional who will review this questionnaire?
    (check one): ☐ Yes ☐No
14. Check the type of respirator you will use (you can check more than one category):
    - ☐ dust mask
    - ☐ half-mask
    - ☐ power air purifying respirator (PAPR)
    - ☐ self contained breathing apparatus (SCBA)
15. Have you ever used a respirator? (check one): ☐Yes ☐ No
    If yes, what type(s)? ____
    ____

Part B. Respirator use information

1. How often (frequency) and for how long (duration) do you use your respirator? ____
2. What type of activities are performed while you wear your respirator?:
   ____
   ____
3. List any additional personal protective equipment (e.g., tyvek, gloves, winter clothing, etc.) worn during respirator use:
   ____
   ____
4. What are the temperature and humidity extremes (highest & lowest) that may be encountered on your job? ____________________
   ____

Section 2 **Medical Information**

Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please check "yes" or "no")

	Yes	No
1. Do you currently smoke tobacco, or have you smoked tobacco in the last month?	☐	☐
2. Have you ever had any of the following conditions?		
a. seizures (fits)	☐	☐
b. Diabetes (sugar disease)	☐	☐
c. Allergic reactions that interfere with your breathing	☐	☐
d. Claustrophobia (fear of closed-in places)	☐	☐
e. Trouble smelling odors.	☐	☐
3. Have you ever had any of the following pulmonary or lung problems?		
a. Asbestosis	☐	☐
b. Asthma	☐	☐
c. Chronic bronchitis	☐	☐
d. Emphysema	☐	☐
e. Pneumonia	☐	☐
f. Tuberculosis	☐	☐
g. Silicosis	☐	☐
h. Pneumothorax (collapsed lung)	☐	☐
i. Lung cancer	☐	☐
j. Broken ribs	☐	☐
k. Any chest injuries or surgeries	☐	☐
l. Any other lung problem that you've been told about	☐	☐
4. Do you currently have any of the following symptoms of pulmonary or lung illness?:		
a. Shortness of breath	☐	☐
b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline	☐	☐
c. Shortness of breath when walking with other people at an ordinary pace on	☐	☐

		Yes	No
	other people at an ordinary pace on level ground		
d.	Have to stop for breath when walking at your own pace on level ground	☐	☐
e.	Shortness of breath when walking or dressing yourself	☐	☐
f.	Shortness of breath that interferes with your job	☐	☐

4. cont.

		Yes	No
g.	Coughing that produces phlegm (thick sputum)	☐	☐
h.	Coughing that wakes you early in the morning	☐	☐
i.	Coughing that occurs mostly when you are lying down	☐	☐
j.	Coughing up blood	☐	☐
k.	Wheezing	☐	☐
l.	Wheezing that interferes with your job	☐	☐
m.	Chest pain when you breathe deeply	☐	☐
n.	Any other symptoms that you think may be related to lung problems	☐	☐
5.	Have you ever had any of the following cardiovascular or heart problems?	☐	☐
a.	Heart attack		
b.	Stroke		
c.	Angina	☐	☐
d.	Heart failure	☐	☐
e.	Swelling in your legs or feet (not caused by walking)	☐	☐
f.	Heart arrhythmia (heart beating irregularly)	☐	☐
g.	High blood pressure	☐	☐
h.	Any other heart problem that you've been told about	☐	☐
6.	Have you ever had any of the following cardiovascular or heart symptoms?	☐	☐
a.	Frequent pain or tightness in your chest	☐	☐
b.	Pain or tightness in your chest during physical activity	☐	☐
c.	Pain or tightness in your chest that interferes with your job	☐	☐
d.	In the past 2 years, have you noticed your heart skipping or missing a beat	☐	☐
e.	Heartburn or indigestion that is not related to eating	☐	☐
f.	Any other symptoms that you think may be related to heart or circulation problems	☐	☐
7.	Do you currently take medication for any of the following problems?		
a.	Breathing or lung problems	☐	☐
b.	Heart trouble	☐	☐
c.	Blood pressure	☐	☐
d.	Seizures	☐	☐

		Yes	No
8.	If you've never used a respirator, check the following box and go to question 9: ☐ If you have used a respirator , have you ever had any of the following problems?		
a.	Eye Irritant	☐	☐
b.	Skin allergies or rashes	☐	☐
c.	Anxiety	☐	☐
d.	General weakness or fatigue	☐	☐
e.	Any other problem that interferes with your use of a respirator	☐	☐
9.	Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire?	☐	☐

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-face piece respirator or a self-contained breathing apparatus (SCBA).

For employees who have been selected to use other types of respirators, answering these questions is voluntary.

		Yes	No
10.	Have you ever lost vision in either eye (temporarily or permanently)?	☐	☐
11.	Do you:		
a.	Wear contact lenses?	☐	☐
b.	Wear glasses?	☐	☐
c.	Have color blindness?	☐	☐
d.	Have any other eye or vision problems?	☐	☐
12.	Have you ever had injury to your ears, including a broken ear drum?	☐	☐
13.	Do you currently have any of the following?		
a.	Difficulty hearing	☐	☐
b.	Wear a hearing aid	☐	☐
c.	Any other hearing or ear problems?	☐	☐
14.	Have you ever had a back injury?	☐	☐
15.	Do you currently have any of the following?		
a.	Weakness in any of your arms, hands, legs, or feet	☐	☐
b.	Back pain	☐	☐
c.	Difficulty fully moving your arms and legs	☐	☐
d.	Pain or stiffness when you lean forward or backward at the waist	☐	☐
e.	Difficulty fully moving your head up or down	☐	☐
f.	Difficulty fully moving your head side to side	☐	☐

e. Are you taking any other medications for any reason (including over-the-counter medications)? ☐ ☐
If yes, name the medications if you know them: ______________________________
____
____
____

g. Difficulty bending at your knees ☐ ☐

h. Difficulty squatting to the ground ☐ ☐

i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs. ☐ ☐

j. Any other muscle or skeletal problem that interferes with using a respirator ☐ ☐

j. Any other muscle or skeletal problem that interferes with using a respirator ☐ ☐

Signature ______________________________ Date ______________

Last Name	____________	First	____________	MI	____________		
Social Security No.	____________	Birthdate	____________	Supervisor	____________		
Job Title	____________	Dept.	____________	Bldg.	____________	Wk. Ph.	____________

THIS SPACE FOR OCCUPATIONAL MEDICINE USE ONLY. MEDICAL APPROVAL FOR RESPIRATOR USE:

Air Purifying	______	No	______	Yes	Date of last medical review:	____________
PAPR	______	No	______	Yes	Remarks:	____________
Supplied Air	______	No	______	Yes		____________
SCBA	______	No	______	Yes		____________
N95 Dust Mask (required use)	______	No	______	Yes		____________

Physician's Signature ______________________ Date ____________

RESPIRATORY PROTECTIVE EQUIPMENT RECERTIFICATION MEDICAL QUESTIONNAIRE

Last Name_______________ First_______________ Middle_______________

Social Security #_______________Birthdate_______________ Supervisor_______________

Job Title _______________ Dept._______________ Bldg._______________Wk. Ph._______________

To satisfy federal requirements, each individual must be medically approved to wear a respirator for tasks requiring respiratory protective equipment. The purpose of this questionnaire is to evaluate whether medical conditions have changed since previous respirator approval. **Please read the questions carefully and answer each by placing a check mark to the appropriate answer. The employee must also sign and date the form. If any of the questions below are marked YES, the employee must contact Occupational Medicine for further medical review.**

1. Do you have any known or suspected major health problems at present (i.e., disease of the heart, lungs, other vital organs, high blood pressure, diabetes, epilepsy, cancer, hernia, perforated eardrums, serious back or joint disorders, or recent major surgery) or are you under the care of a doctor for diagnosis or treatment?

   ☐NO ☐YES If YES, please explain:_______________

2. Have you had any major health or physical problems in the past which have left you with any lasting impairment of bodily function, limitation, or restriction in normal physical activity?

   ☐NO ☐YES If YES, please explain:_______________

3. Do you have any significant symptom or health problem which you believe would be made worse by using respiratory protective equipment?

   ☐NO ☐YES If YES, please explain:_______________

4. Other than the mild discomfort and/or annoyance experienced while wearing respirators, do you have any major objections to using respiratory protective equipment?

   ☐NO ☐YES If YES, please explain:_______________

Employee's Signature_______________ Date:_______________

RESPIRATOR INFORMATION:

X	Brand And Type	Model (circle)	Size (circle)	Cartridge Type (circle)	Hazard
			S S/M M/L	HEPA OV D/M AG F AM	
			S S/M M/L	HEPA OV D/M AG F AM	

RESPIRATORY PROTECTIVE EQUIPMENT INITIAL FIT TEST RECORD & RESPIRATOR PRESCRIPTION

Last Name___________________________________ First_________________________ Middle_______________

Social Security #______________________Birthdate_____________________ Supervisor___________________________

Job Title _____________________________ Dept.________________ Bldg._________________Wk. Ph._______________

Respirator Information

X	TYPE	Stock #

Hazard / Comments____

____

Signatures below indicate that the employee has received respirator training and has passed the fit test for the specified respirator(s), and that the employee agrees to follow appropriate respiratory protection procedures as specified in this training module and the RCI Respiratory Protection Program.

Employee's Signature____ **Date:**_______________________

Supervisor's Signature____ **Date:**_______________________

NOTE: North 7400 APR tested with Bitrex; Other types tested with irritant smoke.

APPENDIX B

Instructions for Voluntary Dust Mask Respirator Use at RCI

Instructions for Voluntary Dust Mask Respirator Use at RCI

The information on this sheet is intended for employees using respirators voluntarily and meets requirements outlined in Appendix D of OSHA's Respiratory Protection Standard 29 CFR 1910.134. Each employee using a dust mask respirator on a voluntary basis must be given a copy of this instruction sheet.

Voluntary Respirator Use

When airborne containment levels are below permissible levels (that is, they are essentially non-hazardous) respirator use at RCI is considered voluntary. If dust mask respirator use is voluntary, employees must complete the following:

1. Read and follow all instructions provided by the respirator manufacturer on use, maintenance, cleaning, care, and warnings regarding respirator limitations.

2. Choose respirators certified by NIOSH (National Institute for Occupational Safety and Health). A label or statement of certification should appear on the respirator or respirator packaging. The label will indicate what the respirator is designed for and its limitations. All respirators available at RCI meet NIOSH certification requirements.

3. Do not wear respirators into atmospheres containing contaminants for which they are not designed to protect against. For example, a respirator designed to filter dust particles **will not** protect against gases, vapors, or very small solid particles of fumes or smoke. Voluntary dust mask respirators should only be used for nuisance dusts. (**DO NOT** use them for lead, asbestos, cadmium, etc.)

4. Dust mask respirators should only be used by their owner

5. Protect respirators from moisture, dust or other contaminants by storing them in plastic zip-lock bags or containers that can be sealed.

6. Ensure that no objects are resting against stored respirators. This could damage the respirators, resulting in an improper fit when they are worn.

7. Destroy dust masks when discarded. Break straps or tear the respirators to make them unusable for anyone else.

APPENDIX C

Definitions

Acid Gas Cartridge:
A respirator cartridge offering protection against acid gases such as sulfur dioxide, hydrochloric acid, hydrogen bromide, etc. The cartridge can also be used for organic vapors and/or chlorine (up to 10 ppm). (Note: Not all acid gases are removed by this cartridge. Consult with Satori for limitations.)

Air-Line Respirator (e.g., Type C supplied air respirator):
The air-line respirator is connected to a suitable compressed air source which is delivered continuously or intermittently (pressure-demand). Typically this respirator type does not filter air but rather supplies clean air form a source outside the work area.

Air Purifying Respirator:
A respirator employing filters or cartridges to remove gases, mists, and/or particles form air (as opposed to air-supplying respirators).

Dust Mask (dust/mist respirator):
A respirator that filters dusts and mists but not gases (vapors). A dust mask not rated as HEPA will not filter out small dust particles such as tobacco smoke (0.01-1.0 micron diameter) or insecticide dust (approximately 0.5-10.0 micron diameter) and cannot be used for asbestos or lead related exposures.

End-of-Service Life Indicators (ESLI):
A system that warns the respirator user that respirator cartridges/filters are no longer effective.

Fit Factor:
Means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Full-Face Respirator:
A respirator that fits over the eyes, nose and mouth, having a clear face piece. Typically negative air purifying but includes SCBA and air-line as well.

Half-Face Respirator:
An air purifying respirator that fits over the mouth and notes, but not the eyes. Typically a negative air purifying respirator.

HEPA:
High Efficiency Particulate Air (filter)

HEPA Filter Cartridge:
A respirator cartridge that offers respiratory protection against airborne particulate matter including dusts, mists, metal fumes, and smokes; but not gases, vapors, or oxygen deficiency. Many HEPA filters are rated to capture over 99% of particles 0.3 microns in diameter or larger. HEPA filters and/or cartridges are typically used for protection against airborne asbestos, lead, radionuclides and other small diameter particulate air contaminants. HEPA cartridges are color coded with a purple/magenta band.

IDLH (Immediately Dangerous to Life or Health):
An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere. Air purifying respirators cannot be used in atmospheres above the IDLH of a contaminant.

Maximum Use Concentration (MUC):
The product of the protection factor (PF) of the respiratory protection equipment and the permissible exposure limit (PEL). (PF x PEL =MUC)

Negative Air-Purifying Respirator:
A respirator that fits tightly against the face and relies on inhalation to bring air across filter cartridges to remove air contaminants.

Organic Vapor Cartridge:
A cartridge offering protection against organic gases and vapors such as hexane, naphtha, acetone, etc. (Note: Not all organic vapors are removed by this cartridge. (Consult with Satori for limitations.)

OSHA:
Occupational Safety and Health Administration

PAPR (Powered Air Purifying Respirator):
A PAPR uses a power source (usually a battery pack) to operate a blower that passes air across a filter, to supply purified air to a respiratory inlet.

PEL (Permissible Exposure Limit):
An exposure limit that is published and enforced by OSHA as a legal standard. PEL's are air contaminant concentrations at or below which a worker may continuously work 8 hours per day, 5 days per week, without ill effects. See also TLV.

Protection Factor:
The ratio of the ambient airborne concentration of a contaminant to its concentration inside the respirator. Half-face respirators are typically rated with a protection factor of 10, thus affording a 10-fold reduction in exposure when used properly.

SCBA (Self Contained Breathing Apparatus):
The type of respiratory protection typically used by fire fighters employing a compressed air tank and positive pressure or pressure-demand air regulators.

TLV (Threshold Limit Value):
A time weighted average air contaminant concentration under which most people can work continuously for eight hours a day, day after day, with no harmful effects. Unlike PEL's, TLV's are updated regularly by the American Conference of Governmental Industrial Hygienists (ACGIH) and reflect current "good practice" exposure limits. Thought they are similar to the PEL's enforced by OSHA, TLV's are guidelines and are not enforceable under federal regulations.

Qualitative Fit-Test (QLFT):
It is a pass/fair fit-test to assess the adequacy of a respirator. It relied on the individual's response to the test agent.

Quantitative Fit-Test (QNFT):
It is an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator. A specialized piece of equipment is used for this measurement.

RIDGE CONTRACTING, INC.
Certified HUBZone

ACCIDENT INVESTIGATION PROCEDURES

P. O. Box 24-0121
Anchorage, Alaska 99524
Phone: (907) 222-7518
Fax: (907) 272-2290
www.ridgecontracting.org

Ridge Contracting Accident Investigation Procedures

The actual procedures used in a particular investigation depend on the nature and results of the accident. The agency having jurisdiction over the jobsite location will most likely conduct its own investigation. Regardless of any external investigations performed on our jobsite it is Ridge Contracting policy to always carry out its own internal investigation. In general our site superintendent or our health and safety officer will be in charge of the investigation. Our appointed investigator will use the following steps to determine who, what, when, where, why, and how the accident occurred. In the end, all of this information will be used to ensure that the same accident does not happen again.

1. Define the scope of the investigation.

2. Select more than one investigator (if needed) and assign specific tasks to each (preferably in writing).

3. Present a preliminary briefing to the investigating team, including:
   a. Description of the accident, with damage estimates.

   b. Normal operating procedures.

   c. Maps (local and general).

   d. Location of the accident site.

   e. List of witnesses.

   f. Events that preceded the accident.

4. Visit the accident site to get updated information.

5. Inspect the accident site.
   a. Secure the area. Do not disturb the scene unless a hazard exists.

   b. Prepare the necessary sketches and photographs. Label each carefully and keep accurate records.

6. Interview each victim and witness. Also interview those who were present before the accident and those who arrived at the site shortly after the accident. Keep accurate records of each interview. Use a tape recorder if desired and if approved.

7. Determine
   a. What was not normal before the accident.

   b. Where the abnormality occurred.

   c. When it was first noted.

   d. How it occurred.

8. Analyze the data obtained in step 7. Repeat any of the prior steps, if necessary.

9. Determine
   a. Why the accident occurred.

   b. A likely sequence of events and probable causes (direct, indirect, basic).

   c. Alternative sequences.

10. Check each sequence against the data from step 7.

11. Determine the most likely sequence of events and the most probable causes.

12. Conduct a post-investigation briefing.

13. Prepare a summary report and most importantly **include the recommended actions to prevent a recurrence**.

RIDGE CONTRACTING, INC.
Certified HUBZone

EQUIPMENT INSPECTION FORM

Make	Model	Type	Year of Manufacture	Hours/ Mileage	Date of Inspection	Serial Number

Fill in appropriate boxes	Company Name	
	Inspector Name	

A. DAILY SERVICE CHECKS:

ITEM	*OK*	*AMOUNT NEEDED*	*ITEM*	*OK*
Radiator Fluid Level			Grease Zerks	
Transmission Fluid Level			Lights	
Hydraulic Fluid Level			Windshield/Glass	
Engine Oil Level			Battery	
Brake Fluid Level			Back-up Alarm/Horn	
Fuel Level			Tires/Tracks	

B. EQUIPMENT INSPECTION PRE-FIELD MOBILIZATION

	CONDITION Bad/Good/ Excellent	*Attn Needed*	Explanation	*Corrected? (Y/N)*
Engine Compartment				
Radiator				
Fan & Shrouds				
Air Induction and Filter				
Belts & Pulleys				
Exhaust & Rain Cap				
Battery & Cables				
Hydraulic Cylinders				
Operators Compartment				
Controls & Linkages				
Hoses & Lines				
Oil Leaks				
Fuel Leaks				
Coolant				
Fasteners				
Cracks				
Guards & Covers				
Cutting Edges				
Sprockets				
Rollers & Idlers				
Tracks or Tires				

B. EQUIPMENT INSPECTION PRE-FIELD MOBILIZATION (continued)

	CONDITION Bad/Good/ Excellent	***Attn Needed***	**Explanation**	***Corrected? (Y/N)***
Engine				
Governor Control				
Trans Operation				
Trans Linkage				
Steering System				
Service Brakes				
Parking Brake				
Unusual Noise				
Gauges Operational				
Gauges Normal				
Backup Alarm				
Heater & Fan				
Switches				
Wipers & Washer				
Lights				
Horn				
Seat & Seat Belts				
Windows				
Doors				
General Appearance:				
Machine Damage:				

NOTES:

NOTES (continued)**:**

Deficiencies noted: ☐ Yes ☐ No

Deficiencies fixed: ☐ Yes ☐ No

Inspection 100% complete ☐ Yes ☐ No If No, Please Explain:

Date:	Inspectors Signature
Date:	Ridge Representative

RIDGE CONTRACTING, INC.
Certified HUBZone

WEEKLY
CRANE INSPECTION REPORT

INDICATE: YES, NO, O.K., OR COMMENT

1. ELECTRICAL — LIGHTS ________ WIRING ________ CONNECTIONS ________

2. STRUCTURAL — BOOMS ________ JIB ________

3. HYDRAULIC SYSTEM — HOSES ________ CONNECTIONS ________
   OUTRIGGERS:
   FRONT ________ BACK ________

4. ENGINE — OIL LEVEL ________ COOLING SYSTEM ________
   INSTUMENTS ________

5. SAFETY LATCH ________ LINES ________
   BLOCKS ________ HOOKS ________
   PENDANTS ________ DRUMS ________
   BACK-UP SIGNAL ________ FIRE EXTINGUISHERS ________
   ALL GUARDS IN POSTION ________

6. GLASS WINDSHIELDS ________ WIPERS ________

7. COMMENTS: ________

____

____

____

____

____

INSPECTED BY ________ DATE ________

RIDGE CONTRACTING, INC.
Certified HUBZone

ANNUAL

CRANE INSPECTION REPORT

EQUIPMENT # ______________________________
MODEL ______________________ SERIAL NUMBER ____________
INSPECTION DATE ______________________________
JOB LOCATION ______________________________
CONTRACTOR ______________________________

INDICATE YES, NO, O.K., OR COMMENT (NO CHECK MARKS)
IF NOT APPLICABLE, WRITE N. A.

GENERAL: APPEARANCE ________ PAINT ________ FIRE EXTINGUISHER ________
CAB ________ GLASS ________ WIPER ________
LEVEL INDICATORS ________ FUEL GAUGE ________ WARNING SIGNAL ________
BOOM ________ ANGLE INDICATOR ________
LOAD INDICATOR ________ LOAD CHARTS ________

ENGINE: OIL LEVEL & COND ________ HOUR METER ________
OPERATING CONDITIO ________
COOLING SYSTEM ________ ANTI-FREEZE ________
BATTERY CONDITIO ________
ENGINE INSTRUMENTS ________
HYDRAULIC SYSTEMS ________ HOSES ________ CONNECTIONS ________
ALL GUARDS IN POSITION ________
COMMENTS: ________

CARRIER: TRACK CONDITIO ________
IS BACK-UP SIGNAL WORKING? ________
BRAKES ________ PARKING BRAKES ________
TIRE CONDITIC R.F.F. ________ L.F.F. ________
R.R. ________ L.R. ________
R.R.R. ________ L.R.R. ________
LIGHTS ________ BRAKE LIGHTS ________
TRANSMISSION ________ SLIPPING ________ NOISY ________
SHIFTING: ________ OIL LEVEL ________
OUTRIGGER R.F. ________ L.F. ________
R.R. ________ L.R.. ________
STEERING: FRONT ________ REAR ________
COMMENTS: ________

BOOM: STRUCTURAL CONDITION (NOTE BENT, RUSTED, OR DAMAGED MEMBERS) ________
LENGTH OF BOOM ________ FEET
IS CRANE RATING CURVE POSTED? ________

PERIODIC CRANE INSPECTION REPORT CONTINUED

BOOM (CONT'D)

BOOMSTOP OPERABLE? ______

IS BOOM POSITION INDICATOR VISIBLE FROM OPERATOR'S STATION? ______

CABLE CONDITION (HOIST) ______ (WHIP) ______ (BOOM) ______

IS THERE SUFFICIENT CABLE TO ALLOW TWO (2) FULL WRAPS OF CABLE ON DRUMS AT ALL WORKING POSITIONS? ______

IS HOIST BRAKING EQUIPMENT CAPABLE OF HOLDING A LOAD AT LEAST THE FULL RATED LOAD ______

HOOK CONDITION ______ SAFETY LATCH ______

WINCH BRAKE ______

CYLINDERS: (NOTE LEAKING, DRIFT, AND SPEED OF OPERATION)

EXTENSION: ______ HOIST ______

OUTRIGGER VERTICAL ______ HORIZONTAL ______

SWING ______ JIB ______

EQUIPPED WITH ARCTIC TWO-BLOCK ______

COMMENTS: ______

OTHER COMMENTS:

NOTE ANY POTENTIAL HAZARDS OR MALFUNCTIONS ______

INSPECTED BY ______ DATE: ______

Standards of Conduct and Discipline

The following Standards of Conduct were created so that Ridge Contracting, Inc. (RCI) employees would know and understand the level of expectations placed upon each individual. The moral conduct and personal behavior of each employee impacts the company image. This makes it imperative for the individual to act at all times with self-respect and integrity. The repercussions for not meeting this standard are subsequently outlined as well.

Standards of Conduct

Ridge Contracting employees shall:

- work injury free
- work drug free
- work affably with other employees
- comply with the RCI Health and Safety Program
- act in a manner that is consistent with RCI and public interest
- prepare themselves for work by wearing appropriate clothing and bringing necessary tools
- abide by any other commonly accepted code of conduct

Ridge Contracting employees shall not:

- have unexcused or excessive absences or tardiness
- discriminate against or harass another individual
- fail or refuse to perform given tasks
- be dishonest in any way
- willfully damage RCI, subcontractor or owner property
- remove or use property belonging to RCI, subcontractor or owner without the proper consent
- refuse to wear proper safety equipment
- fight or threaten to fight other personnel on the project
- work or go into unauthorized construction zones without proper consent
- bring weapons of any kind onto a project worksite without proper consent

Disciplinary Actions

Ridge Contracting Inc. will handle each case of insubordination separately and may take any one of the following actions at anytime.

- written warning
- suspension from work without pay
- immediate discharge