

Formerly Used Defense Sites Program

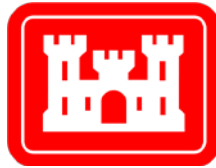
DECISION DOCUMENT

COLLINSON POINT DEW LINE STATION, ALASKA

**Hazardous, Toxic, and Radioactive Waste (HTRW) Project
#F10AK0006-03**

FUDS ID: F10AK0006

April 2013



U.S. Army Corps of Engineers, Alaska District
Environmental and Special Programs Branch
P.O. Box 6898 (CEPOA-PM-ESP)
JBER, Alaska 99506-0898

F10AK000603_05.09_0500_a
200-1e

DECISION DOCUMENT

COLLINSON POINT DEW LINE STATION, ALASKA

Hazardous, Toxic, and Radioactive Waste (HTRW) Project #F10AK0006-03

April 2013

Prepared under contract #
W911KB-08-D-0005, Delivery Order #0002

Submitted To:
U.S. Army Corps of Engineers, Alaska District
P.O. Box 6898
JBER, Alaska 99506-6898

By:
Shannon & Wilson, Inc.
2355 Hill Road
Fairbanks, Alaska 99709-5326

TABLE OF CONTENTS

PART 1: DECLARATION.....	1
1.1 Site Name and Location	1
1.2 Statement of Basis and Purpose	1
1.3 Assessment of Site	1
1.4 Description of Selected Remedy	3
1.5 Statutory Determinations.....	4
1.6 Decision Document Data Certification Checklist	4
1.7 Authorizing Signatures.....	6
PART 2: DECISION SUMMARY.....	7
2.1 Site Name, Location, and Brief Description	7
2.2 Site History and Enforcement Activities.....	7
2.3 Community Participation	8
2.4 Scope and Role of Response Action	9
2.5 Site Characteristics	10
2.5.1 Site Overview.....	10
2.5.2 Site Investigations.....	11
2.5.2.1 AST Pad Area and Adjacent Pond	11
2.5.2.2 Composite Building	13
2.5.2.3 Quonset Hut #3	15
2.5.2.4 Shop Area.....	16
2.5.3 Types and Quantities of Contaminated Media.....	18
2.5.4 Conceptual Site Models	19
2.6 Current and Potential Future Site and Resource Uses.....	19
2.7 Summary of Site Risks	20
2.8 Remedial Action Objectives.....	21
2.9 Description of Alternatives	22
2.10 Comparative Analysis of Alternatives	24
2.11 Principal Threat Waste	26
2.12 Selected Remedy	27
2.13 Statutory Determinations.....	29
2.13.1 Protection of Human Health and the Environment.....	29
2.13.2 Compliance with ARARs	29
2.13.3 Cost-Effectiveness	30
2.13.4 Use of Permanent Solutions.....	30
2.13.5 Preference for Treatment as a Principal Element	31
2.14 Documentation of Significant Changes.....	31
PART 3: RESPONSIVENESS SUMMARY	32
3.1 Stakeholder Comments and Lead Agency Responses	32
PART 4: REFERENCES	34

TABLE OF CONTENTS (cont.)

TABLES

- 1 Comparison of Highest Detected COC Concentrations and Cleanup Levels
- 2 Estimated Volume of Petroleum- and PCB-Contaminated Soil and Concrete
- 3 Summary of Exposure Media, Exposure Pathways, and COCs
- 4 Substantive Oral Comments Received During Public Meeting

FIGURES

- 1 Location and Vicinity Map
- 2 Site Map and Study Areas
- 3 Estimated Areas of Soil and Concrete Exceeding Cleanup Levels
- 4 Human Health Conceptual Site Model
- 5 Ecological Conceptual Site Model

APPENDICES

- A Cumulative Risk Evaluations
- B Cost Summary for Selected Remedy
- C Applicable or Relevant and Appropriate Requirements

DECISION DOCUMENT
COLLINSON POINT DEW LINE STATION, ALASKA

PART 1: DECLARATION

This Decision Document (DD) has been prepared by the U.S. Army Corps of Engineers (USACE) to document the selected remedial action for the Collinson Point Distant Early Warning (DEW) Line Station (Collinson).

1.1 Site Name and Location

Collinson is within the North Slope Borough approximately 40 miles southwest of Kaktovik, Alaska (Figure 1). The site is within the Arctic National Wildlife Refuge (ANWR).

1.2 Statement of Basis and Purpose

This Decision Document (DD) presents the selected remedy for Collinson, which was chosen in accordance with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (NCP). This decision is based on the Administrative Record file for this site. Petroleum, oil, and lubricants (POL) contaminated sites fall under the CERCLA petroleum exclusion and are therefore being addressed under the Defense Environmental Restoration Program (DERP), as authorized in United States Code (USC), Title 10, Section 2701, et seq.. The DERP provides authority to clean up petroleum contamination when it may pose an imminent and substantial endangerment to public health, welfare or the environment. The proposed response action meets the State of Alaska Department of Environmental Conservation (ADEC) requirements for cleanup of petroleum-contaminated sites. Alaska's Site Cleanup Rules (18 AAC 75 Article 3 Oil and Other Hazardous Substances Pollution Control) are risk-based and indicative of when an imminent and substantial endangerment to the public health or welfare or the environment has been mitigated.

Detailed information supporting the selected remedial action is contained in the Administrative Record for this site, located at the U.S. Army Corps of Engineers, Alaska District Office on Joint Base Elmendorf-Richardson, Alaska and the information repository in Kaktovik, Alaska.

1.3 Assessment of Site

This Decision Document provides an overview of the Collinson Point DEW Line Station. It summarizes the site description, previous investigations and remedial activities, risk evaluation,

and the selected remedial action. This document also explains the rationale for selecting the action and is consistent with the regulations contained in the State of Alaska Administrative Code 19 AAC 75, Article 3.

Soil, sediment, and surface water samples collected during the various investigations were analyzed for fuels, fuel components, solvents, semivolatile organic compounds, polychlorinated biphenyls (PCBs), pesticides, and metals to determine if there was any hazardous contamination at the site. Levels of contaminants were screened using State [Alaska Department of Environmental Conservation (ADEC)] cleanup levels and Environmental Protection Agency (EPA) risk and cleanup levels. Sediment and surface water were determined to have contamination within acceptable levels. USACE identified two contaminants of concern (COCs) that present an unacceptable risk. The only hazardous substance that can be remediated under CERCLA was PCBs. Final cleanup levels for PCBs in surface soil at Collinson Point DEW Line Station have been determined and established by applicable and relevant or appropriate requirements (ARARs). Also in need of remediation were petroleum hydrocarbons that present an imminent and substantial endangerment. Petroleum hydrocarbons include diesel-range organics (DRO). The petroleum contamination will be cleaned up consistent with Alaska's Site Cleanup Rules.

The cleanup levels for CERCLA hazardous substances found at the site are based on applicable state requirements promulgated in Alaska Administrative Code (18 AAC 75.341(c), Table B1). The cleanup levels for petroleum hydrocarbons are based on ADEC Method 2 cleanup levels (18 AAC 75 Table B2), which are protective of human health and the environment, and allow unrestricted land use and access. These cleanup levels are also intended to be protective of wildlife resources at the site. This document also explains the rationale for selecting the action and is consistent with the regulations contained in the State of Alaska Administrative Code 18 AAC 75, Article 3.

Table 1 lists the soil and concrete COCs, the highest detected concentrations, and their cleanup levels. Figure 2 shows the study areas listed in this table.

Table 1 – Comparison of Highest Detected COC Concentrations and Cleanup Levels

Study Area	Contaminant of Concern	Highest Detected Concentration	Cleanup Level by Exposure Pathway	Source of Cleanup Level
AST Pad and AST Pond	DRO	24,200 mg/kg J	12,500 mg/kg (ingestion/inhalation)	ADEC Method 2
Composite Building Garage Area soil	PCBs	4.40 mg/kg	1 mg/kg (direct contact)	ADEC Method 2
Composite Building Garage Slab concrete	PCBs	30.7 mg/kg	1 mg/kg	ADEC Method 2 ^a
Quonset Hut #3 Area soil	PCBs	1.30 mg/kg	1 mg/kg (direct contact)	ADEC Method 2
Shop Building Area soil	DRO	22,000 mg/kg J	12,500 mg/kg (ingestion/inhalation)	ADEC Method 2
	PCBs	2.87 mg/kg	1 mg/kg (direct contact)	ADEC Method 2

Notes: J Positively identified but estimated value
 mg/kg milligrams per kilogram
^a ADEC soil cleanup level for PCBs is also being applied to concrete.

The response action selected in this DD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 Description of Selected Remedy

The USACE has selected Alternative 6, Soil Bioremediation and Off-Site PCB Disposal, as the Selected Remedy. The Selected Remedy involves excavating and treating the petroleum-contaminated soil on-site by soil bioremediation, removing and disposing PCB-contaminated soil and concrete at an off-site facility, and site restoration. Site restoration would consist of regrading the ground surface where excavation occurred on the gravel pad, and revegetating areas where excavation occurred in tundra. The areas to be addressed include the Aboveground Storage Tank (AST) Pad and Pond, Composite Building soil and slab, Quonset Hut #3 Area soil, and Shop Area soil (Figure 3).

The primary steps for the selected remedy include:

- project planning;
- mobilize personnel, equipment, and infrastructure needs;
- construct a soil bioremediation treatment cell in an acceptable location on the gravel pad;
- excavate petroleum-contaminated soil exceeding cleanup levels and place into treatment cells;
- excavate PCB-contaminated soil and concrete exceeding cleanup levels;
- demobilize personnel, equipment, infrastructure, and PCB wastes;

- treat petroleum-contaminated soil;
- transport, by barge, the PCB-contaminated soil and concrete for off-site disposal;
- restore the excavated contaminated soil areas through regrading and/or revegetation;
- decommission the soil bioremediation treatment cell once DRO concentrations are below cleanup levels; and
- close the site with No Further Action, Cleanup Complete status.

Alternative 6 was selected as the Selected Remedy because it best meets the remedial action objectives (RAOs) to prevent human exposure to COCs in soil and concrete; transport of COCs from their source areas; and risk to wildlife. The Selected Remedy uses on-site treatment of petroleum-contaminated soil and off-site disposal of PCB-contaminated soil and concrete as the most cost-effective way to meet RAOs and achieve site closure.

1.5 Statutory Determinations

The selected remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate (ARARs) (for CERCLA hazardous substances), will meet ADEC cleanup standards for petroleum hydrocarbons, is cost-effective, and uses permanent solutions to the extent practicable. Petroleum-contaminated media are excluded from regulation under CERCLA. However, the Department of Defense (DOD) can remediate releases of petroleum where the release poses an imminent and substantial endangerment to the public health or welfare or to the environment per 10 USC 2701(b)(2). The petroleum release at the Collinson Point DEW Line Station creates an imminent and substantial endangerment to public health or welfare or the environment.

This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of contaminants as a principal element through treatment). Petroleum-contaminated soil will be treated on site, resulting in permanent reduction in toxicity. The selected remedy will result in no CERCLA hazardous substances, pollutants, or contaminants remaining on-site above levels that would not allow for unlimited use and unrestricted exposure; therefore, a five-year review will not be required for this remedial action.

1.6 Decision Document Data Certification Checklist

The following information is included in the Declaration and Decision Summary sections of this DD. Additional information can be found in the Administrative Record file for this site.

- Contaminants of concern and their respective concentrations (Section 1.3);
- Baseline risk represented by the contaminants of concern (Section 2.7);
- Cleanup levels established for contaminants of concern and the basis for these levels (Section 1.3);
- How source materials constituting principal threats are addressed (Section 2.11);
- Current and reasonably anticipated future land use assumptions used in the assessment of risk (Section 2.6; groundwater is not considered an exposure medium at this site);
- Potential land use that will be available at the site as a result of the Selected Remedy (Section 2.12; groundwater is not considered an exposure medium at this site);
- Estimated capital, annual operation and maintenance (O&M), and total present work costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.10); and
- Key factor(s) that led to selecting the remedy (Section 2.12).

1.7 Authorizing Signatures

This Decision Document presents the selected remedial action of excavation and bioremediation at the Collinson Point DEW Line Station Formerly Used Defense Site (FUDES). This Decision Document will be incorporated into the Administrative File for the site which is available for public review. The U.S. Army Corps of Engineers is the lead agency under the Defense Environmental Restoration Program at the Collinson Point DEW Line Station Formerly Used Defense Site (F10AK0006), and has developed this Decision Document under CERCLA. This document, presenting a selected remedy with a present worth cost estimate of \$1.8 million, is approved by the undersigned, pursuant to Memorandum, DAIM-ZA, September 9, 2003, Subject: Policies for Staffing and Approving Decision Documents, and to Engineer Regulation 200-3-1, Formerly Used Defense Sites Program Policy.



Christopher D. Lestochi
COL, EN
Commander, Alaska District
U.S. Army Corps of Engineers

4/26/13

Date

PART 2: DECISION SUMMARY

The purpose of this section is to provide an overview of the site characteristics, alternatives evaluated, and the analysis of those options. It also identifies the Selected Remedy and explains how the remedy fulfills statutory and regulatory requirements.

2.1 Site Name, Location, and Brief Description

The Collinson Point DEW Line Station is on Alaska's North Slope approximately 40 miles southwest of Kaktovik, Alaska.

Latitude: 69.975

Longitude: -144.8408

ADEC File Number: 380.38.002

CERCLIS ID: AK8570000192

Operable Unit: Not applicable

The site is an archived CERCLA site and is not on the National Priorities List (NPL); site assessment and remediation activities are being conducted and funded by the USACE under the FUDS program. The USACE is the lead agency for CERCLA. The ADEC is the lead regulatory agency. The U.S. Fish and Wildlife Service (USFWS) is the property owner.

The Collinson Point DEW Line station was an installation of the DOD under the jurisdiction of the Department of the Air Force until August 10, 1965, when jurisdiction was passed to the Department of the Navy. The Navy filed a Notice of Intent to Relinquish on February 11, 1970. The site acreage was selected for inclusion into ANWR on December 2, 1980; transfer to the Bureau of Land Management and USFWS became effective on March 28, 1985. Management control was given to the USFWS on March 28, 1985.

From 1953 until 1962, the former Collinson Point DEW Line Station was used as a radar defense facility. Original site improvements consisted of a composite building, shop building, warehouse, a 240-foot-tall radio tower, various storage sheds, a fuel pipeline, and a fuel-storage system consisting of a pump house and ASTs. Most structures have been removed. The gravel pad remains, as does a concrete foundation for the former Composite Building.

2.2 Site History and Enforcement Activities

The sources of contamination at Collinson were ASTs, fuel-transfer piping, drums, transformers, and dump sites used during station operation. Contamination resulted from spills and leaks from

containers used during operations, and from containers, equipment, and dump areas left at the Station until removal during remedial actions in 1994 and 2000. The dumps comprise surface debris that has been buried by sediment or tidal movement; there are no landfills at the Station. Contaminated media that remain at Collinson include gravel-pad soil, tundra soil, pond water, and a concrete foundation.

Between 1985 and 2007, the USACE led several investigations to evaluate environmental contamination at the site. USACE conducted a removal action in 1994 to remove the structures on the site, and a remedial action in 2000 to remove hazardous material, debris, and petroleum-contaminated soil. Pipelines at the site have been cleaned or removed. Even after these actions were completed, some contaminated soil, tundra soil, and surface water remained. USACE conducted additional studies in 2004 and 2007 to determine the extent of the contamination remaining. As a result of the investigations, contaminants including, but not limited to, petroleum hydrocarbons and PCBs were detected in soil, surface water, and concrete at the station.

No enforcement activities have occurred at the site; the ADEC has reviewed USACE activities at the site.

2.3 Community Participation

Community participation included preparing a Proposed Plan (PP), conducting a public meeting in Kaktovik, Alaska, distributing fact sheets and other informational outreach, and soliciting comments from interested parties. The Kaveolook School library in Kaktovik houses a project information repository.

The PP (*Formerly Used Defense Sites Program, Proposed Plan, Collinson Point Distant Early Warning Line Station, February 2012*) is part of the administrative record for this project. The PP was made available to government agencies and the general public for review and comment during the public comment period, March 15 to April 16, 2012.

A public meeting was held in Kaktovik on March 21, 2012. This meeting was advertised in the *Fairbanks Daily News-Miner* (March 10 and March 17, 2012), and the (Kaktovik) *Arctic Sounder* (March 8 and March 15, 2012). The meeting was staffed by representatives of Shannon & Wilson, the USACE, ADEC, and HDR Alaska. The meeting consisted of presentations by Shannon & Wilson and the USACE and display of 10 posters describing the site history and

contaminants, proposed cleanup alternatives, site location, the remedial investigation/feasibility study (RI/FS) process, and how the public can be involved.

Prior to the public meeting, the PP was also introduced through a fact sheet designed to announce the upcoming public meeting, provide project information, describe the contaminants of concern and cleanup objectives, outline the alternatives and their evaluation criteria, and solicit comments. The fact sheet was mailed on March 6 to all post office box holders in Kaktovik. The fact sheet was also mailed to agencies, and copies were taken to the public meeting for additional distribution. Throughout this process, the public has been encouraged to comment on the preferred alternative and to offer their views on future land use.

2.4 Scope and Role of Response Action

The Collinson Point DEW Line Station is considered a single site for the purposes of the overall cleanup plan. The overall strategy for site remediation is to remove sources of contamination from the site, address COCs, and achieve site closure that allows for unrestricted future site use.

One removal action and one remedial action have already been conducted at Collinson. No structures remain at the site but several discrete areas of contaminated soil and a concrete pad are present; these will be addressed by the Selected Remedy described in this DD.

Previous response actions undertaken by the USACE at Collinson included:

- 1994 Removal Action: Environmental Management, Inc., under contract to the USACE, conducted a removal action at Collinson in 1994. Its objective was to remove hazardous and nonhazardous materials from the site, including:
 - shop building and foundation demolition debris;
 - miscellaneous steel and concrete;
 - asbestos-containing materials;
 - batteries and miscellaneous hazardous debris;
 - POL liquids; and
 - lead- and petroleum-contaminated soil.

- 2000 Remedial Action: EMCON, under contract to the USACE, performed a remedial action at Collinson in 2000 to demolish and remove from the site those buildings, equipment, and debris remaining after the previous removal action. Site activities included:
 - hazardous material abatement;

- building demolition;
- miscellaneous debris and equipment removal;
- selective petroleum-contaminated soil removal;
- soil and waste sampling and analysis;
- site restoration; and
- off-site transportation and disposal of wastes.

The Selected Remedy documented in this DD is intended to be the final step in the overall cleanup strategy, and is expected to result in site closure with unrestricted future land use. The purpose of the Selected Remedy is to remove COCs in soil and concrete. The planned sequence of actions describe in this DD include:

- prepare planning documents, obtain permits for off-site activities;
- mobilize camp and equipment to the site by barge;
- construct the petroleum-contaminated soil treatment cell(s);
- excavate petroleum-contaminated soil and place it in the cell(s) for treatment;
- excavate PCB-contaminated soil and concrete and prepare for shipment to off-site disposal facility;
- demobilize camp, transport PCB-contaminated materials for off-site disposal;
- return to site to periodically monitor the petroleum-contaminated soil treatment process until contaminant concentrations are below cleanup levels; and
- decommission treatment cell(s).

2.5 Site Characteristics

2.5.1 Site Overview

Collinson is on a low coastal plain with elevations of approximately 10 feet to 15 feet above sea level along Simpson Cove. It is a remote site with no support infrastructure. The DEW Line Station facilities were constructed on gravel pads on top of and surrounded by tundra; the facilities have been demolished but the gravel pads remain. The gravel pad and surrounding tundra comprise the approximately 20-acre site. Many shallow tundra ponds are adjacent to or near the site. The tundra areas and shallow ponds are designated as jurisdictional wetlands according to the National Wetlands Inventory map for Mt Michelson (D-2). The gravel pad areas are considered uplands.

Collinson Point site lies within the Arctic National Wildlife Refuge, under the jurisdiction of the U.S. Fish and Wildlife Service. The Arctic National Wildlife Refuge is home to some of the most diverse wildlife in the arctic including 42 fish species, 37 land mammals, 8 marine

mammals, and more than 200 migratory and resident bird species. A variety of migratory birds utilize the coastal plain, including Collinson Point, during the summer breeding season.

Simpson Cove supports habitat for a diverse range of biota, benthic, and pelagic organisms. The site is within federally-designated critical habitat for the threatened species, polar bear. According to the U.S. Fish and Wildlife Service, the selected remedy could affect critical habitat of the polar bear. Barrier islands of the site area also designated as critical habitat areas, and inland areas of the site are designated as terrestrial denning critical habitat. Polar bears utilize the coast as a travel corridor during summer. The site is within a “no disturbance zone” for critical habitat areas. Coastal erosion has been documented along the shoreline adjacent to the Collinson Point site and contaminated areas of the site are at risk of eroding into the sea.

The local geology is typical of Alaska’s northern coastal plain, consisting of a surface layer of organic-rich soil and arctic vegetation underlain with a mixture of permanently frozen sand, silt, and gravel. Surface soil typically thaws to a depth of 18 inches to 24 inches in summer. Groundwater is present in the shallow layer of soil which thaws in the summer. There are no known Alaska Native cultural resources at Collinson Point DEW Line Station.

Site-specific factors that may affect response actions at the site include its remote location and the relatively short summer field season. The site’s remoteness and absence of infrastructure creates logistical challenges to constructing and maintaining a camp and performing the response action. The Arctic coastal region has a relatively short summer season, and the petroleum-contaminated soil treatment cell(s) will be frozen for much of the year.

2.5.2 Site Investigations

The USACE conducted site characterization activities on seven occasions between 1985 and 2007, variously collecting samples of soil, sediment, and surface water. They targeted areas suspected to be contaminated. Based on a review of these site characterization events, the USACE proposes to conduct remedial actions at four areas around the site. Figure 3 shows these locations, which are described below:

2.5.2.1 AST Pad Area and Adjacent Pond

The AST Pad and adjacent pond are recommended for cleanup due to DRO concentrations in soil exceeding ADEC Method 2 cleanup levels and DRO and residual-range organics (RRO) in surface water exceeding ADEC Table C groundwater cleanup levels. The

AST Pad includes the former fuel Pumphouse and AST filling stands to the east. The 6.5-inch-diameter POL pipeline ran on the western side of the gravel pad to the Pumphouse. The ASTs were apparently removed before 1985. Natural tundra ponds are east and west of the former Pumphouse/ASTs; the pond to the east is called the AST Pond. The unnamed ponds to the west appear dry in some photographs. The ADEC has determined that the tundra pond areas are considered soil, based on the ephemeral nature of the ponds.

The AST Pad and AST Pond were first investigated in 1989, when petroleum hydrocarbon contamination was found in the soil, tundra soil, and water. It was investigated again in 2000, 2004, and 2007.

In 2000, the USACE excavated about 24 tons of petroleum-contaminated soil from the Pumphouse and AST area. They demolished the Pumphouse and removed the associated piping and risers, including the pipelines to the Warehouse and Composite Building. Following excavation and sampling, they also placed about 1 foot of fill material over the AST Pad (EMCON, 2001).

The USACE collected 15 soil samples from the limits of excavation; these were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX), gasoline-range organics (GRO), DRO, RRO, lead, pesticides, and PCBs. They also collected two soil samples for analysis of these compounds, as well as volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs). BTEX, GRO, DRO, RRO, lead, gamma-hexachlorocyclohexane (the pesticide Lindane), and benzyl butyl phthalate were detected in the AST Pad soil samples, but at concentrations below cleanup levels.

In 2000, two surface-water and two tundra soil samples were collected from the west end of the AST Pond (adjacent to the AST Pad). DRO was detected above the ADEC Table C groundwater cleanup level of 1.5 milligrams per liter (mg/L) in one of the water samples; the remaining analytes were below cleanup levels. In soil, DRO was detected at 18,000 milligrams per kilogram (mg/kg) in one of two samples, greater than the ADEC Table B soil cleanup level of 12,500 mg/kg; the polynuclear aromatic hydrocarbons (PAHs) naphthalene, phenanthrene, fluoranthene, and pyrene were also detected, but below Table B soil cleanup levels.

The USACE collected four soil samples from the former AST area and associated Pumphouse for analysis of DRO, RRO, and BTEX in 2004. While all results were less than the ADEC Table B soil cleanup levels, most samples exhibited a sheen and strong hydrocarbon odor.

The USACE collected one surface-water and two tundra soil samples from the AST Pond for analysis of DRO, RRO, PAHs, and BTEX in 2004. Of these analytes, DRO and RRO were detected above ADEC Table C groundwater cleanup levels in the water sample. DRO was detected in tundra soil above the ADEC Table B soil-cleanup level of 12,500 mg/kg; the PAHs fluorene, naphthalene, phenanthrene, and pyrene were also detected, but below ADEC Table B cleanup levels. No sheen was noted on the surface water, and total aromatic hydrocarbon (TAH) and total aqueous hydrocarbon (TAqH) concentrations did not exceed ADEC water quality standards. USACE concluded “most of this contamination is located at the western and southern portions of the pond” (USACE, 2005).

In 2007, three soil samples were collected from the AST Pad adjacent to the AST Pond, two surface-water samples from the north and south ends of the AST Pond, and two tundra soil samples from the east end of the AST Pond. Detected analytes in the soil, surface water, and tundra soil samples were below cleanup levels; TAH and TAqH were below ADEC water-quality standards. No sheen was observed on the surface water in 2007.

DRO and RRO were reported above ADEC Table C groundwater cleanup levels in the AST Pond surface water and DRO was reported above the ADEC Table B soil cleanup level in tundra soil. The AST Pad appears to be the source of the historical sheen in the AST Pond, which is a violation of Alaska water-quality standards. The estimated volume of petroleum-contaminated soil requiring excavation and treatment is 185 cubic yards, extending over an area of 50 feet by 50 feet and 2 feet depth.

2.5.2.2 Composite Building

The Composite Building is recommended for cleanup due to the presence of PCBs in soil and concrete, at concentrations exceeding ADEC cleanup levels. The Composite Building was a 30-foot by 130-foot structure, with a garage on a concrete slab-on-grade floor at its west end (22-foot by 24-foot area). The remainder of the building was founded on wooden pilings, housing generators and electronic equipment. POL piping entered the building at its east end, where the generators were located. Several samples of environmental media were collected from this area by various entities through 2004.

The USACE’s 1985 composite soil sample collected south of the Composite Building contained 0.1 mg/kg PCBs and 41 micrograms per kilogram ($\mu\text{g}/\text{kg}$) of methylene chloride.

In 1989, nine soil samples were collected under and around the Composite Building. PCBs were detected in three samples, at up to 1.52 mg/kg. The pesticides 4,4'-dichlorodiphenyl dichloroethane (4,4'-DDD) and 4,4'-dichlorodiphenyl trichloroethane (4,4'-DDT) were also detected, but at concentrations below their respective cleanup levels.

In 1994, the USACE excavated petroleum-contaminated soil at the east end and off the southeast corner of the Composite Building. They collected four samples from the limits of excavation for analysis of DRO, GRO, total petroleum hydrocarbons (TPH), and Resource Conservation and Recovery Act (RCRA) metals. DRO and TPH were detected below cleanup levels; arsenic was detected at up to 10 mg/kg, above the ADEC Table B soil cleanup level of 6.1 mg/kg (EMI, 1995). Previous environmental investigations have suggested arsenic is a naturally occurring element at Collinson Point, and its presence represents background concentrations. There are no known or suspected anthropogenic arsenic sources at Collinson Point. Therefore, arsenic was not considered a contaminant of concern for the site (S&W, 2011).

The Composite Building, including the garage, was demolished in 2000, and about 1.7 tons of petroleum-contaminated soil was excavated from beneath the generator room. Ballasts, transformers, and capacitors suspected to contain PCBs, POL piping at the east end of the building, and petroleum-contaminated soil from the vicinity were removed.

In 2000, five soil samples were collected from the area. Two samples contained PCBs at 1.2 mg/kg and 4.4 mg/kg. The remaining analytes were below cleanup levels in the five samples (EMCON, 2001).

Following demolition, excavation, and sampling, the USACE apparently placed gravel fill against each side of the Composite Building garage slab flush with the top of the slab to the surrounding gravel pad. Since the concrete slab was reportedly on-grade and appears to be within 1 foot of the surrounding gravel pad in photographs, a relatively small amount of gravel was likely placed around the slab.

In 2004, the USACE collected four samples of concrete chipped from the surface of the Composite Building garage slab. These samples contained PCBs from 4.53 mg/kg to 30.7 mg/kg. The results were compared to the ADEC soil cleanup level of 1 mg/kg and the report concluded “additional remedial/removal efforts may be required at the garage slab.”

The Composite Building garage-slab concrete exceeds the 1 mg/kg cleanup level applicable to bulk PCB remediation waste and porous surfaces in high-occupancy areas, without further

conditions (ref. TSCA, 40 CFR 761.61(a)(4)(i)(A)). If the procedures and requirements for a low-occupancy area are used, an institutional control such as a deed restriction must be implemented. The USFWS has stated they would not accept alternatives that depend upon the integrity of land use controls. The recording of land use restrictions conflicts with the USFWS agency's mission. Furthermore, the ADEC requires cleanup of soil and concrete to 1 mg/kg, unless a cap is placed over the area, maintained, and recorded with a deed notation. Remediation of the slab is required.

The USACE also collected 10 surface soil samples from the area around the garage slab. These samples contained up to 0.998 mg/kg PCBs. These results did not exceed the 1 mg/kg ADEC soil-cleanup level.

Additional remediation is required for soils around the Composite Building. One area is estimated to be approximately 5 feet by 10 feet, and another about 10 feet by 10 feet, both with an assumed depth of 3 feet below ground surface (bgs); both will require remedial action to mitigate risks due to PCBs. This equates to an estimated 17 cubic yards (cy) of in-place PCB-contaminated soil. The data set suggests a moderate level of uncertainty regarding extent and volume of PCB-contaminated soil.

2.5.2.3 Quonset Hut #3

Quonset Hut #3 is recommended for cleanup because of the presence of PCBs in soil at concentrations exceeding the ADEC cleanup level. Quonset Hut #3 was on a small gravel pad about 100 yards east of the main station pad, connected to the main pad by a gravel road. A tundra pond is south of this smaller gravel pad. The Quonset hut was likely used for housing DEW Line station personnel.

Samples were collected from the Quonset Hut #3 area by various entities in 2000, 2004, and 2007.

In 2000, Quonset Hut #3 was demolished down to the gravel pad. Two soil samples were collected from the pad, and one surface-water and one tundra soil sample from the pond to the south. The soil sample contained 1.3 mg/kg PCB, above the ADEC Table B soil cleanup level of 1 mg/kg. Lead was detected in the water sample above its ADEC Table C groundwater cleanup level; naphthalene was also detected in the tundra soil sample, but below the ADEC soil cleanup level.

In 2004, the USACE was not able to find the location of sample which exceeded the PCB soil cleanup level. They collected four soil samples from the Quonset Hut #3 area, one of which was broken at the laboratory and not analyzed. PCBs were not detected in the remaining three samples.

In 2007, two surface-soil samples were collected northeast of the 2000 soil sample location in the Quonset Hut #3 area for PCB analysis. One sample and its duplicate had similar PCB concentrations as the 2000 sample (1.3 mg/kg). The other PCB sample result did not exceed 1 mg/kg.

PCBs are present in concentrations exceeding the ADEC Table B soil cleanup level, so further remedial action is necessary. An estimated area approximately 40 feet by 20 feet, with an assumed depth of 3 feet bgs, will require remedial action to mitigate risks due to PCBs. This equates to an estimated 88 cy of in-place PCB-contaminated soil. The data set suggests a moderate level of uncertainty regarding the extent and volume of PCB-contaminated media.

2.5.2.4 Shop Area

The Shop Building area is being recommended for cleanup due to DRO- and PCB-contaminated soil in two separate areas exceeding the ADEC soil cleanup levels. The 30-foot by 40-foot Shop Building was south of the Warehouse, built on an elevated concrete slab on treated wood pilings. Multiple reports mention the open sump in the shop floor as a source of contamination for the gravel pad below. Samples were collected in the area during site investigations in 1985, 1989, 1994, and 2000.

The USACE's 1985 composite soil sample collected at the southeast side of the Shop Building contained 0.4 mg/kg PCBs and 34 micrograms per kilogram ($\mu\text{g}/\text{kg}$) methylene chloride. During their 1987 site visit, the USACE noted "stained soil under shop" and southeast of the shop, and a drum pile southeast of the shop.

In 1989, six soil samples were collected in the vicinity of the shop, one water and one tundra soil sample were collected from the pond northeast of the Shop. The pesticides DDT, dichlorodiphenyl dichloroethene (DDE), and endosulfan, as well as several VOCs, were detected in the soil samples, but below cleanup levels. PCBs were detected at 2.87 mg/kg in one of the soil samples collected east of the shop. No analytes were detected in the tundra soil sample. Methylene chloride and acetone were detected in the surface water sample. Methylene chloride

was detected at 45 micrograms per liter ($\mu\text{g/L}$), above its ADEC Table C groundwater cleanup level of 5 $\mu\text{g/L}$.

The USACE noted during a 1992 site visit, “at the shop building, soil contamination exists beneath the raised floor structure due to discharge of waste oils through the floor drains and the historical uses of the shop. An approximately 40-foot by 50-foot area has been targeted for remediation in the shop building area” outside the south overhead door (E&E, 1992).

The USACE included 2.5-inch-diameter POL pipelines, 112 drums, and 12,895 pounds of “shop building debris” in their 1994 inventory of items removed from the site. It is unclear whether this was debris removed from inside the building or around it on the gravel pad. The USACE also excavated an area of petroleum-contaminated soil south of the shop, collecting two soil samples from the excavation limits. They also collected a soil sample underneath the slab where the open sump drained.

The samples beneath the sump contained DRO at 4,900 mg/kg and TPH at 27,000 mg/kg. Several metals were detected, including arsenic. Samples collected at the excavation limits contained DRO up to an estimated concentration of 22,000 mg/kg (above its ADEC Table B cleanup level of 12,500 mg/kg), TPH to 69,000 mg/kg, GRO and barium below cleanup levels, and arsenic at 8 mg/kg. Arsenic is not considered a contaminant of concern for the site (S&W, 2011). The photoionization detector (PID) field-screening results indicate the remaining POL soil contamination did not exceed an area of about 5 feet by 5 feet. The excavation did not extend to native soils, and an approximately 1-foot-thick layer of petroleum-contaminated gravel may remain south of the Shop Building.

The USACE demolished the Shop Building in 2000, leaving the elevated concrete slab. They plugged the two floor drains in the slab with concrete, and placed fill along the two exposed sides of the foundation, sloping it to the surrounding gravel pad, but did not excavate soils under or around the shop building.

In 2000, eight samples were collected from the Shop Building area, including two underneath the slab (one near the sump) and one in approximately the same location as the 1994 sample that contained DRO above 12,500 mg/kg. The shop area soil samples contained BTEX, GRO, DRO, RRO, lead, multiple pesticides, PCBs, and several VOCs, SVOCs, and PAHs, but all were below ADEC Table B cleanup levels. The highest PCB concentration was 0.260 mg/kg.

One water and one tundra soil sample were also collected from the pond east of the Shop Building. The water sample contained benzene, xylenes, toluene, GRO, DRO, RRO, and lead, below ADEC Table C groundwater cleanup levels. The tundra soil sample contained benzene, ethylbenzene, DRO, RRO, lead, several VOCs, and several SVOCs and PAHs, but below ADEC Table B cleanup levels.

The 1989 soil sample containing 2.87 mg/kg PCB was collected near the edge of the gravel pad east of the Shop. It is possible the soil berm placed around the slab in 2000 covered the sample location, since this berm reportedly extended to the edge of the tundra.

Based on the existing data, an area up to 10 feet by 25 feet, up to 3 feet thick, east of the Shop Building requires remedial action to mitigate the risk from PCB-contaminated soils; the estimated volume is 28 cy of in-place soils to be treated in some manner, but a high degree of uncertainty is associated with this estimate. A petroleum-contaminated area south of the Shop Building with an area of about 5 feet by 5 feet and 1 foot thick at the base of the pad also needs remediation to address petroleum-contaminated soils. The estimated volume is 1 cy of in-place soils to be treated; as with the PCB-contaminated soils at this site, there is a high degree of uncertainty associated with this estimate. The petroleum-contaminated soil volume has been added to the Shop-area estimate of volume potentially requiring treatment.

2.5.3 Types and Quantities of Contaminated Media

Table 2 presents the quantities of contaminated media present at each study area at Collinson.

Table 2. Estimated Volume of Petroleum- and PCB-Contaminated Soil and Concrete

Location	COC		Assumed Dimensions	Assumed Average Thickness (ft)	Calculated Surface Area (sf)	Calculated In-Place Volume (cy)	Excavated volume (cy)	Weight (tons)
	DRO	PCB						
AST Pad and AST Pond soil	X		50 ft by 50 ft	2	2,500	185	222	296
Composite Building Garage Area Soil		X	5 ft by 10 ft	3	50	6	7	10
		X	10 ft by 10 ft	3	100	11	13	18
Composite Building Garage Slab Concrete		X	267 ft ²	0.2	267	5	5	10
Quonset Hut #3 Area soil		X	40 ft by 20 ft	3	800	88	106	141
Shop Building Area Soil		X	25 ft by 10 ft	3	250	28	34	45
	X		5 ft by 5 ft	1	25	1	1	2
Total POL soil					2,525	186	223	298
Total PCB soil					1,200	133	160	213
Total PCB concrete					267	5	5	10
Total					30,550 sf	2,620 cy	3,140 cy	4,190 tons

Notes: ft feet
 sf square feet
 cy cubic yards

2.5.4 Conceptual Site Models

Human health and ecological conceptual site models (CSMs) are presented in Figure 4 and Figure 5, respectively.

2.6 Current and Potential Future Site and Resource Uses

The site is uninhabited; the closest community is the village of Kaktovik, with a population of 287. The site is used intermittently for subsistence activities, USFWS camps, and recreational uses. The site is accessible by boat in the summer, snowmachine in the winter, and helicopter or fixed-wing airplane year-round (using the beach as a makeshift airstrip). Collinson lies within the Arctic National Wildlife Refuge (ANWR). The site is situated along Simpson Cove of the Beaufort Sea and the coastline is actively eroding and may encroach on the contaminated areas.

Future site uses are expected to remain consistent with current uses.

2.7 Summary of Site Risks

The response action selected in this DD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

This section presents an overview of the risks associated with the current and future use of the site. Risks were evaluated separately for human health and wildlife at the site. A discussion of potential risks at the site and the risk evaluation process is in the RI/FS report. The results of cumulative risk evaluations for each of the sites recommended for cleanup are presented in Appendix A of this DD.

Although Collinson does not support a year-round residential population, visitors use the site for subsistence, recreational, or research activities.

People who could be exposed to COCs include subsistence harvesters and consumers from Kaktovik, recreational users visiting the ANWR, and other visitors. In the future, construction workers or other visitors who may occupy the site in support of resource-development activities may also be exposed. Several exposure scenarios for these current and potential future receptors were identified:

- incidental soil ingestion and skin contact of contaminants from soil;
- breathing outdoor air;
- drinking surface water; and
- eating wild foods.

The human health conceptual site model shows current and potential future site users may be exposed to contaminants exceeding acceptable levels. A cumulative risk evaluation of contaminants detected at Collinson found that cancer risk equaled 1 in 100,000 in soil at the Composite Building and Shop Building. Appendix A presents cumulative risk evaluation summary tables for the Composite Building and Shop Building.

A screening-level ecological risk assessment conducted at Collinson compared contaminant concentrations detected at the site to published ecological risk-based levels (ERBLs). The purpose of this assessment was to identify whether contaminants were present at concentrations that could affect bird and small mammal species known to live in Arctic coastal areas. The assessment found that concentrations of various contaminants exceeded their ERBLs in soil and

sediment for the common redpoll, Lapland longspur, northern shrike, northern pintail, ruddy turnstone, least weasel, brown lemming, tundra shrew, caribou, and moose.

The polar bear was not subjected to the ecological screening process; however, it was included in the ecological CSM with several complete exposure pathways to site contaminants.

Based on the results of the ecological screening for all other species, it was accepted the polar bear would be adequately protected by ADEC Method 2 cleanup levels. The effect of lead on waterfowl was also of concern, limited to potential nesting areas (i.e., tundra, not gravel pad).

Table 3 summarizes the COCs and exposure media and pathways for those areas at Collinson proposed for remediation.

Table 3 – Summary of Exposure Media, Exposure Pathways, and COCs

Study Area	Exposure Medium	Exposure Pathway	COCs
AST Pad and AST Pond	Soil, surface water	Ingestion, dermal contact	DRO
Composite Building	Surface soil, concrete	Ingestion, dermal contact	PCBs
Quonset Hut #3	Surface soil	Ingestion, dermal contact	PCBs
Shop Area	Surface soil	Ingestion, dermal contact	DRO, PCBs

The ADEC, USACE, and USFWS determined that site remediation to ADEC Method 2 cleanup levels would be protective of bird and mammal receptors as well as humans. These agencies also accepted, based on the results of ecological screening for the other species screened, that the polar bear would be adequately protected by site remediation to ADEC Method 2 cleanup levels.

Removal of COCs to cleanup levels would allow unrestricted use by humans (site visitors, subsistence users), and wildlife. No buildings or water wells are present, and none are anticipated to be constructed in the future. Groundwater is not considered an exposure medium of concern because there is only groundwater above the permafrost.

2.8 Remedial Action Objectives

The remedial action objectives (RAOs) for the Collinson Point DEW Line Station are to:

- Prevent human ingestion/direct contact with soil and concrete having COCs (PCBs and DRO) exceeding their cleanup levels.
- Prevent human inhalation of COCs posing an excess cancer risk.
- Prevent transport of COCs from their source area.

- Prevent ecological risk.

The selected remedy will achieve the RAOs by removal and treatment of contaminated soil and concrete to reduce PCB and DRO contamination to ADEC cleanup levels:

PCBs	1 mg/kg (soil and concrete)
DRO	12,500 mg/kg (soil)

Water in the AST Pond exceeds the ADEC groundwater cleanup levels for DRO and RRO, and has been historically observed to have a sheen, which is a violation of ADEC water-quality criteria. The corrective actions described in this DD do not directly address surface water; cleanup of the adjacent soils should result in improvement in water quality. Surface water quality will be monitored by sampling during the removal action and when the biocell is sampled.

2.9 Description of Alternatives

This section describes the remedial alternatives developed, screened, and evaluated during the FS process.

Alternative 1: No Action — Alternative 1 is required under CERCLA to provide a baseline for comparing remedial alternatives. Under this alternative, no cleanup action would be conducted. The ADEC and USFWS have stated this is not an acceptable alternative.

Alternative 2: Land Use Controls (LUCs) — This alternative would involve establishing land use controls, such as placing signs and instituting land-use restrictions, thereby limiting site access and restricting excavations or other soil disturbance. Alternative 2 would not involve any containment, treatment, or disposal-oriented cleanup. This alternative will restrict future land use that might result in exposure to contamination and could be effective at reducing exposure to contaminated media for people who heed the warning signs, but would not be effective at reducing exposure for wildlife, nor preventing transport of COCs from their source areas. LUCs would not be effective in containing PCBs. It would be difficult to implement and maintain at a remote site. The USFWS stated they would not accept alternatives that depend upon the integrity of land use controls. USFWS would not agree to placement of signs on their property; the recording of land use restrictions conflicts with their agency mission. Approximately three months would be required for planning and deed restriction implementation. Site work consisting of installing informational signs would require three days. The alternative would not

directly address RAOs. While not prohibiting future excavation, any work involving contaminated soil or concrete would need to be conducted in accordance with 18 AAC 75.325-.390, Site Cleanup Rules. Long-term monitoring requirements would consist of 5-year site reviews.

Alternative 3: Capping — This alternative consists of physical isolation of contaminant sources at the site by construction of barriers such as soil caps, which are engineering controls to eliminate exposure. This alternative would restrict future land use in the capped areas. The total estimated area to be capped is 4,000 square feet. Approximately one month of site work would be required to construct the caps, and RAOs would be met upon completion of the cap construction. In order to be effective in the long-term, the caps must remain in good condition and be repaired if they degrade or are damaged. This requires a long-term site review and maintenance commitment. Long-term monitoring requirements would consist of 5-year site reviews.

Alternative 4: On-site Disposal — Contaminated soil would be excavated and placed in an on-site monofill (a landfill dedicated to one type of material). A permit would be required to construct and operate a landfill and would restrict future land use in the monofill area. Approximately 223 cy of petroleum-contaminated soil, and 160 cy PCB-contaminated soil and concrete, would be excavated and placed in the monofill. Approximately one month of site work would be required to construct the monofill, and RAOs would be met upon completion of the monofill construction. This alternative uses the engineering control of landfilling to eliminate exposure. In order to be effective in the long-term, the monofill must remain in good condition and be repaired if it degrades or is damaged. This requires a long-term site review and maintenance commitment. Long-term monitoring requirements would consist of 5-year site reviews.

Alternative 5: Off-site Treatment/Disposal — This alternative would involve the excavation of contaminated soils and concrete for off-site treatment/disposal at an approved facility. The off-site treatment technology would be thermal destruction of the petroleum-contaminated soil, presumably at a facility in the Fairbanks area. PCBs-contaminated media would be placed in a permitted facility in the 48 contiguous states. This alternative requires off-site treatment and disposal facilities. Approximately 223 cy of petroleum-contaminated soil, and 160 cy PCB-contaminated soil and concrete, would be excavated and transported off-site for disposal. Approximately one month of site work would be required to excavate and transport the contaminated soil and concrete, and RAOs would be met upon completion of the site work.

Future land use would not be restricted. Once successfully completed, this alternative would not require long-term monitoring.

Alternative 6: Soil Bioremediation and Off-Site PCB Disposal — Petroleum-contaminated soil would be excavated and placed in an open biocell. Treatment would be achieved through a combination of enhanced natural biological processes and volatilization. PCB-contaminated soil and concrete would be transported off-site for disposal at a permitted facility in the 48 contiguous states. Approximately 223 cy petroleum-contaminated soil would be excavated and placed in an on-site treatment cell. Approximately 160 cy PCB-contaminated soil and concrete would be excavated and transported off-site for disposal. The excavation, soil bioremediation treatment cell construction for petroleum-contaminated soil, and off-site transportation and disposal of PCB-contaminated soil and concrete would require approximately one month. It is estimated petroleum-contaminated soil in the soil bioremediation treatment cell could achieve RAOs in two years. Treatment will be considered complete when DRO concentrations are below 12,500 mg/kg if post-treatment soil is to be spread on the gravel pad, or 200 mg/kg if post-treatment soil is to be spread on tundra. Future land use would be restricted in the treatment cell areas during their operation. Once successfully completed, this alternative would not require long-term monitoring.

2.10 Comparative Analysis of Alternatives

The USACE uses nine evaluation criteria from CERCLA to compare cleanup alternatives and to choose the preferred cleanup alternative. The nine criteria are divided into three categories, threshold (Criteria 1 and 2), balancing (Criteria 3, 4, 5, 6, and 7), and modifying (Criteria 8 and 9). A cleanup alternative must meet the threshold criteria in order to be considered further. The balancing criteria are used to compare one alternative to another. State and community acceptance of a proposed remedial action or, modifying criteria, are important elements in selecting a cleanup alternative and were evaluated during the public review of the Proposed Plan.

1. **Overall Protection of Human Health and the Environment** - Does the alternative protect the health and safety of humans, animals, and plants?
2. **Compliance with ARARs** - Does the alternative meet all established ARARs (for CERCLA hazardous substances only) or risk-based cleanup levels for petroleum hydrocarbons?
3. **Long-Term Effectiveness and Permanence** - How long will it take to complete cleanup? What is the long-term risk at the site? Are the contaminants permanently removed or destroyed?
4. **Reduction of Toxicity, Mobility, or Volume through Treatment** - How well does the alternative treat contamination?

5. **Short-Term Effectiveness** - Could humans, animals, or plants be harmed when performing the work? Would the alternative reduce the site risks in the short term?
6. **Implementability** - Is the alternative easily constructed, maintained, and/or enforced?
7. **Cost** - Is the alternative cost-effective?
8. **State Acceptance** – Has State acceptance has been assessed throughout the RI/FS and PP process?
9. **Community Acceptance** – Has USACE reviewed and considered all comments received during the public comment period?

Risks to human health and the environment posed by contaminants present at Collinson were determined based on their meeting or exceeding cleanup levels. The initial development and screening of alternatives provided a range of remedies to address those risks. These remedies were developed under the assumption the site will be visited and may be occupied by workers, and supports a variety of ecological receptors; the remedies are weighted towards those that do not include restrictions on future site uses. The alternatives are directed at addressing contaminants in soil.

The no-action alternative (Alternative 1) is not protective of human health or ecological receptors. Its inclusion in the FS process follows EPA guidance and serves as a point of comparison against which other alternatives may be evaluated. Alternative 2 would not include any site work, relies on LUCs to limit potential exposure, and would leave contaminant concentrations at current levels until natural attenuation reduces the levels over time. LUCs do not meet the ARAR for PCBs, since contaminated soil would be left at the surface and not covered with a cap. LUCs could be designed to allow for future site construction and excavation by the property owner or others, provided proper precautions are taken to avoid contaminated areas. Because Alternatives 1 and 2 do not meet the threshold criteria of overall protectiveness and compliance with applicable or relevant and appropriate requirements (ARARs), they are not eligible for selection as a final remedy.

Alternatives 3, 4, 5, and 6 include site-work components that would reduce or eliminate exposure to petroleum- and PCB-contaminated soils. Alternatives 3 and 4 would protect against exposure to contaminated soil, but would require restrictions be placed on future site uses to ensure cap integrity is not compromised. Reductions in contaminant concentrations would rely on natural processes. Alternatives 5 and 6 would achieve the greatest reduction in risk to human health and ecological receptors by treating soil to below cleanup levels or removing those soils from the site. A request for No Further Action to the ADEC could be made upon successful implementation of this alternative.

Alternatives 4, 5, and 6 would require a similar level of effort to conduct the field operations. However, Alternative 4 would require a greater future level of effort to ensure the cap remains viable and enforce future site-use restrictions, and Alternative 6 would require frequent site visits to rototill and sample the treatment cells. Successful completion of Alternatives 5 and 6 would not require future efforts.

State and community acceptance has been gauged through public outreach and agency reviews of the RI/FS and Proposed Plan. Section 3.0 of this DD presents the responsiveness summary describing public involvement activities. Alternatives 3 and 4 were least acceptable to the public and agencies, whereas Alternatives 5 and 6 met the state and community preference for alternatives that result in removal of contaminants above cleanup levels from the site.

Alternatives 1 and 2 do not meet the threshold criteria and are not eligible for selection. Alternative 3 represented a balance between implementation challenges and long-term protectiveness. Alternative 4 would leave contaminants on-site in a containment cell and require long-term maintenance, whereas Alternative 5 would remove contaminants exceeding cleanup levels from the site and would not incur long-term costs. The high cost to implement Alternative 5 is balanced by community desire to eliminate exposures through soil removal. Alternative 6 meets the goal of achieving site closure with no long-term maintenance or site review requirements and its moderate cost. This alternative achieves site cleanup through on-site treatment of petroleum-contaminated soil, and off-site disposal of PCB-contaminated soil and concrete. Site closure could be achieved once on-site treatment reduces petroleum concentrations to below cleanup levels.

2.11 Principal Threat Waste

The NCP stipulates a preference for treatment to reduce principal threats posed by a site wherever practicable. Principal threat wastes are generally considered to be those source materials that are highly toxic or highly mobile which cannot be contained in a reliable manner or would present a significant risk to human health or the environment should exposure occur. Non-mobile contaminated source material of low to moderate toxicity and low toxicity source materials generally will not constitute a principal threat waste. Following the EPA guidance *A Guide to Principal Threat and Low Level Threat Wastes, OSWER 9380.3-06FS, November 1991*, the contaminants at Collinson are not considered principal threat wastes.

2.12 Selected Remedy

The USACE has selected Soil Bioremediation and Off-Site PCB Disposal, as the Selected Remedy. The Selected Remedy involves excavating and treating the petroleum-contaminated soil on-site by soil bioremediation, removing and disposing PCB-contaminated soil and concrete at an off-site facility in the 48 contiguous states, and site restoration. Site restoration would consist of regrading the ground surface where excavation occurred on the gravel pad, and revegetating areas where excavation occurred in tundra. The areas to be addressed include the AST Pad and Pond, Composite Building, Quonset Hut #3, and Shop Area.

Key factors that led to selecting this remedy were that it reduces COC concentrations to below cleanup levels, eliminates human health and ecological exposure pathways, can manage changes in the actual quantity of petroleum-contaminated soil requiring treatment without significant changes in cost, is acceptable to ADEC and USFWS, and allows for unrestricted future site use.

The primary steps for Alternative 6 include:

- prepare work plans describing the contractor's approach to site cleanup;
- delineate the areas to be excavated;
- build the soil bioremediation treatment cell in an acceptable location on the gravel pad;
- excavate petroleum-contaminated soil exceeding cleanup levels;
- place the excavated petroleum-contaminated soil in the treatment cell;
- treat the petroleum-contaminated soil using nutrient augmentation and periodic rototilling;
- remove PCB-contaminated concrete from Composite Building foundation;
- transport the PCB-contaminated soil and concrete for off-site disposal;
- restore the excavated contaminated soil areas through regrading and/or revegetation; and
- decommission the soil bioremediation treatment cell once DRO concentrations are below cleanup levels.

There are two main factors that could affect the progress of this alternative: quantity of contaminated material requiring treatment or disposal, and length of time needed to treat the petroleum-contaminated soil. The quantity of contaminated soil and concrete could be different than the current estimate. A change in the quantity of petroleum-contaminated soil would not have a significant effect on cost; the size of the on-site soil bioremediation treatment area can be easily changed to match the amount of soil needing treatment. A change in the quantity of PCB-contaminated soil or concrete would have a greater effect on cost, since those materials need to be transported to the nearest road system then trucked to a disposal facility in the 48 contiguous

states. If the amount of PCB-contaminated material needing to be disposed off-site doubled, the total cost of the alternative would increase by about 12 percent.

If the time required to treat petroleum-contaminated soil to below cleanup levels takes longer than expected, there will be increased costs related to actively managing the soil bioremediation treatment cell. These include additional trips to the site to rototill the soil, add nutrients or water if needed, and collect samples to check contaminant levels. Each additional year added to the time needed to treat the soil could add about five percent to the project cost. This alternative would be considered complete when soil sampling shows COC concentrations are below cleanup levels. The USACE proposes to calculate remediation rates based on sampling at the end of the second year, if concentrations remain above cleanup levels to demonstrate treatment effectiveness. The methods used to assess when COC concentrations in the treatment cells are below cleanup levels will be established in project work plans developed as part of the corrective action planning process. If COC concentrations remain above RAOs after five years, the USACE will reevaluate the remedial action to determine whether continued biotreatment would be effective or an alternative action is warranted.

The expected outcome of this alternative is permanent removal of COCs above cleanup levels and unrestricted use of the site without long-term maintenance obligations. Its cost is least sensitive to changes in volumes of contaminated materials to be treated.

ADEC agrees the selected remedy will comply with state regulation when properly executed. USFWS agrees with the USACE's selection of Soil Bioremediation and Off-Site PCB Disposal as the Selected Remedy for treating petroleum- and PCB-contaminated soil and concrete at Collinson.

Based on information currently available, USACE believes the Selected Remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. USACE expects the Selected Remedy to satisfy the following statutory requirements of CERCLA §121(b):

- 1) be protective of human health and the environment;
- 2) comply with Applicable or Relevant and Appropriate Requirements (or justify a waiver);
- 3) be cost-effective;
- 4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and
- 5) satisfy the preference for treatment as a principal element.

A detailed cost summary for the Selected Remedy is presented in Appendix B. The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file or a DD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 percent to -30 percent of the actual project cost.

2.13 Statutory Determinations

Under CERCLA and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs, are cost-effective, and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes a preference for remedies that employ treatment that permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element and a bias against off-site disposal of untreated wastes. The following sections discuss how the Selected Remedy meets these statutory requirements.

As noted in Section 1.5 of this DD, petroleum contaminated media are excluded from regulation under CERCLA. However, the DOD can remediate releases of petroleum where the release poses an imminent and substantial endangerment to the public health or welfare or to the environment per 10 USC 2701(b)(2). The petroleum release at the Collinson Point DEW Line Station creates an imminent and substantial endangerment.

2.13.1 Protection of Human Health and the Environment

Bioremediation and Off-Site PCB Disposal was chosen as the Selected Remedy because it best meets the RAOs to prevent human exposure to COCs in soil and concrete; transport of COCs from their source areas; and risk to wildlife. The expected outcome of this remedy is permanent removal of COCs above cleanup levels and unrestricted use of the site without long-term maintenance obligations. Its cost is least sensitive to changes in volumes of contaminated materials to be treated.

2.13.2 Compliance with ARARs

A table of ARARs is presented in Appendix C. The selected remedy meets the chemical-specific ARARs by removing CERCLA hazardous substances (e.g., PCBs) that exceed cleanup levels

from the site. In addition, the selected remedy meets the risk-based cleanup levels for petroleum hydrocarbons.

Action-specific and location-specific ARARs can be met by the selected remedy through the project planning and design process. The bioremediation treatment cells can be designed to optimally protect site visitors and ecological receptors from direct contact with contaminated soil. Excavation activities can be implemented in a manner protective of site workers but they may be subject to limits on access (e.g., driving on tundra). The selected remedy includes transportation and off-site disposal processes that can be addressed with proper planning.

Site work should be done in a manner protective of area wildlife and permissible within the boundaries of ANWR.

2.13.3 Cost-Effectiveness

The cost of the selected remedy is estimated to be \$1,809,273, of which capital costs are estimated to be \$967,506 for engineering, excavation, treatment cell construction, and site restoration. Petroleum-contaminated soil treatment is estimated to cost \$276,734 over the course of two summer field seasons. Potential for cost escalation is considered moderate, and could occur if volumes of soil and/or concrete requiring treatment or disposal exceed estimates, or the duration of petroleum-contaminated soil treatment exceeds estimates. Given the small volume of petroleum-contaminated soil, on-site treatment is similar in cost to off-site treatment or disposal, which would require shipping by barge to Prudhoe Bay then by truck to either Fairbanks or Anchorage. However, the cost to implement the Selected Remedy is least sensitive to changes in the quantity of petroleum-contaminated soil to be treated, which is preferable to off-site disposal options. The relatively small quantity of PCB-contaminated soil and concrete does not justify on-site treatment.

2.13.4 Use of Permanent Solutions

The technology used in landfarming petroleum-contaminated soil at North Slope sites has been demonstrated at other sites. The remedy is effective over the long term in that the identified risks will be eliminated through the treatment and removal action. Once the petroleum-contaminated soil treatment is complete, PCB-contaminated media have been disposed off-site, and tundra-excavation areas revegetated, no contaminants exceeding cleanup levels will remain at the site.

2.13.5 Preference for Treatment as a Principal Element

By treating the petroleum-contaminated soil by landfarming, the Selected Remedy addresses principal threats posed by the site through the use of treatment technologies. By using treatment as a significant portion of the remedy, the statutory preference for remedies that employ treatment as a principal element is satisfied.

2.14 Documentation of Significant Changes

The Proposed Plan for the Collinson Point DEW Line Station was released for public comment on March 16, 2012. The Proposed Plan identified Alternative 6, Soil Bioremediation and Off-Site PCB Disposal, as the Preferred Alternative for site remediation. The USACE reviewed all written and verbal comments submitted during the public comment period. It was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PART 3: RESPONSIVENESS SUMMARY

3.1 Stakeholder Comments and Lead Agency Responses

The ADEC and USFWS have been involved with the Collinson Point DEW Line Station project throughout the development of the RI/FS report, PP, public involvement activities, and this DD. ADEC agrees the selected remedy of Bioremediation and Off-Site PCB Disposal will comply with state regulation when properly executed. USFWS agrees with the USACE's selection of Bioremediation and Off-Site PCB Disposal as the remedy for treating petroleum- and PCB-contaminated soil and concrete at Collinson.

After the Proposed Plan was released, a public comment period was held from March 15 to April 16, 2012. A public meeting was held in Kaktovik, Alaska on March 21, 2012, at the Qargi Community Center. Several concerns were raised during the public meeting regarding remediation at the Collinson Point DEW Line Station. Most of the questions and comments were not significant or relevant to the content of the Proposed Plan or the USACE preferred alternative. Attendees discussed previous cleanup efforts, effects of the contaminants on wildlife and subsistence, and USACE plans for the two sites. Many comments focused on other sites in the vicinity of Kaktovik which are unrelated to Collinson or Nuvagapak Points. Most comments were supportive of the proposed alternative and had particular interest in possible jobs provided by the cleanup, as well as prospects for the area's future. A full transcript of the public meeting, is available separately (HDR Alaska, 2012).

A summary of significant oral comments relevant to the Proposed Plans and the USACE preferred alternative for site cleanup is shown in Table 4.

TABLE 4. SUBSTANTIVE ORAL COMMENTS RECEIVED DURING PUBLIC MEETING

Transcript Page, Line Number	Participant Name	Question/Comment	Response
65, 24	Clarice Akootchook	Participant stated a preference for Alternative 5; asked why contaminants would be left on-site.	Alternative 6, the USACE's preferred Alternative, would result in no contaminants left on site; upon disposal or treatment the contaminants would meet Applicable or Relevant and Appropriate Requirements for PCBs and risk-based cleanup levels for petroleum hydrocarbons. Alternative 5 was not selected based on a preference for selecting a remedy that uses treatment as a primary element. In addition, the cost to implement Alternative 5 is more sensitive to changes in the quantity of petroleum-

			contaminated soil to be disposed off-site and thus higher risk of failure to implement the remedy successfully. Alternative 6 is least sensitive to potential increases in quantity of petroleum soil encountered during implementation of the remedy.
75, 23	George Tagarook	Participant stated approval of Alternative 6.	No response required.

One written comment was received during the public comment period. The commenter described their experience visiting the site since 1995 and suggested a Kaktovik-based workforce should be considered when planning site remedial activities. The commenter generally felt the cleanup project might provide needed jobs to the community. The complete written comment is shown below.

Comment #1:

Collinson Point, west of Kaktovik, known as Barter Island. This area on the coast 35 miles of southwest is an area where harvest food on the land and sea as far as Flaxmanof Island, we would spend some days out on the land where we harvest fish and caribou, whale or seals. I been in the area for or seen how it change at least since '95, Distant Early Warning been around for years and still today I have seen each site for many years, even east of from the Canadian border. I have been employed by clean up crew before, that was interesting to have been employed. We had our own crew, we did the job well done back in the 90's. Still today these sites are still there where the road and gravel pads are still today. We also built the unmanned sites into Canada Northwest Territories, that was awesome job. I remember the site at Bar-A when it used to be open, I find these sites helpful threw the many many years of service, where safety was needed or help was needed back when there were these sites was built. They did provide a lot of work to operate at a wide wide range of service threw out Alaska and Canada. Bar-A known as Nuvagapak Point is another area where gravel roads are still visible today, pads, runway. I can remember the site been there still today, but when I seen it was the big long tower was down. I said when I seen it remembering it was been long tower laying down on the ground. I find these area would be good to clean up to provide employment for village or at least go into 2013 summer to continue cleanup projects were to provide work that would be awesome.

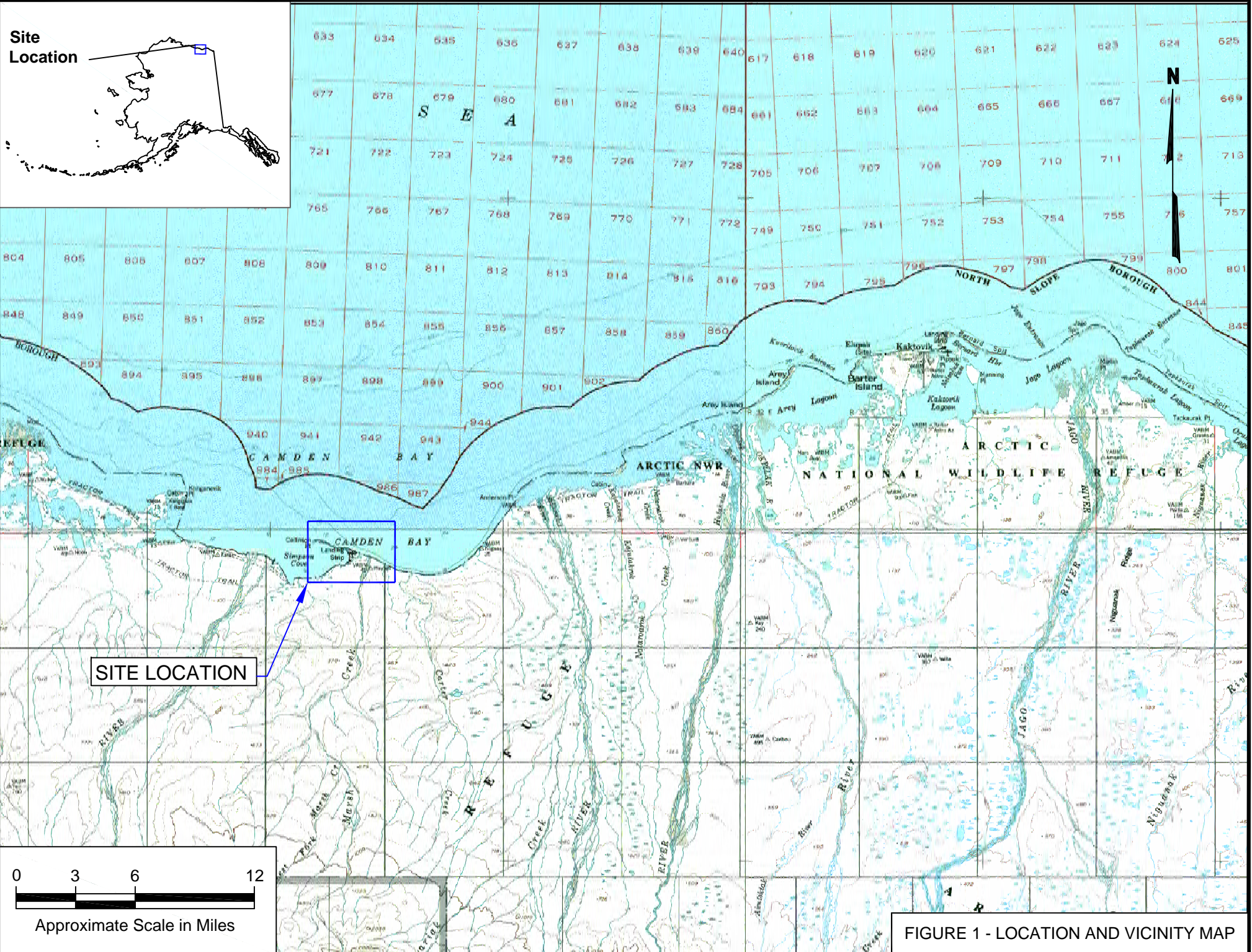
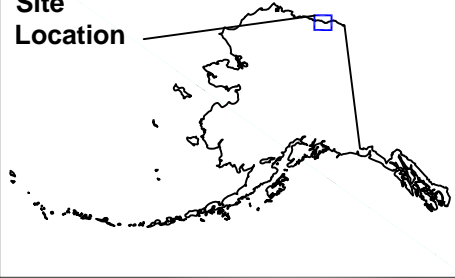
USACE Response:

A preference for local hire can be expressed to the selected contractor, but is not mandatory.

PART 4: REFERENCES

- Alaska Department of Environmental Conservation (ADEC), 2012. 18 Alaska Administrative Code (AAC) 75, Oil and Other Hazardous Substances Pollution Control, revised as of April 8, 2012.
- DOWL Engineers, 1992 (March). *Hazardous and Toxic Waste Final Report, Collinson Point, Phase II Site Investigation and Basis for Design*. F10AK000603_01.05_0001_p.
- Ecology and Environment, Inc. (E&E), 1992 (October). *Site Visit Report, Collinson Point DEW Line Station, North Slope Borough, Alaska*. F10AK0006-_01.09_0500_a.
- EMCON, 2001. *Final Remedial Action Report, Collinson Point (POW-D) Intermediate DEW Line Station Site Restoration, North Slope Borough, Alaska*. F10AK000601_07.08_0001_p.
- Environmental Management, Inc. (EMI), 1995. *Field Report, Removal Action, Collinson Point DEW Line Station, North Slope Borough, Alaska*. May. F10AK000601_07.08_0002_p.
- HDR Alaska, Inc., 2012. *Collinson Point Distant Early Warning Line Station and Nuvagapak Point Distant Early Warning Line Station, Public Participation Summary*. December. F10AK000903_05.10_0500_a.
- Shannon & Wilson, 2011. *Final Remedial Investigation/Feasibility Study Report, Collinson Point DEW Line Station*. May. F10AK000603_04.09_0500_a.
- Shannon & Wilson, Inc., 2012. *Formerly Used Defense Sites Program, Proposed Plan, Collinson Point Distant Early Warning Line Station*. February. F10AK000603_04.10_0500_a.
- U.S. Army Corps of Engineers (USACE), 1985. *Defense Environmental Restoration Account (DERA) Inventory Project Report (IPR) Collinson Point (POW-D) Dew Line Site*.
- USACE, 1990. Collinson Point DEW Line Station 1988 INPR Package and 1990 INPR memos June 20. F10AK0006-_01.08_0500_a.
- USACE, 2004. *Formerly Used Defense Sites (FUDS) Program Policy, ER 200-3-1*.
- USACE, 2005. *Final Chemical Data Report, Collinson Point DEW Line Site Post-Remedial Action/Site Restoration Investigation North Slope Borough, Alaska*.
- U. S. Environmental Protection Agency (EPA), 1991. *A Guide to Principal Threat and Low Level Threat Wastes, OSWER 9380.3-06FS*, November.

Site Location



SITE LOCATION



Approximate Scale in Miles

FIGURE 1 - LOCATION AND VICINITY MAP

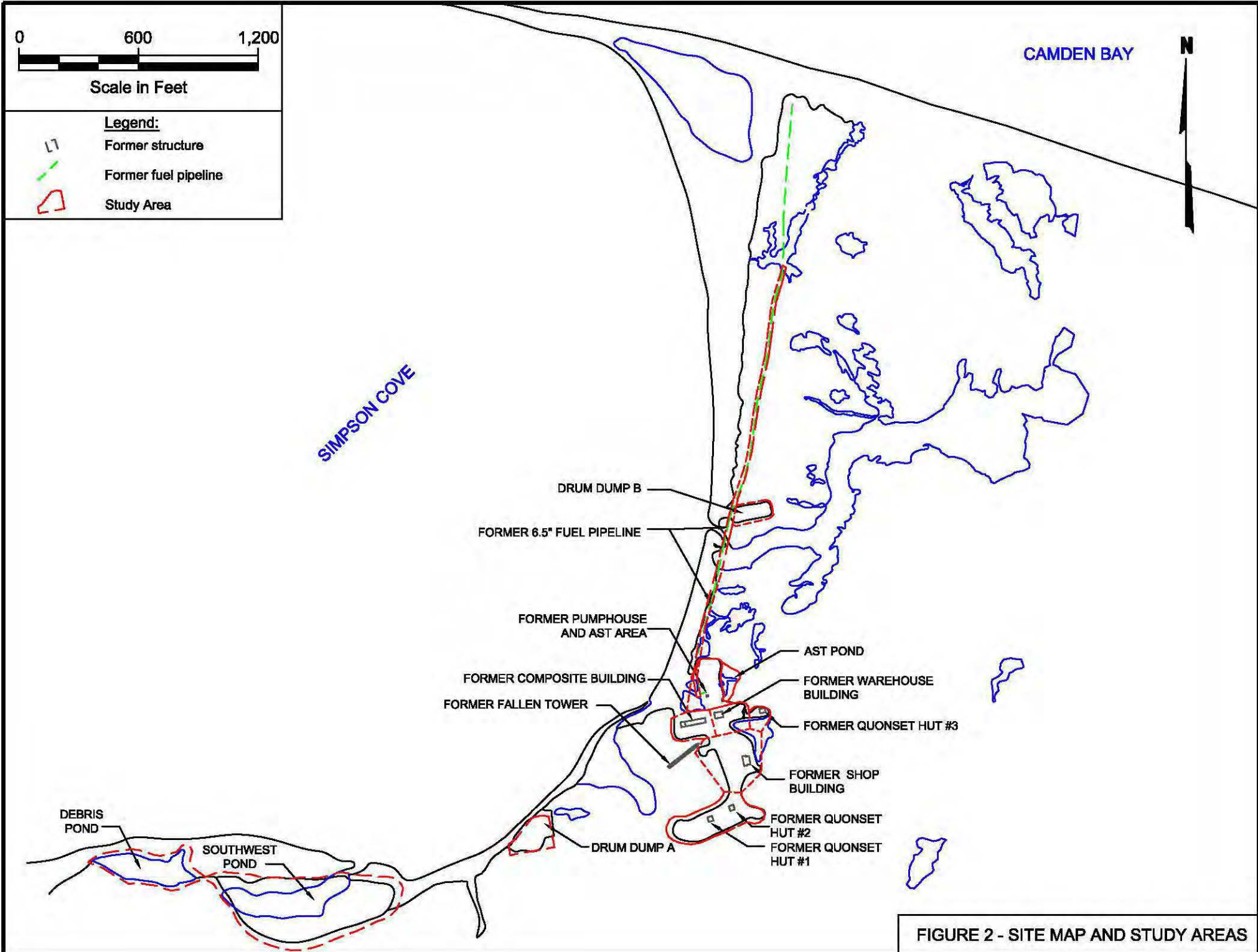


FIGURE 2 - SITE MAP AND STUDY AREAS



HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: COLLINSON POINT DEW LINE STATION

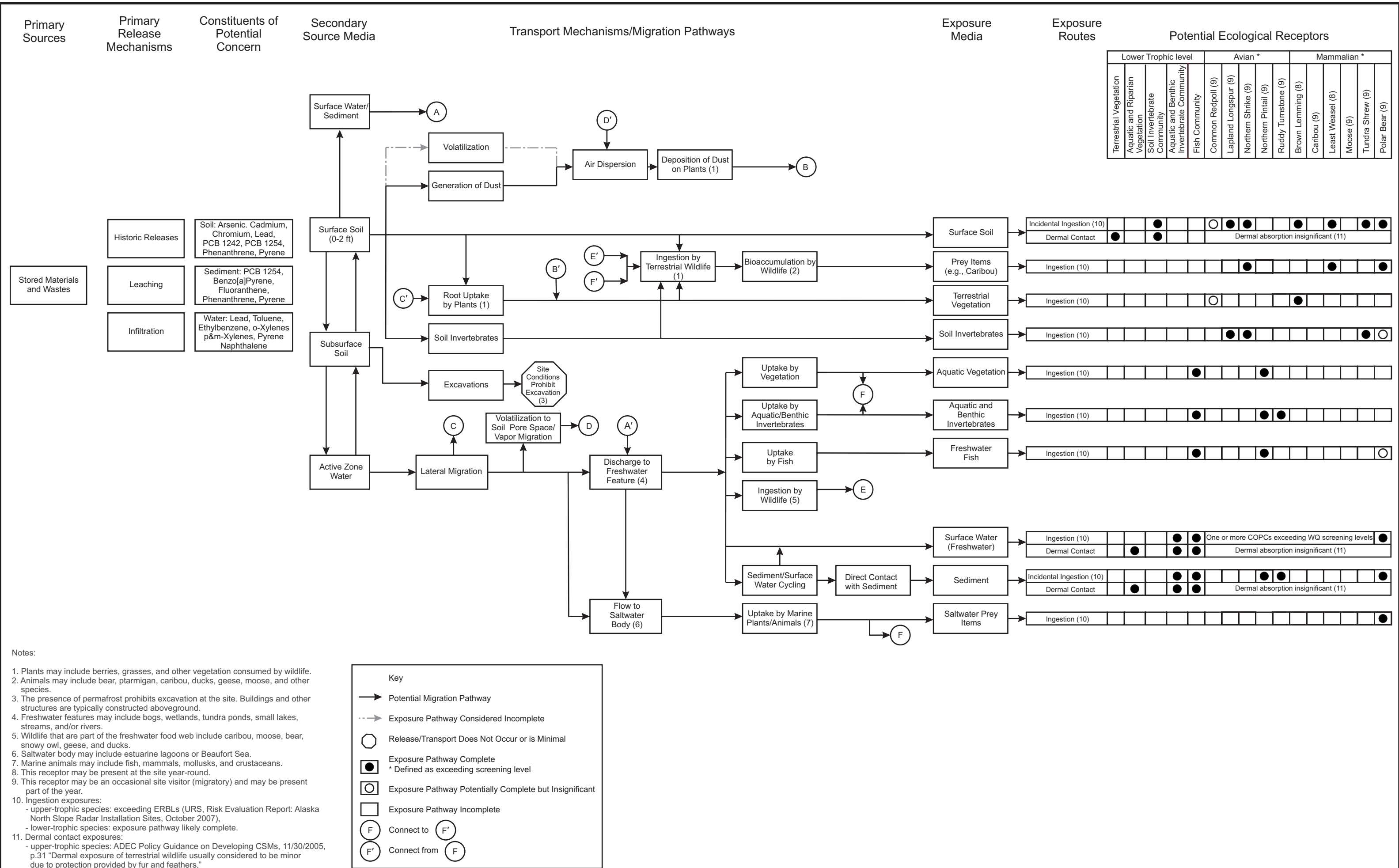
Completed By: _____

Date Completed: _____

Instructions: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.

(1)		(2)		(3)		(4)		(5)							
Check the media that could be directly affected by the release.		For each medium identified in (1), follow the top arrow <u>and</u> check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.		Check all exposure media identified in (2).		Check all pathways that could be complete. The pathways identified in this column <u>must</u> agree with Sections 2 and 3 of the Human Health CSM Scoping Form.		Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.							
Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other					
<input checked="" type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to subsurface <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Runoff or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil <input checked="" type="checkbox"/> Inhalation of Fugitive Dust			C/F	F	C/F							
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	<input type="checkbox"/> groundwater	<input type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water												
<input type="checkbox"/> Ground-water	<input type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	<input checked="" type="checkbox"/> air	<input checked="" type="checkbox"/> Inhalation of Outdoor Air <input type="checkbox"/> Inhalation of Indoor Air <input checked="" type="checkbox"/> Inhalation of Fugitive Dust			C/F	F	C/F							
<input checked="" type="checkbox"/> Surface Water	<input checked="" type="checkbox"/> Direct release to surface water <i>check surface water</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Sedimentation <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	<input checked="" type="checkbox"/> surface water	<input checked="" type="checkbox"/> Ingestion of Surface Water <input checked="" type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water			C/F	F	C/F							
<input checked="" type="checkbox"/> Sediment	<input checked="" type="checkbox"/> Direct release to sediment <i>check sediment</i> <input type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____	<input checked="" type="checkbox"/> sediment	<input checked="" type="checkbox"/> Direct Contact with Sediment			C/F	F	C/F							
		<input checked="" type="checkbox"/> biota	<input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods			C/F	F	C/F	C/F						

FIGURE 4 - HUMAN HEALTH CONCEPTUAL SITE MODEL Revised, 10/01/2010



Notes:

- Plants may include berries, grasses, and other vegetation consumed by wildlife.
- Animals may include bear, ptarmigan, caribou, ducks, geese, moose, and other species.
- The presence of permafrost prohibits excavation at the site. Buildings and other structures are typically constructed aboveground.
- Freshwater features may include bogs, wetlands, tundra ponds, small lakes, streams, and/or rivers.
- Wildlife that are part of the freshwater food web include caribou, moose, bear, snowy owl, geese, and ducks.
- Saltwater body may include estuarine lagoons or Beaufort Sea.
- Marine animals may include fish, mammals, mollusks, and crustaceans.
- This receptor may be present at the site year-round.
- This receptor may be an occasional site visitor (migratory) and may be present part of the year.
- Ingestion exposures:
 - upper-trophic species: exceeding ERBLs (URS, Risk Evaluation Report: Alaska North Slope Radar Installation Sites, October 2007),
 - lower-trophic species: exposure pathway likely complete.
- Dermal contact exposures:
 - upper-trophic species: ADEC Policy Guidance on Developing CSMs, 11/30/2005, p.31 "Dermal exposure of terrestrial wildlife usually considered to be minor due to protection provided by fur and feathers,"
 - lower-trophic species: assume direct exposure.

Key

- Potential Migration Pathway
- - - - - Exposure Pathway Considered Incomplete
- Release/Transport Does Not Occur or is Minimal
- Exposure Pathway Complete
- * Defined as exceeding screening level
- Exposure Pathway Potentially Complete but Insignificant
- Exposure Pathway Incomplete
- (F) Connect to (F')
- (F') Connect from (F)

FIGURE 5 - ECOLOGICAL CONCEPTUAL SITE MODEL

APPENDIX A
CUMULATIVE RISK EVALUATIONS

Table A-1
Composite Building Area
Cumulative Risk Calculations — Soil
Collinson Point DEW Line Station, Alaska

COPC	Highest Detected Site Concentration	RBC ²	Units	Site Concentration/RBC	Risk at Site Concentration ^{3,4}
Carcinogens: Direct contact¹					
Aroclor 1254	4.400	3.8	mg/kg	1.158	1.2E-05
Total					1.2E-05
Carcinogens: Inhalation Risk¹					
Aroclor 1254	4.400	25	mg/kg	0.176	1.8E-06
Total					1.8E-06
Carcinogenic Cumulative Risk					1E-05

Notes:

¹ Methodology and risk-based concentration (RBC) followed Cumulative Risk Guidance (ADEC 2008)

² RBC is for Arctic Zone; data from Cumulative Risk Guidance (ADEC 2008)

³ Risk at site concentration = (site concentration/RBC) x 10⁻⁵

⁴ Carcinogenic cumulative risk and cumulative Hazard Index are rounded to one significant figure; individual carcinogenic risks and hazard indices are rounded to two significant figures (ADEC 2008, page 11)

Abbreviations:

COPC	Chemical of Potential Concern
mg/kg	milligrams per kilogram
RBC	risk-based concentration

Conclusions:

- Calculated risk from carcinogens in soil does not exceed screening criterion (> 1 x 10⁻⁵).

Table A-2
Shop Building Area
Cumulative Risk Calculations — Soil and Surface Water
Collinson Point DEW Line Station, Alaska

COPC	Highest Detected Site Concentration	RBC ²	Units	Site Concentration/RBC	Risk at Site Concentration ^{3,4}
Carcinogens: Direct contact¹					
Aroclor 1254	2.870	3.8	mg/kg	0.76	7.6E-06
Dieldrin	0.048	0.43	mg/kg	0.11	1.1E-06
Total					8.7E-06
Carcinogens: Inhalation Risk¹					
Aroclor 1254	2.870	25	mg/kg	0.115	1.1E-06
Total					1.1E-06
Carcinogens: Water Ingestion Risk¹					
Benzene	0.0011	0.015	mg/L	0.073	7.3E-07
Total					7.3E-07
Carcinogenic Cumulative Risk					1E-05
COPC	Highest Detected Site Concentration	RBC ²	Units	Site Concentration/RBC	HQ at Site Concentration ^{4,5}
Noncarcinogens: Direct contact¹					
Dieldrin	0.048	4.4	mg/kg	0.01	0.01
Total					0.01
Noncarcinogens: Water Ingestion Risk¹					
Methylene chloride	0.045	2.2	mg/L	0.02	0.02
Benzene	0.0011	0.15	mg/L	0.01	0.01
Total					0.03
Noncarcinogenic Hazard Index					0.0

Notes:

¹ Methodology and risk-based concentration (RBC) followed Cumulative Risk Guidance (ADEC 2008)

² RBC is for Arctic Zone; data from Cumulative Risk Guidance (ADEC 2008)

³ Risk at site concentration = (site concentration/RBC) x 10⁻⁵

⁴ Carcinogenic cumulative risk and cumulative Hazard Index are rounded to one significant figure; individual carcinogenic risks and hazard indices are rounded to two significant figures (ADEC 2008, page 11)

⁵ HQ at site concentration = (site concentration/RBC) x 1

Abbreviations:

COPC	Chemical of Potential Concern
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
HI	Hazard Index for noncarcinogenic risk
HQ	Hazard Quotient for noncarcinogenic risk
RBC	risk-based concentration

Conclusions:

- Calculated risk does not exceed carcinogenic screening criterion (>1 x 10⁻⁵).
- Calculated risk does not exceed Hazard Index screening criterion (HI > 1) for soil.

APPENDIX B

COST SUMMARY FOR SELECTED REMEDY

Table B-1
Alternative 6 - Landfarming, Off-site Disposal
Collinson Point DEW Line Station, Alaska

This response action involves construction of an on-site treatment cell for POL-contaminated soil and off-site disposal of PCB-contaminated media.

MOBILIZATION (Year 1)				
Personnel, Equipment & Materials				
	Number	Rate	Subtotal	
Fairbanks to Barrow	4 People - 1 way	\$450	\$1,800	
Frontier Flying Charter - 6 people from Barrow to Collinson (turbo caravan @ \$1,350/hour or \$3,000/trip)	1 round trip	\$3,000	\$3,000	
Trucking - Fairbanks to Prudhoe Bay dock (Materials and Supplies)	2 loads	\$4,500	\$9,000	
Trucking - Prudhoe Bay to Prudhoe Bay dock (Heavy Equipment)	7 loads	\$350	\$2,450	
Remote Camp Mobilization - Prudhoe to Site	1 lump sum (LS)	\$2,500	\$2,500	
Remote Camp Mobilization - Fairbanks to Prudhoe	1 LS	\$18,607	\$18,607	
			15% Fee	\$5,604
			<i>Total</i>	\$42,961
Barging				
	Daily Rate	Days	Subtotal	
550-ton barge - Loading @ Prudhoe Bay	\$15,000	1	\$15,000	
550-ton Barge - Prudhoe to Collinson	\$15,000	1	\$15,000	
550-ton Barge - Unloading @ Collinson	\$15,000	1	\$15,000	
550-ton Barge - Collinson to Prudhoe Bay (25-hour run time)	\$15,000	1	\$15,000	
<i>Note: Assume barge has other work along northern coast of Alaska</i>				
			<i>Total</i>	\$60,000
HAZWOPER Labor (Assist with barge unloading and camp setup, 7 days)				
	Hourly Rate	Hours	Subtotal	
2 each Operators (84-hour work week each)	\$153	168	\$25,781	
1 each Laborer (84-hour work week)	\$128	84	\$10,778	
<i>Note: Davis Bacon wages</i>				
<i>G&A/OH/Profit applied for a multiplier to the base rate of 2.52</i>				
<i>Hourly rate = average for 40hr ST and 44hr OT</i>				
			<i>Total</i>	\$36,559
Equipment Standby & Onsite Support for Mob				
	Monthly Rate (160 hrs unless noted)	Months	Subtotal	
1 each Cat D6N LGP bulldozer w/ winch	\$9,360	0.25	\$2,340	
1 each Cat 930G loader w/ forks and material-handling arm	\$7,225	0.25	\$1,806	
1 each Cat 312L excavator w/ ripper bucket	\$5,630	0.25	\$1,408	
1 each Cat 725 articulated dump truck	\$11,500	0.25	\$2,875	
1 each Tundra 1500 rig heater 1.35M BTU	\$8,500	0.25	\$2,125	
2 each Polaris Ranger	\$4,000	0.5	\$2,000	
1 each 50 kW generator (XQ 60) unlimited hours	\$3,750	0.25	\$938	
1 each service truck	\$5,930	0.25	\$1,483	
1 each 5,000-gallon fuel tank w/pump station	\$1,800	0.25	\$450	
Spare ground engaging parts for heavy equipment	\$3,500	1	\$3,500	
6-cubic-yard trash dumpster	\$150	1	\$150	
			15% Fee	\$2,861
<i>Note: Assume equipment available in Prudhoe Bay for rent</i>				
			<i>Total</i>	\$21,935
Mobilization Task Total				\$161,455

Table B-1
Alternative 6 - Landfarming, Off-site Disposal
Collinson Point DEW Line Station, Alaska

Alternative 6 (continued)

POL SOIL REMOVAL AND PLACEMENT IN TREATMENT CELL (Year 1)

HAZWOPER Labor - 223 loose cubic yards/298 tons of POL soil to excavate and place in treatment cell = 4 days

	Hrly Rate	Hours	Subtotal
2 each Operators (12-hour work day each for 4 days)	\$153	96	\$14,732
1 each Laborer (12-hour work day for 4 days)	\$128	48	\$6,159
Revegetation: 1 each Laborer (12-hour work day for 1 day)	\$128	12	\$1,540

Note: Davis Bacon wages

G&A/OH/Profit applied for a multiplier to the base rate of 2.52

Hourly rate = average for 40hr ST and 44hr OT

Total **\$22,431**

Equipment	Monthly Rate (160 hrs unless noted)	Months	Subtotal
1 each Cat D6N LGP bulldozer w/ winch	\$9,360	0.5	\$4,680
1 each Cat 930G loader w/ forks and material-handling arm @ \$7,225/month each	\$14,450	0.5	\$7,225
2 each Cat 312L excavator w/ ripper bucket @ \$5,630/month each	\$11,260	0.5	\$5,630
1 each Cat 725 articulated dump truck	\$11,500	0.5	\$5,750
1 ea Tundra 1500 rig heater 1.35M BTU	\$8,500	0.5	\$4,250
4 each Polaris Ranger	\$8,000	0.5	\$4,000
1 each 50 kW generator (XQ 60) unlimited hours	\$3,750	0.5	\$1,875
1 each service truck	\$5,930	0.5	\$2,965
1 each 10,000-gallon fuel tank w/ pump station	\$3,500	0.5	\$1,750
27-cubic-yard trash dumpster	\$500	0.5	\$250

Note - 7 days forecast but 0.5 month rent used to cover additional hours for overtime

15% Fee **\$5,756**
Total **\$44,131**

Materials & Supplies

	Quantity	Cost Each	Extended
Diesel Fuel	5,000	\$5	\$22,500
Geotextile	5,000 sq ft	\$10,000	\$10,000
Erosion Blanket	5,000 sq ft	\$10,000	\$10,000
Revegetation seed mixture	10 lb	\$40	\$200
Safety Fencing	LS	\$500	\$500
Decon Supplies	LS	\$1,000	\$1,000
Personal Protective Equipment	LS	\$1,000	\$1,000
Safety Vests	LS	\$150	\$150
Hard Hats	LS	\$100	\$100
Oil and Grease	LS	\$2,500	\$2,500
Chains, Shackles, Lifting Straps	LS	\$1,250	\$1,250
Spill Kits	2	\$2,000	\$2,000
Duck Ponds	9	\$250	\$2,250
Shovels, Rakes	6	\$30	\$180
Equipment Tarps & Trunks (heating)	2	\$340	\$680

15% Fee **\$8,147**
Total **\$62,457**

Camp Costs

Daily Camp Rental	4	\$950	\$3,800
Field Labor	4	\$1,333	\$5,330

15% Fee **\$1,370**
Total **\$10,500**

POL-Contaminated Soil Removal Task Total \$139,518

Table B-1
Alternative 6 - Landfarming, Off-site Disposal
Collinson Point DEW Line Station, Alaska

Alternative 6 (continued)

PCB SOIL REMOVAL AND OFF-SITE DISPOSAL (Year 1)				
HAZWOPER Labor (165 loose cubic yards/223 tons of PCB soil to excavate & bag = 3 days)				
	Hourly Rate	Hours	Subtotal	
2 each Operators (12-hour work day each for 3 days)	\$153	72	\$11,049	
1 each Laborer (12-hour work day for 3 days)	\$128	36	\$4,619	
<i>Note: Davis Bacon wages</i>			<i>Total</i>	\$15,668
<i>G&A/OH/Profit applied for a multiplier to the base rate of 2.52</i>				
<i>Hourly rate = average for 40hr ST and 44hr OT</i>				
Equipment	Monthly Rate (160 hrs unless noted)	Months	Subtotal	
1 each Cat D6N LGP bulldozer w/ winch	\$9,360	0.25	\$2,340	
1 each Cat 930G loader w/ forks and material-handling arm @ \$7,225/month each	\$14,450	0.25	\$3,613	
2 each Cat 312L excavator w/ ripper bucket @ \$5,630/month each	\$11,260	0.25	\$2,815	
1 each Cat 725 articulated dump truck	\$11,500	0.25	\$2,875	
1 ea Tundra 1500 rig heater 1.35M BTU	\$8,500	0.25	\$2,125	
4 each Polaris Ranger	\$8,000	0.25	\$2,000	
1 each 50 kW generator (XQ 60) unlimited hours	\$3,750	0.25	\$938	
1 each service truck	\$5,930	0.25	\$1,483	
1 each 10,000-gallon fuel tank w/ pump station	\$3,500	0.25	\$875	
27-cubic-yard trash dumpster	\$500	0.25	\$125	
<i>4 days planned, equipment rental for 1 week to cover extended hours</i>			<i>15% Fee</i>	\$2,878
			<i>Total</i>	\$22,066
Materials & Supplies	Quantity	Cost Each	Extended	
Diesel Fuel	3,000	\$5	\$13,500	
			<i>15% Fee</i>	\$2,025
			<i>Total</i>	\$15,525
Camp Costs				
Daily Camp Rental	4	\$950	\$3,800	
Field Labor	4	\$1,333	\$5,330	
			<i>15% Fee</i>	\$1,370
			<i>Total</i>	\$10,500
PCB Soil Disposal	Quantity	Cost	Subtotal	
Barge Unloading @ Prudhoe Bay onto trucks	165	\$10	\$1,650	
Transportation - Prudhoe Bay to Arlington, Oregon (per CY)	165	\$800	\$132,000	
Disposal Fee - Non-TSCA PCB contaminated soil (per CY)	165	\$47	\$7,755	
			<i>15% Fee</i>	\$21,211
			<i>Total</i>	\$162,616
PCB-Contaminated Soil Removal Task Total				\$226,374

Table B-1
Alternative 6 - Landfarming, Off-site Disposal
Collinson Point DEW Line Station, Alaska

Alternative 6 (continued)

TAKEDOWN & DEMOBILIZATION (Year 1)				
Personnel, Equipment & Materials				
	Number	Rate	Subtotal	
Fairbanks to Barrow	4 People - 1 way	\$450	\$2,700	
Frontier Flying Charter - 6 people Barrow to Collinson (turbo caravan @ \$1,350/hr or \$3,000/trip)	1 round trip	\$3,000	\$3,000	
Trucking - Fbks to Prudhoe Bay Dock (Materials and Supplies)	2 loads	\$4,500	\$9,000	
Trucking - Prudhoe Bay Dock to Prudhoe Bay (Heavy Equip.)	7 loads	\$350	\$2,450	
Heavy Equipment Environmental Fees (oil and antifreeze change outs)	9	\$50	\$450	
Remote Camp Demobilization - Site to Prudhoe Bay	1 LS	\$2,500	\$2,500	
Remote Camp Demobilization & 1 Time Fees - Prudhoe Bay to Fbks	1 LS	\$18,607	\$18,607	
6-cubic-yard trash dumpster - disposal fee	1	\$250	\$250	
			15% Fee	\$5,844
			<i>Total</i>	\$44,801
Barging				
	Daily Rate	Days	Subtotal	
550-ton Barge - Prudhoe Bay to Collinson	\$15,000	1	\$15,000	
550-ton Barge - Loading at Collinson	\$15,000	1	\$15,000	
550-ton Barge - Collinson to Prudhoe Bay (25 hours run time)	\$15,000	1	\$15,000	
550-ton Barge - Unloading @ Prudhoe Bay	\$15,000	1	\$15,000	
<i>Note: Assume barge has other work along northern coast of Alaska</i>				
			<i>Total</i>	\$60,000
Labor (Assist with barge loading and camp takedown, 7 days)				
	Hrly Rate	Hours	Subtotal	
2 each Operators (84-hour work week each)	\$153	168	\$25,781	
1 each Laborer (84- hour work week)	\$128	84	\$10,778	
<i>Note: Davis Bacon wages</i>				
<i>G&A/OH/Profit applied for a multiplier to the base rate of 2.52</i>				
<i>Hourly rate = average for 40hr ST and 44hr OT</i>				
			<i>Total</i>	\$36,559
Equipment Standby & Onsite Support for Demob				
	Monthly Rate (160 hrs unless noted)	Months	Subtotal	
1 each Cat D6N LGP bulldozer w/ winch	\$9,360	0.25	\$2,340	
h Cat 930G loader w/ forks and material-handling arm @ \$7225/month each	\$14,450	0.25	\$3,613	
2 each Cat 312L excavator w/ ripper bucket @ \$5630/month each	\$11,260	0.25	\$2,815	
1 each Cat 725 articulated dump truck	\$11,500	0.25	\$2,875	
1 ea Tundra 1500 rig heater 1.35M BTU	\$8,500	0.25	\$2,125	
4 each Polaris Ranger	\$8,000	0.25	\$2,000	
1 each 50 kW generator (XQ 60) unlimited hours	\$3,750	0.25	\$938	
1 each service truck	\$5,930	0.25	\$1,483	
1 each 10,000-gallon fuel tank w/ pump station	\$3,500	0.25	\$875	
27-cubic-yard trash dumpster	\$500	0.25	\$125	
			15% Fee	\$2,878
			<i>Total</i>	\$22,066
<i>Note: Assume equipment available in Prudhoe Bay for rent</i>				
			Demobilization Task Total	\$163,425

Table B-1
Alternative 6 - Landfarming, Off-site Disposal
Collinson Point DEW Line Station, Alaska

Alternative 6 (continued)

POL SOIL TREATMENT (Years 1 and 2)					
Cost per site visit [Rototill treatment cells once per week, June through August, two summers (24 weeks total)]					
Personnel, Equipment & Materials		Number	Rate	Subtotal	
Frontier Flying Charter - 2 people from Barrow to Collinson (turbo caravan @ \$1,350/hour or \$3,000/trip)		1 round trip	\$3,000	\$3,000	
HAZWOPER Labor		Hourly Rate	Hours	Subtotal	
1 each Operator (10-hour work day)		\$153	10	\$1,535	
1 each Laborer (10-hour work day)		\$128	10	\$1,283	
<i>Note: Davis Bacon wages</i>				<i>Per-visit total</i>	\$5,818
<i>G&A/OH/Profit applied for a multiplier to the base rate of 2.52</i>				<i>24 visits total</i>	\$139,625
<i>Hourly rate = average for 40hr ST and 44hr OT</i>					
Equipment (3 months/summer season, 2 seasons)		Monthly Rate (160 hrs unless noted)	Months	Subtotal	
1 each John Deere 4500 tractor with rototiller attachment		\$9,360	6	\$56,160	
1 each service truck		\$3,000	6	\$18,000	
1 each 1,000-gallon fuel tank w/ pump station		\$1,500	6	\$9,000	
5-cubic-yard trash dumpster		\$250	6	\$1,500	
				<i>15% Fee</i>	\$12,699
				<i>Total</i>	\$97,359
Materials & Supplies		Quantity	Cost Each	Extended	
Diesel Fuel		1,000	\$5	\$5,000	
				<i>15% Fee</i>	\$750
				<i>Total</i>	\$5,750
Barging (one mob, one demob per season, two seasons)		Daily Rate	Days	Subtotal	
550-ton barge - Loading @ Prudhoe Bay		\$2,000	1	\$2,000	
550-ton Barge - Prudhoe to Collinson		\$15,000	1	\$15,000	
550-ton Barge - Unloading @ Collinson		\$2,000	1	\$2,000	
550-ton Barge - Collinson to Prudhoe Bay		\$15,000	1	\$15,000	
<i>Note: Assume barge has other work along northern coast of Alaska</i>				<i>Total</i>	\$34,000
				POL-Contaminated Soil Treatment Task Total	\$276,734

Capital Cost Subtotal	\$967,506
Project Management (10 percent)	\$96,751
Remedial Design (12 percent)	\$116,101
Construction Management (15 percent)	\$145,126
Design Contingency (25 percent)	\$241,877
Bid Contingency (25 percent)	\$241,877
TOTAL ESTIMATED PROBABLE COST OF ALTERNATIVE 6	\$1,809,237

* - see Alternative 2 for explanation of periodic cost assumptions

APPENDIX C

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Table C-1
Applicable or Relevant and Appropriate Requirements (for CERCLA hazardous substances)
Collinson Point DEW Line Station, Alaska

ARARs	Citation or Reference	Requirements	Comments and Analysis/Rationale for Decision
Alaska State Regulations			
Oil and Hazardous Substances Pollution Control Regulations	18 AAC 75.341(c), Table B1	Regulations establishing discharge reporting, cleanup, and disposal requirements for oil and other hazardous substances. Provides cleanup standard for soil.	These regulations provide applicable soil cleanup standards for CERCLA hazardous substances (PCBs only).
Federal Regulations			
Endangered Species Act of 1973	16 USC 1538(a)(1)(B)	Establishes requirements, with respect to any endangered species of fish or wildlife listed, that it is unlawful for any person to take any such species within the United States. The term "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.	Endangered, threatened, and/or species of special concern are known to utilize critical habitat designated on-site. The polar bears (threatened) range includes the site and spectacled eiders (threatened) are known to nest in coastal locations.
Protection of Wetlands	40 CFR 230.10	Requires minimization of destruction, loss, or degradation of wetlands. Prohibits discharge of dredged or fill material into wetlands without a permit.	There are jurisdictional wetlands identified at the site which may be impacted by implementation of the selected remedy.
Marine Mammal Protection Act	16 USC 1372, Section 102(a)(2)(A)	Provides for the protection and management of marine mammals and their products. Includes walrus, polar bears, sea otters, whales, porpoises, seals, and sea lions. Primary authorities are the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.	Remedial actions cannot impair protected species. Designated critical habitat area for polar bears includes the Collinson Point site.
Wildlife Refuge Protection	16 USC 668dd(c)	On National Wildlife Refuge Systems, requirement states that no person shall disturb, injure, cut, burn, remove, destroy, or possess any real or personal property of the US, including natural growth, in any area of the System; or take or possess any fish, bird, mammal, or other wild vertebrate or invertebrate animals or part or nest or egg thereof within any such area; or enter, use, or otherwise occupy any such area for any purpose; unless such activities are performed by persons authorized to manage such area, or unless such activities are permitted either under subsection (d) of this section or by express provision of the law, proclamation.	The Collinson Point DEW Line Station is within the Arctic National Wildlife Refuge.

Table C-1
Applicable or Relevant and Appropriate Requirements (for CERCLA hazardous substances)
Collinson Point DEW Line Station, Alaska

ARARs	Citation or Reference	Requirements	Comments and Analysis/Rationale for Decision
The Migratory Bird Treaty Act	16 USC 703	Law makes it unlawful to take, kill, or possess any migratory bird or any part, nest, or eggs of any such bird.	The coastal plain area of the Arctic National Wildlife Refuge, including Collinson Point, is used for summer breeding and visitation by a variety of migratory birds. Common species resident to, migrating through, or breeding on the coastal plain include the greater white-fronted goose, snow goose, ross's goose, brant, tundra swan, northern pintail, king eider, common eider, long tailed duck, red-breasted merganser, american golden plover, ruddy turnstone, semipalmated sandpiper, red-necked phalarope, glaucous gull, arctic tern, pomarine jaeger, and long-tailed jaeger.

Table C-2
Risk-Based Cleanup Levels (for petroleum hydrocarbons)
Collinson Point DEW Line Station, Alaska

Cleanup Levels	Citation or Reference	Requirements	Comments and Analysis/Rationale for Decision
Alaska State Regulations			
Oil and Hazardous Substances Pollution Control Regulations	18 AAC 75.341(b), Table A1 and 18 AAC 75.341(c), Table B2	Regulations establishing discharge reporting, cleanup, and disposal requirements for oil and other hazardous substances. Provides cleanup standard for soil.	Specifies risk-based cleanup levels for diesel and gasoline range organics which will be used to determine mitigation of imminent and substantial endangerment for petroleum hydrocarbons as authorized by DERP.
Water Quality Standards	18 AAC 70.020(b)	Specifies the water quality criteria that may not be exceeded in a waterbody as a result of human actions. For petroleum hydrocarbons, the standard of control is runoff may not cause a visible sheen upon the surface of the water.	Runoff from excavation areas may not cause or contribute to a violation of the water quality standards.