Alaska Department of Environmental Conservation

Reuse & Redevelopment Initiative

Brownfield Assessment

PROPERTY ASSESSMENT AND CLEANUP PLAN

Old AVEC Tank Farm

Elim, Alaska

Submitted to:
Department of Environmental Conservation
Brownfield Program

SLR

By:
SLR International Corp
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PROPERTY ASSESSMENT AND CLEANUP PLAN
OLD AVEC TANK FARM
ELIM, ALASKA

Prepared for

Alaska Department of Environmental Conservation
Contaminated Sites Program
Division of Spill Prevention and Response
610 University Avenue
Fairbanks, AK 99709-3643

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Prepared by

SLR
4601 Business Park Blvd., Suite K42
Anchorage, Alaska 99503

3455 Rewak Drive, Suite 103
Fairbanks, Alaska 99709

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This document has been prepared by SLR International Corp. The material and data in this report were prepared under the supervision and direction of the undersigned.

Christina Bentz
Project Geologist

for Carl Benson
Project Manager

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ACRONYMS

AAC	Alaska Administrative Code
AST	above ground storage tank
AVEC	Alaska Village Electric Co-operative
BEESC	Bristol Environmental & Engineering Services Corporation
bgs	below ground surface
BIA	U.S. Bureau of Indian Affairs
CSM	conceptual site model
cy	cubic yards
DBA	DEC Brownfield Assessment
DEC	Alaska Department of Environmental Conservation
DRO	diesel range organics
EPA	U.S. Environmental Protection Agency
ETM	exposure tracking model
HAZWOPER	hazardous waste operation and response
IGAP	Indian Environmental General Assistance Program
mg/kg	milligrams per kilogram
PAPC	Property Assessment and Cleanup Plan
PCB	polychlorinated biphenyl
PID	photoionization detector
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
SLR	SLR International Corp
VOC	volatile organic compound

EXECUTIVE SUMMARY

SLR International Corp is pleased to submit this Property Assessment and Cleanup Plan (PACP) to the Alaska Department of Environmental Conservation (DEC) for the Old Alaska Village Electric Co-operative (AVEC) Tank Farm site in Elim, Alaska. The Old AVEC Tank Farm is located in the City of Elim (located in Section 15, Township 10 South, Range 18 West, Kateel River Meridian, Alaska) at the intersection of 2nd Street and Main Street and will be referred to as the Site for the remainder of this plan.

The objective of this PACP is to provide information aimed at advancing the property through the Brownfield process to beneficially reuse the Site. The Site, owned by the Elim Native Corporation, is the location of the Old AVEC Tank Farm. AVEC discontinued site use when the new tank farm was built in the early 2000s.

Interested parties in this PACP include the Native Village of Elim, the Elim Native Corporation, the City of Elim, and DEC. The exact reuse of the Site has not been determined but potential reuse options include housing or recreational site.

In order to reuse the site, solid waste and contaminated soil, if encountered, should be removed. The remedial alternative of landfarming followed by use as landfill cover was chosen for soils excavated from the Old AVEC Tank Farm site. A cost estimate for guiding future funding requests was prepared for the preferred remedial alternative based on local equipment and labor available in Elim.

1. INTRODUCTION

In the spring of 2009, the Native Village of Elim submitted an Alaska Department of Environmental Conservation (DEC) Brownfield Assessment (DBA) request form to DEC to address contamination concerns at the Old Alaska Village Electric Co-operative (AVEC) Tank Farm site. The DBA request form is included as Appendix A. The Old AVEC Tank Farm is located in the City of Elim (located in Section 15, Township 10 South, Range 18 West, Kateel River Meridian, Alaska) at the intersection of 2nd Street and Main Street (Figure 1). The property is owned by the Native Village of Elim and was previously owned by the U.S. Bureau of Indian Affairs (BIA) who issued a permit to AVEC from 1970 to 2005 to use the property to construct facilities and install electrical generation equipment, and associated distribution facilities, to provided electrical utility service to the Village of Elim. AVEC operated a power plant which utilized up to nine aboveground storage tanks (ASTs); the number of ASTs has changed through time and in its current configuration, there are nine ASTs. The DBA request form identified petroleum contamination from former activities at the Site as a health concern precluding reuse of the land.

This Property Assessment and Cleanup Plan (PACP) was written by SLR International Corp (SLR) on behalf of DEC in response to the DBA request to recommend property assessment and cleanup actions with general cost estimates to enable sufficient and productive reuse of the property (as appropriate).

Funding for this work was provided by the U.S. Environmental Protection Agency (EPA) through DEC using the State Tribal Response Program grant program. Funding for the cleanup of the Site may come from one of the following sources:

- Economic stimulus funds could provide funding if the project meets the definition of "shovel ready;" and
- The EPA Brownfield competitive cleanup process in 2010 could provide funding.

1.1 PURPOSE OF PROJECT

The purpose of this PACP is to provide background, regulatory, and remedial option information appropriate for advancing the Site through the Brownfield process to help the state and community redevelop and reuse the property.

1.2 SCOPE OF SERVICES SUMMARY

SLR completed the following tasks to develop this PACP.

1.2.1 TASK 1 – STAKEHOLDER SCOPING AND PLANNING MEETING

In September 2009, SLR participated in a stakeholder and planning teleconference with stakeholders in the project. Attendees included representatives from The Native Village of Elim, the City of Elim, AVEC, DEC, and SLR. The purpose of the meeting was to define the

project objectives and also identify the path through the Brownfield process to reuse the Site. SLR prepared a summary record of the meeting and provided it to the stakeholders and DEC. A copy of this summary for the scoping meeting is included in Appendix B.

1.2.2 TASK 2 – PACP PREPARATION

The PACP, developed following SLR's Site visit, is based on review of information gathered from the stakeholder meeting, DEC site files, previous investigations conducted at the Site, communication with individuals familiar with the community and the Site, and observations made during SLR's Site visit in October 2009. This plan includes a comprehensive summary of the existing site conditions and recommendations for property assessment and corrective actions to supply interested stakeholders with a guideline document suitable for progressing the Site through the remediation process.

1.3 OBJECTIVES

The objective of this project is to provide a PACP that recommends cleanup actions with general cost estimates to enable sufficient and productive reuse of the property. Readers of this plan shall have an understanding of the following:

- An accurate historical summary for the Old AVEC Tank Farm site, to include historical land use, environmental incidents, and assessment/response activities to date;
- An understanding of the proposed reuse of the property;
- A qualitative assessment of risk to human receptors from potential contamination at the site;
- Knowledge of specific data gaps that may be necessary to fill, in order to fully evaluate cleanup requirements;
- A clear understanding of the steps necessary to make the property suitable to meet the community reuse objectives; and
- Knowledge of practical remediation strategies including cost estimates.

2. COMMUNITY OVERVIEW AND INFORMATION

This section provides information about the community of Elim. It provides pertinent information on the stakeholders and summarizes the community involvement for the property.

2.1 COMMUNITY GENERAL INFORMATION

2.1.1 LOCATION AND CLIMATE

The community lies at approximately 64.617500 degrees north latitude and -162.260560 degrees west longitude using North American Datum 1983 (Section 15, Township 10S, Range 18 west of the Kateel River Meridian). Elim encompasses an area of 2.4 square miles of land and no water (DCCED, 2009).

Elim is an Inupiat Eskimo community located on the northwest shore of Norton Bay on the Seward Peninsula. It is 96 miles east of Nome and 460 miles northwest of Anchorage. The settlement of Elim was formerly the Malemiut Inupiat Eskimo Village of Nuviakchak (DCCED, 2009).

The City was incorporated in 1970. When the Alaska Native Claims Settlement Act was passed in 1971, Elim decided not to participate, and instead opted for title to the 298,000 acres of land in the former Elim Reserve (DCCED, 2009).

Elim has a subarctic climate with maritime influences. Norton Sound is ice-free generally between mid-June and mid-November. The nearest weather station is Moses Point which indicates that the region gets approximately 18 inches of precipitation annually. Temperatures (in degrees Fahrenheit) range from the negative single digits in winter to the upper 50s during the summer months (WRCC, 2009).

2.1.2 COMMUNITY RESOURCES AND INFRASTRUCTURE

The community of Elim is comprised of approximately 300 persons and relies heavily on subsistence harvests which include fish, seal, walrus, beluga whale, reindeer, and moose (DCCED, 2009).

Water is derived from an infiltration gallery in Elim Creek and Elim has had piped water and sewer since 1974. Wastes flow to a sewage treatment plant with ocean outfall. Elim is best reached by air and sea. Elim has one of the best and most modern runways in the region at 3,000 feet long and 60 feet wide. There is no dock in the village, so supplies must be lightered to shore by a company operating from Nome. Plans are underway to develop a harbor and dock, and an access road is under construction (DCCED, 2009).

2.2 COMMUNITY INVOLVEMENT

The following entities are considered stakeholders for the Old AVEC Tank Farm site:

AVEC – The electric cooperative operated power generation and fuel storage facilities at the site under a lease from the BIA.

Native Village of Elim – The Native Village of Elim is recognized as a traditional council by the BIA.

Elim Native Corporation – The Elim Native Corporation will be the owner of the Site once cleanup activities have occurred in a manner consistent with current environmental regulations.

The Community of Elim – The Community of Elim includes residents of the village who may potentially be affected by contaminated media at the Site.

Alaska Department of Environmental Conservation – DEC's *Reuse and Redevelopment Program* targets specific assessment and cleanup projects on behalf of state agencies. The program uses its DBA request forms to identify appropriate projects and gather information to make a determination for eligibility.

2.2.1 COMMUNITY CONCERNS

Community concerns identified in the 2009 DBA application and discussed during the 2009 SLR site visit included:

- Potential health hazard, and
- The AVEC plant moved several years ago and no one has pursued the cleanup of the Site.

2.2.2 STAKEHOLDER MEETING SUMMARY

In September 2009, a stakeholder and planning teleconference was held and included attendees from the Native Village of Elim, the City of Elim, AVEC, DEC, and SLR. The purpose of the meeting was to define the project objectives and identify the path through the Brownfield process to reuse the property. SLR prepared a summary record of the meeting and provided it to the stakeholders and DEC. A copy of this summary is included in Appendix B.

2.2.3 PROPOSED COMMUNITY DEVELOPMENT AND LAND USE

The proposed uses for the property are for the location of a private residence, elder housing, use as a commercial property, or as a recreational site.

2.2.4 INTERVIEWS AND COMMUNITY INPUT

Interviews were conducted during SLR's site visit in October 2009 with individuals knowledgeable about current and historic conditions of the property and other information necessary to prepare the PACP. Interviews were conducted with Carol and Paul Nagaruk, members of the IRA Council and City Council, and Gary Nakarak. These interviews are summarized below to provide the pertinent information gathered.

Carol and Paul Nagaruk – Carol Nagaruk is the Indian Environmental General Assistance Program Coordinator (IGAP) for the Native Village of Elim and has lived in Elim her entire life. Paul Nagaruk has lived in Elim for the past 15 years and is a former mayor. Both Mr. and Mrs. Nagaruk are familiar with the Old AVEC Tank Farm site. Mr. and Mrs. Nagaruk provided a guided tour of Elim during SLR's 2009 Site visit; the following information was gathered during this tour and in subsequent conversations during the Site visit.

The City of Elim gets its water from a seep and an infiltration gallery in Elim Creek (Figure 1). The Nagaruk's did not believe the well installed for the Old BIA school was ever used. Elim has barge service throughout the summer months, but the Nagaruk's were unaware of any backhaul program. The landfill uses cover material, but at the time of the site visit, the landfill was uncovered. There is an ash burner at the landfill and they accept waste for $900 per truck load.

When discussing the Old AVEC Tank Farm with the Nagaruk's, SLR learned that AVEC had accepted bids on a building formerly located at the Site. The building was sold to an Elim resident who assumed responsibility for removing the building from the Site. Work to remove the building and its foundation was in progress at the time of the Site visit. Piping associated with the Old AVEC Tank Farm that exists outside of the fenced area was also described. Mr. Nagaruk indicated that the fence surrounding the Site could be beneficially reused within the community either at the school basketball courts or at the community playground. The school basketball courts are located adjacent to the Old AVEC Tank Farm and were built over the location of the Old BIA school tanks. Contaminated soil associated with the Old BIA school tanks was discovered during construction of the courts; the contaminated soil was removed from the Site and taken to an aerating area. Two soil aerating areas have been used: 1) behind the landfill in a cleared area approximately 2.25 miles from town and 2) a flat area at the Iron Creek Pit (an active gravel mining pit on corporation land) approximately 4.5 to 5 miles from town.

Mrs. Nagaruk indicated that there is a priority for getting fuel tanks out of town and that the school tanks, city tanks, store tanks, and the new AVEC tanks are all outside of the main town area at the new bulk tank area; the new bulk tank area is located near the end of the runway farthest from town. Mrs. Nagaruk also stated that one of the primary concerns about the Old AVEC Tank Farm is its close proximity to the school.

IRA Council and City Council Members – During the Site visit, SLR had the opportunity to attend and participate in a combined IRA and City Council Meeting. IRA Council members in attendance included Robert Keith (President, Native Village of Elim), Sheldon Robert, Fred Murray, Janelle Murray, Tyler Ivanoff, and Charles Saccheus. City Council

members in attendance included Edwin Kotongan (Mayor of Elim), Marlin Paul, Sr., Betty Segock, Christine Amaktoolik (City Clerk), and Ida Murray. Below is a summary of information gathered during the meeting.

Past activities at the site included the use of transformers, generators, stove oil, diesel fuel, radiator fluid (glycol), and paint; based on the age of the buildings, it is possible lead-based paint was used. The potential presence of polychlorinated biphenyl (PCB)-containing transformers at the Old AVEC Tank Farm site was noted by members of the community through around 1980. These transformers were located on the ground and no one knows if any leaks occurred. No liner was present underneath the AVEC tanks when they were first installed. It was estimated that a liner may have been installed in the 1980s. One member of the community indicated that on one occasion they observed overfilling of the AVEC tanks.

During a project undertaken in 2008 to move the sewer lines to a greater depth, contaminated soil was encountered north of the Old AVEC Tank Farm site. It was not believed that contaminated soil was encountered east of the Old AVEC Tank Farm, however. It was also indicated that a feed line from the Old AVEC Tank Farm is still present and contaminated soil may be encountered there.

The community has no use for the Old AVEC tanks and does not want to pay for the Site cleanup through higher consumer electricity rates. One of the main concerns expressed related to the Site is that the community is worried about potential impacts to their water supply. It was also indicated that a study is currently underway to evaluate relocating the community's drinking water supply further upstream. Members of the Elim Native Corporation are concerned because the land ownership supposedly reverts to them and they don't want to assume ownership due to potential environmental liabilities.

The new AVEC plant was built in the early 2000s and nothing has been done with the Site since that time. Potential uses for the Site were discussed; these included: 1) Housing – there is a limited amount of good land to build on in Elim and it is less expensive to build closer to the water and sewer plant, 2) Picnic area for the community, and 3) A 5-plex elder housing unit with a community center.

Other contaminated sites, were also discussed as described below:

- Old BIA School Tank Farm – located where the courts are now; indicated that there were leaks over time.
- New School Site – during construction of the new school a lot of contaminated soil had to be removed.
- Old Armory Tank Farm – located north of the Old AVEC Tank Farm; encountered contaminated soil in the area in 2008. It was stated that strong odors were detected.
- Old Store Tank Farm – there was a 10,000-gallon gasoline spill at the Old Store Tank Farm. The spill was reported and cleaned up, but is the driving force for the community of Elim to relocate all fuel tanks outside of the main town area. The Old AVEC Tank Farm is the last tank farm located in the main part of town.

During the cleanup, a bedrock rise was observed between town and Norton Sound, which acted as a barrier trapping contamination near town.

Gary Nakarak – Gary Nakarak, a resident of Elim and the new owner of the former generator building, was also interviewed. Mr. Nakarak was the high bidder when AVEC auctioned off the building in fall 2008. At the time of the Site visit, he was in the process of removing the building and associated support structure. Mr. Nakarak indicated that he was planning to move the building foundation off site as well as debris located on the north side of the white generator building, and wood and metal debris near the 55-gallon barrels. Mr. Nakarak stated that he had disassembled the building to make it easier to move and that he would be rebuilding it in a different configuration than the original structure for use as a shop. Mr. Nakarak indicated that the floor of the building was stained.

3. PROPERTY/SITE OVERVIEW

This section provides a historical overview of the property including the historical and current use of the property and its geologic setting. It also summarizes the records review conducted for this work.

3.1 OVERVIEW OF SITE PROPERTY

The Old AVEC Tank Farm site is located at 64.616070 degrees north latitude and -162.263670 degrees west longitude relative to the North American Datum of 1983 (Figure 1). The area leased to AVEC from the BIA was approximately 20,000 square feet. The area included in this PACP includes everything inside the fenced area (Figures 2 and 3) which consists of nine vertical ASTs, a white generator building, a CONEX building, electrical boxes and equipment, a generator, 55-gallon barrels, 5-gallon buckets, and miscellaneous debris. The two structures, the white generator building and the CONEX building, contain old electrical equipment, paint, paint thinner, and a generator. The property is located in the central portion of Elim close to residences, the City of Elim office, and the school.

3.2 GEOLOGIC SETTING

According to the Site Reconnaissance Report (BEESC, 2001), the land surface in Elim generally slopes southward towards Norton Sound. Surface water runoff is in the direction of Norton Sound, and ground water would also likely flow in that direction. Elim Creek runs through the village and flows into Norton Sound. The area is underlain with basalt-like material that is relatively shallow in some areas (less than 20 feet). Soil encountered at the Site consists of sandy gravel-like material including a slate-like shale material and sandy loam-like material.

One ground water well is registered in the village of Elim (ADNR, 2009). The well was drilled in 1964 at the old BIA school to a depth of 78 feet below ground surface (bgs) (screened from 72 to 78 feet bgs). Bedrock was encountered at approximately 8 feet bgs and was frozen to a depth of 29 feet bgs. Water was encountered at a depth of 66 feet bgs. The static water level was observed at 63 feet bgs and a pumping test observed 3 feet of drawdown. Testing of the water in 1964 indicated a high concentration (1,100 parts per million [ppm]) of dissolved solids which exceeds the current regulatory criterion for drinking water of 500 ppm. In addition, both sodium (at 270 ppm) and chloride (at 479 ppm) exceed the current regulatory limit of 250 ppm.

3.3 PROPERTY USE

3.3.1 HISTORICAL USE

The Site was owned by the BIA prior to conveyance to the Elim Native Corporation. The BIA issued a permit to AVEC for the period of time from April 1, 1970 to April 1, 2005 to use the Site as the location of a power plant to generate electricity for the Village of Elim.

AVEC operated a power plant which utilized the nine ASTs remaining at the site until the early 2000s when the new AVEC power plant and tank farm were built on a different property.

A review of aerial photographs of the Site from 1969 to 2004 was conducted. The following observations were made during this review:

- In 1969, no development is present at the Site;
- In 1972, four ASTs and the former generator building were present on the Site. No liner or berm is visible in this photograph;
- In 1980, six ASTs were present at the Site and no liner is visible in the photograph;
- In 1991, eight ASTs, the former generator building, the white generator building, and other equipment were present at the Site. In this photograph, it appears that a containment is present around the ASTs; and
- In 2004, the Site contains all structures and equipment described in this PACP with the exception that the former generator building (visible in the photograph) was removed from the Site prior to SLR's visit in 2009.

Copies of the aerial photographs acquired for this PACP (1969, 1972, 1991, and 2004) are provided in Appendix I.

3.3.2 CURRENT USE

The property has remained unused since the early 2000s; the structures, tanks, and other items from the former AVEC power plant and tank farm that remain onsite limit the community's ability to reuse the property. The Site is located on prime real estate in town close to the city office, school, and other residences.

3.4 OWNERSHIP INFORMATION

Currently the Elim Native Corporation, City of Elim, and Elim IRA Council all have some legal jurisdiction regarding the property. Once the property has been cleaned up in a manner that is consistent with current environmental regulations, it will belong to the Elim Native Corporation.

The property was in Reservation Status prior to the creation of the Elim Native Corporation. In 1970, the BIA issued a site use permit to AVEC to build and operate a power plant to provide electricity to the City of Elim. The use permit expired on April 1, 2005.

3.5 RECORDS REVIEW

Records reviewed to prepare this PACP included the DBA application (Appendix A) and a Site Reconnaissance Report (BEESC, 2001).

The records review also included files from DEC's Drinking Water program (DEC, 2009). As a Class C public water system in Alaska, the city water system source consists of surface water collection from one location in Elim Creek. The drinking water in Elim is sampled regularly in accordance with the requirements of the Drinking Water Program in DEC's Division of Environmental Health's Drinking Water Program. The Drinking Water Program maintains records of all drinking water sample analysis results. Volatile organic compound (VOC) sampling has been conducted annually for the City of Elim. The most recent VOC analytical results for Elim are provided in Appendix E.

4. SITE RECONNAISSANCE

In October 2009, an SLR representative traveled to Elim to assess the current condition of the Old AVEC Tank Farm site, interview individuals familiar with the property, and evaluate potential remedial strategies. Interviews conducted during the Site visit are presented in Section 2.2.4 of this document. Evaluation of the property's current condition is discussed below. Photographic and written documentation of the Site visit are included in Appendices C and D, respectively.

4.1 METHODOLOGY

To assess the conditions of the Site, SLR traversed the property to inspect for surface staining or other visual signs of contamination; SLR also noted the presence and condition of potential environmental liabilities, including waste material and derelict equipment located on the Site.

4.2 OBSERVATIONS

SLR visited the Old AVEC Tank Farm site on October 6 and 7, 2009. During SLR's visit, nine ASTs (ranging in size from 6,090 gallons to 9,572 gallons) with a total capacity of 73,647 gallons were noted. The tanks all appeared empty but have not been properly abandoned in accordance with regulations outlined in the Code of Federal Regulations Title 40, Part 112. Also observed on site were seven 55-gallon drums (Photograph 6), three 5-gallon buckets of De-Solv-It, one generator (Photograph 5), one white generator building (Photographs 2 and 3), one CONEX (Photographs 3 and 7), four power boxes (Photograph 7), old building foundation, miscellaneous debris, and a City of Elim truck were observed. One area of stained soil approximately 3 feet wide by 4 feet in length was observed southwest of the white generator building (Photograph 9).

Inside the white generator building, equipment and piping associated with past operation remain (Photographs 10 and 11) as well as buckets of paint (Photographs 10 and 12), and paint thinner (Photograph 10). Inside the CONEX building was electrical equipment, an unused generator, and an old generator base (Photographs 13 and 14). Additionally, underground piping associated with the Old AVEC Tank Farm was identified south of the Site along the west edge of the road, extending approximately 178 feet from the tank farm; pipe headers were visible in two locations south of the Site (Photograph 4).

4.3 SITE SAMPLING

No sampling was conducted as part of this project.

5. ENVIRONMENTAL REVIEW AND SUMMARY OF FINDINGS

This section summarizes previous environmental reviews conducted at the property. It also provides a summary of the findings of this PACP.

5.1 HISTORICAL ENVIRONMENTAL REVIEW

In September 2001, Bristol Environmental & Engineering Services Corporation (BEESC) conducted a site visit to the Old AVEC Tank Farm, which included the collection of soil samples. At the time of the visit, the tank farm was still in use.

Three soil samples were collected and field screened for total petroleum hydrocarbons using PetroFlag®; in addition one sample was also screened for volatile hydrocarbons using the heated headspace method with a photoionization detector (PID). Two samples were collected and submitted to an analytical laboratory for diesel range organics (DRO) analysis. One sample, located approximately 30 feet east of the tank farm fence, did not detect DRO. The other sample, collected on the east side of the tank farm (30 feet north of its southeast corner and approximately 3 feet east of the fence), contained DRO at a concentration of 212 milligrams per kilogram (mg/kg), which is slightly below the cleanup level of 250 mg/kg (BEESC, 2001). The approximate locations that the samples were collected are shown on Figure 3; both samples were collected from outside the fenced area.

During SLR's 2009 Site visit (Section 4) it was observed that all nine ASTs were located within a lined containment area. Some corrosion was evident on the tanks, but all appeared to be empty. The 55-gallon drums and buckets were sitting on pallets outside of the lined area (Figure 3, Photograph 6 in Appendix C). One area of stained soil approximately 3 feet wide by 4 feet in length was observed.

5.2 POTENTIAL SOURCE AREAS

Obvious potential source areas on the property include: the ground beneath the nine ASTs and the ground beneath the fuel drums, generator, and other smaller containers observed during the 2001 site visit by BEESC.

In addition, potential source areas adjacent to the property were identified during SLR's site visit in 2009; it is unknown whether these source areas have impacted the Site. These potential source areas are described in Section 2.2.4 of this report.

5.3 KNOWN OR PERCEIVED DATA GAPS

The primary data gaps existing for characterizing the contamination at the Site include the extent and magnitude of impacted soil at the Site and whether ground water has been impacted.

5.4 CONCEPTUAL SITE MODEL

SLR developed a conceptual site model (CSM) to qualitatively assess the ways in which potential human receptors may be exposed to contamination as a result of activities at the property. The CSM is based upon the available data for this Site collected by BEESC (2001) and observations made by SLR's site visit (2009). The following text describes the potential exposure scenarios for current and future receptors. The CSM is included as Appendix F of this report.

The CSM identified the following potentially complete exposure pathways:

- Incidental soil ingestion,
- Dermal absorption of contaminants from soil,
- Ingestion of ground water,
- Inhalation of outdoor air,
- Inhalation of indoor air, and
- Ingestion of wild foods.

A complete discussion of these pathways is provided in Appendix F.

DEC's Contaminated Sites Program developed the Exposure Tracking Model (ETM) to prioritize which sites need the most attention. The ETM is a revision to the Alaska Hazard Ranking Model, historically used to prioritize all contaminated sites. The ETM is a preliminary evaluation of all sites and ranks each site according to possibility of human and ecosystem exposure to the contaminants that are present. Prioritization for a site can change over time. No ETM has been completed for the Old AVEC Tank Farm.

5.5 CLEANUP CRITERIA

This section describes the cleanup criteria that currently apply to the property.

DEC soil cleanup levels specified in Title 18 of the Alaska Administrative Code (AAC), Chapter 75 of *Oil and Other Hazardous Substances Pollution Control* in Tables B1 and B2, DEC Method Two, for the under 40-inch zone (DEC, 2008) are applicable for this Site. The most stringent of the direct contact, outdoor inhalation, or migration to ground water soil cleanup levels, whichever is less, is used; the soil cleanup levels for compounds of potential interest are listed below.

- Benzene, 0.025 mg/kg (migration to ground water)
- Toluene, 6.5 mg/kg (migration to ground water)
- Ethylbenzene, 6.9 mg/kg (migration to ground water)
- Total xylenes, 63 mg/kg (outdoor inhalation and migration to ground water)
- Gasoline range organics, 300 mg/kg (migration to ground water)

- DRO, 250 mg/kg (migration to ground water)
- Residual range organics, 10,000 mg/kg (ingestion)
- PCBs, 1 mg/kg (direct contact)
- Polynuclear aromatic hydrocarbon compounds at varying concentrations listed in 18 AAC 75.
- Resource and Recovery Act metals at varying concentrations listed in 18 AAC 75.

5.5.1 OTHER REGULATED CLEANUP CRITERIA

All material to be disposed off-site will be inventoried prior to the handling of the waste. Although the presence of PCB-, asbestos-, and lead-containing material has not been confirmed at this Site, if encountered, this material will require special handling in accordance with state and federal regulations.

5.5.2 NON-REGULATED CLEANUP CRITERIA

For non-hazardous, non-regulated waste material, cleanup criteria do not include the acquisition of a DEC Solid Waste Permit. Material including, but not limited to, cement, rebar, crushed glass, brick, and mortar are usually not regulated.

5.6 GENERAL ENVIRONMENTAL OVERVIEW

Based on the CSM provided in Appendix F of this PACP, the limited soil characterization data available, and planned land reuse objective (a private residence, a location for elder housing, use as a commercial property, or a recreational site), remedial action and additional site characterization is necessary to reduce the risk to human receptors prior to reuse. Potential near-surface and subsurface soil contamination poses a risk to human receptors through incidental soil ingestion, dermal absorption of contaminants from soil, ingestion of ground water, inhalation of outdoor air, inhalation of indoor air, and ingestion of wild foods.

Because the Site is located in the middle of the community, and the potential reuse objective may include permanent residences, cleanup activities would significantly reduce the potential exposure to contaminants by human and ecological receptors.

6. RECOMMENDED ACTIONS

The following sections summarize the actions recommended to reuse the land at the Old AVEC Tank Farm site for the purposes to be determined by the property owners.

6.1 ENVIRONMENTAL ACTIONS

SLR recommends the following environmental actions to allow the community of Elim to reuse the land at the Old AVEC Tank Farm site: 1) solid waste removal, 2) targeted surface and subsurface soil investigation, 3) excavation of contaminated soil, and 4) contaminated soil management. These actions are described in detail below and involve the removal of all items on the Site as well as the excavation of impacted soils that might be present related to historical activities at the Site.

No investigation of ground water below permafrost is currently recommended based on the low potential for exposure by ingestion of ground water as the community drinking water source is from surface water upslope of the Site, and historical information from the BIA School well that indicates the ground water quality in the area is poor. In addition, the depth to ground water (approximately 66 feet bgs near the old school) and the presence of permafrost in the area limit the ability of contaminants to migrate to ground water. The potential for exposure to shallow suprapermafrost ground water would be evaluated based on the findings of the soil investigation and recommendations for investigation would be made at that time. Additional information regarding ground water and the potential for exposure from ground water is presented in the CSM for this Site (Appendix F).

In order to maximize efficiency and minimize costs, SLR recommends that all operable equipment and items with beneficial use be reused within the community if possible and solid waste be disposed of locally.

6.2 SOLID WASTE REMOVAL

Debris located in and around the Old AVEC Tank Farm property currently precludes the reuse of the Site and may be negatively impacting the surrounding environment. This material includes, but is not limited to, the items described below. It is recommended that "debris" be removed from the Old AVEC Tank Farm property and surrounding land. Prior to the removal of any of the debris listed below, it is recommended that the location of debris be marked with swing ties and a handheld global positioning system receiver to assist in a targeted surface and subsurface soil investigation and contaminated soil excavation. An environmental consultant will be on site to assist with the segregation of solid waste and also to perform the targeted surface and subsurface soil investigation activities described in Section 6.3.

- Nine ASTs were observed on the Old AVEC Tank Farm property; the tanks are no longer in use and appeared to be empty. It is recommended that these tanks be decommissioned by a qualified contractor, cut up, and disposed of in the local landfill.

- One hundred seventy eight feet of fuel line associated with the Old AVEC Tank Farm property was noted. The fuel line should be emptied of fuel and abandoned in place in compliance with state and federal regulations.
- Seven 55-gallon barrels were located on the northeast corner of the Old AVEC Tank Farm property. Drums, if they contain fluid, should be sampled and disposed of according to all applicable state, federal, and local regulations. If possible, the drums can be reused within the community. It is recommended that if the drums contain used oil, the used oil be combusted in a waste oil burner for energy recovery. The waste oil would require testing to determine if it complies with state and federal regulations for this purpose, for example to check for the presence of chlorinated hydrocarbons. According to the City of Elim, there is a functional used oil burner at the City Shop. One drum of used antifreeze was noted during the 2009 site visit; used antifreeze will need to be shipped offsite for proper disposal.
- Three 5-gallon buckets of De-Solv-It and multiple containers of paint and paint thinner were located on the Old AVEC Tank Farm property. These items should be reused within the community, if possible.
- A single generator is present within the fenced area on the property. It is recommended that the generator be reused within the community, if possible.
- Four electrical boxes and other electrical equipment were noted on the property. Operational equipment should be reused within the community; non-operational equipment should be disposed of in the local landfill, if it does not contain PCBs or other hazardous substances.

All activities for the removal of materials off site will be conducted according to all applicable state and federal regulations. The best and most cost-effective alternative for removal and disposal of the materials listed above would either be reuse within the community or disposal at the local dump.

6.3 TARGETED SURFACE AND SUBSURFACE SOIL INVESTIGATION

In order to ensure that a contaminated soil excavation is completed in the most efficient manner possible, it is recommended that a targeted surface and subsurface soil investigation be performed to confirm the contaminants of concern and contaminant distribution. It is proposed that this investigation be conducted by digging test pits with a backhoe, or alternatively, by using a hand auger with extensions capable of advancing to 10 feet bgs. This is not proposed as a full site characterization, but rather a targeted investigation to minimize the amount of soil removed and confirm the presence or absence of contaminants that may not be detected using field screening methods (i.e., total petroleum hydrocarbons using PetroFlag® and volatile hydrocarbons using the heated headspace method with a PID); these include PCBs, chlorinated solvents, and Resource Conservation and Recovery Act (RCRA) metals, which could be present at the Site based on historical site usage. This targeted surface and subsurface soil investigation will take place within the Site perimeter and adjacent to the buried fuel line to investigate for potential fuel leaks. This work is proposed to occur during

the debris removal phase of site cleanup when an environmental consultant is already recommended to be on site.

A utility clearance must be performed prior to any excavation work.

6.4 CONTAMINATED SOIL EXCAVATION

One area of stained soil was noted on the Old AVEC Tank Farm property (Photograph 9) during SLR's site visit in 2009. The area is approximately 3 feet by 4 feet and the depth of contamination is unknown. No other areas of stained soil were observed, however a review of aerial photographs indicated that the ASTs have not always been inside a lined and diked containment and the potential exists for impacted soils beneath the ASTs.

Although the total in-place volume of future proposed excavation area(s) cannot be determined without subsurface investigation, the following information should provide the community of Elim with a proposed plan for removal of impacted soil once the surface and subsurface investigation activities, described in the preceding section, are completed. During contaminated soil removal, field screening samples should be collected to guide the lateral extent of the excavation. Once field screening indicates that contaminated soil has been excavated, confirmation samples should be collected from the excavation sidewall and floor.

For estimating purposes only, it is assumed that 100 cubic yards (cy) of petroleum hydrocarbon-impacted soil are present at the Site. The costs for removing less or more soil than this would have to be evaluated on a line item basis as there is not a linear relationship between volume of impacted soil and cost.

It is also assumed that no PCB-, chlorinated solvent-, or metals-impacted soil is present at the Site based on available historical use information. If present, these soils will require special handing and will most likely need to be shipped off site for disposal at an approved facility.

6.5 SOIL MANAGEMENT ALTERNATIVES

The results of the evaluation of the selected soil remedial actions are presented in Table 1. The following alternatives were considered for the management of contaminated soil.

- **Passive Biopile Construction** – In this option, excavated soils are mixed with clean soil, placed on a treatment area, and covered. Aeration is provided passively through perforated pipe extending into the pile. Fertilizer may be added to soils in the pile to enhance microbial activity. The pile is covered and a leachate collection sump is included to manage water if the cover is damaged. The pile is left until the soils meet specified cleanup levels for land spreading or beneficial reuse.
- **Road Base Encapsulation** – This alternative method would only apply to Elim if the road bed was constructed to provide zero net infiltration, the road is located in an area that meets the requirements of 18 AAC 75.360(11)(G), and with the concurrence of the community.

- **Daily Landfill Cover** – Under this option, contaminated soils could be used for landfill cover. This option requires permission from DEC's Solid Waste Program, and typically is contingent on pre-treatment of soil prior to use as landfill cover. This alternative is a common form of beneficial reuse of contaminated soil, is less expensive than many other options at remote sites, and effectively manages risks associated with contaminated soil. For Elim, this method is an option because there is a Class III landfill which is required to be covered twice a year or more regularly, if needed (HDR, 1999).
- **Landfarming** – This method includes spreading the contaminated soil into a 1-foot thick layer. The soil is tilled periodically during the summer months using a rototiller. Tilling aerates the soils to promote aerobic degradation of contaminants in the soil. The addition of fertilizer is also used to promote biological activity. Initial landfarm characterization samples are collected to document contaminant levels at the time of placement. Characterization samples are collected on an annual basis to determine when cleanup goals are met. The DEC Solid Waste Program will specify the target cleanup thresholds prior to using landfarmed soils as daily landfill cover.
- **Thermal Remediation** – Thermal remediation of contaminated soil is generally expensive at remote locations both to ship in treatment equipment and for the fuel required, and is most likely not a feasible option for Elim.
- **Shipment Off-Site for Treatment or Disposal** – This option is employed if soils cannot be reasonably treated on-site and is most feasible when inexpensive transportation is available. If soils are determined to be hazardous, or no appropriate area exists for on-site treatment, it may have to be containerized and transported to a facility for treatment or disposal. In these instances, treatment typically involves incineration, and disposal typically involves placement in a permitted landfill.

6.6 PREFERRED ALTERNATIVE

The matrix for remedial option selection is presented in Table 1. The alternatives are ranked according to the five parameters of environmental protection, regulatory compliance, effectiveness, implementability, and cost. Remediation options with the best overall rating are compared for use at a particular site.

The preferred alternative for contaminated soils at the Old AVEC Tank Farm is landfarming followed by use as landfill cover material. Use of this soil as landfill cover material would be beneficial for Elim because the community has a Class III landfill which requires cover to be placed at least twice a year or more frequently, if needed (HDR, 1999). Landfarming should be implemented to reduce contaminant concentrations to acceptable levels for use as landfill cover material, which are assumed to be DEC Method Two ingestion and inhalation cleanup levels.

Initial work will include landfarm construction, which is anticipated to require an area of approximately 52 feet by 52 feet. Each year that landfarming is conducted, two rounds of

tilling and fertilizer application will occur using local labor. In addition, analytical samples will be collected on an annual basis. It is estimated that three successive field seasons of landfarm fertilizer application, tilling, and sampling will be required to meet DEC requirements for use of the soil as landfill cover.

6.7 LONG-TERM SOIL TREATMENT LOCATIONS IN ELIM

Two areas have previously been used for landfarming around Elim. The first location is a cleared area near the landfill, which is approximately 2.25 miles from town. The second location is a flat area on the edge of the Iron Pit gravel mine approximately 4.5 to 5 miles from town (Figure 1).

Due to the additional cost of handling contaminated soil more than once, storage or stockpiling of soil prior to landfarming will only be required in the event of unforeseen delays to the project schedule, or if the storage is a means of staging the material for a future, currently unidentified, beneficial use. Stockpile construction is frequently a long-term or short-term intermediate step to developing soil treatment options and must be constructed in accordance with 18 AAC 78.274.

6.8 SOURCE OF BACKFILL MATERIAL

The Iron Creek Pit, an active gravel mining pit on Elim Native Corporation land, approximately 4.5 to 5 miles from town, has been identified as a source of backfill material.

6.9 WATER MANAGEMENT OPTIONS

Ground water is not expected to be encountered during any subsurface investigation activities or excavations. However, if ground water is encountered, dewatering will not be conducted and the excavation will not proceed below the static water level if water is encountered.

6.10 EQUIPMENT AND LABOR REQUIREMENTS

The equipment requirements to implement the preferred alternative require the use of an excavator capable of digging at least 10 feet in depth and dump trucks capable of carrying up to 10 cy of material, and a loader. Labor requirements to implement this require two local heavy equipment operators and two local laborers. Available resources in Elim are discussed in the following section.

6.11 AVAILABLE RESOURCES IN ELIM

This section describes the equipment currently available in Elim. As a cost control, site remediation should be timed with other large construction activities within the community, if possible, in order to take advantage of resource leveraging opportunities. Ongoing or upcoming projects planned in Elim are described in Section 6.11.3.

6.11.1 EQUIPMENT

A list of heavy equipment available within the City of Elim and the rates for equipment rental is included in Appendix H.

6.11.2 LABOR

Eight village residents participated in the 40-hour hazardous waste operation and emergency response (HAZWOPER) training and five village residents completed the 8-hour refresher class in 2009. According to Carol Nagaruk, IGAP Coordinator, four of the HAZWOPER trained residents are also qualified heavy equipment operators.

6.11.3 RESOURCE LEVERAGING OPPORTUNITIES

Ongoing or upcoming projects planned for Elim include the following:

- Construction of several new homes in the community is planned at an unspecified time.
- A study is currently underway to evaluate moving the current community water supply intake further upriver.

6.11.4 PERSONNEL QUALIFICATIONS

Personnel working on the field component of this project must be trained to the HAZWOPER standard per the Occupational Safety and Health Administration requirement in 29 CFR 1910.120. Equipment operators must have certification and be able to verify their training and experience to operate equipment required for this project.

7. CONCLUSIONS

In order to prepare the Old AVEC Tank Farm site for its proposed future reuse, the equipment and debris at the Site will need to be removed. It is recommended that electrical equipment, used oil, De-Solv-It, paint, and paint thinner be reused within the community if possible. In order to confirm or deny the presence of potential contaminants, which require special handling (i.e., PCBs, chlorinated solvents, and metals) and limit the removal of more soil than necessary, a targeted surface and subsurface soil investigation should be conducted during the solid waste removal phase of the cleanup. In addition, the targeted soil investigation should include sampling along the buried fuel line to investigate for potential leaks. Potential petroleum hydrocarbon contamination at the Site can best be managed through excavation and the remedial option of landfarming followed by use as landfill cover with approval from the DEC's Contaminated Sites Program and Solid Waste Program. To assure the project timeline, this approach should be executed using equipment, operators, and labor located within the Village of Elim and consultant assistance with reporting and project scoping. Waste management, excavation, and landfarm preparation can be implemented in one field season. It is estimated that three successive field seasons of landfarm fertilizer application, tilling, and sampling will be required to meet closure standards established by the DEC. The preliminary cost estimate for this work is $271,395 (Appendix G). It should be noted that, because contaminant characterization work has not been completed, the cost associated with managing soils in this general cost estimate is for an assumed 100-cy unit volume of petroleum contaminated soil, and it is also assumed that no PCB-, RCRA metal-, or chlorinated solvent-impacted soil is encountered. Excavation and treatment of larger volumes of contaminated soils will result in lower per-yard, or per-ton, costs for the landfarming element. The project will rely on consultant assistance for documentation and reporting to DEC.

8. REFERENCES

Alaska Department of Commerce, Community, and Economic Development (DCCED), Division of Community and Regional Affairs (DCRA), 2009. www.commerce.state.ak.us/deca/commdb/CIS.cfm , November.

Alaska Department of Environmental Conservation (DEC), Division of Environmental Health, Drinking Water Program, 2009. www.dec.state.ak.us/eh/dw/index.htm, November.

DEC, 2008. 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control*, as amended through October 9.

Alaska Department of Natural Resources (ADNR), Division of Land, Mining and Water, 2009. Well Log Tracking System, Key 2772, Elim School Well. http://www.navmaps.alaska.gov/welts. December.

Bristol Environmental & Engineering Services Corporation (BEESC), 2001. *Draft Site Reconnaissance Report, Elim, Alaska*, December.

HDR, 1999. *City of Elim Solid Waste Permit Application for a Class III Solid Waste Landfill*, September.

Western Regional Climate Center (WRCC), 2009. http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak6058, November.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

The purpose of an environmental assessment is to reasonably evaluate the potential for or actual impact of past practices on a given site area. In performing an environmental assessment, it is understood that a balance must be struck between a reasonable inquiry into the environmental issues and an exhaustive analysis of each conceivable issue of potential concern. The following paragraphs discuss the assumptions and parameters under which such an opinion is rendered.

No investigation is thorough enough to exclude the presence of hazardous materials at a given site. If hazardous conditions have not been identified during the assessment, such a finding should not therefore be construed as a guarantee of the absence of such materials on the site, but rather as the result of the services performed within the scope, limitations, and cost of the work performed.

Environmental conditions may exist at the site that cannot be identified by visual observation. Where subsurface work was performed, our professional opinions are based in part on interpretation of data from discrete sampling locations that may not represent actual conditions at unsampled locations.

Except where there is express concern of our client, or where specific environmental contaminants have been previously reported by others, naturally occurring toxic substances, potential environmental contaminants inside buildings, or contaminant concentrations that are not of current environmental concern may not be reflected in this document.

FIGURES

SLR

SCALE: 1" = 700'
WHEN PLOTTED AT 8.5 x 11 PAGE SIZE

0 700 1400' 2100'

N

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report PROPERTY ASSESSMENT AND CLEANUP PLAN
OLD AVEC TANK FARM
ELIM, ALASKA

Drawing SITE LOCATION MAP

Date November 10, 2009	Scale 1" = 700'	Fig. No. 1
File Name ELIM_F1	Project No. 005.0065.09013	

SLR

SCALE: 1" = 100'
WHEN PLOTTED AT 8.5 x 11 PAGE SIZE
0 100 200 300'

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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report PROPERTY ASSESSMENT AND CLEANUP PLAN
OLD AVEC TANK FARM
ELIM, ALASKA

Drawing SITE DETAIL

Date November 10, 2009	Scale 1" 100'	Fig. No. 2
File Name ELIM_F2	Project No. 005.0065.09013	

NOTES

BACKGROUND PHOTOGRAPH REFERENCED FROM AEROMETRIC 2004 AERIAL PHOTOGRAPH

2001 SOIL SAMPLE LOCATIONS ESTIMATED FROM THE 2001 BRISTOL ENVIRONMENTAL & ENGINEERING SERVICES CORPORATION SITE RECONNAISSANCE REPORT

LEGEND

ELM-S-002 — APPROXIMATE 2001 SOIL SAMPLE LOCATION

ABREVIATIONS

BGS	BELOW GROUND SURFACE
DRO	DIESEL RANGE ORGANICS
MG/KG	MILLIGRAMS PER KILOGRAM
N/R	NOT RECORDED
PETROFLAG	TOTAL PETROLEUM HYDROCARBONS
PID	HEADSPACE VAPOR LEVEL
PPM	PARTS PER MILLION

SLR

SCALE: 1" = 25'
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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Report: PROPERTY ASSESSMENT AND CLEANUP PLAN
OLD AVEC TANK FARM
ELIM, ALASKA

Drawing: 2001 SOIL SAMPLE LOCATION MAP

Date	November 10, 2009	Scale	1" 25'
File Name	ELIM_F3	Project No.	005.0065.09013

Fig. No. 3

TABLE

Table 1
Evaluation of Remedial Alternatives for Soil

ALTERNATIVE	ENVIRONMENTAL PROTECTION	REGULATORY COMPLIANCE	EFFECTIVENESS	IMPLEMENT-ABILITY	COST	OVERALL RATING
No Action	Poor	Fair	Poor	Excellent	Good; site ground water monitoring required	Fair
Passive Biopile Construction	Good	Good	Fair	Fair	Good	Fair
Road Base Encapsulation	Good	Good	Good	Poor; no known road construction	Good	Fair
Daily Landfill Cover	Fair	Fair	Fair	Good; there is a Class III landfill in Elim	Good	Fair
Landfarming	Fair	Fair	Fair	Good	Good	Good
Landfarming followed by Daily Landfill Cover	Good	Good	Good	Good; there is a Class III landfill in Elim	Good	Good
Thermal Remediation	Good	Good	Good	Good	Poor; extremely high cost for small projects	Fair
Offsite Shipment and Disposal	Good	Good	Good	Fair; only practical if non-petroleum hydrocarbon-impacted soils are present	Poor; extremely high cost for small projects	Fair

APPENDIX A

DEC BROWNFIELD ASSESSMENT REQUEST FORM – 2009

Old AVEC Tank Farm - Elim
600.57.001

DEC BROWNFIELDS ASSESSMENT REQUEST FORM – 2009

Please check the appropriate box for each question at the top of this page, and then answer questions 1–5 by inserting text in the blank area under each question, using as much space as you need. The deadline for receipt of requests is March 3, 2009.

Eligibility Determination—General Questions:

Is the applicant in any way responsible for the potential contamination at the site, or related to those who may be responsible?

☒ Yes ☒ No How did AVEC come into Elim?

Is the site federally owned?

☐ Yes ☒ No

Has the site or facility received funding for remediation from the Leaking Underground Storage Tank (LUST) Trust Fund?

☐ Yes ☒ No ☐ Unknown

If you answered "yes" to any of the above questions, we recommend that you please call DEC to discuss the specifics of your eligibility determination.

To the best of your knowledge, is the *owner* of the property in question:

☐ Private ☐ City/Public ☐ State ☒ Native Corp ☐ Tribal ☒ Unknown

Known or suspected contaminant(s) (check one):

☐ Hazardous Substances ☒ Petroleum Only ☐ Hazardous Substances and Petroleum

Is this site currently listed on DEC's *contaminated sites* database?

☐ Yes ☐ No ☒ Unknown

If yes, please list the project name, if known:

---

1. Applicant/Owner

a) ***Applicant*** - Provide the name and address of the organization applying for a DBA, the name of the contact person, email, telephone, and fax numbers.

Robert A. Keith, President
Native Village of Elim
P.O. Box 39070
Elim Alaska 99739

angelrag@gci.net
(907) 890-3737
(907) 890-3738

If Applicant is IGAP staff, please provide name of EPA project officer:

b) ***Project Team*** - Because no one person can be responsible for all aspects of a brownfield project, we request that you form a *project team* to ensure continued action beyond this DBA. Attach a letter from each team member acknowledging their support and willingness to participate. (Team members may include: city or village government representatives, tribal council representatives, environmental managers, elders or other community leaders, and other interested parties.)

~~☐~~ IGAP Staff

c) ***Property Owner*** - The owner of the property must allow DEC access to the site. If the applicant is different from the owner, include written consent for access from the owner. (*Note: the applicant must be able to secure access for DEC and its contractors to conduct the assessment.*)

See faxed letter, attached

Elim Native Corp. (Remember we are not affiliated with any other Regional corporation

196 - surface & subsurface

City has keys to the fenced area

2. Site Information

a) ***Historical Site Use*** - Describe, to the best of your ability, the previous known uses of the site, when the different activities occurred, and any historic or cultural significance of the property. Identify when and how the site became or may have become contaminated, with what substance(s), and where the contamination is likely to be found.

US Survey #25418
Norton Bay Reservation
Old AVEC Powerplant
Diesel

b) ***Current Site Condition and Use*** - Provide the common name of the site, address, approximate acreage, zoning, and types of buildings. Please attach a site map or aerial photograph showing the site's location in the community, adjacent land use, and areas of known or suspected contamination. Identify approximate property boundaries.

See map included

Has AVEC done any

c) ***Prior Environmental Assessment Activities*** - Please describe any prior site assessment or cleanup activities at the site and briefly state what you know about the findings of that work. Attach the summary or conclusion sections of the reports if available. If reports are not available, provide the consultant, client, approximate date of the study, and any other pertinent information.

(?)

3. Environmental Concerns

a) ***Reason for Concern*** - What is the reason for concern by the community, and what do you hope to gain by our involvement? Is there specific information that you are seeking? Please discuss community concerns in general, and identify any specific problems if possible.

- Health Hazard
- New AVEC plant moved a number of years ago. No one has pursued the cleanup.
- The land can be used for a private home or commercial property

b) ***Proposed Project Need*** - Describe to the best of your ability what your project team believes are the needed assessment activities, and what result you would like to see from this project. Indicate any constraints as to when this work must be completed (e.g., to meet construction timeline, property transaction pending, etc.).

Old AVEC powerplant cleaned up and the land available for use for the community

4. Community Planning and Reuse Goals

a) ***Other Community Plans or Projects*** - It is helpful to know if other state or federal agencies are planning work in your community. List any community *plans* that may exist or are in development, such as: economic development plans, hazard mitigation plans, or erosion studies. Describe any other community *projects* that may be scheduled or pending, such as: water and sewer construction, a new landfill, road or airport construction, a new school or addition, fuel-storage tank farms, new housing, or other facilities.

Community meeting will need to be held with all organizations + membership with AVEC.

b) ***Reuse or Redevelopment Plans*** - Does the community have well defined plans for how they would like to reuse this site if it were not for the real or perceived environmental problems? Is this site affecting the use of adjacent properties, subsistence habitat, or other resources? Do reuse plans include the incorporation of greenspace or sustainable, green building practices? If so, please describe.

Reuse or Re Development Plans should be done with a community meeting.

5. Public Involvement

a) ***Public Benefit*** - Briefly discuss how your proposed reuse or redevelopment plans for the property will provide a benefit to the public. Why is this important to your community? (Things to consider: creation of jobs, preservation of historically or culturally significant property, preservation of subsistence habitat, reuse or recycling of materials, cost savings to the community, or increased property values.)

Community meeting

b) ***Community Support*** - Is the community strongly supportive of this project? Please identify other organizations in your community with whom you are coordinating on this reuse or redevelopment project. (Providing names and phone numbers of contacts is helpful here, and include resolutions or letters of support as applicable.)

If you see into City of Elim minutes and # of times Utility Board bring up how to clean up this old site

c) ***Community Resources*** - Our assessment often requires local assistance with site visits, lodging, excavation equipment, and transportation. Describe local resources that are available for this project. Does the community have financial or other resources to supplement this DBA or for other phases of the project, such as equipment, in-kind services, or funding for cleanup or new construction? Can this DBA be used to leverage other funding or services for the project?

only if a community meeting is held and every one is there & understands "in-kind" services

The selection of a site for a DBA in no way implies that DEC is accepting liability for any contamination that may exist at the site, nor is DEC responsible for any necessary cleanup of hazardous substances that may be found at the site. Liability for contamination on a property is specifically addressed in Alaska Statute (AS) 46.03.822, which outlines those who are liable for the release of a hazardous substance. The general liability categories include: (1) those with an ownership interest in the property; (2) those in control of the substance at the time of the release; or (3) those who arrange for disposal or transport of the substance.

Submit Completed Forms by March 3, 2009, to:

By email: Sonja.Benson@alaska.gov or
By fax: (907) 451-2155 c/o Sonja Benson

Or by regular mail:

DEC Brownfield Assessments
c/o Sonja Benson
Department of Environmental Conservation
610 University Avenue
Fairbanks, Alaska 99709

If you have questions, call Sonja Benson at (907) 451-2156, Deborah Williams at (907) 451-5174, or John Carnahan at (907) 451-2166.

CITY OF ELIM
ELIM CITY COUNCIL
P.O.BOX 39009
ELIM, ALASKA 99739
PH: (907)890-3441
FAX: (907)890-3811

ELIM · NATIVE · CORP.

DT: April 15, 2009

TO: Sonja Benson, ADEC DBA

FR: City of Elim, Elim IRA Council and Elim Native Corporation

RE: DEC Brownfields Assessment Support

On behalf of Elim City residents, Elim IRA Council membership and Elim Native Corporation shareholders we respectfully request that your office do a Brownfields assessment on the former AVEC power plant farm. The land was in Reservation Status prior the creation of the Elim Native Corporation. The Bureau of Indian Affairs issued a Site use permit (attached) in 1970 to AVEC for the purpose of building and operating a power plant to provide Electricity for Elim. The above named organizations support and grant Alaska Department of Environmental Conservation (ADEC) or any contractor of ADEC ingress or aggress to the former AVEC power plant farm for the purpose doing a Brownfields Assessment on said property. All three parties have some legal jurisdiction regarding this old AVEC power plant farm but the land on which this plant occupies will be Elim Native Corporation land once the clean up issues have been dealt with in a manner consistent with current environmental regulations.

Enclosed are 5 pages taken from a BIA report in the mid 1970's that provide excellent historical background. If you have any questions please call Robert or Carol at 890-3737 or Christine Amaktoolik, City Manager at 890-3441 and Darla Jemewouk at 890-3741 wk 890-2001.

Edwin Kotongan	Robert A. Keith	Julius Pleasent VP for
City of Elim Mayor	Elim IRA Council President	Elim Native President

Elim June 1974

Spring 2008

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

By authority of the Department of the Interior, the Area Director, Bureau of Indian Affairs, Juneau Area Office, hereinafter called the Permittor, hereby grants permission to Alaska Village Electric Cooperative, Inc., in Anchorage, Alaska, hereinafter called the Permittee to enter upon and occupy the following described lands at Elim, Alaska, to wit:

Beginning at the Northwest Corner of BIA school property marked with a white 2" x 4", thence East 200 feet to the True point of beginning on the North boundary line of BIA property, thence 100 feet North; thence 200 feet East; thence 100 feet South to the BIA property line; thence 200 feet West to the True point of beginning, containing 20,000 square feet, and the associated areas required for the distribution of the electrical energy produced for consumption in the Village of Elim, Alaska.

This permit shall take effect and begin on April 1, 1970, and be in effect until April 1, 2005. The Permittee shall pay on or before the effective date of this permit the sum of one dollar ($1.00) and other valuable consideration for the full period this permit remains in force and effect.

In consideration of this permission, the Permittee agrees to use the lands for the following purposes and upon the following conditions, to wit:

To construct facilities for installing electrical generation equipment, primary and secondary distribution facilities, and operate and maintain the same for the purpose of furnishing electric utility service in the Village of Elim, Alaska, as shown on the attached drawing, which is a part of this permit.

The Alaska Village Electric Cooperative, Inc., will use Elim workmen in every capacity possible in connection with this utility operation. Subject to the preferential right of employment provided above in connection with the performance of work under this agreement, the Permittee agrees to comply with all of the provisions of Section 202 (1) to (7) inclusive of Executive Order 11246, as amended, (30 FR 12319), which is hereby incorporated by reference in this agreement.

It is further understood and agreed that this instrument is not a lease and is not to be taken or construed as granting any leasehold interest or right in or to the land described herein but is a Use Permit for the term before stated.

The Permittee plans to construct certain facilities located on the permit area. The Permittor grants permission to the Permittee to use these facilities on said land for the purposes stated in this

permit. The Permittee may remove such improvements from the land within one year after termination of this permit or any renewal thereof; provided that upon failure of the Permittee to remove such constructed improvements within the period fixed, they shall become the property of the Permittor.

The Permittee shall commit no waste on the premises, and he shall not permit violation of any State or Federal law thereon; and that at the termination of the permit he shall leave the premises in a clean and sanitary condition.

No member of or delegate to Congress or Resident Commissioner shall be admitted to any share of this permit or to any benefit that may arise herefrom, but this restriction shall not be considered to extend to this permit if made with a corporation or company for its general benefit.

Acting Area Director
Bureau of Indian Affairs
Permittor

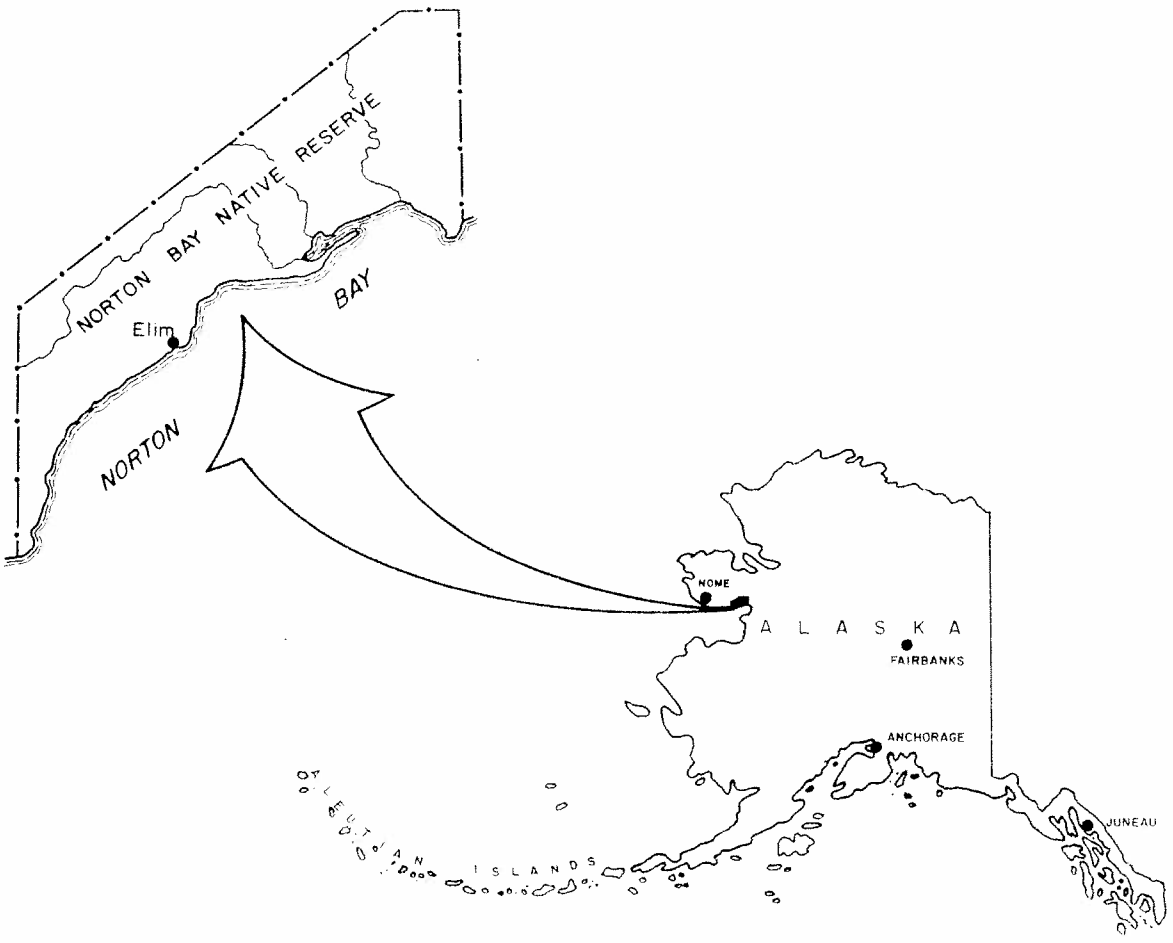
Alaska Village Electric Cooperative, Inc.
Permittee

NATIVE VILLAGE OF ELIM
ELIM IRA COUNCIL
PO BOX 70
ELIM, AK. 99739

REPORT NO. 231

ELIM ALASKA

ITS RESOURCES AND DEVELOPMENT POTENTIAL



PREPARED BY
THE PLANNING SUPPORT GROUP
BUREAU OF INDIAN AFFAIRS
DEPARTMENT OF THE INTERIOR

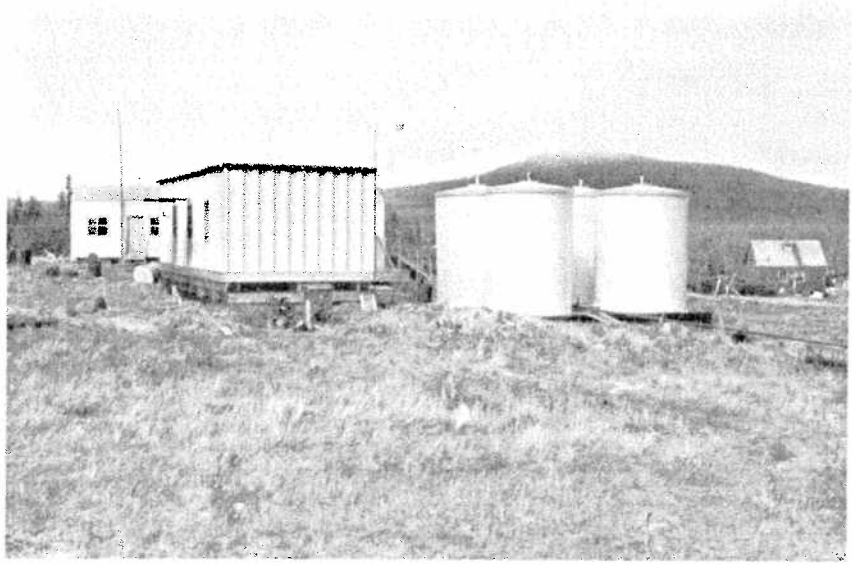
ELECTRICITY

Electricity Source

Elim is one of 48 villages in Alaska that is electrified by the Alaska Village Electric Co-operative, Inc. (A.V.E.C.). A.V.E.C. was organized in 1968 to provide electrical services to small rural villages throughout Alaska and all villages which are members of A.V.E.C. have populations of less than 500 persons. A.V.E.C. borrows their capital funds from the Rural Electrification Administration (R.E.A.) to install the system and therefore must conform to R.E.A.'s regulations. The original installation, additional service hook-up installation, operations and repairs of the electrical system is handled by a contractual agreement between the incorporated village of Elim and A.V.E.C. Because of R.E.A.'s regulations, A.V.E.C. cannot pay over $200 per meter on installation or pay over $260 for the village to operate the system. The village plant operating expenses are paid from local sales. When A.V.E.C. was formed in Alaska, an agreement was made between R.E.A., O.E.O., B.I.A., and the Alaska State Department of Education where operating funds for management and technical staff of A.V.E.C. would be paid by an O.E.O. grant. B.I.A. and the state operated schools agreed to pay the largest share of the operating and loan repayment expenses by purchasing electricity from A.V.E.C. for operation of their schools. In the 48 villages with A.V.E.C. the Alaska State and B.I.A. schools pay an established monthly rate, year-round, regardless of size of school, village, or seasonal consumption.

Electricity is produced in Elim by a diesel engine-driven 50 kilowatt (K.W.) generator with an additional 50 K.W. generator as an alter-

nate or back-up. A.V.E.C. is proposing to replace the two 50 K.W. generators with two 100 K.W. generators since Elim's consumption of electricity has increased. A.V.E.C. periodically sends a service man to Elim to check and repair the diesel engines and the generators. Fuel oil for the diesel engines is hauled into Elim once a year when the Bureau of Indian Affairs' ship, the NORTH STAR III, makes its annual voyage delivering supplies. A relatively large amount of fuel oil is consumed by the diesel engines, as the NORTH STAR III hauled 25,300 gallons to A.V.E.C. at Elim in 1972 and 15,000 gallons in 1973.[1/] This amounts to 733 barrels of fuel oil shipped to Elim in two years for use in generating electricity.



A.V.E.C.'s building for electrical generators and four fuel storage tanks to operate the engine-driven generators.

1/ Bureau of Indian Affairs' NORTH STAR III Trip Reports for Voyages 98 and 100.

July with $15.83 and the highest month was December with $23.96. Converting the average Elim residential FY 1974 bill to kilowatts consumed the average FY 1974 monthly residential household consumed 110.6 K.W. per month. During July the lowest average monthly consumption per household was 80.5 K.W. and the highest consumption was during December with 134.7 K.W. During the winter month of December, the average Elim residential consumer of electricity used 67.3 percent more than during the summer month of July. 1/

Although the average residential Elim electricity consumer was billed $244.08 during fiscal year 1974, for a total village residential consumer bill of $8,908.41, the residential consumer bill was only 24.1 percent of the total A.V.E.C. Elim bill. Non-residential electricity consumers were billed $28,073.29 during fiscal year 1974, which is 75.9 percent of Elim's total electrical bill. 2/ During most of the year there were six non-residential electricity consumers with the Bureau of Indian Affairs School the largest user of electricity. The high non-residential bill for fiscal year 1974 may not be completely indicative of a typical year since the Public Health Service conducted a fairly large construction project building the water-sewer system during this period. Now that the water-sewer project is pumping water through a complete circulator system by an electric motor-driven pump, an additional non-residential consumer is added to the consumptive use of the electrical system.

1/ Calculated from information furnished by the Alaska Village Electric Co-operative Inc. - Anchorage, Alaska - see Appendix Table 9.

2/ Ibid

APPENDIX B

STAKEHOLDER MEETING MINUTES

Meeting Summary

Date: September 24, 2009, 10:00 A.M. to 11:15 A.M.

Re: Elim Property Assessment and Cleanup Plan Stakeholder Meeting

Attendees: Carol Nagaruk, Environmental Coordinator (IGAP) for Native Village of Elim
Edward Kotongan, Mayor, City of Elim
Christine Amaktoolik, City Clerk, City of Elim
Leigh Takak, Watershed Project Assistant, Native Village of Elim
Mark Teitzel, Vice President of Engineering, Alaska Village Electric Cooperative (AVEC)
Deborah Williams, Brownfield Project Manager, Alaska Department of Environmental Conservation (DEC)
Sonja Benson, Brownfield Project Manager, DEC
Michael Rieser, Program Director, SLR
Carl Benson, Project Manager, SLR
Christina Bentz, Field Geologist, SLR

Meeting Opening:

The planning meeting was opened with brief introductions from each of the meeting attendees. Ms. Benson then spoke briefly about the EPA-funded Brownfield, reuse and development, program and how the focus of the Brownfield program is safe for reuse of properties with environmental concerns. Ms. Benson spoke to how the program looks at assessments of sites with potential hazards to human health and the environment, and evaluates options for funding and community resources to achieve cleanup for safe reuse. Ms. Benson added that based on the reconnaissance report from 2001, one sample was collected from outside the fence of the Elim AVEC tank farm and indicated fuel concentrations below cleanup levels, but it would be good to have more assessment at the site. Ms. Benson spoke of the grant funds available for private site assessment through the State Tribal Response Program (STRP) through the EPA and that this would be the mechanism for funding this project. Ms. Benson stated that the team approach was effective and should include all interested parties: the City of Elim, The Native Village Elim, and the Village Corporation. It was pointed out that only the City of Elim and the Village Corporation would be eligible for a cleanup grant if cleanup was necessary. Mr. Teitzel said that AVEC was interested in the land use permit issued by BIA back in 1970 and that the land ownership status was not completely clear to AVEC at this time. Ms. Benson closed her introduction to the project by stating that the objective of this project is to prepare a Property Assessment and Cleanup Plan (PACP) for the safe reuse of the property.

Mr. Teitzel said the site photograph was a good view of the current state of the old AVEC facility, but wanted to know who owned the truck in the tank farm area. Ms. Nagaruk said the truck belonged to the city and was there because it was the safest place to store it when not in use.

A project briefing was then given by Mr. Benson from SLR.

SLR Project Summary:

Mr. Benson explained SLR's objectives to accomplish the project and the PACP process. The project includes a review of available documentation from ADEC, ownership records for the property, aerial photographs, a site visit, and interviews with key persons involved with the property/project area. Mr. Benson continued and said soil disposal options would be evaluated based on labor and equipment availability, and exposure considerations. Mr. Benson said that the site visit would include inspection of the facility to assess the need for future site characterization work and that the PACP would recommend sampling and assessment required to characterize contamination potentially at the site. The PACP would also summarize local resources, qualified labor and village equipment available for managing contaminated soil if necessary, and would include options available to the Village of Elim for treating the soil and removing the old AVEC infrastructure from the site.

Mr. Rieser continued the introduction of the project by summarizing other information that would be needed to fulfill the project objectives. These include interviews with the tank farm and AVEC generator operator to better understand the past use practices at site. This information would allow a future characterization to be prepared to assess for contaminants specific to those activities which may have involved the use of solvents, lubricating oils, transformers, or fuels. Mr. Rieser added that this PACP won't develop volumes of contaminated soil, but would scope assessment activities based on past practices. Examples of disposal options would be included in the PACP which could include shipping off site or daily use as landfill cover.

Ms. Amaktoolik asked whether the plan would include treatment options for soils contaminated by fuels that leaked below the tanks. Mr. Rieser said a conceptual site model (CSM) would be developed as part of the plan to determine how contaminants could be transported to receptors off site using transport mechanisms specific to the site. Cleanup levels would be developed for contaminants at the site, using the transport mechanisms identified in the CSM, and would be used to identify appropriate cleanup actions. Ms. Amaktoolik asked whether this would include soils outside the fence. Mr. Rieser said yes, but a site characterization involving sampling would have to be performed to quantify this if it exists. Ms. Williams said that to perform a complete assessment, the tanks would have to be removed first and asked whether a community plan existed for this land. Ms. Amaktoolik said a community meeting would have to be held to develop reuse options.

Mr. Rieser said that community resources available for performing the cleanup work would be evaluated in the PACP. Ms. Nagaruk said a 40-hour class and an 8-hour class were being conducted this week in Elim, and that twelve people have Hazmat training now.

Ms. Benson asked if there were currently plans for the property. Ms. Nagaruk said there would be plans because the property is centrally located within the village.

There was a discussion of the history of AVEC in Elim. Mr. Teitzel said the plant was energized in 1971 on requests from community leaders to provide power and locate land on which to build the facility. Ms. Nagaruk said AVEC paid the operators of the tank farm and generator facilities. Mr. Teitzel said the power was paid for by grants, loans, and from payments from utility users. Mr. Teitzel continued by saying in the early 2000s AVEC partnered with the Denali Commission to build new facilities, but not remove the old ones, and now cities and villages have old tanks, but no funds are available to cleanup old community tank farms and generator facilities.

Ms. Benson asked what the planned project schedule would be. Mr. Rieser said the site visit should be conducted as soon as possible, and it was decided the week of October 5 would be a good time for the community. Ms. Nagaruk said that the city would have lodging available during this week and food would be available at the school (breakfast and lunch).

A discussion was started regarding the best key dates for historical aerial photographs representing the improvements at the generator facility. It was decided that a photo depicting the date of system startup (March 1971) and other photos indicating upgrades would be the best. Mr. Teitzel said he could review work orders at AVEC that would indicate the dates of significant upgrades at the power plant through time.

Mr. Rieser asked about transportation for Ms. Bentz during the site visit and Mr. Nagaruk said that it wouldn't be a problem to arrange for a 4-wheeler to be available during the week of October 5.

Meeting Closing:

Ms. Williams concluded the meeting by thanking the attendees, and requested to SLR prepare the meeting notes. Ms. Williams said that she would start preparation of a list of the meeting attendees for distribution with the minutes.

APPENDIX C

PHOTOGRAPHIC LOG

PHOTOGRAPHIC LOG

Photograph 1:
Vertical ASTs on the east side of the property (photograph taken looking south).

Photograph 2:
Central portion of the property; the floor of the former generator building found can be seen (beneath the arrow) and the white generator building is present on the right (photograph taken looking south).

Photograph 3:
Western portion of the property. Both the white generator building (left) and the CONEX building (right) are visible as is the City of Elim's truck (photograph taken looking south).

Photograph 4:
Piping headers associated with the Old AVEC Tank Farm fuel lines. A total of approximately 178 feet of buried piping is still present extending from the southeast corner of the tank farm.

Photograph 5:
An old generator was present on the site.
No stained soil was observed next to this generator.

Photograph 6:
Drums located on the northeast corner of the Old AVEC Tank Farm.

Photograph 7:
Old electrical boxes. The wood and generator in the foreground will be removed by Mr. Gary Nakarak who owns the former AVEC building.

Photograph 8:
Stressed vegetation was noted in several locations on the site. It was unable to be determined if stressed vegetation is a result of site-related activities or due to runoff at the site.

Photograph 9:
Stained soil southwest of the white generator building; this was the only area where stained soil was observed.

Photograph 10:
Piping and paint and paint thinner cans inside of white generator building.

Photograph 11:
Equipment remaining inside the white generator building.

Photograph 12:
Paint found inside the white generator building.

Photograph 13:
Equipment inside the CONEX building.

Photograph 14:
Old generator base and electrical equipment present inside the CONEX building.

Photograph 15:
Potential soil landfarming area (left half of photograph) at Iron Creek Pit.

APPENDIX D

FIELD NOTES

Elim Old AVEC Tank Farm

"Rite in the Rain"®

ALL-WEATHER

JOURNAL

No. 391

005.0065.09013

"Rite in the Rain®"
ALL-WEATHER WRITING PAPER

Name SLR International Corp
Christina Bentz
Address 4601 Business Park Blvd., Suite K42, Anchorage, AK 99503
Phone 907-222-1112

Project Elim Old AVEC Tank Farm Property Assessment and Cleanup Plan
005.0065.09013

Clear Vinyl Protective Slipcovers (Item No. 30) are available for this style of notebook. Helps protect your notebook from wear & tear. Contact your dealer or the J. L. Darling Corporation.

CONTENTS

PAGE	REFERENCE	DATE

Tuesday Oct. 6, 2009 C. Bentz

0915 depart office for airport
0945 checked in and waiting for scheduled departure to Nome (1100); review site background information
1140 depart Anchorage via Alaska Airlines; delay due to mechanical issues
1310 arrive in Nome
1330 checked in at Bering Air; waiting for scheduled departure (1500)
1457 depart Nome for Elim
1539 arrive in Elim; meet Carol and Paul Nagaruk (Carol = IGAP Coordinator) go on driving tour of Elim - Carol has lived her whole life in Elim and Paul has lived in Elim for the past 15 years and is a former mayor.
- city water supply is a seep and an dug out area in the creek bed that utilizes pumps; they did not believe the old well (46 28 1960s for old school) was used
- Elim has barge service all through the summer months; unaware of backhaul program

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

- drove by site; Carol + Paul indicated that AVEC was accepting bids on the old building - sold to a local home owner who is now responsible for its removal from the site; work to remove the building is in progress; also looked at piping associated with the old AVEC Tank Farm which lies outside the fence; Paul indicated the fence surrounding the tank farm could be beneficially re-used within the community at the courts by the school or at the community playground
- talked about old school tanks which were located where courts are currently - leaked at some point and contaminated soil was removed from the site and taken to aerating area
- two aerating areas exist; 1 - behind the landfill in a cleared area (approximately 2 1/4 miles from town) 2 - at the Iron Creek Pit which is

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

4 1/2 to 5 miles from town - the pit is used for active gravel mining and is on corporation land
- landfill uses cover material → not current on cover but lots of turnover at the city recently; they have an ash burner and accept waste (~$900/load)
- Carol indicated that getting tanks out of town is a priority school tanks, city tank, store tanks, and AVEC tanks are all outside of main town area
- Carol stated one of the concerns with the site is proximity to the school
- nearest SW is either Elim Creek or Norton Sound

After driving tour stop briefly at Native Village of Elim offices brief discussion with Robert Keith (president) - he indicated that last year they dug up sewer pipes and buried them deeper in

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

the vicinity of Old AVEC Tank Farm - stated he did not believe any soil was removed from east of site but area to the north had contaminated soil

1730 break for dinner / relax before IRA council + city council meeting

1930 at Village office for IRA council and City Council Meeting

2100 depart meeting - see notes on pages 6-

End of day.

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

1930 Attend IRA Council / City Council Meeting; attendees included

IRA Council - Robert Keith
Sheldon Robert
Fred Murray
Janelle Murray
Tyler Ivanoff
Charles Saccheus

City Council - Edwin Kotongan
Marlin Paul Sr.
Betty Segock
Christine Amaktoolik
Ida Murray

Discussed Old AVEC Tank Farm and related issues

- Past activity @ site included
  - transformers
  - generators
  - stove oil
  - diesel fuel
  - radiator fluid (glycol)
  - paint - lead based?
- Early days @ AVEC had PCB-containing transformers - on the ground through 1980 - no one

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

Knows if they ever leaked

- No use for old AVEC tanks in the community
- New AVEC plant built around 2000
- Talked about building that was auctioned off by AVEC - wondering if there are any concerns
- Community does not want to pay for AVEC Tank Farm-cleanup through higher consumer rates
- Concern for the Corporation - land supposidly reverts to corporation → they don't want to assume ownership due to potential environmental liability
- No liners at first underneath the AVEC tanks; liners may have been installed in the 1980s
- One person had observed overfilling of AVEC tanks - one time
- Potential use for the site:
  1- Housing - they are limited on good land to build plus it is cheaper to build closer to water + sewer currently limited to building east

C. Bentz 10/6/09

Oct. 6, 2009 C. Bentz

2 - Picnic Area for community
3 - 5-Plex for elders w/ community center

- Feed line from AVEC tank farm still present - may encounter contaminated soil during removal although 2009 activities to deepen sewer line - didn't hear anything about contaminated soil encountered
- Community is worried about potential impacts to water supply; study ongoing for possible re-location of surface water supply
- looked @ 1973 photo of Elim AVEC Tank Farm only had 4 tanks located North of Old School Tank Farm
- Historically had 3 to 4 ditches to route water away from town - may be visible in old photos
- Other contaminated sites identified in Elim discussed
  - Old School Tank Farm

C. Bentz, 10/6/09

Oct. 6, 2009 C. Bentz

located where courts are now; indicated that it had leaks through time

- New school construction had to remove a lot of cont. soil associated with it
- Old Armory Tanks - encountered cont. soil north of AVEC Tank Farm in 2008 - indicated strong smelling soil
- Old store tank farm had a 10,000 gallon gasoline spill that was reported and cleaned up → this spill is the driving force for Elim to re-locate all tanks outside of main city area → AVEC tank farm is last remaining one. When cleanup of spill occured a bedrock rise was observed between town and the ocean - trapping cont. against it
- noted that some spills have been reported - check DEC database

C. Bentz, 10/6/09

Oct. 7, 2009 C. Bentz

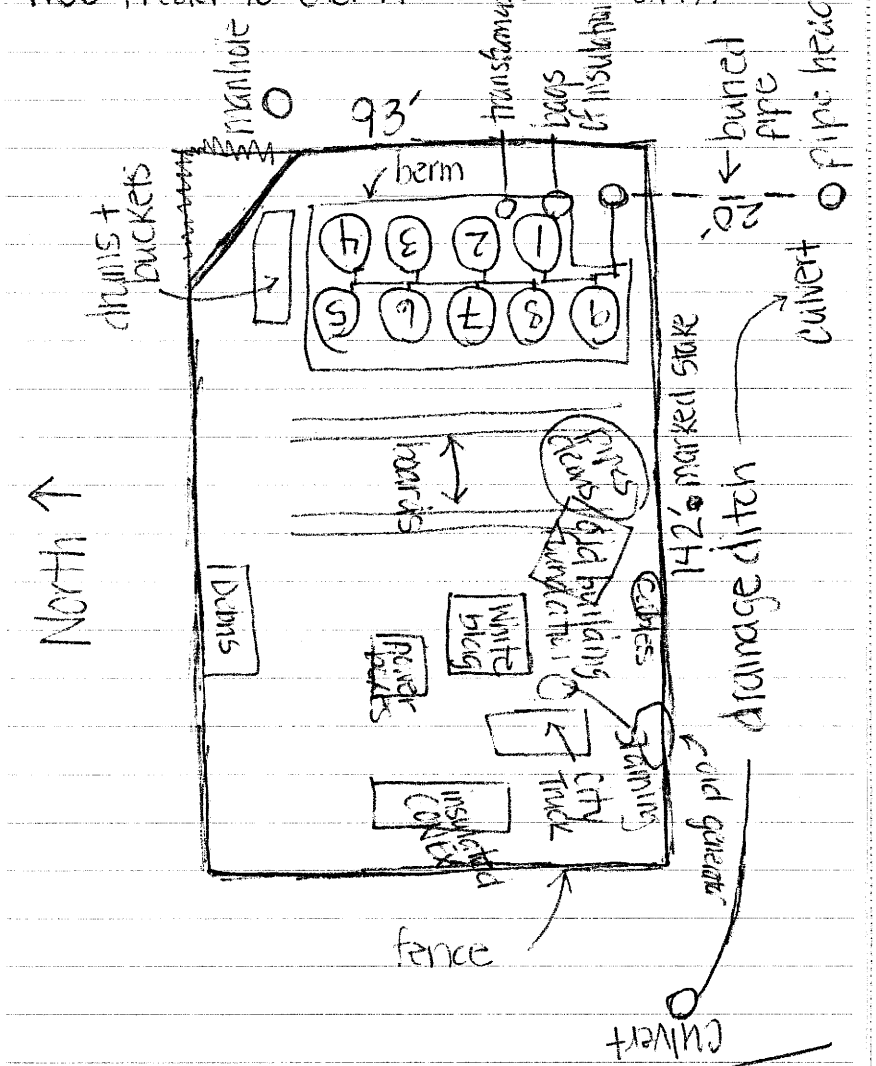
0830 Call Carl Benson with update on site visit

0900 Head to Village office - review documents and gather additional information

- barge service through Crowley + Northland
- water/sewer pipes buried along roadways
- community would like to see contaminated sites cleaned up - have been getting locals trained for 40-hr. HAZWOPER and doing annual 8-hr. refresher
- potential future construction plans include -
  - building houses
  - potential 5-plex (elder housing)
  - new water supply
- community getting new loader and 410 - equipment they have is capable of digging frozen ground

Oct. 7, 2009 C. Bentz

1100 Head to Old AVEC Tank Farm



C. Bentz 10/7/09

Oct. 7, 2009 C. Bentz

from center of pipe headers = 158' to above ground pipes south of site - line is buried

tanks: 1 - #1 Diesel Fuel
Tank #8
12' 11.01"
9,118 gallons

2 - #1 Diesel Fuel
Tank #6
13' 5.38"
8,659 gallons

3 - #1 Diesel Fuel
Tank #4
13' 0.83"
9,184 gallons

4 - #1 Diesel Fuel
Tank #2
13' 0.63"
6,809 gallons

5 - #1 Diesel Fuel
Tank #1
13' 0.63"
8,327 gallons

6 - #1 Diesel Fuel
Tank #3
13' 1.13"
7,565 gallons

Oct. 7, 2009 C. Bentz

7 - #1 Diesel Fuel
Tank #5
13' 6.63"
9,572 gallons

8 - #1 Diesel Fuel
Tank #7
12' 10.51"
8,293 gallons

9 - 6,690 gallons

Tanks on 2x12 over timbers with liner beneath; sand bags holding liner in place; where visible liner appears in good condition; vegetation growing inside bermed area; liner holds water; tanks appear empty

7 drums on North side of berm on pallets
labels indicate
Diesel #1
Delvac 1300 Super (Main)
Used Antifreeze
Used oil

3 buckets De-Solv-It

C. Bentz 10/7/09

Oct. 7, 2009 C. Bentz

1230 depart Old AVEC Tank Farm → head to village office to write-up photographs & Darla Jemewouk 890-2001

1315 meet ~~Darlene~~ CB on Corporation board = $5/cubic yard for backfill
no current fee for placing soil in aerating area
Corporation had written letter to AVEC about responsibility to clean it up maybe about a year ago - have never responded
land will belong to corporation, so ultimately corporations decision on future land use - corporation hasn't talked about re-use

1450 talk to Gary Nakarak - new owner of building - still has stuff to move offside → building foundation, debris north of white building, and wood/metal debris near drums

☆ Call AVEC - determine what they want from the site - community thinks they may want CONEX or at least generator in it

1500 go to city office, check out + wait

C. Bentz 10/7/09

Old AVEC Tank Farm Photo Log

100-0001 Soil ~~Air~~ Aerating Area at Iron Creek CB Pit

100-0002 + 100-0003 Same as 100-0001

100-0004 Iron Creek Pit Gravel Mining Area

100-0005 - 100-0011 Elim / Norton Sound Photos

100-0012 - 100-0015 View of property from the North

100-0016 North of site (area where Contaminated soil was discovered in 2008)

100-0017 - 100-0018 drum + debris area just north of tanks

100-0019 - 100-0021 site from the east

100-0022 - east of site

100-0023 - pipe headers

100-0024 above ground piping that connects tank farm to pipe headers

100-0025 - 100-0026 pipe headers

100-0027 view of drainage ditch + south side of property

100-0028 shows location of courts + new school relative to site

100-0029 visible piping associated with old AVEC tank farm

C. Bentz 10/7/09

Photo Log Cont.'d

100-0030 close up of piping associated w/ AVEC old Tank Farm
100-0031 view in between tanks
100-0032 shows standing water near tank 9 (no sheen visible)
100-0033 - 100-0036 view of property from the south
100-0037 above ground piping and stressed (?) vegetation
100-0038 - 100-0041 drum, bucket, and debris area
100-0042 bags of insulation
100-0043 wood + metal debris on west side of tanks
100-0044 - 100-0045 motor oil/diesel fuel blending system
100-0046 fan in diked area
100-0047 debris CB ~~east~~ west of tanks
100-0048 stained parts of wood
100-0049 old foundation and nuts in property from building removal
100-0050 disturbed soil from building removal
100-0051 white building onsite

C. Bentz 10/7/09

Photo Log Cont.'d

100-0052 - 100-0053 electrical boxes
100-0054 debris area north of white building
100-0055 small patches of soil staining
100-0056 electrical + fencing materials near power pole
100-0057 CONEX (insulated)
100-0058 - 100-0059 vegetation outside CONEX - stressed?
100-0060 - 100-0064 inside CONEX
100-0065 poles on ground
100-0066 - old generator
100-0067 debris
100-0068 - 100-0070 old generator
100-0071 rolls of wires
100-0072 area of stained soil CB ~~W~~ east of truck, SW of white building
100-0073 White building
100-0074 - 100-0082 inside white building

C. Bentz 10/7/09

Oct 7, 2009 C. Bentz

for flight. Scheduled to be here around 1550.

1635 arrive in Nome

1650 Check in at Alaska Airlines flight departs at 2055

2230 arrive in Anchorage

2257 have luggage and car; depart for home. End of day

C. Bentz 10/7/09

APPENDIX E

CITY DRINKING WATER ANALYTICAL RESULTS

Water System

Water System No.:	AK2340345	**Federal Type**	C
Water System Name:	ELIM WATER SUPPLY	**State Type:**	C
Principal County Served:	NOME	**Primary Source:**	SW
Status:	A	**Activity Date:**	1997-01-01 00:00:00.0

Non-Coliform Sample Results

Lab Sample No. :	VO*F0812255-01A	**Collection Date**	12-16-2008

Analyte Code	Analyte Name	Method Code	Less than Indicator	Level Type	Reporting Level	Concentration Level	Monitoring Period Begin Date	Monitoring Period End Date	MCL
2378	1,2,4-TRICHLOROBENZENE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2008	0.070000000 MG/L
2380	CIS-1,2-DICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.070000000 MG/L
2955	XYLENES, TOTAL	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2008	10.00000000 MG/L
2964	DICHLOROMETHANE	524.2	Y	MRL	2.000000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2968	O-DICHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.600000000 MG/L
2969	P-DICHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.075000000 MG/L
2976	VINYL CHLORIDE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.002000000 MG/L
2977	1,1-DICHLOROETHYLENE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2008	0.007000000 MG/L
2979	TRANS-1,2-DICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.100000000 MG/L
2980	1,2-DICHLOROETHANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2981	1,1,1-TRICHLOROETHANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.200000000 MG/L
2982	CARBON TETRACHLORIDE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2983	1,2-DICHLOROPROPANE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2984	TRICHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2985	1,1,2-TRICHLOROETHANE	524.2	Y	MRL	1.000000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2987	TETRACHLOROETHYLENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.005000000 MG/L
2989	CHLOROBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.100000000 MG/L
2990	BENZENE	524.2	Y	MRL	0.500000000		01-01-2008	12-31-2008	0.005000000

					UG/L				MG/L
2991	TOLUENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	1.000000000 MG/L
2992	ETHYLBENZENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.700000000 MG/L
2996	STYRENE	524.2	Y	MRL	0.500000000 UG/L		01-01-2008	12-31-2008	0.100000000 MG/L

Total Number of Records Fetched = 21

APPENDIX F

CONCEPTUAL SITE MODEL

OLD AVEC TANK FARM
CONCEPTUAL SITE MODEL

This Conceptual Site Model (CSM) was developed to qualitatively assess the ways in which potential human receptors may be exposed to contaminants associated with the Old AVEC Tank Farm site (the Site). This CSM is based on information from the 2001 site visit (BEESC, 2001) and information gathered during the 2009 site visit.

This CSM was prepared in accordance with the Alaska Department of Environmental Conservation (DEC) *Draft Guidance on Developing Conceptual Site Models* (DEC, 2005) using the DEC Draft Human Health Conceptual Site Model Scoping Form. The DEC Draft Human Health Conceptual Site Model Diagram was used to summarize the results of the scoping form. All cleanup levels referenced in this CSM are DEC Method Two cleanup levels for either the Under-40 Inch Zone or migration to ground water, whichever is less.

1.1 Impacted Media

Impacted media at the Site are the environmental substances to which a contaminant is directly released (DEC, 2005). All media are discussed in the subsequent sections with respect to whether the media are impacted or not.

1.1.1 Surface Soil

Surface soil is defined as the interval from 0 feet to 2 feet below ground surface (bgs) (DEC, 2005). Previous activities at the Site would likely have resulted in impacts in the immediate vicinity of above ground storage tanks (ASTs), drums, and equipment; a release or discharge associated with the activities at this Site would therefore directly affect surface soil. For this CSM, surface soil is considered an impacted medium.

Two samples were collected from the surface soil interval in 2001. The samples were collected from outside the Site boundaries, and results may not be attributable to previous activities at the Site. Field screening using a photoionization detector was performed on one of these samples with a result of 0.8 parts per million (ppm). Both samples were field screened using U.S. Environmental Protection Agency (EPA) Method 9074, which is a turbidometric field testing method for qualitative analysis of total petroleum hydrocarbons (TPH). TPH results ranged from 0 ppm to 330 ppm. Both samples were also submitted to an analytical laboratory for analysis of diesel range organics (DRO); no other analysis was requested. DRO concentrations ranged from non-detect to 212 milligrams per kilogram (mg/kg), which is slightly below the DEC Method Two soil cleanup level of 250 mg/kg (BEESC, 2001).

One area (approximately 3 feet by 4 feet) of stained soil was observed southwest of the white building during the 2009 site visit. No other stained soil was observed.

1.1.2 Subsurface Soil

Subsurface soil is defined as the interval from 2 feet to 15 feet bgs (DEC, 2005); soil below 15 feet bgs is not considered in this CSM because it is below the depth interval for direct contact by

human receptors. Previous activities at the Site would likely have resulted in impacts in the immediate vicinity of ASTs, drums, and equipment, and thus surface soil rather than subsurface soil would have been the receiving medium. Thus, for this CSM, subsurface soil is not considered an impacted medium.

One field screening sample was collected from this interval in 2001 (from an offsite location). Field screening via EPA Method 9074 resulted in a value of 0 ppm. No analytical samples have been collected from this interval.

1.1.3 Ground Water

Previous activities at the Site would likely have resulted in impacts in the immediate vicinity of ASTs, drums, and equipment, and thus soil rather than ground water would have been the receiving medium. As such, for this CSM, ground water is not considered an impacted medium, but will be considered as an exposure medium; exposure media are described in further detail in Section 1.2.

One ground water well is registered in the village of Elim. The well was drilled in 1964 at the U.S. Bureau of Indian Affairs school to a depth of 78 feet bgs (screened from 72 to 78 feet bgs). Bedrock was encountered at approximately 8 feet bgs and was frozen to a depth of 29 feet bgs. Water was encountered at a depth of 66 feet bgs. The static water level was observed at 63 feet bgs and a pumping test observed 3 feet of drawdown. Testing of the water in 1964 indicated a high concentration (1,100 ppm) of dissolved solids which exceeds the current regulatory criterion for drinking water of 500 ppm. In addition, both sodium (at 270 ppm) and chloride (at 479 ppm) exceed the regulatory limit of 250 ppm.

1.1.4 Surface Water

Previous activities at the Site would likely have resulted in impacts in the immediate vicinity of ASTs, drums, and equipment, and thus soil rather than surface water would have been the receiving media. As such, for this CSM, surface water is not considered an impacted media, but will be considered as an exposure media.

The nearest surface water body to the Site is Norton Sound, which is located approximately 0.08 miles south of the Site. The area is subject to storm surges which may occur in the fall months when Norton Sound is open and ice free. The rate of coastal flood hazards in Elim is low and no residential units are located within the 100-year flood plain; severe coastal floods were recorded in 1917, 1946, and 1974 (Dorava et. al., 1994). Norton Sound is an inlet of the Bering Sea and although used for subsistence activities, is not anticipated as a drinking water source due to its saltwater nature.

The community drinking water supply is located approximately ¼ mile from the Site. The community drinking water supply consists of an infiltration gallery along Elim Creek, which is upgradient of the Site (Figure 1).

No known surface water samples have been collected from near the Site. The most recent volatile organic compound sample collected on December 16, 2008 from the community

drinking water supply did not contain any analytes at concentrations above laboratory method reporting limits.

1.1.5 Sediment

A release at the Site would not directly affect sediments associated with Norton Sound, as described above for surface water. Therefore, for this CSM, sediment is not considered an impacted media.

No known sediment samples have been collected from the Site.

1.2 Transport Mechanisms and Exposure Media

Transport mechanisms are the pathways through which contaminants may move from impacted media to other exposure media. Exposure media are the media to which contaminants are released or transported, both of which may result in exposure of human receptors to the contaminants. Six transport mechanisms were identified at the Site including direct release to surface soil, migration or leaching to subsurface soil, migration or leaching to ground water, volatilization, runoff or erosion, and uptake by plants and animals. Based on the impacted media and transport mechanisms, five exposure media (soil, ground water, air, surface water, and biota) were identified.

Possible transport mechanisms and exposure media are depicted on the DEC Draft Human Health CSM Diagram included at the end of this CSM (as Appendix F-3).

1.3 Exposure Pathways

Each potential exposure pathway was evaluated using the DEC Draft Human Health CSM Scoping Form. Based on this evaluation, six potentially complete exposure pathways were identified. These pathways include incidental soil ingestion, dermal absorption of contaminants from soil, ingestion of ground water, inhalation of outdoor air, inhalation of indoor air, and ingestion of wild foods. A description of complete and incomplete exposure pathways is provided in the following sections.

1.3.1 Complete or Potentially Complete Exposure Pathways

The direct contact exposure pathway via incidental soil ingestion is considered complete because soil contamination exists between 0 feet and 15 feet bgs and the property may be used by human receptors.

The dermal absorption of contaminants from soil exposure pathway is potentially complete because polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenols (PCBs), which may permeate the skin, may be present at the Site based on historical use information. Collection of soil samples for PAH and PCB analysis would allow for a definitive determination of whether or not this pathway is complete and/or significant.

The ingestion of ground water exposure pathway is considered potentially complete because there is the potential for contaminants to migrate to ground water and use of ground water as a future drinking water source cannot be excluded. Exposure via this pathway is considered to be low because the availability of another drinking water source and the poor quality of ground water limit its potential usage as a future drinking water source. In addition, the depth to water and the presence of permafrost in the area limit the ability of contaminants to migrate to ground water.

The inhalation of outdoor air exposure pathway is considered complete because of the presence of volatile contaminants (DRO) in soil between 0 feet and 15 feet bgs and the potential use of the property by human receptors. This pathway is relevant for receptors near the Site in addition to onsite receptors, since outdoor air is not constrained by Site boundaries.

The inhalation of indoor air exposure pathway is considered potentially complete because of the presence of DRO and the potential presence of additional volatile contaminants in soil (based on historical use information) between 0 feet and 15 feet bgs, and the presence of occupied buildings (both residential and commercial) within 100 feet of the Site. DEC generally does not require an evaluation for vapor intrusion if the only contaminants present at a site are DRO, GRO, and RRO. If no other volatile components are identified at the Site, this pathway may therefore not require further evaluation.

The ingestion of wild foods exposure pathway is considered potentially complete because of the potential presence of contaminants in the top 6 feet of soil, where they are available for uptake, and the proximity of the Site to subsistence hunting and gathering areas. Based on historical site usage, PAHs and PCBs, which have the potential to bioaccumulate, may be present at the Site. Collection of soil samples for PAH and PCB analysis would allow for a definitive determination of whether or not this pathway is complete and/or significant. This pathway is relevant for receptors near the Site in addition to onsite receptors, since animals could accumulate contaminants at the Site and then move offsite to nearby subsistence hunting and gathering areas.

1.3.2 Incomplete Exposure Pathways

The remaining exposure pathways were determined to be incomplete based on site data, features, or other pertinent information in accordance with the DEC Draft Human Health CSM Scoping Form. These incomplete pathways are discussed briefly here.

The ingestion of surface water exposure pathway is not considered complete because the community drinking water source is upgradient of the Site. Any transport of contaminants would be to Norton Sound (an inlet of the Bering Sea), which is used for subsistence activities; exposure via subsistence activities is already accounted for in the ingestion of wild foods pathway (discussed in Section 1.3.1).

The dermal exposure to contaminants in ground water and surface water pathways and the inhalation of volatile compounds in household water pathway are not considered to require further evaluation (and are thus considered incomplete) because DEC water quality standards are being applied as cleanup levels at the Site.

The inhalation of fugitive dust exposure pathway is not considered complete because DEC soil ingestion cleanup levels, which are being applied at the Site, are protective of this pathway for all analytes except chromium. Based on historical site use information, chromium is not considered a contaminant of potential concern at the Site.

The direct contact with sediment pathway is not considered complete because DEC soil ingestion cleanup levels, which are being applied at this site, are protective of this pathway. In addition, sediment is not considered an exposure media, and no known activities that result in direct contact with sediment are undertaken at the Site.

1.4 Current and Future Receptors

The AVEC power plant moved in approximately 2000 and the Site has remained unused since that time; the structures, tanks, and other items that remain onsite are located within a fenced area that has a lock. Access to the Site by trespassers, visitors, and recreational users is therefore currently prevented but could occur in the future. Due to the Site's location close to the city offices, school, and residences, and the proposed future reuse objectives for the Site, the following human receptors are considered to be potentially exposed to site contaminants:

- Residents (current and future);
- Commercial/industrial worker (current and future);
- Construction workers (future);
- Site visitors, or trespassers (future); and,
- Subsistence harvesters and consumers (current and future).

1.5 References

Alaska Department of Environmental Conservation (DEC), 2005. *Draft Guidance on Developing Conceptual Site Models*. Alaska Department of Environmental Conservation, Division of Spill Prevention and Response. November 30.

Bristol Environmental & Engineering Services Corporation (BEESC), 2001. *Draft Site Reconnaissance Report, Elim, Alaska*, December.

Dorava, Joseph M., Robert P. Ayres, and William C. Sisco, 1994. *Overview of Environmental and Hydrogeologic Conditions at Moses Point*, Alaska, U.S. Geological Survey Open-File Report 94-310.

HDR Alaska, Inc. (HDR), 1999. *City of Elim Solid Waste Permit Application for a Class III Solid Waste Landfill*, September.

Human Health Conceptual Site Model
Scoping Form

Site Name: Old AVEC Tank Farm, Elim, Alaska

File Number: N/A

Completed by: SLR International Corp

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, a CSM graphic and text must be submitted with the site characterization work plan.

General Instructions: Follow the italicized instructions in each section below.

1. *General Information:*

Sources *(check potential sources at the site)*

- ☐ USTs
- ☑ ASTs
- ☐ Dispensers/fuel loading racks
- ☑ Drums
- ☐ Vehicles
- ☐ Landfills
- ☑ Transformers
- ☑ Other: Generators

Release Mechanisms *(check potential release mechanisms at the site)*

- ☑ Spills
- ☑ Leaks
- ☑ Direct discharge
- ☐ Burning
- ☐ Other: _____

Impacted Media *(check potentially-impacted media at the site)*

- ☑ Surface soil (0-2 feet bgs*)
- ☐ Subsurface Soil (>2 feet bgs)
- ☐ Air
- ☐ Groundwater
- ☐ Surface water
- ☐ Other: _____

Receptors (*check receptors that could be affected by contamination at the site)*

- ☑ Residents (adult or child)
- ☑ Commercial or industrial worker
- ☑ Construction worker
- ☑ Subsistence harvester (i.e., gathers wild foods)
- ☑ Subsistence consumer (i.e., eats wild foods)
- ☑ Site visitor
- ☑ Trespasser
- ☑ Recreational user
- ☐ Farmer
- ☐ Other: _____

* bgs – below ground surface

2. *Exposure Pathways:* *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact –

1 Incidental Soil Ingestion

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

If both boxes are checked, label this pathway complete: Complete

2 Dermal Absorption of Contaminants from Soil

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Can the soil contaminants permeate the skin? (Contaminants listed below, or within the groups listed below, should be evaluated for dermal absorption). ☑

Arsenic	Lindane
Cadmium	PAHs
Chlordane	Pentachlorophenol
2,4-dichlorophenoxyacetic acid	PCBs
Dioxins	SVOCs
DDT	

If all of the boxes are checked, label this pathway complete: Complete

b) Ingestion –

1 Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, OR are contaminants expected to migrate to groundwater in the future? ☑

Could the potentially affected groundwater be used as a current or future drinking water source? *Please note, only leave the box unchecked if ADEC has determined the groundwater is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350.* ☑

If both the boxes are checked, label this pathway complete: Complete

2 Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water OR are contaminants expected to migrate to surface water in the future? ☑

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? *Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities).* ☐

If both boxes are checked, label this pathway complete: _____

3 Ingestion of Wild Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild food? ☑

Do the site contaminants have the potential to bioaccumulate (*see* Appendix A)? ☑

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. the top 6 feet of soil, in groundwater that **could be** connected to surface water, etc.) ☑

If all of the boxes are checked, label this pathway complete: Complete

c) Inhalation

1 Inhalation of Outdoor Air

Is soil contaminated anywhere between 0 and 15 feet bgs? ☑

Do people use the site or is there a chance they will use the site in the future? ☑

Are the contaminants in soil volatile (*See Appendix B*)? ☑

If all of the boxes are checked, label this pathway complete: Complete

2 Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be placed on the site in an area that could be affected by contaminant vapors? (i.e., within 100 feet, horizontally or vertically, of the contaminated soil or groundwater, <u>or</u> subject to "preferential pathways" that promote easy airflow, like utility conduits or rock fractures) ☑

Are volatile compounds present in soil or groundwater (*See Appendix C*)? ☑

If both boxes are checked, label this pathway complete: Complete

3. Additional Exposure Pathways: *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- Climate permits recreational use of waters for swimming,
- Climate permits exposure to groundwater during activities, such as construction, without protective clothing, or
- Groundwater or surface water is used for household purposes.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

No further evaluation is necessary since DEC water-quality standards are being applied as cleanup levels.

Inhalation of Volatile Compounds in Household Water

Exposure from this pathway may need to be assessed only in cases where DEC water-quality or drinking-water standards are not being applied as cleanup levels. Examples of conditions that may warrant further investigation include:

- The contaminated water is used for household purposes such as showering, laundering, and dish washing, and
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix B)

Check the box if further evaluation of this pathway is needed: ☐

Comments:

No further evaluation is necessary since DEC water-quality standards are being applied as cleanup levels.

Inhalation of Fugitive Dust

Generally DEC soil ingestion cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway, although this is not true in the case of chromium. Examples of conditions that may warrant further investigation include:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers. This size can be inhaled and would be of concern for determining if this pathway is complete.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

No further evaluation is necessary because DEC soil ingestion cleanup levels, which are being applied at this Site, are assumed to be protective of this pathway and chromium is not considered a contaminant of concern at this Site.

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during recreational or some types of subsistence activities. People then incidentally **ingest** sediment from normal hand-to-mouth activities. In addition, **dermal absorption of contaminants** may be of concern if people come in contact with sediment and the contaminants are able to permeate the skin (see dermal exposure to soil section). This type of exposure is rare but it should be investigated if:

- Climate permits recreational activities around sediment, and/or
- Community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

ADEC soil ingestion cleanup levels are protective of direct contact with sediment. If they are determined to be over-protective for sediment exposure at a particular site, other screening levels could be adopted or developed.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

No further evaluation of this pathway is necessary as there is no known activities that would result in exposure to sediment, nor is sediment an exposure media at this Site.

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

APPENDIX A

BIOACCUMULATIVE COMPOUNDS

Table A-1: List of Compounds of Potential Concern for Bioaccumulation

Organic compounds are identified as bioaccumulative if they have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5. Inorganic compounds are identified as bioaccumulative if they are listed as such by EPA (2000). Those compounds in Table X of 18 AAC 75.345 that are bioaccumulative, based on the definition above, are listed below.

Aldrin	DDT	Lead
Arsenic	Dibenzo(a,h)anthracene	Mercury
Benzo(a)anthracene	Dieldrin	Methoxychlor
Benzo(a)pyrene	Dioxin	Nickel
Benzo(b)fluoranthene	Endrin	PCBs
Benzo(k)fluoranthene	Fluoranthene	
Cadmium	Heptachlor	Pyrene
Chlordane	Heptachlor epoxide	Selenium
Chrysene	Hexachlorobenzene	Silver
Copper	Hexachlorocyclopentadiene	Toxaphene
DDD	Indeno(1,2,3-c,d)pyrene	Zinc
DDE		

Because BCF values can relatively easily be measured or estimated, the BCF is frequently used to determine the potential for a chemical to bioaccumulate. A compound with a BCF greater than 1,000 is considered to bioaccumulate in tissue (EPA 2004b).

For inorganic compounds, the BCF approach has not been shown to be effective in estimating the compound's ability to bioaccumulate. Information available, either through scientific literature or site-specific data, regarding the bioaccumulative potential of an inorganic site contaminant should be used to determine if the pathway is complete.

The list was developed by including organic compounds that either have a BCF equal to or greater than 1,000 or a log K_{ow} greater than 3.5 and inorganic compounds that are listed by the United States Environmental Protection Agency (EPA) as being bioaccumulative (EPA 2000). The BCF can also be estimated from a chemical's physical and chemical properties. A chemical's octanol-water partitioning coefficient (K_{ow}) along with defined regression equations can be used to estimate the BCF. EPA's Persistent, Bioaccumulative, and Toxic (PBT) Profiler (EPA 2004) can be used to estimate the BCF using the K_{ow} and linear regressions presented by Meylan et al. (1996). The PBT Profiler is located at http://www.pbtprofiler.net/. For compounds not found in the PBT Profiler, DEC recommends using a log K_{ow} greater than 3.5 to determine if a compound is bioaccumulative.

APPENDIX B

VOLATILE COMPOUNDS

Table B-1: List of Volatile Compounds of Potential Concern
Common volatile contaminants of concern at contaminated sites. A chemical is defined as volatile if the Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater and the molecular weight less than 200 g/mole (g/mole; EPA 2004a). Those compounds in Table X of 18 AAC 75.345 that are volatile, based on the definition above, are listed below.

Acenaphthene	1,4-dichlorobenzene	Pyrene
Acetone	1,1-dichloroethane	Styrene
Anthracene	1,2-dichloroethane	1,1,2,2-tetrachloroethane
Benzene	1,1-dichloroethylene	Tetrachloroethylene
Bis(2-chlorethyl)ether	Cis-1,2-dichloroethylene	Toluene
Bromodichloromethane	Trans-1,2-dichloroethylene	1,2,4-trichlorobenzene
Carbon disulfide	1,2-dichloropropane	1,1,1-trichloroethane
Carbon tetrachloride	1,3-dichloropropane	1,1,2-trichloroethane
Chlorobenzene	Ethylbenzene	Trichloroethylene
Chlorodibromomethane	Fluorene	Vinyl acetate
Chloroform	Methyl bromide	Vinyl chloride
2-chlorophenol	Methylene chloride	Xylenes
Cyanide	Naphthalene	GRO
1,2-dichlorobenzene	Nitrobenzene	DRO

APPENDIX C

COMPOUNDS OF CONCERN FOR VAPOR MIGRATION

Table C-1: List of Compounds of Potential Concern for the Vapor Migration

A chemical is considered sufficiently toxic if the vapor concentration of the pure component poses an incremental lifetime cancer risk greater than 10-6 or a non-cancer hazard index greater than 1. A chemical is considered sufficiently volatile if it's Henry's Law constant is 1 x 10^{-5} atm-m^3/mol or greater.

Acenaphthene	Dibenzofuran	Hexachlorobenzene
Acetaldehyde	1,2-Dibromo-3-chloropropane	Hexachlorocyclopentadiene
Acetone	1,2-Dibromoethane (EDB)	Hexachloroethane
Acetonitrile	1,3-Dichlorobenzene	Hexane
Acetophenone	1,2-Dichlorobenzene	Hydrogen cyanide
Acrolein	1,4-Dichlorobenzene	Isobutanol
Acrylonitrile	2-Nitropropane	Mercury (elemental)
Aldrin	N-Nitroso-di-n-butylamine	Methacrylonitrile
alpha-HCH (alpha-BHC)	n-Propylbenzene	Methoxychlor
Benzaldehyde	o-Nitrotoluene	Methyl acetate
Benzene	o-Xylene	Methyl acrylate
Benzo(b)fluoranthene	p-Xylene	Methyl bromide
Benzylchloride	Pyrene	Methyl chloride chloromethane)
beta-Chloronaphthalene	sec-Butylbenzene	Methylcyclohexane
Biphenyl	Styrene	Methylene bromide
Bis(2-chloroethyl)ether	tert-Butylbenzene	Methylene chloride
Bis(2-chloroisopropyl)ether	1,1,1,2-Tetrachloroethane	Methylethylketone (2-butanone)
Bis(chloromethyl)ether	1,1,2,2-Tetrachloroethane	Methylisobutylketone
Bromodichloromethane	Tetrachloroethylene	Methylmethacrylate
Bromoform	Dichlorodifluoromethane	2-Methylnaphthalene
1,3-Butadiene	1,1-Dichloroethane	MTBE
Carbon disulfide	1,2-Dichloroethane	m-Xylene
Carbon tetrachloride	1,1-Dichloroethylene	Naphthalene
Chlordane	1,2-Dichloropropane	n-Butylbenzene
2-Chloro-1,3-butadiene (chloroprene)	1,3-Dichloropropene	Nitrobenzene
Chlorobenzene	Dieldrin	Toluene
1-Chlorobutane	Endosulfan	trans-1,2-Dichloroethylene
Chlorodibromomethane	Epichlorohydrin	1,1,2-Trichloro-1,2,2-trifluoroethane
Chlorodifluoromethane	Ethyl ether	1,2,4-Trichlorobenzene
Chloroethane (ethyl chloride)	Ethylacetate	1,1,2-Trichloroethane
Chloroform	Ethylbenzene	1,1,1-Trichloroethane
2-Chlorophenol	Ethylene oxide	Trichloroethylene
2-Chloropropane	Ethylmethacrylate	Trichlorofluoromethane
Chrysene	Fluorene	1,2,3-Trichloropropane
cis-1,2-Dichloroethylene	Furan	1,2,4-Trimethylbenzene
Crotonaldehyde (2-butenal)	Gamma-HCH (Lindane)	1,3,5-Trimethylbenzene
Cumene	Heptachlor	Vinyl acetate
DDE	Hexachloro-1,3-butadiene	Vinyl chloride (chloroethene)

Source: EPA 2002.

HUMAN HEALTH CONCEPTUAL SITE MODEL

Site: Old AVEC Tank Farm
Elim, Alaska

Completed By: SLR International Corp
Date Completed: November 2009

Follow the directions below. Do not consider engineering or land use controls when describing pathways.

(1)
Check the media that could be directly affected by the release.

(2)
For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Briefly list other mechanisms or reference the report for details.

(3)
Check exposure media identified in (2).

(4)
Check exposure pathways that are complete or need further evaluation. The pathways identified must agree with Sections 2 and 3 of the CSM Scoping Form.

(5)
Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.

Media	Transport Mechanisms	Exposure Media	Exposure Pathways	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☑ Surface Soil (0-2 ft bgs)	☑ Direct release to surface soil — check soil	☑ soil	☑ Incidental Soil Ingestion	F	F	F	F	F	F	
	☑ Migration or leaching to subsurface — check soil		☑ Dermal Absorption of Contaminants from Soil	F	F	F	F	F	F	
	☑ Migration or leaching to groundwater — check groundwater									
	☑ Volatilization — check air									
	☑ Runoff or erosion — check surface water									
	☑ Uptake by plants or animals — check biota									
	☐ Other (*list*):									
☐ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil	☑ groundwater	☑ Ingestion of Groundwater	F	F					
	☐ *Migration to groundwater* — check groundwater		☐ Dermal Absorption of Contaminants in Groundwater							
	☐ *Volatilization* — check air		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ *Other (list):*									
☐ Ground-water	☐ Direct release to groundwater — check groundwater	☑ air	☑ Inhalation of Outdoor Air	C/F	C/F	C/F	F	C/F	C/F	
	☐ *Volatilization* — check air		☑ Inhalation of Indoor Air	C/F	C/F	F				
	☐ *Flow to surface water body* — check surface water		☐ Inhalation of Fugitive Dust							
	☐ *Flow to sediment* — check sediment									
	☐ *Uptake by plants or animals* — check biota									
	☐ *Other (list):*									
☐ Surface Water	☐ Direct release to surface water — check surface water	☑ surface water	☐ Ingestion of Surface Water							
	☐ *Volatilization* — check air		☐ Dermal Absorption of Contaminants in Surface Water							
	☐ *Sedimentation* — check sediment		☐ Inhalation of Volatile Compounds in Tap Water							
	☐ *Uptake by plants or animals* — check biota									
	☐ *Other (list):*									
☐ Sediment	☐ Direct release to sediment — check sediment	☐ sediment	☐ Direct Contact with Sediment							
	☐ *Resuspension, runoff, or erosion* — check surface water									
	☐ *Uptake by plants or animals* — check biota									
	☐ *Other (list):*									
		☑ biota	☑ Ingestion of Wild Foods	C/F		C/F		C/F	C/F	

Revised 3/21/06

APPENDIX G

COST ESTIMATE SPREADSHEETS

Cost Estimate for FY 2010 Work April 6, 2010 - Interim Removal Action, Old AVEC Tank Farm, Elim, Alaska

1. Direct Labor	Clerical	Drafting	Environmental Scientist	Project Manager	Project Director	Total Hours	Total Cost	Comments / Backup
	$55.00	$90.00	$90.00	$100.00	$130.00	Hours	Cost	
Task 1 - Remedial Work Plan Preparation	6	24	76	16	4	126	$11,450.00	40 hours for plan prep plus one site visit of two 12-hour days (including coordination with Village representatives) and 12 hours travel (round trip)
Task 2 - Debris Removal, Tank Decommissioning		8	138	16	4	166	$15,260.00	Assumes 16 hours for consultant to mobilize for field work and coordinate with certified tank removal subcontractor for decommissioning of 9 AST's and 178' of fuel pipeline, and removal of AST's. Consultant will perform field screening to estimate contamination limits during tank decommissioning, building demolition, and waste removal. Assumes one week (12-hour days) for consultant and laborer's to be on site during tanks and pipe decommissioning (the tank decommissioning subcontractor will be on site approximately 14 days) and tank removal and two 12-hour days for building demolition and disposal of non-hazardous debris on-site. This task includes 12 hours for round trip travel from Anchorage to Elim.
Task 3A - Construction Landfarm area.			24	8	2	34	$3,220.00	Will require one day on site for cell construction (avg. 12-hour days). This time is needed to prep the roughly 52'x52' square area for the landfarm. This task includes 12 hours for round trip travel from Anchorage to Elim. It is assumed all scope items for Task 3A-3D will be performed in a single site visit.
Task 3B - Excavation of Contaminated Soils, Spreading Landfarm Soils			24	4	2	30	$2,820.00	Assumes a 10-yard capacity dump truck. One hour turn time for each 10-yard load from excavation of contaminated soil will be the rate-limiting step. Assumes the trucks will travel for 30 minutes round trip with 15 minutes on each end for loading and dumping. Total 12-hour operating day of hauling and excavation. One contingency day added for equipment maintenance. Excavation floor sampling/mapping will take place during excavation. Dump trucks will dump soils in an area next to the landfarm area and the loader will require one day to spread after initial spreading by trucks is complete.
Task 3C - Backfilling Excavations (100 cubic yards)			24	4	2	30	$2,820.00	Assume one hour turn time for each 10-yard load from backfill source area. One day required to load and haul material to excavation site and compact site in 1-foot lifts. One contingency day added for equipment maintenance.
Task 3D - Tilling and Fertilizing landfarm			72	16	8		$9,120.00	Set up equipment and start tilling and fertilizing process to be performed by local labor and travel time (one way). This task also assumes time to purchase and ship the rototiller, fertilizer spreader, and fertilizer to Elim. Project report for excavation and backfill, and landfarm construction
Task 4 - Landfarm Maintenance 2011		6	48	8	2	64	$5,920.00	Assume one trip for sample collection (one 12 hour day and 12-hours travel time) and 24 hours for environmental scientist to prepare letter interim report. Assumes village labor to do two rounds of tilling and fertilizing
Task 5 - Landfarm Maintenance 2012		6	48	8	2	64	$5,920.00	Assume one trip for sample collection (one 12 hour day and 12-hours travel time) and 24 hours for environmental scientist to prepare letter interim report. Assumes village labor to do two rounds of tilling and fertilizing
Task 6 - Decommission landfarm 2013		4	36	18	4	62	$5,920.00	Will require up to one 12 hour day for cell confirmation sampling, one 12 hou
Task 7 - Reporting	12	24	72	24	8	140	$12,740.00	day for creating landfill cover stockpile and 12 hours of travel Final report of landfarm sampling and decommissioning.
Total Hours	18	72	562	122	38	812		
Labor Cost	$990	$6,480	$50,580	$12,200	$4,940	**Labor Cost Total**	**$75,190**	

Task 1 - Remedial Work Plan Preparation	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Phone/FAX	1	estimate	$50	$50	
Reproduction	1	estimate	$250	$250	
Per Diem	3	estimate	$65	$195	
Lodging	2	estimate	$100	$200	
ATV Rental	2	12-hr days	$75	$150	
ATV Fuel	4	gallons	$10	$40	Assumes 4 gallons per day of ATV use
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim

Subtotal Task 1 (ODC)	**$1,853**
Subtotal Task 1 (Labor)	**$11,450**
Task 1 - Total Costs	**$13,303**

Cost Estimate for FY 2010 Work April 6, 2010 - Interim Removal Action, Old AVEC Tank Farm, Elim, Alaska

Task 2 - Debris Removal, Tank Decommissioning	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Consultant and Tank Contractors RT Airfare, Anchorage to Elim	4	each	$968	$3,872	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim
ATV Rental	9	12-hr days	$75	$675	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
ATV Fuel	36	gallons	$10	$360	Assumes 4 gallons per day of ATV use
Dump Truck	9	12-hr days	$338	$3,042	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
950 F Loader	11	12-hr days	$450	$4,950	
Equipment Fuel	264	gallons	$10	$2,640	Assumes 3 gallons per hour of equipment use
Equipment Operator #1	132	Hour	$52	$6,882	Assume one week for tank decommissioning and disposal, 2 days for building demolition and disposal of non-hazardous debris, and 2 days for test pitting Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Equipment Operator #2	108	Hour	$52	$5,631	Assume one week for tank decommissioning and disposal, and 2 days for building demolition and disposal of non-hazardous debris. Davis Bacon wag rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #1	108	Hour	$43	$4,692	Assume one week for tank decommissioning and disposal, and 2 days for building demolition and disposal of non-hazardous debris. Davis Bacon wag rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #2	108	Hour	$43	$4,692	Assume one week for tank decommissioning and disposal, and 2 days for building demolition and disposal of non-hazardous debris. Davis Bacon wag rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Debris disposal	16	truckload	$900	$14,400	Assumes Connex, generators, paints, and solvents will be reused and NOT disposed of. Assumes 5 truckloads for the ASTs, 10 truckloads for building debris, and 1 truckload for miscellaneous equipment and debris. Does not account for disposal of drums, that will be characterized in this project task. It is assumed characterization will reveal waste oil and drum contents will be reused in a waste oil burner in Elim.
Drum Sample Analysis - Method 1311 TCLP for SW-846 Method 8260 for Volatiles	8	samples	$265	$2,120	One sample per drum plus one duplicate sample.
Drum Sample Analysis - Method 1311 TCLP for SW-846 Method 8270 for Semi volatiles	8	sample	$305	$2,440	One sample per drum plus one duplicate sample.
Drum Sample Analysis - Method 1311 TCLP for SW-846 Method 6020 for Metals	8	sample	$245	$1,960	One sample per drum plus one duplicate sample.
Soil Sample Analysis - GRO/BTEX AK101/EPA 8021B	18	samples	$85	$1,530	Samples and one duplicate needed to characterize soil under each AST and along fuel pipeline.
Soil Sample Analysis - DRO/RRO AK101/AK102	18	samples	$85	$1,530	Samples and one duplicate needed to characterize soil under each AST and along fuel pipeline.
Soil Sample Analysis - PCBs	9	samples	$85	$765	Confirm of deny presence of contaminant onsite during targeted investigation.
Soil Sample Analysis - RCRA Metals	9	samples	$155	$1,395	Confirm of deny presence of contaminant onsite during targeted investigation.
Soil Sample Analysis - Chlorinated Solvents	9	samples	$185	$1,665	Confirm of deny presence of contaminant onsite during targeted investigation.
Transportation of Consultant Equip/Materials to Elim	1	estimate	$2,000	$2,000	
Lodging	9	man-day	$100	$900	
Meals	9	man-day	$65	$585	Estimated daily cost for food and meals.
PID Rental	9	days	$50	$450	
Tank Decommissioning Contractor	1	each	$35,000	$35,000	Includes general estimate from Rockwell Engineering for decommissioning of 9 ASTS and 178' of fuel pipeline. It is assumed the pipeline will be abandoned in place.
Digital Camera	9	days	$15	$135	
PPE	45	days	$20	$900	

Subtotal Task 2 (ODC)	**$105,211**
Subtotal Task 2 (Labor)	**$15,260**
Task 2 - Total Costs	**$120,471**

Task 3A - Construction Landfarm area.	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim
ATV Rental	1	12-hr days	$75	$75	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
ATV Fuel	4	gallons	$10	$40	Assumes 4 gallons per day of ATV use
950 F Loader	1	12-hr days	$450	$450	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Dump Truck	1	12 -hr days	$338	$338	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Equipment Fuel	24	gallons	$10	$240	Assumes 3 gallons per hour of equipment use
Operator #1	12	Hour	$52	$626	Assume one day for preparation of landfarm area. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Operator #2	12	Hour	$52	$626	Assume one day for preparation of landfarm area. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #1	12	Hour	$43	$521	Assume one day for preparation of landfarm area. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #2	12	Hour	$43	$521	Assume one day for preparation of landfarm area. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
20-mil HDPE Liner Material	3600	sq ft	$0.35	$1,260	Polar Supply quote 10/12/2009 assumes 52'x52' landfarm area with 4' on each side for the berm.
20-mil HDPE Liner Material cut fee	1	each	$31.50	$32	Polar Supply quote 10/12/2009.
Felt Liner	3364	sq ft	$0.10	$336	Assumes 52'x52' landfarm area with 4' on each side for the berm.
Calgon carbon water treatment unit	1	each	$900	$900	
Water Pump	1	each	$200	$200	
Lodging	1	man-day	$100	$100	
Meals	1	man-day	$65	$65	Estimated daily cost for food and meals.
Surveying equipment	1	weeks	$300	$300	Surveyor's Exchange: laser level that can be operated by one person.
Digital Camera	1	days	$15	$15	
PID Rental	1	days	$50	$50	
PPE / Consumables	5	days	$20	$100	Based upon costs of Level D PPE during the effort.

Subtotal Task 3A (ODC)	**$7,762**
Subtotal Task 3A (Labor)	**$3,220**
Task 3A - Total Costs	**$10,982**

Cost Estimate for FY 2010 Work April 6, 2010 - Interim Removal Action, Old AVEC Tank Farm, Elim, Alaska

Task 3B - Excavation of Contaminated Soils, Spreading Landfarm Soils	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Hitachi Excavator	2	12-hr days	$450	$900	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Dump Truck	2	12-hr days	$338	$676	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Equipment Fuel	48	gallons	$10	$480	Assumes 3 gallons per hour of equipment use
ATV Rental	2	12-hr days	$75	$150	
ATV Fuel	8	gallons	$10	$80	Assumes 4 gallons per day of ATV use
Equipment Operator #1	24	Hour	$52	$1,251	Assume two days for excavation. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Equipment Operator #2	24	Hour	$52	$1,251	Assume two days for excavation. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #1	24	Hour	$43	$1,043	Assume two days for excavation. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #2	24	Hour	$43	$1,043	Assume two days for excavation. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Soil Sample Analysis (Floor Characterization) - GRO/BTEX AK101/EPA 8021B	7	samples	$85	$595	Needed to characterize excavation floor levels, assumes one excavation planned to be 2500 square feet. This will require six samples (two for first 25(square feet and one additional for next 250). Total samples is 6, plus 1 for QC. Thus, per UST procedures manual, sample requirements will be 7 basec
Soil Sample Analysis (Floor Characterization) - DRO/RRO AK101/AK102	7	sample	$85	$595	As above for excavation floor.
Soil Sample Analysis (Sidewall Characterization) - GRO/BTEX AK101/SW 8021B	9	samples	$85	$765	Sidewall characterization based on one sample per 20 linear feet with 10% QC duplicate frequency.
Soil Sample Analysis (Sidewall Characterization) - DRO/RRO AK101/AK102	9	sample	$85	$765	As above for excavation sidewall.
Soil Sample Analysis (Sidewall and Floor) PAH SIM SW 8270	3	sample	$185	$555	PAH analysis on selected sidewall and floor samples exhibiting highest screening results.
Soil sample analysis (Sidewall and Floor) VOC 8260B	3	sample	$185	$555	VOC analysis on selected sidewall and floor samples exhibiting highest screening results or areas indicative of solvent or gasoline use.
Soil Sample Analysis (Sidewall Characterization) - GRO/BTEX Travel Blanks	1	trip blank	$43	$43	Trip blanks for GRO/BTEX analyses.
Soil sample analysis (Sidewall and Floor) VOC Travel Blanks	1	trip blank	$92	$92	Trip blanks for VOC analyses.
Soil Sample Analysis (Landfarm Characterization) - GRO/BTEX	4	samples	$85	$340	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Soil Sample Analysis (Landfarm Characterization) - DRO/RRO	4	sample	$95	$380	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Lodging	2	days	$100	$200	
Meals	2	days	$65	$130	
PPE	10	days	$20	$200	
Digital Camera	3	days	$10	$30	
PID Rental	3	days	$50	$150	
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim

Subtotal Task 3B (ODC)	**$13,236**
Subtotal Task 3B (Labor)	**$2,820**
Task 3B - Total Costs	**$16,056**

Task 3C - Backfilling Excavations (100 cubic yards)	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Hitachi Excavator	2	12-hr days	$450	$900	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Dump Truck	2	12-hr days	$338	$676	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Equipment Fuel	48	gallons	$10	$480	Assumes 3 gallons per hour of equipment use
ATV Rental	2	12-hr days	$75	$150	
ATV Fuel	8	gallons	$10	$80	Assumes 4 gallons per day of ATV use
Equipment Operator #1	24	Hour	$52	$1,251	Assume two days to backfill and compact excavation areas. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Equipment Operator #2	24	Hour	$52	$1,251	Assume two days to backfill and compact excavation areas. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #1	24	Hour	$43	$1,043	Assume two days to backfill and compact excavation areas. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
Laborer #2	24	Hour	$43	$1,043	Assume two days to backfill and compact excavation areas. Davis Bacon wage rates for Group I Operator and Group I Laborer. Rate includes Fringe Costs.
20-mil HDPE Liner Material	2500	sq ft	$0.35	$875	Polar Supply quote 10/12/2009 with 1000 square feet as contingency to cutting losses and excavation expansion.
Purchase of small plate compactor and shipping with liner material	1	estimate	$2,500	$2,500	16" by 21" plate compactor is $1,995 at CMI in Fairbanks May 2009
Lodging	2	day	$100	$200	
Meals	2	day	$65	$130	
PPE	10	day	$20	$200	
Digital Camera	5	day	$10	$50	
Backfill gravel for Excavations	100	cubic yards	$1.40	$140	

Subtotal Task 3C (ODC)	**$10,969**
Subtotal Task 3C (Labor)	**$2,820**
Task 3C - Total Costs	**$13,789**

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Task 3D - Tilling and Fertilizing landfarm	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Rototiller	1	estimate	$3,000	$3,000	
Laborer #1	48	hours	$43	$2,064	Assume one day to spread fertilizer and till soil using local labor. This will be performed twice annually. Also assumes 24 hours annually to dewater th landfarm, performed as needed.
Transportation of Equip/Materials to Elim	1	estimate	$1,000	$1,000	Ship fertilizer and rototiller from Anchorage.
Fertilizer Spreader	1	estimate	$150	$150	Purchase of broadcast spreader.
Fertilizer	1	estimate	$200	$200	35 pounds of 8-32-16 fertilizer for approximate 10-12 pounds per 1,000 square feet. Two applications per summer season.
ATV Rental	4	vehicle-day	$75	$300	Vehicle rental for laborer to drive to and from landfill landfarm area.
ATV Fuel	16	gallons	$10	$160	Assumes 4 gallons per day of ATV use
Rototiller Fuel	30	gallons	$10	$300	
Lodging	1	man-day	$100	$100	
Meals	4	man-day	$65	$260	Based upon worker for four days in the field.
PID	1	instr-day	$50	$50	
PPE	4	day	$20	$80	
Digital Camera	1	day	$15	$15	Based upon one Digital Camera
Miscellaneous	1	estimate	$1,000	$1,000	Confirmation sampling: frequency based upon one sample per 50 cubic yards, plus 6 samples for screening.

Subtotal Task 2E (ODC)	**$8,679**
Subtotal Task 2E (Labor)	**$9,120**
Task 2E - Total Costs	**$17,799**

Task 4 - Landfarm Maintenance 2011	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim
Laborer #1	48	hours	$43	$2,064	Assume one day to spread fertilizer and till soil using local labor. This will be performed twice annually. Also assumes 24 hours annually to dewater th landfarm, performed as needed.
Transportation of Equip/Materials to Elim	1	estimate	$200	$200	Ship fertilizer and rototiller from Anchorage
Fertilizer	1	estimate	$200	$200	35 pounds of 8-32-16 fertilizer for approximate 10-12 pounds per 1,000 square feet. Two applications per summer season.
ATV	5	vehicle-day	$75	$375	Vehicle rental for laborer to drive to and from landfill landfarm area.
ATV Fuel	20	gallons	$10	$200	Assumes 4 gallons per day of ATV use
Rototiller Fuel	30	gallons	$8	$240	Rototiller fuel
Lodging	1	man-day	$100	$100	
Calgon Carbon Canister	1	each	$450	$450	
Soil Sample Analysis (Landfarm Characterization) - GRO/BTEX	4	samples	$85	$340	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Soil Sample Analysis (Landfarm Characterization) - DRO/RRO	4	sample	$95.00	$380	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Water Sample Analysis (Landfarm Discharge) - DRO/RRO AK101/AK102	6	samples	$85.00	$510	Landfarm water discharge water sample. Assumes two samples and one duplicate sample will be collected two times per year.
Meals	5	man-day	$65	$325	Based upon worker for 5 days in the field.
PID	1	instr-day	$50	$50	
PPE	5	day	$20	$100	
Digital Camera	1	day	$15	$15	Based upon one Digital Camera.
Miscellaneous	1	estimate	$1,000	$1,000	

Subtotal Task 3 (ODC)	**$7,517**
Subtotal Task 3 (Labor)	**$5,920**
Task 3 - Total Costs	**$13,437**

Task 5 - Landfarm Maintenance 2012	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim
Laborer #1	48	hours	$43	$2,064	Assume one day to spread fertilizer and till soil using local labor. This will be performed twice annually. Also assumes 24 hours annually to dewater th landfarm, performed as needed.
Transportation of Equip/Materials to Elim	1	estimate	$200	$200	Ship fertilizer and rototiller from Anchorage.
Fertilizer	1	estimate	$200	$200	35 pounds of 8-32-16 fertilizer for approximate 10-12 pounds per 1,000 square feet. Two applications per summer season.
ATV	5	vehicle-day	$75	$375	Vehicle rental for laborer to drive to and from landfill landfarm area.
ATV Fuel	20	gallons	$10	$200	Assumes 4 gallons per day of ATV use
Rototiller Fuel	30	gallons	$8	$240	Rototiller fuel
Lodging	1	man-day	$100	$100	
Calgon Carbon Canister	1	each	$450	$450	
Soil Sample Analysis (Landfarm Characterization) - GRO/BTEX	4	samples	$85	$340	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Soil Sample Analysis (Landfarm Characterization) - DRO/RRO	4	sample	$95.00	$380	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Water Sample Analysis (Landfarm Discharge) - DRO/RRO AK101/AK102	6	samples	$85.00	$510	Landfarm water discharge water sample. Assumes two samples and one duplicate sample will be collected two times per year.
Meals	5	man-day	$65	$325	Based upon worker for 5 days in the field.
PID	1	instr-day	$50	$50	
PPE	5	day	$20	$100	
Digital Camera	1	day	$15	$15	Based upon one Digital Camera.
Miscellaneous	1	estimate	$1,000	$1,000	

Subtotal Task 4 (ODC)	**$7,517**
Subtotal Task 4 (Labor)	**$5,920**
Task 4 - Total Costs	**$13,437**

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Task 6 - Decommission landfarm 2013	No. of Units	Unit	Cost Per Unit	Subtotal	Comments
Consultant RT Airfare, Anchorage to Elim	1	each	$968	$968	Alaska Airlines from Anchorage to Nome, Bering Air from Nome to Elim
Hitachi Excavator	2	12-hr days	$450	$900	Based on City of Elim Equipment Rates, Effective June 27, 2001. Daily Rate (8 Hours) Plus 4 Hours Prorated Daily Rate
Dump Truck	2	12-hr days	$338	$675	Assumes two days of dump truck time to move soils closer to landfill.
Equipment Fuel	48	gallons	$10	$480	Assumes 3 gallons per hour of equipment use
ATV	2	12-hr days	$75	$150	Vehicle rental for laborer to drive to and from landfill landfarm area.
ATV Fuel	8	gallons	$10	$80	Assumes 4 gallons per day of ATV use
Operator #1	24	hour	$52	1251.36	
Operator #2	24	hour	$52	1251.36	
Laborer	24	hour	$43	$1,043	
Transportation of Equip/Materials to Elim	2	estimate	$200	$400	
Lodging	2	man-day	$100	$200	
Meals	2	man-day	$65	$130	Based upon worker for two days in the field.
PID	2	instr-day	$50	$100	
Digital Camera	2	day	$15	$30	Based upon one Digital Camera.
Soil Sample Analysis (Landfarm Characterization) - GRO/BTEX	4	samples	$85	$340	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
Soil Sample Analysis (Landfarm Characterization) - DRO/RRO	4	sample	$95.00	$380	Four samples, includes one duplicate, for 100 cubic yards (ex situ volume) per Table C of 18 AAC 78.605(b).
PPE	8	days	$20.00	$160	
Phone/FAX	1	estimate	$50	$50	
Reproduction - B&W	1000	each	$0.10	$100	
Reproduction - Color	100	each	$1	$100	

Subtotal Task 5 (ODC)	**$8,788**
Subtotal Task 5 (Labor)	**$5,920**
Task 5 - Total Costs	**$14,708**

Total, Labor	**$75,190**
Total, Other Direct Costs	**$171,532**
10% Contingency	**$24,672**
TOTAL PROJECT COST (Elim Remediation)	***$271,395***

APPENDIX H

HEAVY EQUIPMENT RENTAL RATES

CITY OF ELIM
ELIM, ALASKA 99739
Effective June 27, 2001

Equipment Rental Rates:

Equipment	Hr Rate (Short term) (With fluids w/o fuel	Wet Rate (With Fluids and Fuel)	Wet w/op (With fluids fuel and operator)		
1. Dump Truck	75.00	82.04	107.04	225/day	1,000/week
2. Hitachi ex-200	150.00	157.04	182.04	300/day	1,200/week
3. 950F Loader	150.00	158.44	183.44	300/day	1,200/week
4. 140G	150.00	158.44	183.44	300/day	1,200/week
5. 450JD	75.00	77.81	102.81	225/day	1,000/week
6. 410E	100.00	104.23	129.23	250/day	1,100/week
7. D4	100.00	104.00	127.00	250/day	1,100/week
8. Flat Bed/Geo	50.00	175.00/day			
9. Freight Trailer	25.00/day				

Note:

*1. For Daily and Weekly dry rates renters shall be responsible for operator's wages, maintenance, fueling repair, and replacement of parts while equipment is under their control. (CHAPTER 39, SECTION 3)
2. Day rate is based on an 8 hour day, then prorated.
3. Weekly rate is based on a 40 hour week, then prorated.
4. Rates are subject to change at any time.
5. Deposit on estimated rental will be required unless credit has been established.
6. City approved operators only or CLD certified.
7. The City reserves the right to refuse to rent equipment.
8. Must use City Equipment Logs and submit figures daily.

APPENDIX I

AERIAL PHOTOGRAPHS