ELIM OLD AVEC TANK FARM ABBREVIATED PRELIMINARY ASSESSMENT

This Abbreviated Preliminary Assessment (APA) for the Elim Old AVEC Tank Farm in Elim, Alaska was conducted by the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Program (CSP) under the ANCSA site verification program.

APAs are intended to identify potential hazards at a site, identify sites that require immediate action, and to establish priorities for sites requiring in-depth investigations. This APA is based on readily available information about the site, a field visit, and limited soil sampling. It is not intended to be a full investigation or characterization of this site. This document is intended to meet the requirements of an APA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and be in accordance with the Site Cleanup Rules of 18 Alaska Administrative Code (AAC) 75.325-.390.

Preparer: Nabi Qureshi

Alaska Department of Environmental Conservation

Contaminated Sites Program

555 Cordova Street

Anchorage, Alaska, 99501

Nabi.Qureshi@Alaska.gov

Site Name: Elim Old AVEC Tank Farm

SEMS ID: n/a

ADEC Haz ID: 25432

EPA ANCSA ID: ANCSA00469

Previous names:

Site location: Elim

Latitude: 64.616541 North

Longitude: -162.263164 West

Site owners: Elim Native Corporation

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LIST OF ABBREVIATIONS AND ACRONYMS

AAC – Alaska Administrative Code

ANCSA – Alaska Native Claims Settlement Act

APA – Abbreviated Preliminary Assessment

AST – Aboveground storage tanks

AVEC – Alaska Village Electric Co-operative

BIA – US Bureau of Indian Affairs

Bgs – Below ground surface

BTEX – Benzene, Toluene, Ethylbenzene, Xylenes

COPC – Contaminant of Potential Concern

CSP – Contaminated Sites Program

CUL – Cleanup Level

ADEC – Department of Environmental Conservation

DRO – Diesel Range Organics

EPA- US Environmental Protection Agency

FSG - ADEC Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tank Sites

GRO – Gasoline Range Organics

IGAP – Indian General Assistance Program

IRA – Alaska Indian Reorganization Act

MTG – Migration to Groundwater

PACP – Property Assessment and Cleanup Plan

PAH – Polycyclic Aromatic Hydrocarbons

PCB – Polychlorinated Biphenyls

PID – Photoionization Detector

QA/QC – Quality Assurance/Quality Control

QAPP – Quality Assurance Project Plan

RRO – Residual Range Organics

SAP – Sampling and Analysis Plan

SVOC – Semi-Volatile Organic Compounds

SVR – Site Visit Report

VOC – Volatile Organic Compounds

XRF – X-ray Fluorescence

1 DESCRIPTION OF THE RELEASE (OR POTENTIAL RELEASE) AND PROBABLE NATURE

The Elim Old Alaska Village Electric Co-operative (AVEC) Tank Farm (site) was operated by AVEC as a powerplant between 1970 and 2005 and has since been abandoned. The site previously consisted of nine aboveground storage tanks (AST), two buildings, a generator, and miscellaneous waste and debris, including 55-gallon drums and 5-gallon buckets containing unknown fluids. The four northmost tanks are the oldest and likely where any releases would have occurred, due to the lack of a liner until the 1980s. Prior to this the sampling events detailed in this APA, contamination had never been confirmed by laboratory analysis.

2 SITE DESCRIPTION AND HISTORY

General Location

Elim, Alaska is located on the northwest shore of Norton Bay on the Seward Peninsula (64.6160 N, -162.2648 W; Section 15, Township 10 South, Range 11 West, Kateel River Meridian; Figure 1). It is 460 miles northwest of Anchorage, and 96 miles east of Nome, located in the Nome Census Area. The Elim Old AVEC Tank Farm is located in the City of Elim at the intersection of 2nd Street and Main Street, at approximately 64.616541 North, -162.263164 West (Figure 2).

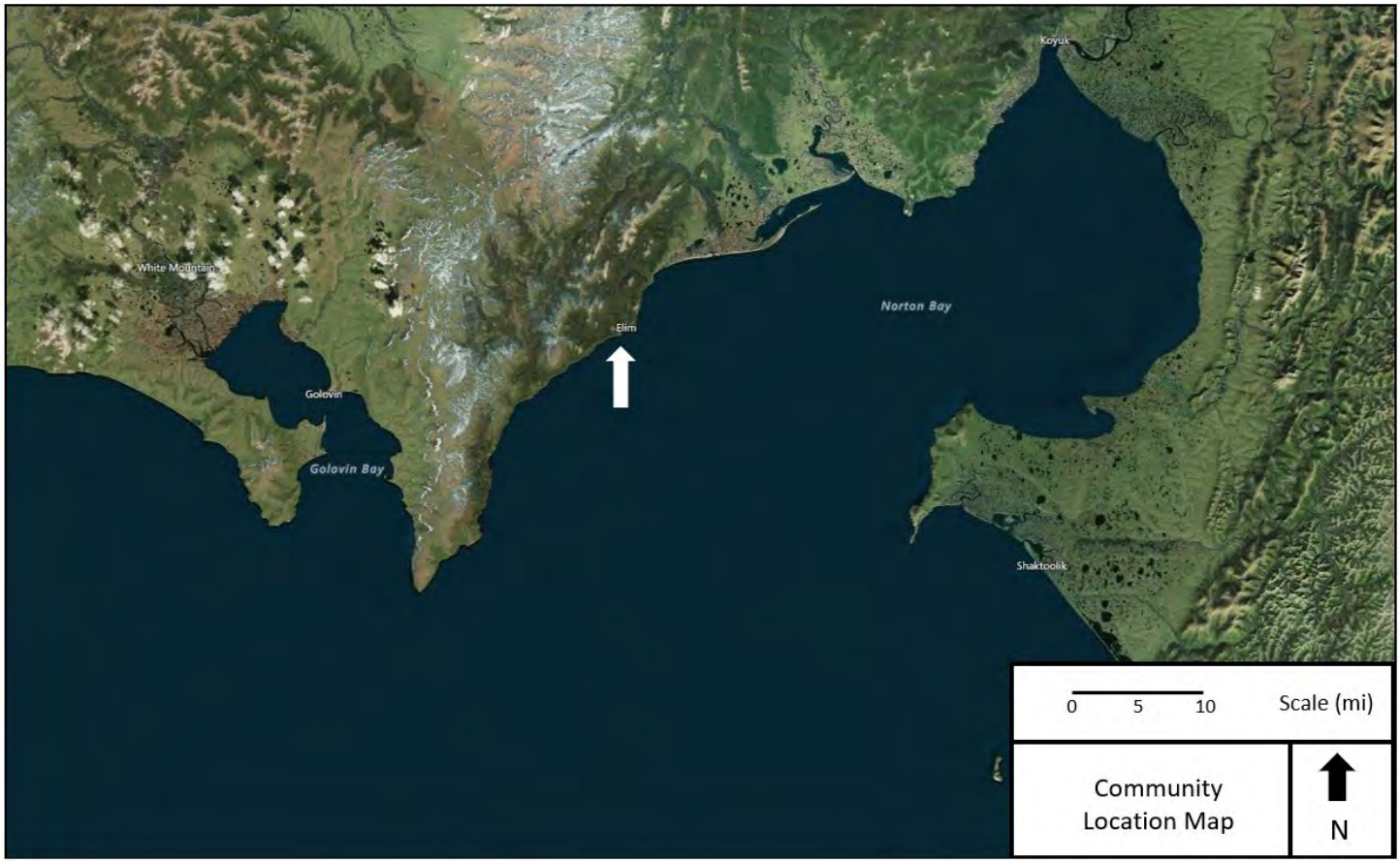

Figure 1 Site location indicated in Norton Sound region.

Figure 2 Site location indicated in Elim.

ANCSA Conveyance

The Elim Old Alaska Village Electric Cooperative (AVEC) Tank Farm property was conveyed under the Alaska Native Claims Settlement Act (ANCSA) section 19(b) to Elim Native Corporation on September 14, 1979, in Patent No. 50-79-0148 (Appendix A). Elim Native Corporation was conveyed surface and subsurface rights to the land described as U.S. Survey No. 2548, comprising of the Norton Bay Reservation. Elim Native Corporation is not affiliated with any ANCSA regional corporation. Prior to 1979, this property was owned by the (Bureau of Indian Affairs) BIA, who had issued a temporary use permit to AVEC, active from April 1, 1970, to April 1, 2005.

Demographic and Geographic Setting

Elim, incorporated in 1970, is a Yupik/Inupiat Eskimo community formerly known as the Malemuit Inupiat Village of Nuviakchak. Per the Alaska Department of Commerce, Community, and Economic Development (DCCED), Elim is home to a population of just over 350 residents, 95% of which identify as American Indian or Alaska Native. Subsistence fishing and harvesting activities are well-developed and practiced in Elim.

The area is characterized by tundra interspersed with boreal forest and weather patterns of shorter warm summers with longer cold winters. Elim is located within ADEC's under 40 inch precipitation zone. The community drinking water source is from surface water upslope of this site; depth to groundwater, while variable in the community, is recorded at approximately 66 feet below ground surface (bgs) at the old U.S. Bureau of Indian Affairs (BIA) school, and historical information indicates that groundwater quality is poor due to high concentrations of dissolved solids which exceed the regulatory criterion for drinking water.

Site History

Between 1970 and 2005, AVEC operated a power plant which utilized up to nine vertical ASTs, as well as a generator building, and a Conex building, electrical boxes and equipment, and a generator enclosed in a 20,000 square feet fenced area. Surveys of the site also identified 55-gallon drums, 5-gallon buckets containing unknown fluids, and miscellaneous debris. Interviews indicate that a liner was placed in the 1980's under the tank farm footprint and it is suspected that the liner was subsequently removed when structures were removed. The tank farm was relocated in 2005, and by 2012, all ASTs and other infrastructure had been decommissioned and removed. Currently the area is overgrown with vegetation, and a collapsing chain-link fence around the perimeter of the property encases the site.

The Elim Old AVEC Tank Farm is an informational site on the CSP Database (Elim Old AVEC Tank Farm, File Number #600.38.006, Hazard ID 25432), and is unverified on the U.S. Environmental Protection Agency's (EPA) Contaminated ANCSA Site Common Operating Picture (EPA Site ID ANCSA00469). The Native Village of Elim received an ADEC Brownfields Assessment in 2009.

3 ADEC ANCSA VERIFICATION

This APA was conducted by ADEC's Contaminated ANCSA Lands unit, a program within ADEC CSP, with the aim of gathering information pertinent to the three criteria for cleanup funding under the U.S. Environmental Protection Agency's (EPA's) Contaminated Alaska Native Claims Settlement Act (ANCSA) Lands Assistance Program. These criteria are that the site:

1. Was conveyed pursuant to ANCSA.
2. Was contaminated by hazardous or toxic substances, pollutants, contaminants, or oil at the time of conveyance.
3. Is on the EPA's Contaminated ANCSA Sites Common Operating Picture (EPA Inventory).

ADEC will relay the results of this APA to the EPA to ensure the EPA Inventory is updated with the most current data. This APA is not intended to determine eligibility or verification status for this site. For final eligibility determination, please check the status of the sites on the EPA Inventory or consult with an EPA project manager.

4 PREVIOUS INVESTIGATIONS

4.1 2001 SITE RECONNAISSANCE

In September 2001, a Site Reconnaissance (Appendix B) was completed to address the four AST tank farm sites in Elim, Alaska through ADEC's AST Program. Three samples were taken from outside the fence surrounding the Old AVEC Tank Farm, and two were sent for lab analysis for Diesel Range Organics (DRO). One sample returned a non-detect result, while the sample closer to the tank farm returned a DRO concentration of 212 mg/kg below ADEC Cleanup Level (CUL). The report recommended that the soil beneath the tank farm be investigated once the tank farm was decommissioned.

4.2 2009/2010 BROWNFIELDS ASSESSMENT AND PROPERTY ASSESSMENT AND CLEANUP PLAN

In 2009, the property received an ADEC Brownfields Assessment under ADEC's Reuse and Redevelopment program. Fieldwork was completed in 2009 and a Property Assessment and Cleanup Plan (PACP) was produced in 2010 (Appendix C). These efforts did not include any sample collection or lab analysis. The report identifies six areas of potential contamination, including:

- Debris pile
- Drum area
- Tank farm area
- Electrical boxes
- One electrical transformer (located within the tank farm)
- Stained soil

The 2010 PACP recommended removing solid waste, excavating, and managing contaminated soil, and conducting a targeted surface and subsurface soil investigation. It was not recommended in this report to investigate groundwater.

4.3 2018 SITE VISIT

In September 2018, ADEC staff conducted a site visit to the Elim Old AVEC Tank Farm along with staff from Kawerak, Inc. During this site visit, staff collected twelve screening samples from four test pits, three of which were within the tank farm footprint, with the final test pit being just outside the tank farm footprint. Soil samples were screened for petroleum using the heated headspace method with a Photoionization Detector (PID). Samples from test pits in the upper area of the tank farm showed elevated PID readings. Analytical soil samples were not collected for lab analysis. The Site Visit Report (SVR) can be found in Appendix D.

5 FIELD WORK

ADEC staff conducted a site visit in July 2024. ADEC staff were joined by Shaun Daniels with the Elim Indian Reorganization Act (IRA) Tribal Council as an Environmental Coordinator. Preparation for the site visit was conducted in coordination with Elim Indian General Assistance Program (IGAP), Elim Native Corporation, and the City of Elim. Site access was granted by Elim Native Corporation. Elim maintenance personnel confirmed the presence of a waterline outside of property along the northeast border of the tank farm.

The site visit included a visual inspection of the site, photographing site conditions, limited field screening using an X-ray Fluorescence (XRF) handheld instrument, and collection of surface soil samples for laboratory analysis.

The site was enclosed in a chain-linked fence that was collapsing in some areas in the southwest corner of the site and the north border near the unsecured gate. Some large shrubs were present along the fencing and the entire property was overgrown with vegetation, obstructing thorough investigation of areas of stained soil and distressed vegetation. The tank farm footprint was depressed and contained by berms around the perimeter. Standing water was present at the lower end of the tank farm footprint. ADEC staff identified sampling locations based on visual and olfactory observations, as well as suspected areas of previous interest. Photos of site and sampling activities can be found in Appendix F, and field documentation can be found in Appendix G.

Sixteen samples were collected from twelve distinct locations for sampling and analyzed for one or more Contaminants of Potential Concern (COPC). Subsurface sampling was attempted; however, refusal was met between 14 and 17 inches bgs in most sampling areas. A background sample was collected outside the vicinity of observable debris to establish a baseline for naturally occurring metal concentrations in the local environment. For the purposes of this investigation, analytical soil sample results are compared to ADEC Migration to Groundwater (MTG) CULs established in 18 AAC 75.341, Tables B1 and B2, for the Over 40-Inches of Precipitation Climate Zone. Table 1 below displays sample ID, approximate locations of samples, depth of sample, laboratory analysis conducted, and CUL exceedances if any. Figure 2 depicts sample locations, IDs, and CUL exceedances, if any. Soil samples were submitted for laboratory analysis of one or more of the following:

- Gasoline Range Organics (GRO) by AK 101
- DRO by AK 102
- Residual Range Organics (RRO) by AK 103
- Benzene, Toluene, Ethylbenzene, Xylenes (BTEX) by AK 101
- Volatile Organic Compounds (VOCs) by EPA 8260D
- Semi-Volatile Organic Compounds (SVOC) including Polycyclic Aromatic Hydrocarbons (PAH) by EPA 8270E
- Metals by EPA 6020B
- Polychlorinated Biphenyls (PCBs) by EPA 8082A

Table 1 Sampling information and exceedances

Sample ID	Location/Notes	Depth (bgs)	Analysis	CUL Exceedances
2407ELIM-TANK01SS	Within tank farm footprint, upper NW side	6”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B	DRO: 957 mg/kg
2407ELIM-TANK02SS	Within tank farm footprint, upper NE side; strong petroleum odor	9”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B	DRO: 7910 mg/kg

2407ELIM-TANK02SUB	Within tank farm footprint, upper NE side; met resistance at 14”	14”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B	DRO: 5170 mg/kg
2407ELIM-TANK03SS	Within tank farm footprint, true center	8.5”	AK101 + BTEX, AK102/AK103, EPA 8260D	N/A
2407ELIM-TANK03SUB	Within tank farm footprint, true center; met resistance at 17”	17”	AK101 + BTEX, AK102/AK103, EPA 8260D	DRO: 406 mg/kg
2407ELIM-TANK04SS	Within tank farm footprint, lower tank farm center	14”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B, EPA 8082A	N/A
2407ELIM-TANK05SS[1]	Within tank farm footprint, lower tank farm center (duplicate)	14”	AK101 + BTEX, EPA 8260D	N/A
2407ELIM-TANK06SS	Outside of tank farm footprint, SE corner of property; found buried foam and soda cans	7”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E	N/A
2407ELIM-TANK07SS[1]	Outside of tank farm footprint, SE corner of property (duplicate)	7”	AK101 + BTEX	N/A
2407ELIM-STAIN08SS	Near center of property, at suspected area of previously identified stained soil and distressed vegetation; strong petroleum odor	10”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B	N/A
2407ELIM-CON09SS	At suspected area of previously identified Conex footprint, west side of property; gravel in soil	3”	AK101 + BTEX, AK102/AK103, EPA 6020B	N/A
2407ELIM-TF10SS	Within tank farm footprint, along east edge of footprint near suspected area of previously identified transformer	8”	EPA 8082A	N/A
2407ELIM-DRUM11SS	In NE corner of property above tank farm footprint	6”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E	N/A

2407ELIM-DRUM12SS	In NE corner of property above tank farm footprint	3”	EPA 6020B	N/A
2407ELIM-TANK13SS	Within tank farm footprint, along S edge near standing water; opportunistic sample	8”	AK101 + BTEX, AK102/AK103, EPA 8260D, EPA 8270E, EPA 6020B	DRO: 275 mg/kg
2407ELIM-METBACK	Background metal sample, In NW corner of property	6”	EPA 6020B	N/A

1. Duplicate samples

Figure 3 Elim Old AVEC Tank Farm sampling locations and exceedances.

6 SAMPLING METHODOLOGY

This section summarizes the sampling methods employed for this investigation. Detailed information can be found in the site-specific Sampling and Analysis Plan (SAP), dated July 2024 (Appendix H). All field and sampling activities were conducted in accordance with the ADEC’s Field Sampling Guidance for Contaminated Sites and Leaking Underground Storage Tank Sites (FSG), dated January 2022.

6.1 SAMPLING LOCATIONS

Sampling locations were selected based on previously identified areas of interest and targets in the SAP. Sampling efforts focused on the upper area of the tank farm footprint, which is suspected to have the oldest contamination. Samples TANK01SS, TANK02SS, TANK02SUB, TANK03SS, TANK03SUB, TANK04SS, TANK05SS (duplicate), TF10SS, and TANK13SS were collected from within the tank farm footprint. Sample TF10SS was collected from the area suspected to be where the electrical transformer was observed in the 2009 PACP and was only sampled for PCBs by EPA 8082A. Sample TANK13SS was an opportunistic sample based on available sampling containers, ADEC staff selected the sampling area due to proximity to standing water. Sample TANK06SS and TANK07SS (duplicate) were sampled outside of the tank farm footprint, adjacent to the standing water in the southeast corner of the tank farm footprint; this location was selected due to its proximity to the piping header area. Sample STAIN08SS was collected in an area of distressed vegetation that was identified in the 2009 PACP and 2018 SVR. Sample CON09SS was collected in the suspected area of the former Conex building. Samples DRUM11SS and DRUM12SS were collected in the northeast corner of the property outside of the tank farm footprint, in an area that had previously been identified as a "drum area" in the 2009 PACP. Sample METBACK was collected in the northwest border of the property, away from any observable contamination.

6.2 FIELD SCREENING

XRF Field screening measurements were collected in the vicinity of sample DRUM11SS and DRUM12SS. XRF field screening measurements for soils were collected by filling a quart-size resealable plastic bag with soil using a clean metal spoon. The XRF was placed in direct contact with the side of the bag. Measurements were collected with at least a 30-second exposure window. The XRF was calibrated prior to use. The XRF values were within normal parameters and the data is considered usable for field screening. XRF screening results can be found in Appendix E.

6.3 ANALYTICAL SAMPLE COLLECTION

A fresh pair of nitrile gloves were worn and changed before each analytical sample was taken. A clean metal spoon was used to collect soil samples in lab-provided sample jars. Soil analytical samples submitted for volatiles analysis (AK101, EPA 8260) were preserved using methanol; no other samples required preservation. The date and time for each sample was documented in the field logbook (Appendix G). All samples were collected using a hand tool (hand auger) and soil disruption was minimal.

6.4 SAMPLE HANDLING AND CUSTODY

Samples remained in the custody of ADEC staff until they were transferred to the laboratory. A chain of custody record was completed for each batch of samples and included in the lab-provided sample container to be sent to the laboratory. The samples were transported to SGS Anchorage, an ADEC-approved lab, via ADEC staff. The samples were wrapped in bubble wrap inside lab-provided storage coolers. A copy of the SGS laboratory data package including the chain of custody is included in Appendix I.

6.5 Deviations from the SAP

The SAP stated that staff will collect one surface soil sample, and one subsurface soil sample from each test pit. However, when collecting samples, staff met refusal between 14 and 17 inches bgs with hand tools, and therefore were only able to collect one to two surface soil samples at each sample location. Since subsurface samples were not collected, sampling containers were redistributed, and staff were able to identify twelve locations for sampling rather than the predetermined eight.

Due to thick vegetation, staff were not able to identify or sample the footprint of the demolished buildings which had been identified as targets in the SAP. However, staff were able to sample the area of the Conex building.

Due to time constraints, limited site activities, and previous investigations, staff decided to omit use of a PID and XRF to identify sampling areas. An XRF was only used for screening in the areas of sample DRUM11SS and DRUM12SS, due to suspected metal concentration in that area.

7 Sample Analysis

The data met the data quality objectives of the State-Directed Site Discovery and Investigation Programs Quality Assurance Project Plan (QAPP), dated October 2023. Quality Assurance and Quality Control (QA/QC) measures included a trip blank sample for volatiles. The trip blank had a detectable but trivial concentration of GRO. Sample 2407ELIM-TANK02SS indicated surrogate recovery for 8260D did not meet QC criteria and was qualified as undetected and uncertain This does not affect useability of the data. The laboratory reported matrix spike and matrix spike duplicate with a significant number of quality control problems which have been determined to not be representative of the data. This does not affect quality or usability of the data. Laboratory data packet can be found in Appendix I.

For the purposes of this investigation, analytical soil sample results are compared to ADEC CULs established in 18 AAC 75.341, Tables B1 and B2, for the Over 40-Inches of Precipitation Climate Zone.

Five samples exceeded the most stringent CUL. Samples 2407ELIM-TANK01SS (6” bgs), 2407ELIM-TANK02SS (9” bgs), 2407ELIM-TANK02SUB (14” bgs), and 2407ELIM-TANK03SUB (17” bgs), were collected in the upper portion of the tank farm, where historic contamination was suspected to have occurred. Each sample exceeds DRO CUL at 957mg/kg, 7,910 mg/kg, 5170 mg/kg, and 406 mg/kg, respectively. 2407ELIM-TANK13SS collected at 6” bgs in the lower portion of the tank farm exceeded DRO CUL at 275 mg/kg. Low-level detections of COPCs were found in other samples, but none exceeded applicable CULs.

8 Site Evaluation Information

8.1 Soil exposure Pathway

Four areas at this site have confirmed DRO contamination in surface soils. Sample areas show exceedances of ADEC Under 40 Inch Zone MTG CULs, but do not exceed ADEC CUL for direct exposure. Contamination is not delineated vertically or horizontally, and due to the limited sampling efforts and

historical property use, it is expected that contamination may exist elsewhere within the site. High potential risk is expected at this site for surface soils.

8.2 Surface water Exposure Pathway

The nearest surface water to this site in Norton Bay, about 500 ft south of the site, and Elim Creek, about 1000 ft east of the site. Contamination is unknown in surface water but not expected.

8.3 Groundwater Exposure pathway

Groundwater was not encountered as part of this effort, but lab analysis confirms levels of DRO higher than ADEC MTG CUL.

9 ADEC Site Verification Recommendation

This APA found that the previous use of this site as a tank farm led to the release of petroleum contamination. Table 3 describes how the evidence presented in the APA applies to the criteria for the EPA Contaminated ANCSA Lands Assistance Program eligibility criteria.

ANCSA Status Criteria	**Status**	**Discussion**
Conveyed pursuant to ANCSA	Confirmed	Conveyance document attached as Appendix A.
Contaminated by hazardous or toxic substances, pollutants, contaminants, or oil at the time of conveyance	Confirmed	Analytical sample results for petroleum exceeding applicable CUL are connected to pre-conveyance activities.
On EPA's Contaminated ANCSA Sites Inventory	Confirmed	This site is present on the EPA Contaminated ANCSA Site Inventory.

APPENDICES

Appendix A – Patent No. 50-79-0148

Appendix B – 2001 Site Reconnaissance Report

Appendix C – 2010 Property Assessment and Cleanup Plan

Appendix D – 2018 Site Visit Report

Appendix E – XRF Log

Appendix F – Photo Log

Appendix G – Field Documentation

Appendix H – 2024 Elim Old AVEC Tank Farm Sampling and Analysis Plan

Appendix I – Lab Data Packet

Appendix A – Patent No. 50-79-0148

Form 1860–9
(March 1965)
(formerly 4–1043)

F-20517

The United States of America

To all to whom these presents shall come, Greeting:

WHEREAS

Elim Native Corporation

is entitled to a Land Patent pursuant to Sec. 19(b) of the Alaska Native Claims Settlement Act of December 18, 1971 (85 Stat. 688, 702; 43 U.S.C. 1601, 1613(a) (1976)) (ANCSA), for the surface and subsurface estates in the following described lands:

U.S. Survey No. 2548, Alaska, comprising the Norton Bay Reservation.

Containing 297,982 acres.

NOW KNOW YE, that there is, therefore, granted by the UNITED STATES OF AMERICA unto the above-named corporation the surface and subsurface estates in the land described above; TO HAVE AND TO HOLD the said estates with all the rights, privileges, immunities, and appurtenances of whatsoever nature, thereunto belonging, unto the said corporation, its successors and assigns, forever:

EXCEPTING AND RESERVING TO THE UNITED STATES from the lands so granted:

Pursuant to Sec. 17(b) of the Alaska Native Claims Settlement Act of December 18, 1971 (85 Stat. 688, 708; 43 U.S.C. 1601, 1616(b) (1976)), the following public easements, referenced by easement identification number (EIN) on the easement maps attached to this document, copies of which will be found in case file F-20517-EE, are reserved to the United States. All easements are subject to applicable Federal, State, or municipal corporation regulation. The following is a listing of uses allowed for each type of easement. Any uses which are not specifically listed are prohibited.

<u>25 Foot Trail</u> - The uses allowed on a twenty-five (25) foot wide trail easement are: travel by foot, dogsled, animals, snowmobiles, two and three-wheel vehicles and small all-terrain vehicles (less than 3,000 lbs. Gross Vehicle Weight (GVW)).

<u>One Acre Site</u> - The uses allowed for a site easement are: vehicle parking (e.g., aircraft, boats, ATV's, snowmobiles, cars, trucks), temporary camping, and loading or unloading. Temporary camping, loading or unloading shall be limited tc 24 hours.

Patent Number 50-79-0148

April 2025
GPO 841-090

AA-20517

a. (EIN 1 C3, D1, O) An easement for an existing access trail twenty-five (25) feet in width from Moses Point in Sec. 23, T. 9 S., R. 17 W., Kateel River Meridian, northwesterly to Sec. 16, T. 8 S., R. 17 W., Kateel River Meridian. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

b. (EIN 2 C1, C3, D1, D9, O) An easement for an existing access trail twenty-five (25) feet in width from Sec. 15, T. 11 S., R. 20 W., Kateel River Meridian, northeasterly through the selection to Sec. 16, T. 8 S., R. 14 W., Kateel River Meridian. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement. The season of use will be limited to winter.

c. (EIN 9 C3) An easement for a proposed access trail twenty-five (25) feet in width from trail easement EIN 1 C3, D1, O in Sec. 16, T. 8 S., R. 17 W., Kateel River Meridian, northerly to public lands in Sec. 28, T. 7 S., R. 17 W., Kateel River Meridian. The uses allowed are those listed above for a twenty-five (25) foot wide trail easement.

d. (EIN 13 D9) A one (1) acre site easement upland of the ordinary high water mark in Sec. 22, T. 9 S., R. 17 W., Kateel River Meridian, on the right bank of Kwiniuk River. The uses allowed are those listed above for a one (1) acre site.

THE GRANT OF THE ABOVE-DESCRIBED LAND IS SUBJECT TO:

1. Valid existing rights therein, if any, including but not limited to those created by any lease (including a lease issued under Sec. 6(g) of the Alaska Statehood Act of July 7, 1958 (72 Stat. 339, 341; 48 U.S.C. Ch. 2, Sec. 6(g) (1976))), contract, permit, right-of-way or easement, and the right of the lessee, contractee, permittee or grantee to the complete enjoyment of all rights, privileges and benefits thereby granted to him. Further, pursuant to Sec. 17(b)(2) of ANCSA, any valid existing right recognized by ANCSA shall continue to have whatever right of access as is now provided for under existing law; and

2. The following third-party interests, if valid, created and identified by the Bureau of Indian Affairs as provided by Sec. 14(g) of the Alaska Native Claims Settlement Act of December 18, 1971 (85 Stat. 688, 704; 43 U.S.C. 1601, 1613(g) (1976)):

   a. Use Permit, to Alaska Village Electric Cooperative, Inc., Anchorage, Alaska, for use and occupancy of approximately 20,000 square feet of land located within protracted Sec. 15, T. 10 S., R. 18 W., Kateel River Meridian.

Patent No. 50-79-0148

Form 1860–10
(July 1975)

F-20517

b. Use Permit, to United States Department of the Army, Alaska National Guard, Elim, Alaska, for use and occupancy of approximately 1.01 acres of land located within protracted Sec. 15, T. 10 S., R. 18 W., Kateel River Meridian.

IN TESTIMONY WHEREOF, the undersigned authorized officer of the Bureau of Land Management, in accordance with the provisions of the Act of June 17, 1948 (62 Stat. 476), has, in the name of the United States, caused these letters to be made Patent, and the Seal of the Bureau to be hereunto affixed.

GIVEN under my hand, in Anchorage, Alaska the FOURTEENTH day of SEPTEMBER in the year of our Lord one thousand nine hundred and SEVENTY-NINE and of the Independence of the United States the two hundred and FOURTH.

[SEAL]

By _____
Assistant to the State Director for ANCSA

50-79-0148
Patent Number _____

☆U.S. GOVERNMENT PRINTING OFFICE: 1975—681-167/73 REGION NO. 4

Appendix B – 2001 Site Reconnaissance Report

SITE RECONNAISSANCE REPORT

ELIM, ALASKA

DRAFT

Contract No. 18-5001-10
Project No. 22041

Prepared for:
Alaska Department of Environmental Conservation
Aboveground Storage Tank Program
410 Willoughby Avenue, Suite 105
Juneau, Alaska 99801-5207

Prepared by:
Bristol Environmental & Engineering Services Corporation
2000 W. International Airport Road, #C-1
Anchorage, Alaska 99502
(907) 563-0013

December 2001

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ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AST	aboveground storage tank
AVEC	Alaska Village Electric Cooperative
BEESC	Bristol Environmental & Engineering Services Corporation
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
DRO	diesel-range organic
F	Fahrenheit
GPS	global positioning system
GRO	gasoline-range organic
mg/kg	milligrams per kilogram
PID	photoionization detector
ppm	parts per million
°	degree
′	minute
″	second

1.0 EXECUTIVE SUMMARY

1.1 Summary

The Alaska Department of Environmental Conservation (ADEC) tasked Bristol Environmental & Engineering Services Corporation (BEESC) with conducting a site reconnaissance at the following four aboveground storage tank (AST) sites in Elim, Alaska:

- ANICA Native Store Old Tank Farm Site;
- Alaska Village Electric Cooperative (AVEC) Tank Farm;
- City of Elim Tank Farm; and
- City of Elim Shop Old Tank Farm Site.

The fieldwork for this site reconnaissance was performed on September 20 and September 21, 2001, and involved the collection of 12 surface and subsurface soil samples. By selecting soil sampling locations and relying on the observation, field judgment, and field instrumentation, an effort was made to identify potential contamination from the four tank farm sites in Elim. Of the several samples that were collected, none exceeded the cleanup levels for the particular parameters described in the ADEC cleanup criteria, and no volatile organics were identified from the abandoned gasoline tank farm.

ANICA Native Store Old Tank Farm Site. Sampling at this site indicated the presence of diesel-range organics (DRO) at a concentration below the cleanup level. It is recommended that a search of the ADEC records be performed to determine the extent of reported gasoline contamination and cleanup at this site. Surface soil in the area appeared to be similar throughout, and it was not evident that clean fill had been imported to replace contaminated soils that reportedly had been removed from the site during remediation.

AVEC Tank Farm. One soil sample from an area near the fence had a relatively low DRO concentration, and the sample collected downgradient from the area had no detectable DRO concentration. No further site investigation is recommended for this site until the site is decommissioned. Additional sampling is recommended in areas beneath the tanks, when the tanks are removed, to identify the presence of any localized contamination.

City of Elim Tank Farm. The fueling tank associated with the City of Elim Tank Farm appears to be leaking fuel as part of its operations. Although analytical results indicated the presence of DRO below cleanup levels, field techniques indicated the presence of contamination 50 feet downgradient from the fueling tank in an area approximately 20 feet wide. The depth of the contamination has not been identified. It is recommended that good housekeeping methods be established and implemented to avoid further spills.

City of Elim Shop Old Tank Farm. At the City of Elim Shop Old Tank Farm site, a relatively low DRO concentration was identified in a soil sample from the southeast corner of the abandoned tank farm. Sampling at this site was relatively shallow, and additional sampling should be performed beneath the area of the two tank footprints within the bermed area when the tank farm area is decommissioned and the liner is removed. Sampling should include soils from the native soil beneath the fill material that was imported to construct and level the tank farm.

1.2 Introduction to Project

1.2.1 Project Manager

The BEESC project manager is Michael F. Torpy, P.E.

1.2.2 Field Personnel

Mr. Torpy and Larry Pederson conducted the site reconnaissance at Elim.

1.2.3 Logistics of Project

Access to the site is by air or sea. Flights to Elim are with routine commercial air service from Nome. Alaska Airlines offers commercial flights between Anchorage and Nome on a daily basis, and Bering Air, Hageland Aviation Services, and other area airlines offer commercial flights between Nome and Elim 7 days per week during the summer.

Northern Air Cargo and Alaska Airlines can ship equipment between Nome and Anchorage. Equipment can be flown between Nome and Elim with Bering Air, Hageland Aviation, or other local airlines. There is no guarantee that the equipment will get on the flight, however, and the project needs to be managed accordingly.

Compressed gas for photoionization detector (PID) calibration and methanol for sample preservation cannot be shipped on commercial flights. These items can be shipped by Northern Air Cargo and then transferred to Bering Air, Hageland Aviation, or other area airlines. The methanol and compressed gas must be checked as cargo for Bering Air and Hageland Aviation, but may be transported on the plane with passengers.

Once in Elim, lodging can be found with the Elim City Office. The rental rate is $75 per night per person. The city facilities include living amenities such as shared stove, refrigerator and freezer, shower, and telephone. Food can be purchased at the Elim ANICA Native Store.

When staying in Nome, the Aurora Inn may be used for hotel accommodations, and several other lodging facilities are available. Vehicle reservations can be made through Stampede Car Rentals in Nome. The Aurora Inn and Stampede Car Rentals are located in the same place. A vehicle in Elim may be rented from somebody in the city if the city administrator is notified ahead of time. The availability and rental rates of vehicles vary.

For the site reconnaissance to Elim, the trip was combined with site reconnaissance trips originating in Anchorage and overnight stops in Nome between trips to Teller, Brevig Mission, Golovin and Elim, and Koyuk. Although a continuous trip that included Koyuk from Elim would have been feasible, arrangements could not be made to leave Koyuk without a delay of 2 or 3 days. For this reason, the trip to Elim from Nome was combined only with the site reconnaissance to Golovin.

1.3 Objective of Investigation

1.3.1 Purpose

The purpose of the site reconnaissance at the City of Elim was to determine the potential for environmental contamination from fuel tank farms of the city. The objective was accomplished by gathering information through interviews and environmental sampling. The information

from the site reconnaissance is used to develop an understanding of the potential extent of contamination and to assess the potential threat of the contamination to human health and the surrounding environment.

1.3.2 Work Plan

The work followed the work plan prepared for the site reconnaissance to the City of Elim in August 2001. The work plan included a Site Safety and Health Plan.

1.3.3 ADEC Cleanup Levels Used (and Justification)

Cleanup levels for the following sites are based on Method Two, in Title 18, Chapter 75, of the Alaska Administrative Code, as amended through October 28, 2000. The cleanup levels selected for Elim are based on Method Two, Under 40-Inch Zone migration to groundwater pathway. This selected method and its scenario is the most restrictive of the three scenarios included in Method Two. The selected method is appropriate for the physical conditions of the site, and may be used as an initial basis of comparison for evaluating the environmental conditions of the site. The Method Two cleanup levels are shown in Table 1-1.

Table 1-1 Method Two Cleanup Levels

Cleanup Level in Milligrams per Kilogram (mg/kg)					
GRO	DRO	Benzene	Toluene	Ethylbenzene	Xylenes
300	250	0.02	5.4	5.5	78

2.0 CITY SUMMARY

2.1 General Information

The information provided in this section was obtained from the Alaska Department of Community and Economic Development Web site (http://www.dced.state.ak.us/mra/CF_BLOCK.cfm). This information was last updated in 2001.

Elim is on the northwest shore of Norton Bay on the Seward Peninsula, 96 miles east of Nome. It lies 460 miles northwest of Anchorage at approximately 64 degrees (°) 37 minutes (′) North Latitude, 162° 15′ West Longitude (Section 15, Township 010S, Range 018W, Kateel River Meridian). Elim is located in the Cape Nome Recording District. The area encompasses 2.4 square miles of land and zero square miles of water.

The settlement of Elim was formerly the Malemiut Inupiat Eskimo Village of Nuviakchak. The Native culture was well developed and well adapted to the environment. Each tribe possessed a well-defined subsistence harvest territory. The area became a federal reindeer reserve in 1911. In 1914, Reverend L.E. Ost founded a Covenant mission and school, called Elim Mission Roadhouse. 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. The Iditarod Sled Dog Race passes through Elim each year.

Elim is an Inupiat Eskimo community with a fishing and subsistence lifestyle. The sale and importation of alcohol is banned in the city.

The Elim economy is based on subsistence harvests; cash employment is limited to fishing, the city, and the school. Unemployment is high, and seasonal part-time employment in nearby Nome has declined recently because of a depressed gold market. Thirty-nine residents hold commercial fishing permits. The city would like to develop a fish processing plant. Residents rely on fish, seal, walrus, beluga whale, reindeer, moose and garden harvests.

Water is derived from a well and is treated. Housing built by the U.S. Bureau of Indian Affairs and Housing and Urban Development and water and sewer systems built by the Public Health Service 1974 have provided residents with piped water and sewer, indoor water heaters and plumbing, and in-home washers and dryers. Wastes flow to a sewage treatment plant with ocean outfall. The landfill is not permitted through the state. The city needs a new water source because of occurring water shortages and plans to replace cracked polyvinyl chloride pipes.

Elim is reached by air travel on a routine schedule by at least two different commercial services. Recent improvements have made the state-owned airport one of the best and most modern in the region. The airport offers a 3,000-foot gravel runway. Elim Native Corporation also owns a private 4,700-foot paved airstrip with a 1,390-foot crosswind runway at Moses Point. Because the city does not have a dock, a company operating from Nome must lighter supplies to shore. Plans are being made to develop a harbor and dock, and an access road is under construction.

Elim has a subarctic climate with maritime influences. Norton Sound is ice-free generally between mid-June and mid-November. Summers are cool and moist; winters are cold and dry. Summer temperatures range between 46 degrees (°) Fahrenheit (F) and 62°F; winter temperatures range between -8°F and 8°F. Average annual precipitation is 19 inches, including approximately 80 inches of snowfall.

2.2 City Contacts

The following city contacts were made:

Darla Jemewouk, City Administrator, (907) 890-3441

Luther Nagaruk, City Clerk, (907) 890-3441

James Keef, School Principal, (907) 890-3041

Christine Amaktoolik, ANICA Store Manager, (907) 890-3281

Bob Dickens, Bering Straits School District Maintenance Manager, (907) 624–3611

2.3 Equipment in City

The City of Elim owns 11 pieces of heavy equipment, including a D8-K bulldozer, D8 bulldozer, dump truck, 410E backhoe, fuel truck, flatbed truck, Davis trailer, and various other heavy equipment. Arrangements may be made to rent the equipment, depending on availability. The city has a published fee sheet for the equipment. Most of the equipment appeared to be in working order, and three items were being repaired at this time of the visit.

2.4 Residents with 40-hour Training

Five or 6 individuals who are residents the city reportedly have current Hazardous Waste Operations and Emergency Response training. In addition, as many as five more individuals are believed to have received the initial training, but may not be current in their training requirements.

2.5 Buried Utilities

Water and sewer lines are buried along the roads of the city, and the city has as-builts showing their locations and depths. Electric and telephone lines are above ground and supported on utility poles.

2.6 Tank Farm Locations

The locations of the four tank farm in the City of Elim are shown in Figure 2-1.

2.7 Water Supply Locations

Water is obtained from a small spring and stream northeast of the city. The water is pumped from the spring, and in dry times, from the surface stream (referred to as Elim Creek) to a water storage tank where it is distributed to the residents of Elim.

2.8 Landfill Location

The Elim landfill is approximately 2 miles east of the City of Elim along the Moses Point Road. An access road to the landfill is located on the south side of the Moses Point Road and is about 400 feet long.

2.9 Source Material Site Locations

Two pits are used as borrow sources in the Elim area, both along the Moses Point Road, east of the city. One pit is near the landfill on the north side of the Moses Point Road; the other pit is a few miles beyond the landfill. Several other potential borrow sources are reported to exist and to be available for use if the existing sites are not adequate.

2.10 Subsistence and Recreational Areas

The Elim area is generally a subsistence region. Caribou are said to migrate along the Moses Point Road about 2 miles east of the city, and are hunted for subsistence use. Subsistence hunting occurs in the region surrounding Elim, with the people hunting moose, fox, rabbit, wolverine, wolf, bear, and squirrel. In the winter, ice fishing occurs in the area, often not more than one-quarter to one-half mile off the south side of the city shoreline. In addition, the ocean is used to hunt whale and waterfowl in the spring and fall. Recreation occurs throughout the area of Elim, and people use four-wheelers and snow machines for recreation year-round. A camp used for subsistence hunting and fishing and for recreation lies outside the city about 8 to 10 miles in an area called Moses Point.

3.0 SITE INFORMATION AND FINDINGS

The location of the soil samples was selected by evaluating the condition of the tank farm and the slope of the terrain surrounding the tank farm. Locations where soil samples were collected for laboratory analysis were selected with the following approach:

- Judging where contamination may most likely travel from a fuel release, based on the site terrain;
- Identifying where obvious contamination is present (soil staining, odor, etc.) or would be most likely to have traveled downgradient from the tank farm; and
- Locating a specific site or area, based on information from an interview.

The physical site investigation consisted of walking around the tank farm and its surrounding area. Staining, slope of the surface, stressed vegetation, and the condition of the tank farm and its tanks were observed. In areas where the presence of contamination was believed to be possible, a metal detector was used to determine the absence of buried metal (and utility lines). After digging into the ground, the appearance of the soil was observed, and the PID meter was used to determine whether volatile hydrocarbons could be detected.

In locations having the highest likelihood for potential contamination, a soil sample was collected and tested with use of the PID meter. A portion of each sample was saved in a Ziplock bag for subsequent PetroFlag testing. The soil samples were placed into the appropriate glass jars, labeled, and kept within eyesight during the site investigation. The soils were prepared for shipment under chain of custody, and sent by cargo transport to CT&E Analytical Laboratory in Anchorage, Alaska, for laboratory analysis. It should be noted that there was no attempt made to maintain the samples on ice. This approach to handling the samples is consistent with the objectives of the site reconnaissance.

As a matter of record, the location of each sample site was recorded with a hand-held global positioning system (GPS) unit. The averaging function was used, and at least 100 counts were made before the position was recorded. The accuracy of the data was read from the GPS unit and recorded in the field notes (Appendix B).

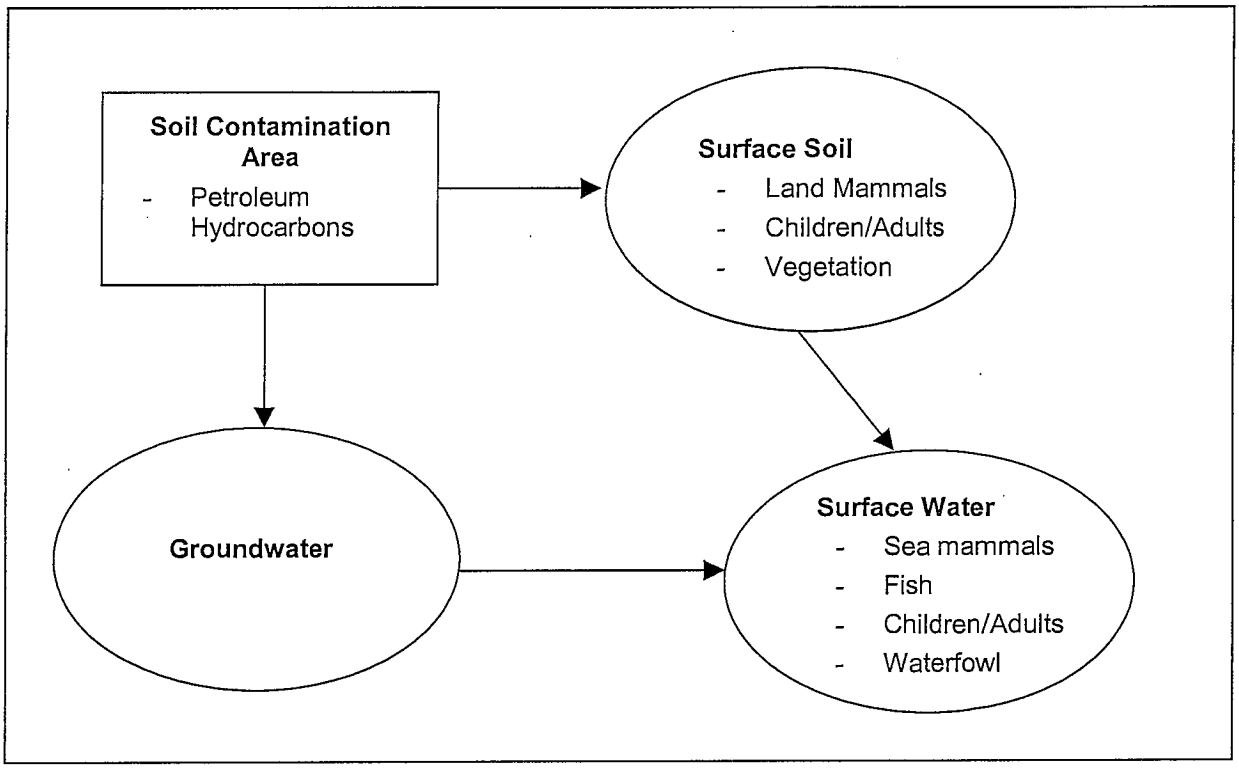
Typical sampling included exposing a soil sample area by removing any vegetation cover with the use of a shovel, then using a hand auger to reach a particular soil depth. In some cases, a deeper sample could not be collected; for example, when large rocks or bedrock were encountered and when loose gravel collapsed into the sample hole.

The records of activities associated with this site reconnaissance are provided in the photographs in Appendix A. Copies of the field notes are provided in Appendix B. Appendix C contains the chain-of-custody form for the samples and the analytical report. Appendices D and E are not used.

The land surface of Elim generally slopes southward to Norton Bay. A construction worker involved with the construction of the new school indicated that the Elim area is underlain with a basalt-like material that is relatively shallow in some areas (less than 10 feet). Surface runoff in the area generally flows south to Norton Bay, and any groundwater would likely also flow in the same direction. A creek, referred to as Elim Creek, runs through the city area and into Norton Bay.

A general conceptual site model, shown in Figure 3-1, identifies the potential fate of any contaminants in the area. In general, surface and groundwater contaminants of Elim tank farms would eventually reach Elim Creek and finally Norton Bay, where exposure of fish and wildlife to the contaminant could cause secondary exposure to human health. Other potential routes of exposure to contaminants in Elim include inhalation of volatile contaminants and ingestion of surface soil contaminants such as berries and other foods.

Figure 3-1 General Site Conceptual Model for the Elim Tank Farm Sites



3.1 ANICA Native Store Old Tank Farm Site

3.1.1 Site Description

Located at GPS coordinates North 64° 36′ 57.3 seconds(″) West 162° 15′ 34.6″, this site (Photograph 1 and Figure 2-1) is an empty gravel lot where a gasoline tank farm reportedly had been located. According to interviews, a fuel release occurred in the area before the tank was removed, and the U.S. Coast Guard and ADEC had been involved with the spill response. The city clerk and a village elder, Luther Nagaruk, who maintains and oversees the operations of city sites, indicated that the spill reached the Norton Bay waters and required extensive remediation. It was reported that the contaminated soil was removed and the area was filled with clean soil.

3.1.2 Site Reconnaissance

The site is located at the edge of an area at approximately the same elevation as the nearby buildings. The area is on the edge of a minor sea bluff, raised approximately 10 to 15 feet above the nearby beach and sea, south of the site. The ANICA store is located across the road that runs adjacent to the site and is north of the abandoned site. At the time of the visit, minor amounts of debris were observed at the site, but no apparent staining or noticeable petroleum odor was noted. Vegetation was growing sparsely throughout the area, but signs of stresses vegetation were not identified.

Soil Sample Collection. After the property was visually examined and PID readings were taken at the surface, one soil sample was collected at the north edge of the property at a depth of approximately 2 feet below ground surface (bgs). The sample was tested with a PID meter. The soil was a sandy material with large pebbles.

3.1.3 Laboratory Analytical Results

Results of analysis are summarized in Table 3-1. As indicated, the soil has no detected concentration of gasoline-range organics (GRO) and a DRO concentration of 152 milligrams per kilogram. In addition, the soil contained no detectable concentration of volatile organic hydrocarbons (see Table 3-2).

Table 3-1 ANICA Native Store Old Tank Farm Site Sampling Results

Sample Number	GPS Coordinates	Sample Core Depth (feet)	PID Reading (ppm)	PetroFlag Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)
ELM-S-001	North 64° 36' 57.3" West 162° 15' 34.6"	2	0	N/R	U (3.7)	152

N/R = not recorded
ppm = parts per million
U (##) = undetected at the limit value amount

Table 3-2 BTEX Analytical Results for Soil Sample ELM-S-001 at the ANICA Native Store Old Tank Farm Site

Analytical Results in Milligrams per Kilogram (mg/kg)				
Benzene	Toluene	Ethylbenzene	o-Xylene	p&m-Xylene
U (0.0019)	U (0.037)	U (0.037)	U (0.037)	U (0.075)

BTEX = benzene, toluene, ethylbenzene, and xylenes
U (###) = undetected at the limit value amount

3.1.4 Discussion and Conclusions

Table 3-3 summarizes sample types, general sample locations, and rationale based on the site conceptual model shown in Figure 3-1. Limited information indicates that the soil of the area contains relatively minor concentrations of DRO material. No further assessment of this area is

recommended until after a search is performed to determine the history of the site and what actions were taken to remove reported contamination of the site soil. If it is found that no cleanup has been performed, the reasons should be evaluated to determine whether additional site investigation is required to identify extent and location of contamination. No further site investigation is recommended, based on the available information.

Table 3-3 Future Sampling Rationale for the ANICA Native Store Old Tank Farm Site

Sample Media	Location	Rationale or Action
Groundwater	Downgradient from suspected source area	No action is recommended.
Surface Soil	Various locations within the tank pit	Contaminants possibly leaching from surface soil into groundwater and surface water. No sampling is recommended. Review of historical files is recommended
	Area surrounding tank	No action is recommended.
Subsurface Soil	In tank farm and surrounding area	No action is recommended.
Surface Water	Downgradient from suspected source area	No action is recommended.

3.2 AVEC Tank Farm

3.2.1 Site Description

This site (Photographs 2 and 3 and Figure 2-1) is located at GPS coordinates North 64° 36′ 59.3″ West 162° 15′ 46.8″. It consists of nine vertical tanks that are reportedly used to store diesel fuel for the power plant.

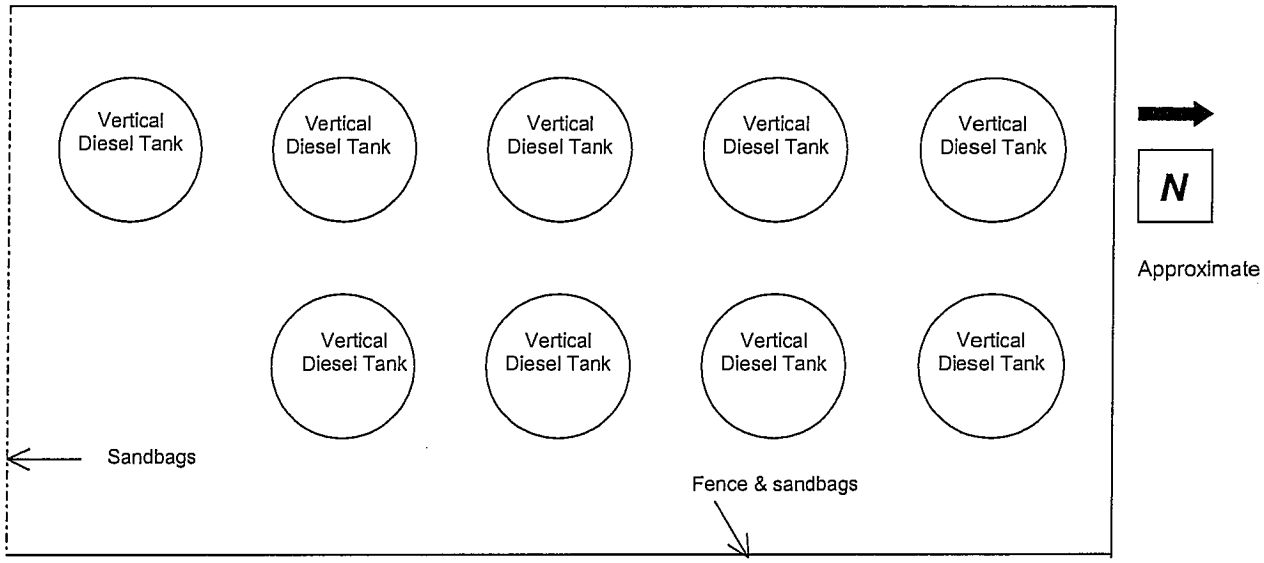
The information about this tank farm was derived from discussions with Mark Tietzel of AVEC in Anchorage. Mr. Tietzel provided as-builts of the facility and referred the field crew to one of the plant operators who mentioned that he was unaware of any historical spills at the tank farm.

The power plant (south of the tank farm) and tank farm are surrounded by a fence, and sandbags surround the tank farm within the fence. The fenced area is bordered on each of its four sides by roads, and the terrain slopes eastward. East and across the road from the tank farm is a residential house, and additional houses are located farther east.

3.2.2 Site Reconnaissance

The tank farm is surrounded by fencing, and contains several 55-gallon fuel drums and other smaller containers. The fuel tanks appeared to be in good condition, with the southern tanks being in the best condition. The surface of the northern tanks showed signs of rust. The tanks rested on wooden platforms. The wooden platforms and sand bags appeared to be in good condition. No liner was observed. Vegetation was noted surrounding the fenced area. Figure 3-2 shows the relative position of the various tanks.

Figure 3-2 Layout of the Alaska Village Electric Cooperative (AVEC) Tank Farm



Note: Figure is not to scale.

Soil Sample Collection. Soil sample ELM-S-002 was screened with a PID and submitted for laboratory and PetroFlag analysis. The sample was collected at approximately 2 feet bgs, on the east side of the tank farm, approximately 30 feet north of its southeast corner and approximately 3 feet east of the fence. The soil was a sandy gravel-like material and included a slate-like shale material. As indicated in Table 3-4, the soil had a relatively low reading from the PID meter, and contained a relatively low concentration of DRO.

A soil sample was also collected in the ditch on the east side of the road adjacent to the east side of the tank farm. The ditch was downgradient from the tank farm, adjacent to a residential yard, and contained soil that was a sandy loam-like material. Sample ELM-S-003 was collected at a point approximately 30 feet east of the tank farm fence and approximately 2 feet deep. Another sample, ELM-S-003a, was collected at 4 feet bgs.

3.2.3 Laboratory Analytical Results

Table 3-4 summarizes the results of analysis. As indicated, the soil contains relatively low concentrations of DRO material at a depth of 2 feet bgs near the tank farm (on its downgradient east side), and no contamination was identified across the road and down gradient from the tank farm (near the neighboring residence).

Table 3-4 AVEC Tank Farm Sampling Results

Sample Number	GPS Coordinates	Sample Core Depth (feet)	PID Reading (ppm)	PetroFlag Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)
ELM-S-002	North 64° 36' 59.3" West 162° 15' 46.8"	2	0.8	330	N/A	212
ELM-S-003	North 64° 36' 59.4" West 162° 15' 46.3"	2	N/R	0	N/A	U(12.4)
ELM-S-003a	North 64° 36' 59.4" West 162° 15' 46.3"	4	N/R	0	N/A	N/A

N/A = no analysis requested
N/R = not recorded
ppm = parts per million

3.2.4 Discussion and Conclusions

According to the site conceptual model shown in Figure 3-1 and results of analysis, it is apparent that any petroleum contamination from the site would be limited to the soils immediately beneath the tank farm. When the tank farm is decommissioned, additional sampling should be conducted to determine whether any contamination is present beneath the tank farm. While the AVEC Tank Farm is in operation, no additional site investigation is recommended. Table 3-5 summarizes the rationale for any additional sampling for the site.

Table 3-5 Future Sampling Rationale for the AVEC Tank Farm

Sample Media	Location	Rationale or Action
Groundwater	Downgradient from a suspected source area	No additional sampling is recommended.
Surface Soil	Various locations within the tank farm	Define immediate extent of potential contamination when tank farm is decommissioned.
Subsurface Soil	In tank farm and surrounding area	No additional sampling is recommended.
Surface Water	Downgradient from a suspected source area	No additional sampling is recommended.

3.3 City of Elim Tank Farm

3.3.1 Site Description

The City of Elim Tank Farm site (Photographs 4 through 6 and Figure 2-1), located at GPS coordinates North 64° 37′ 04.0″ West 162° 15′ 33.7″, consists of four vertical fuel tanks. The tank farm is adjacent to city roads on its north and east sides, and is approximately 50 feet north of the city water tank (Photograph 5). There is no fence or berm around the tanks, which are connected by a piping system that lies near the ground surface. The two western tanks have a relatively small, lined gravel diking system, and are upgradient from the adjacent area immediately south of the west tanks. The area of the two eastern tanks slopes eastward and has no diking or berms around it. The tanks in the east area appeared to be resting partially on the ground and partially on lumber. The four tanks are rusted and reportedly store heating fuel (diesel #1). Between the east and west tanks is a skid-mounted fueling station. Figure 3-3 shows the relative positions of the tanks and the piping arrangement among the tanks.

3.3.2 Site Reconnaissance

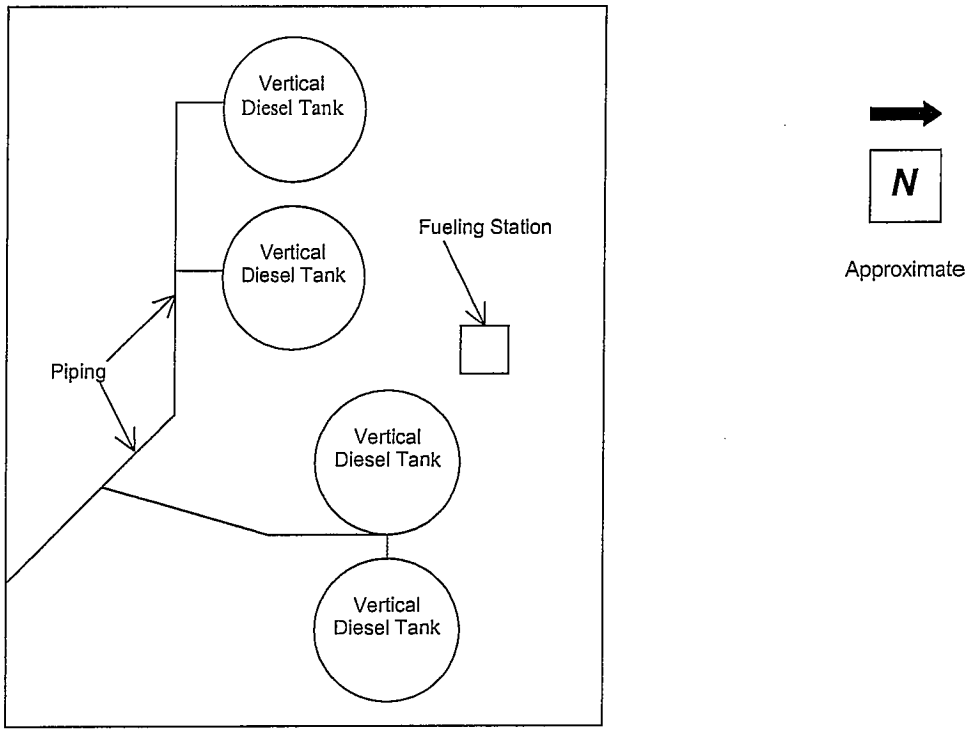
The soil in the tank farm area was similar to its surroundings in the area south of the tank farm. Surface material on the north side of the tanks appeared to be a fill material, with no vegetation, and obviously supporting vehicle traffic. A city resident indicated that the fueling station is active.

The general terrain of the area slopes downward primarily toward the east. Surface and groundwater would travel eastward toward nearby Elim Creek, which empties into the Norton Bay on the south side of the city.

Soil Sample Collection. Sample ELM-S0004 was collected at approximately 5 feet bgs. The soil was a sandy-loam containing small pebbles. The sample was taken in an area downgradient from the west tanks on their south side.

Sample ELM-S-005 was collected approximately 5 feet east of the bermed area and south of the fueling station, at a location where the surface material had the same appearance as the nearby road. The soil was highly compacted, consistent with that of the road material. Because an odor was noted in the soil at various locations south of the bermed area, additional samples were collected and subsequently analyzed at an analytical laboratory and with

Figure 3-3 Layout of the City of Elim Tank Farm



Note: Figure is not to scale.

PetroFlag kits. As the sampling progressed, it became evident through the level of the odor that the odor probably originated from the fueling station, not the tank farm tanks. Sample ELM-S-005a was taken 20 feet east of the berm and east of the fuel station. Sample ELM-S-005b was taken approximately midway between the north and south ends of the east berm, and approximately 3 feet from the east berm. Sample ELM-S-005c was collected 40 feet from the east side of the berm, and sample ELM-S-005d was taken approximately 50 feet from the east berm at a downgradient location east of the fueling station, where drainage flows directly to Elim Creek. Sample ELM-S-005e was collected near the southeast corner of the bermed area.

3.3.3 Laboratory Analytical Results

The results of analysis and testing are summarized in Table 3-6.

Table 3-6 City of Elim Tank Farm Sampling Results

Sample Number	GPS Coordinates	Sample Core Depth (feet)	PID Reading (ppm)	PetroFlag Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)
ELM-S-004	North 64° 37' 03.9" West 162° 15' 34.3"	5	0	0	N/A	U (11.8)
ELM-S-005	North 64° 37' 04.0" West 162° 15' 33.7"	1	N/R	N/R	N/A	176
ELM-S-005a	N/R	1	N/R	1,996	N/A	N/A
ELM-S-005b	N/R	1	N/R	N/R	N/A	N/A
ELM-S-005c	N/R	1	N/R	1,657	N/A	N/A
ELM-S-005d	N/R	1	N/R	579	N/A	N/A
ELM-S-005e	N/R	1	N/R	49	N/A	N/A

N/A = no analysis requested
N/R = not recorded
ppm = parts per million

3.3.4 Discussion and Conclusions

Soil contamination in the area appears to be associated with the fueling station. Although nobody contacted recollected spills from the tanks of the tank farm, it was evident from the

appearance of the soil around the fueling station that leaks have occurred at the fueling station. The extent of contamination is apparently limited to an area approximately 50 feet east of the fueling tank and in a plume probably less than 20 feet wide immediately in front of the fueling tank. The depth of contamination is not known.

Until the soil at the City of Elim Tank Farm can be further evaluated, it is recommended that, good housekeeping methods should be established and implemented to avoid further spills from operating the furling tank. Table 3-7 summarizes the reasoning for any additional sampling at the site.

Table 3-7 Future Sampling Rationale for the City of Elim Tank Farm

Sample Media	Location	Rationale or Action
Groundwater	Downgradient from suspected source area	No additional sampling is warranted or recommended.
Surface Soil	Various locations east of the fueling tank	Define extent of contamination for purpose of potential remedial activities. No additional sampling is warranted or recommended.
Subsurface Soil	Various locations throughout the tank area and along pipeline appear clean, except downgradient from the fueling tank	Contaminants possibly migrating downward. Extent of depth of DRO contamination is undefined. No additional sampling recommended if good housekeeping methods are established and implemented.
Surface Water	Downgradient from suspected source area	No effect likely, and additional sampling not warranted or recommended.

3.4 City of Elim Shop Old Tank Farm Site

3.4.1 Site Description

The site is on the north side of the city (Figure 2-1) in an area that had reportedly been owned by the Alaska Department of Transportation and Public Facilities, which had deeded the property to the city. The area consists of a shop on the south part of the property, a large lot behind (north of) the shop used as an equipment lay-down area, and an abandoned tank farm area (in the farthest northeast corner) where the remaining flattened, raised gravel area is evidence of the abandoned tank farm. The tank farm area (Photograph 7) is upgradient to a forested area on the east side of the tank farm and at a level with the forested area adjacent to the north side of the tank farm.

The open area between the shop and the tank farm held various types of building debris and abandoned vehicles and equipment, some of which appeared to be under repair. There was noticeable surface soil staining within the equipment lay-down area.

The tank farm appears to have a liner beneath the surface soil within the bermed tank farm area. Several sealed 55-gallon drums were resting on wooden pallets within the tank farm area, which had berms on three of its sides. The berms were probably built as part of the tank farm. The berm on the west side of the tank farm was apparently removed to provide traffic access into the tank farm area. Remnants of two tanks can be seen as footprints within the bermed

area. Various types of debris are piled on the east side of the tank farm in an area that separates the tank farm from the downgradient forest.

The 55-gallon drums in the area were reportedly full of heating fuel salvaged as part of the tank decommissioning. The fuel is being distributed to the community elders as they need it, and will eventually be gone from the site. There is no history of spills from tanks that had been at the site.

3.4.2 Site Reconnaissance

The land surface in the area slopes downward toward the east. Any surface water from the area drains toward Elim Creek toward the middle of town, and eventually empties into Norton Bay. Groundwater in the area likely drains similarly.

Soil Sample Collection. Sample ELM-S-006 was collected on the east side of the tank farm, approximately 20 feet from the berm, midway along the length of the berm. The sample was collected from a depth of approximately 2 feet bgs and consisted of large gravel and silt-like material. The material was most likely part of the fill used to prepare and level the equipment lay-down yard.

Samples ELM-S-007 and its duplicate ELM-S-008 were collected at the southeast corner berm, approximately 10 feet east of the corner. The samples were collected at approximately 2 feet bgs and consisted of large gravel and silt-like material. The material was most likely imported fill used to level the equipment lay-down yard.

3.4.3 Laboratory Analytical Results

The results of analysis are summarized in Table 3-8.

Table 3-8 City of Elim Shop Old Tank Farm Site Analytical Results

Sample Number	GPS Coordinates	Sample Core Depth (feet)	PID Reading (ppm)	PetroFlag Reading (ppm)	GRO (mg/kg)	DRO (mg/kg)
ELM-S-006	North 64° 37' 07.9" West 162° 15' 38.6"	2	N/R	0	N/A	U(11.6)
ELM-S-007	North 64° 37' 07.8" West 162° 15' 38.6"	2	N/R	286	N/A	15.4
ELM-S-008	Duplicate of -007	N/R	N/R	N/R	N/A	12.7

N/A = no analysis requested
N/R = not recorded
ppm = parts per million

3.4.4 Discussion and Conclusions

As indicated in Table 3-8, relatively low concentrations of DRO are present in the soil on the east side of the tank farm. Sampling in the area was difficult because of the nature of the soil, and because of the debris in areas where samples may have been collected. The surface of the forested area downgradient from the tank farm was inspected and did not appear to have

staining. The absence of visual signs of spills and the results of analysis indicate that petroleum contamination from the tank farm is probably limited. When the tank farm berms are demolished, the area beneath the tanks farm should be examined to confirm the absence of contamination. Whenever the site is further evaluated, additional samples should be collected below the fill material in the yard to evaluate the condition of the natural soil. Future sampling recommendations are shown in Table 3-7.

Table 3-7 Future Sampling Rationale for the City of Elim Shop Old Tank Farm Site

Sample Media	Location	Rationale
Groundwater	Downgradient from suspected source area	No groundwater was found to be affected, and no sampling is warranted or recommended.
Surface Soil	Various locations throughout the tank farm area	Contaminants are possibly present beneath liner. Confirmation sampling is recommended when the tank farm is demolished.
Subsurface Soil	Various locations throughout the tank area and along pipeline	Confirmation sampling is recommended when the tank farm is demolished.
Surface Water	Downgradient from suspected source area	Surface water runoff does not likely contain contaminants from the tank farm. No additional sampling is recommended.

4.0 SUMMARY OF SITE FINDINGS

Table 4-1 summarizes pertinent information for the four tank farms in Elim where site reconnaissance activities were performed.

Table 4-1 Site Summaries

Site Name	Status	Owner/ Operator	Spill Summary	Identified Spills/ Observations	Point of Contact/ Phone Number
ANICA Native Store Old Tank Farm Site	Abandoned	ANICA	A large spill in 1994. Coast Guard. ADEC reportedly responded	No stained soil or stressed vegetation observed at this site.	Christine Amaktoolik (907) 890-3281
AVEC Tank Farm	Active	Alaska Village Electric Cooperative	No spills identified	No stained soil or stressed vegetation observed at this site.	Mark Teitzel (907) 561-1818 or (800) 478-1818
City of Elim Tank Farm	Active, and pending consolidation.	City of Elim	No spills identified	Some staining observed near the pump station. Slight leaking around the valve of one of the tanks	Luther Nagaruk (907) 890-3441
City of Elim Shop Old Tank Farm Site	Abandoned. Berm, liner, and soil fill remain.	City of Elim	No spills identified.	No stained soil was observed in tank farm area, but stained soil was observed in equipment lay-down area.	Luther Nagaruk (907) 890-3441

5.0 SUMMARY OF ASSESSMENT AND REMEDIATION RECOMMENDATIONS

The site reconnaissance evaluated the soil conditions at four sites. By selecting soil sampling locations and relying on the observation, field judgment, and field instrumentation, an effort was made to identify potential contamination from four different tank farms in Elim. None of the several samples collected exceeded the cleanup levels for the particular parameters described in the ADEC cleanup criteria, and no volatile organics were identified from the abandoned gasoline tank farm.

ANICA Native Store Old Tank Farm Site. Sampling at this site indicated the presence of DRO at a concentration below the cleanup level. It is recommended that a search of the ADEC records be performed to determine the extent of reported gasoline contamination and cleanup at this site. Surface soil in the area appeared to be similar throughout, and it was not evident that clean fill had been imported to replace contaminated soils that reportedly had been removed from the site during remediation.

AVEC Tank Farm. One soil sample from an area near the fence had a relatively low DRO concentration, and the sample collected downgradient from the area had no detectable DRO concentration. No further site investigation is recommended for this site until the site is decommissioned. Additional sampling is recommended in areas beneath the tanks, when the tanks are removed, to identify the presence of any localized contamination.

City of Elim Tank Farm. The fueling tank associated with the City of Elim Tank Farm appears to be leaking fuel as part of its operations. Although analytical results indicated the presence of DRO below cleanup levels, field techniques indicated that presence of contamination 50 feet downgradient from the fueling tank, and in an area approximately 20 feet wide. The depth of the contamination has not been identified. It is recommended that good housekeeping methods be established and implemented to avoid further spills.

City of Elim Shop Old Tank Farm. At the City of Elim Shop Old Tank Farm site, a relatively low DRO concentration was identified in a soil sample from the southeast corner of the abandoned tank farm. Sampling at this site was relatively shallow, and additional sampling should be performed beneath the area of the two tank footprints within the bermed area when the tank farm area is decommissioned and the liner is removed. Sampling should include soils from the native soil beneath the fill material that was imported to construct and level the tank farm.

6.0 SUMMARY OF ACCIDENTS AND INCIDENTS

No accidents or incidents occurred during or as part of the site reconnaissance.

Appendix C – 2010 Property Assessment and Cleanup Plan

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

By:
SLR International Corp
April 2010

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

April 2010

Prepared by

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

3455 Rewak Drive, Suite 103
Fairbanks, Alaska 99709

SLR Project Number
005.0065.09013

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

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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CONTENTS (CONTINUED)

CONTENTS (CONTINUED)

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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

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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.