UNITED STATES AIR FORCE
BULLEN POINT SHORT RANGE RADAR STATION, ALASKA

DECISION DOCUMENTS FOR CERCLA SITES OT003, OT004, ST005, AND LF006 AND FOR NON-CERCLA SITES SS001, SS002, ST007, AND ST008 AT BULLEN POINT SHORT RANGE RADAR STATION

FINAL

September 2007

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FINAL

September 2007

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Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

SEPTEMBER 2007

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1.0 Declaration

1.1 Site Name and Location

Facility Name: Outside Transformer (OT003), Bullen Point Short Range Radar Station (SRRS)
Site Location: Bullen Point, Alaska
CERCLIS ID Number: Not Applicable
Alaska Department of Environmental Conservation (ADEC) Contaminated Site Record Key (reckey) Number: 200436X921301.
Operable Unit/Site: Not Applicable

Bullen Point SRRS is located on the Arctic Coastal Plain at 70°10'N latitude and 146°51'W longitude. The Outside Transformer (OT003) is one of eight different sites located at the Bullen Point SRRS being addressed under the U.S. Air Force (USAF) Environmental Restoration Program (ERP). The Bullen Point SRRS is not listed on the National Priorities List.

OT003 is located adjacent to the south side of the eastern module train at 70°10'34.61"N latitude, 146°51'19.17"W longitude (this is the location of sample number OT003SS01). It consists of one transformer on a raised platform stand and the soil beneath the platform stand. The platform is approximately 3 feet wide by 6 feet long and is raised approximately 8 feet above the ground surface. A close-up photograph of the transformer platform is depicted in Figure 2-3. The transformer was labeled as being nitrogen filled, but likely also contained PCB-laden dielectric fluid (oil).

1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the ERP site Outside Transformer (OT003) in Bullen Point, Alaska which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

This document is issued by the Department of the Air Force (USAF), as the lead agency. The USAF is managing remediation of contamination at OT003 in accordance with CERCLA as required by the Defense Environmental Restoration Program (DERP). The decision put forth in this document is also in accordance with the requirements of Title 18, Chapter 75, Article 3, of the Alaska Administrative Code (AAC) Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances regulations for the State of Alaska.

As the lead agency, the USAF has selected the remedy. The State of Alaska, through the ADEC concurs with the selected remedy. The U.S. Environmental Protection Agency (EPA) has been given the opportunity to review this document and has chosen to defer to the ADEC for regulatory oversight of the ERP at Bullen Point SRRS.

1.3 Assessment of Site

During a 1988 field investigation, the transformer was inspected for possible leakage (WCC 1990). The platform and soil beneath it were examined and no evidence of staining was observed. The transformer was labeled as being nitrogen-filled, so it was assumed that PCBs were not present and no samples were collected. In November 1991, the ADEC stated in a letter to the USAF that no further action was necessary at this site (ADEC 1991), and it was not investigated further.

In order to verify that a release from the transformer had not occurred, as part of the 2004 Remedial Investigation (RI), a single soil sample was collected directly beneath the platform and analyzed for PCBs. There was no apparent staining or odor evident in the surrounding gravel pad. The soil sample had a concentration of 1.51 milligrams PCBs per kilogram (mg/Kg). Due to only one sample being collected, the extent of the contamination is not well characterized (HCG 2005). However, the sample was collected in the area considered to have the highest probability of a release. Based on the relatively low concentration of PCBs detected and the site inspection, the extent of PCB contaminated soil greater than 1 mg/Kg was considered to be limited in area, approximately 25 square feet with a total in-place volume of 1 cubic yard.

Based on the findings of the RI and other key documents that can be found in the Administrative Record File for Bullen Point SRRS, the CERCLA response action selected in this Decision Document is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The USAF is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 Description of Selected Remedy

Remedial alternatives for OT003 were developed and evaluated through a Feasibility Study (FS) (USAF 2005). Based on the results of the FS, the USAF selects the following remedy:

- excavation of soil with PCBs above 1 mg/Kg beneath the transformer stand (an estimated volume of 1 cubic yard [yd^3]);
- transportation of PCB contaminated soil to an offsite treatment, storage and disposal facility (TSD) for disposal; and
- disposal of soils will be consistent with the Off-Site Rule (40 CFR 300.440).

OT003 is one of eight ERP sites at Bullen Point SRRS. The overall cleanup strategy for Bullen Point involves source management and migration and exposure controls. The selected alternative for OT003 fits into the overall site management plan by source reduction in the source area without the need for institutional controls. The cleanup plan for Bullen Point includes the following:

- Cleaning up petroleum contamination in accordance with Alaska's oil and hazardous substance pollution control laws.
- Cleaning up the soil contamination other than petroleum hydrocarbons to 18 AAC 75.341 Method Two cleanup levels for the Arctic Zone.

- Removing the inactive facilities that have no utility (value) to the future landowner (i.e., completion of Clean Sweep Program at Bullen Point)

No source materials constituting principal threats exist at the site, because PCBs in soil at the site are at concentrations that present an excess cancer risk near the acceptable risk range of 10^{-6}.

1.5 Statutory Determinations

The selected remedy for OT003 is protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the site. It provides the best balance of trade-offs in terms of balancing criteria while also considering the bias against offsite treatment and disposal and considering state and community acceptance.

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site whenever practicable (40 CFR 300.430[a] [1] [iii] [A]). The selected remedy for OT003 does not satisfy the statutory preference for treatment as a principal element of the remedy because excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure. Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

Any petroleum contamination will be addressed in accordance with Alaska's oil and hazardous substance pollution control laws.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this DD (Section 2).

- List of chemicals of concern (COCs) and their respective concentrations (Section 2.7.1, Table 2-2)
- Baseline risk represented by the COCs (Section 2.7.1.1, Tables 2-3 and 2-4)
- Cleanup levels established for COCs and the basis for these levels (Section 2.12.4, Table 2-7)
- How source materials constituting principal threats will be addressed (Section 2.11)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and DD (Section 2.7.1.1)
- Potential land and ground water use that will be available at the site as a result of the selected remedy (Section 2.6 and 2.12.4)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.12.3, Table 2-6)

- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.12)

Additional information can be found in the Administrative Record file for Bullen Point SRRS, Alaska which can be found at http://www.adminrec.com/PACAF.asp?Location=Alaska

Four information repositories are also located in Kaktovik, these include:

- Mayor's Office
- School Library
- Native Village of Kaktovik
- Kaktovik Inupiat Corporation

1.7 Authorizing Signatures

This signature sheet documents the United States Air Force and ADEC approval of the remedy selected in this Decision Document for Outside Transformer (OT003), Bullen Point SRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson — 10 Oct 07

BRENT A. JOHNSON
Colonel, USAF
Commander, 611th Air Support Group

Date

John Halverson — 8/30/07

JOHN HALVERSON
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

2.0 Decision Summary

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

2.1 Site Name, Location, and Description

2.1.1 Regional Setting

Bullen Point SRRS is located at latitude 70°10'N, longitude 146°51'W on the Arctic Coastal Plain on the shore of the Beaufort Sea. The installation consists of 620 acres of low-lying tundra. The nearest populated area is Deadhorse, 38 miles west of the installation. Air travel provides the only year-round access to Bullen Point SRRS, while marine travel provides summer access. Bullen Point SRRS is not connected by road to Deadhorse or any other populated area. The general location of the Bullen Point SRRS is shown on the inset in Figure 2-1.

The weather station closest to Bullen Point is at Prudhoe Bay, 38 miles to the west. Because of a similarity in elevation and proximity to the Beaufort Sea, conditions at Prudhoe Bay should approximate those at Bullen Point. Average annual precipitation recorded at Prudhoe Bay from 1986 to 1999 was 4.26 inches per year, which included 33.1 inches of snowfall (Western Regional Climate Center 2006). Average daily minimum and maximum temperatures in July were 39.7 degrees Fahrenheit (°F) and 55.4°F, respectively. In December, these average temperatures were -19.2°F and -6.6°F, respectively. The extreme recorded temperatures are -62°F and 83°F.

Surficial deposits in the Bullen Point SRRS area consist of sand and gravel near the shoreline and along stream channels; silt, sand, and gravel deposits in the inland low areas; and eolian (wind) silt and fine sand deposits in the upland areas. Vegetated tundra is present above these deposits and consists of low growing plants including mosses, lichens, sedges, and grasses (Arctic Slope Technical Services [ASTS] 1982). Bullen Point SRRS is located in an area of continuous permafrost up to 2,000 feet deep (Lachenbruch 1982). The seasonal active zone layer typically varies from 2 to 5 feet in thickness.

Small streams, discharging into the Beaufort Sea, drain the lakes and wetlands surrounding the Bullen Point SRRS. Drinking water for Bullen Point SRRS was provided by a reservoir south of the facility that was formed by damming a stream. Since operations ceased, the dam has been breached and the reservoir drained (Hoefler Consulting Group [HCG] 2005).

2.1.2 Regional Ecology

Bullen Point provides habitat for a variety of fish, bird and mammal populations commonly found in the northern arctic coast region (USAF 2005). Fish common to the western Beaufort Sea nearshore habitats include four-horn sculpin, Arctic cisco, and Arctic char (ASTS 1982). Eighty-five species of predominantly waterfowl and shorebirds are also found in the area. Marine mammals that have been reported off Bullen Point include beluga and bowhead whales, walrus, polar bears, and ringed and bearded seals. Land mammals such as caribou, foxes, weasels, moose, grizzly bear, wolverine and wolf are also found in the region.

The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.1.3 Facility History and Background

The Bullen Point SRRS is one of many Distant Early Warning (DEW) Line stations located across the arctic region of North America and Greenland. The installation was in operation between 1953 and 1971 and was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to an SRRS, which has operated since 1994. It is unmanned except for period maintenance visits. Operations and support personnel are based out of Elmendorf Air Force Base, located near Anchorage, Alaska.

The Bullen Point SRRS initially consisted of a module train, rotation radar, and support facilities. Presently, facilities include an old, inactive radome; four 30-foot communication antennas; a new radome; a group of eight buildings attached by covered walkways (the module train); two pump houses; a warehouse; seven diesel oil tanks; a 250,000-gallon water storage tank; associated roads and pads; a 3,600-foot gravel airstrip; and a helicopter pad. The inactive structures at Bullen Point SRRS are scheduled for demolition under the Air Force (USAF) Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn would transfer the land to the State of Alaska based on the State's expressed interest in the property.

In addition, the potential advantages of making the property acceptable for land transfer to the BLM, and eventually the State of Alaska, were considered when evaluating the need for remedial action and selecting the appropriate remedial alternative. The State has selected the land as part of its entitlement under the Alaska Statehood Act. However, in its current condition the land is unacceptable to the State. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of DRO in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for RRO in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup level for DRO and RRO in the native soils (e.g., tundra and peat) is the listed Method Two soil cleanup level. At the Old Landfill (LF006), the DRO and RRO cleanup levels are 500 and 2,000 mg/Kg, respectively.
- Removal of contaminated soil, hazardous materials, and solid waste (debris) from the Old Landfill (LF006).
- Removal of inactive facilities that have no utility (value) to the future landowner.

As part of the cleanup at Bullen Point, the USAF will construct a new solid waste landfill at an inland location on its property. The landfill will receive nonhazardous waste from Clean Sweep demolition activities and the cleanup of the Old Landfill (LF006), which is threatened by coastal erosion. The new landfill will be transferred to the State of Alaska after it is closed, along with the rest of the excess USAF property at Bullen Point.

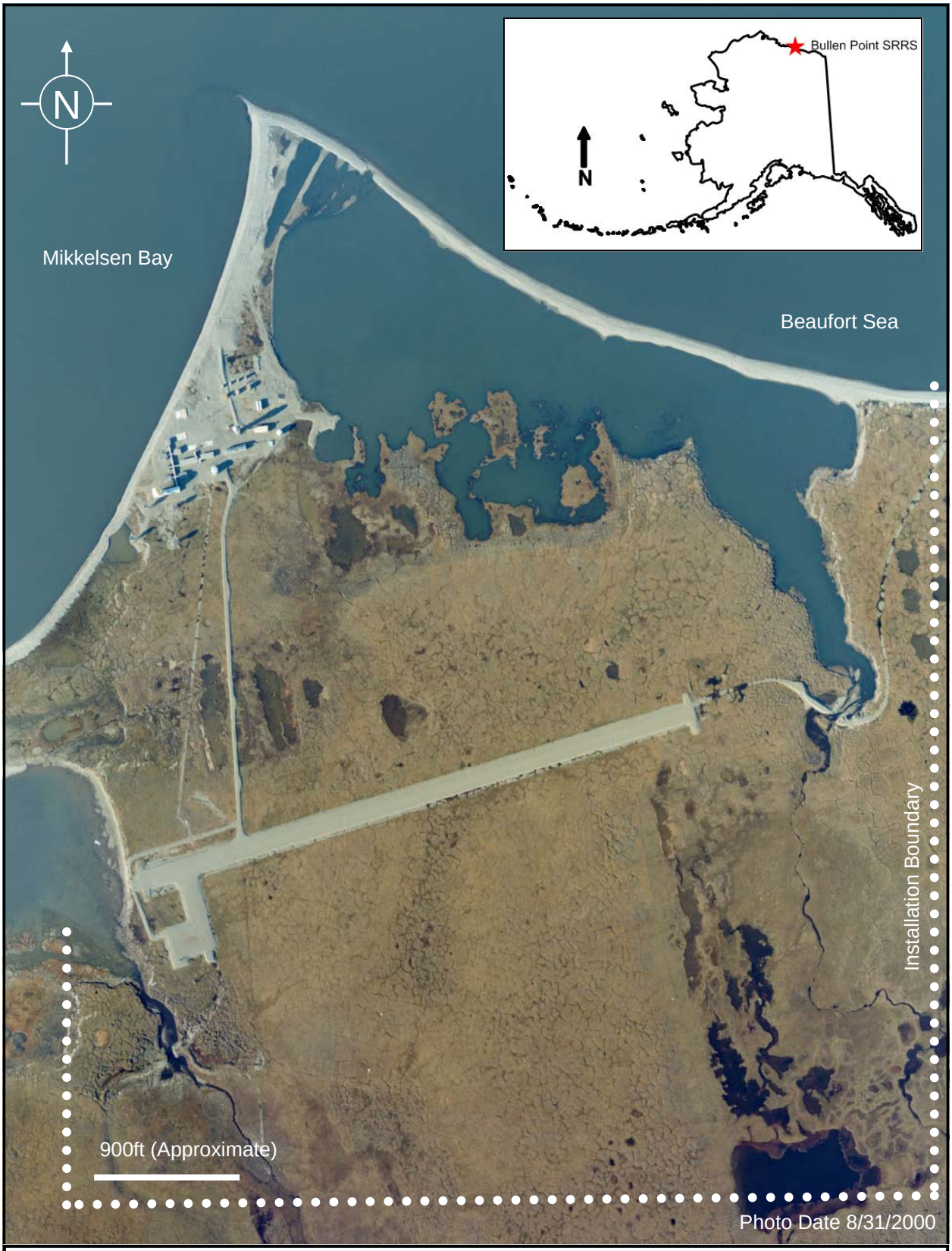

Figure 2-1
Bullen Point SRRS Vicinity Map

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The 2004 RI/FS concluded that the most cost-effective approach to completing all of the USAF objectives under the ERP at Bullen Point, including building demolition and debris removal, was to perform the cleanup activities necessary to make the excess land acceptable for transfer according to State of Alaska requirements. Consequently, six ERP sites were proposed for remedial action.

2.1.4 Facility ERP History

Under the USAF ERP and its predecessor the Installation Restoration Program, environmental investigations have been conducted at the Bullen Point SRRS since 1981. These investigations included preliminary assessments in 1981 and 1986. Environmental samples were collected and limited removal actions performed at Bullen Point SRRS in 1988 as part of a Stage 3 Remedial Investigation/Feasibility Study (RI/FS) at five sites (Woodward Clyde Consultants [WCC] 1990). In preparation for construction activities associated with the SRRS, soils in the construction area were screened for hydrocarbons in 1991 (ENSR 1992, as reported in ICF 1996a). A second, more extensive RI/FS was conducted in 1993 for five sites (ICF 1996a). In an effort to fill data gaps and update previous data, additional sampling occurred in 2004 at Bullen Point SRRS for eight sites (HCG 2005). All eight sites were included in the Proposed Plan and Decision Document process.

Past activities potentially resulting in contaminant release at the Bullen Point SRRS include:

- Spills during the transfer of fuels in and out of storage tanks;
- Leaks from fuel lines, drums, and tanks;
- Spills or leaks of fuel, lubricants, or solvents during vehicle and equipment maintenance activities;
- Spills or leaks from transformers or other electrical equipment containing polychlorinated biphenyls (PCBs); and
- Disposal of wastes and other discarded material containing hazardous substances.

Some of the contaminants encountered during investigations at Bullen Point SRRS are benzene, toluene, ethylbenzene, and total xylenes compounds (BTEX); diesel range organics (DRO); gasoline range organics (GRO); polynuclear aromatic hydrocarbons (PAHs); PCBs; petroleum, oil, and lubricants (POL); residual range organics (RRO); semivolatile organic compounds (SVOCs); metals; and volatile organic compounds (VOCs). Most of these contaminants are the result of fuel or oil spills.

As the lead agency, the USAF has conducted environmental remedial investigation and assessment activities at OT003 in accordance with CERCLA under the Defense Environmental Restoration Program (DERP) which was established by Section 211 of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

As the support agency, the ADEC provides primary oversight of the environmental restoration actions, in accordance with their contaminated sites regulations (18 AAC 75, Article 3, Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances).

Funding is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense (DoD) installations.

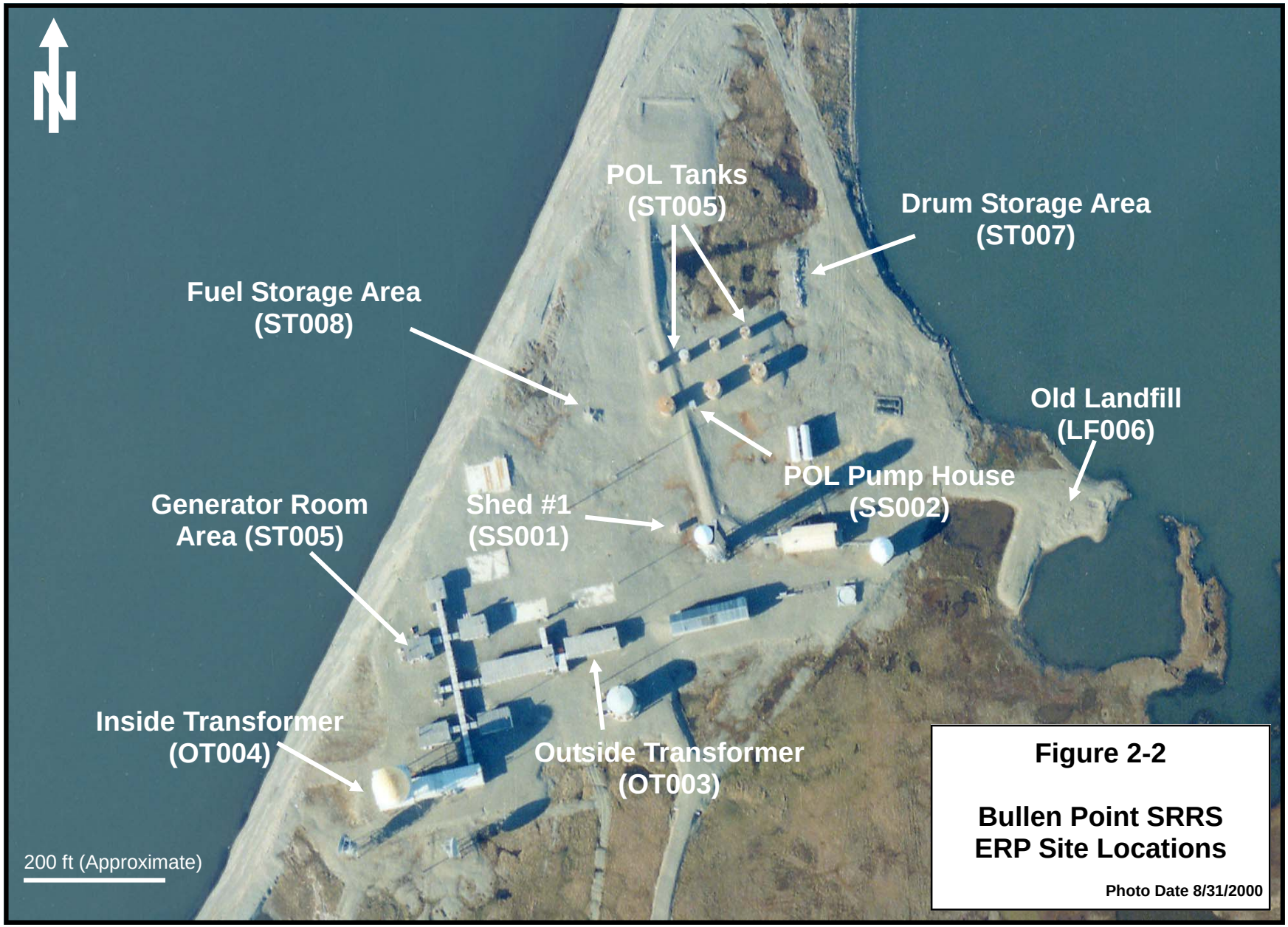
2.2 Site History and Enforcement Activities

This section provides background information and summarizes the series of investigations that led to the Decision Document (DD). It describes the CERCLA response actions undertaken at OT003.

OT003 is located adjacent to the south side of the eastern module train at 70°10'34.61"N latitude, 146°51'19.17"W longitude (Figure 2-2). The transformer is located on the western half of the platform. The platform is located on the same gravel pad the module trains occupy and tundra borders the gravel pad to the south. The site is on land currently owned by the USAF.

During a 1988 field investigation, the transformer was inspected for possible leakage (WCC 1990). The platform and soil beneath it were examined and no evidence of staining was observed. The transformer was labeled as being nitrogen-filled, so it was assumed that PCBs were not present and no samples were collected. In November 1991, the ADEC stated in a letter to the USAF that no further action was necessary at this site (ADEC 1991), and it was not investigated further.

In order to verify that a release of the fluids from the transformer had not occurred, OT003 was further investigated as part of the 2004 RI. As no evidence of a release in the surrounding gravel was observed, only a single soil sample was collected directly beneath the platform and analyzed for PCBs.


N
POL Tanks
(ST005)
Drum Storage Area
(ST007)
Fuel Storage Area
(ST008)
Old Landfill
(LF006)
POL Pump House
(SS002)
Shed #1
(SS001)
Generator Room
Area (ST005)
Inside Transformer
(OT004)
Outside Transformer
(OT003)
200 ft (Approximate)
Figure 2-2
Bullen Point SRRS
ERP Site Locations
Photo Date 8/31/2000

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No land use controls are applicable as part of the selected remedy for this site. In addition, there are no Federal Facility Agreements or state agreements for the Bullen Point SRRS. No sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have been detected at OT003. There have been no regulatory enforcement activities at the site.

In accordance with USAF policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process culminating in this DD. Separate NEPA documentation will not be issued.

2.3 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan and review by the support agency. Components of these items and documentation of how each component was satisfied for OT003 are described below.

Proposed Plan. A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review on October 17, 2006. A public meeting was also held at that time.

Public Comment Period. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. A summary of the public comments and responses to public comments are provided in Section 3 of this decision document. The USAF received no requests to extend the public comment period.

Public Meetings. The USAF held a public meeting in Kaktovik on October 17, 2006 to discuss the Proposed Plan and record verbal comments. No comments were received regarding the Proposed Plan. Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board (RAB) meetings. The RAB consists of representatives from the community and the USAF. A RAB was formed in Kaktovik in 1998 and typically meets quarterly. RABs provide a forum for discussion and exchange of information among federal and state agencies and the community regarding cleanup of a military site. The RAB plays an important role in the decision-making process.

Updated Mailing List and Mailing Events. A mailing list of interested parties is maintained and updated regularly by the Air Force Community Relations Coordinator.

Administrative Record. The administrative record located at the 611 Civil Engineering Squadron (CES) office at the Elmendorf Air Force Base, Alaska, is continually updated and developed. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. An index of documents is included in Appendix A. A website with the administrative record current up through 2003 is also available to the public at:
http://www.adminrec.com/PACAF.asp?Location=Alaska

Information Repository. The information repository is a file containing newsletters, fact sheets, and community relations documents relating to Proposed Plans and response actions for all of the ERP sites at Bullen Point SRRS. Four information repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation.

Management Action Plan. The Management Action Plan (MAP) report is updated periodically and made available to the public in order to provide a summary of all restoration activities in one document. The most recent MAP was published in 2004 (USAF 2004) and is part of the Administrative Record.

USAF responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided as Section 3 of the DD.

2.4 Scope and Role of Operable Unit or Response Action

There are no operable units at Bullen Point SRRS. However, the overall cleanup strategy for the installation includes source reduction and making the property acceptable for transfer to the BLM and eventually the State of Alaska. The conditions for land transfer were discussed in Section 2.1.2.

A Proposed Plan has been issued for eight ERP sites at Bullen Point, including OT003.

2.5 Site Characteristics

2.5.1 Topography and Stratigraphy

The Outside Transformer is located on a platform supported by two poles. It is directly adjacent to the eastern module train and approximately 90 feet northwest of the water storage tank (Figure 2-1). The transformer is located on the western half of the platform. The platform is located on the same gravel pad the module trains occupy and tundra borders the gravel pad to the south.

The area immediately beneath the platform and next to the module train is relatively flat with a slight slope to the south toward tundra. The ground surface below the transformer platform is approximately 10 feet above sea level. The soils in the area of the platform are sandy gravel and have sparse vegetation.

2.5.2 Surface and Subsurface Hydrology

There are no surface water bodies or distinct drainage patterns located near the site. The gravel pad is relatively flat in the area surrounding OT003. A slight slope to the south may cause surface water runoff to flow in this direction. However, water likely infiltrates the gravel pad prior to reaching the tundra approximately 100 feet to the south. Subsurface water is likely present a couple of feet below ground surface perched on the permafrost.

2.5.3 Ecology

OT003 is located on the southern portion of the gravel pad that supports the Bullen Point facilities. The gravel pad is only sparsely vegetated in some areas and considered relatively poor

ecological habitat. Regional ecology of the Bullen Point Installation is described in Section 2.1.2. The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.5.4 Previous Site Characterization Activities

During a 1988 field investigation, the transformer was inspected for possible leakage (WCC 1990). The platform and soil beneath it were examined and no evidence of staining was observed. The transformer was labeled as being nitrogen-filled, so it was assumed that PCBs were not present and no samples were collected. In November 1991, the ADEC stated in a letter to the USAF that no further action was necessary at this site (ADEC 1991), and it was not investigated further.

As part of the 2004 RI, a single soil sample was collected directly beneath the platform and analyzed for PCBs. There was no visible evidence of a release to the gravel pad. The soil sample had a concentration of 1.51 milligrams per kilogram (mg/Kg). Due to only one sample being collected, the extent of the contamination is not well characterized (HCG 2005). However, the sample was collected in the area considered to have the highest probability of a release. Based on the relatively low concentration of PCBs detected and the site inspection that showed no visual evidence of staining, the surface extent of PCB contaminated soil greater than 1 mg/Kg was considered to approximately 25 square feet (ft^2). The sample results are summarized in Table 2-1 and the sample location is shown on Figure 2-3.

2.5.5 Nature and Extent of Contamination

2.5.5.1 Known or Suspected Sources of Contamination

Although the transformer at OT003 is marked as nitrogen-filled, that does not preclude it from having contained dielectric fluid (oil) with PCBs. A nitrogen blanket is sometimes placed over a transformer's dielectric fluid to keep moisture out of the oil. The suspected source of the PCB contamination is spills or leaks from the transformer that is located on the raised platform.

2.5.5.2 Types of Contamination and the Affected Media

Table 2-1 summarizes the maximum concentrations of detected contaminants. The soil directly beneath the platform contains PCBs exceeding the ADEC 18 AAC 75.341, Table B2, Method Two cleanup criterion of 1 mg/Kg. It is estimated that approximately 25 ft^2 of impacted soil is present at this site with a total in-place volume of 1 cubic yard (yd^3) (HCG 2005).

2.5.5.3 Known or Potential Routes of Migration

The occurrence of PCBs is probably limited and confined to the gravel pad area directly beneath the platform. PCBs are relatively insoluble and tend to bind to soil particles; therefore, the potential for transport is considered to be minimal. The PCBs would not have traveled in surface water runoff except if the flow was strong enough to entrain soil particles. This is unlikely considering the low surface gradient at OT003.

Table 2-1 OT003 Summary of Sample Results

Media	Analyte	Screening Criteria: 18 AAC 75 Cleanup Level (Arctic Zone) for Soil[1]	1993 RI/FS Maximum Concentration[2,3]	2004 RI/FS Maximum Concentration[2,3]	2004 RI/FS Frequency of Detections[4]
Soil (mg/Kg)	PCBs	1	NS	1.51	1/1

Notes
1- Lowest value of ingestion or inhalation shown from 18 AAC 75, Tables B1 and B2, referred to as "Method Two Cleanup Levels" for the Arctic Zone
2- For soil/sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.
3- 1993 data taken from the *Final RI/FS, Bullen Point Radar Installation, Alaska* (ICF 1996a).
2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).
4- The frequency of detections is the number of times the analyte was detected in the samples collected at the site.
Frequencies do not include replicate samples collected.

Abbreviations

"--"	Screening criteria does not exist for this compound
NS	Not Sampled
mg/Kg	milligrams per kilogram
PQL	Practical Quantitation Limit
PCBs	Polychlorinated Biphenyls

2.5.6 Conceptual Exposure Model

A conceptual exposure model was developed to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. These pathways are presented in Figure 2-4, based upon current and reasonably likely future land uses and the potential beneficial use of surface water at OT003.

For purposes of evaluating exposure pathways, it was assumed there are no current site residents on the Bullen Point SRRS. Current site use is limited to periodic site workers, and occasional recreational or subsistence uses by residents of Kaktovik. Future exposure pathways assume the Bullen Point SRRS facility is inactive.

Conceptual human health and ecological site models for OT003 are contained in Figures 2-4 and 2-5, respectively. The accidental ingestion of contaminated soil is considered the most probable exposure pathway at OT003. Groundwater is not a current or future source of drinking water at Bullen Point. There is minimal potential for contaminants to migrate from the soils at OT003 to surface water. Vertical migration is limited by the presence of permafrost. In general, air transportation is not a significant pathway of exposure because PCBs are nonvolatile.

In addition, PCBs are persistent and have the potential to bioaccumulate. If aquatic or terrestrial organisms were exposed to the contaminated soil, the PCBs could be ingested. The PCB-contaminated soil is unlikely to enter aquatic environments because they are located in a stable environment removed from surface water bodies. Some types of terrestrial animals such as borrowing ground squirrels could potentially come into contact with the PCB-contaminated soils. The PCBs could then travel up the food chain and eventually be ingested by humans. This risk is low, however, because only occasional recreational and subsistence activities occur in the vicinity of Bullen Point SRRS.

611 CES
PRIDE IN PROGRESS

BULLEN POINT SRRS

OUTSIDE TRANSFORMER (OT003)
SUMMARY OF SAMPLE LOCATIONS

BULLEN POINT, ALASKA

PROJECT NO: 9702-041

DATE: 12-28-06

FIGURE NO: 2-3

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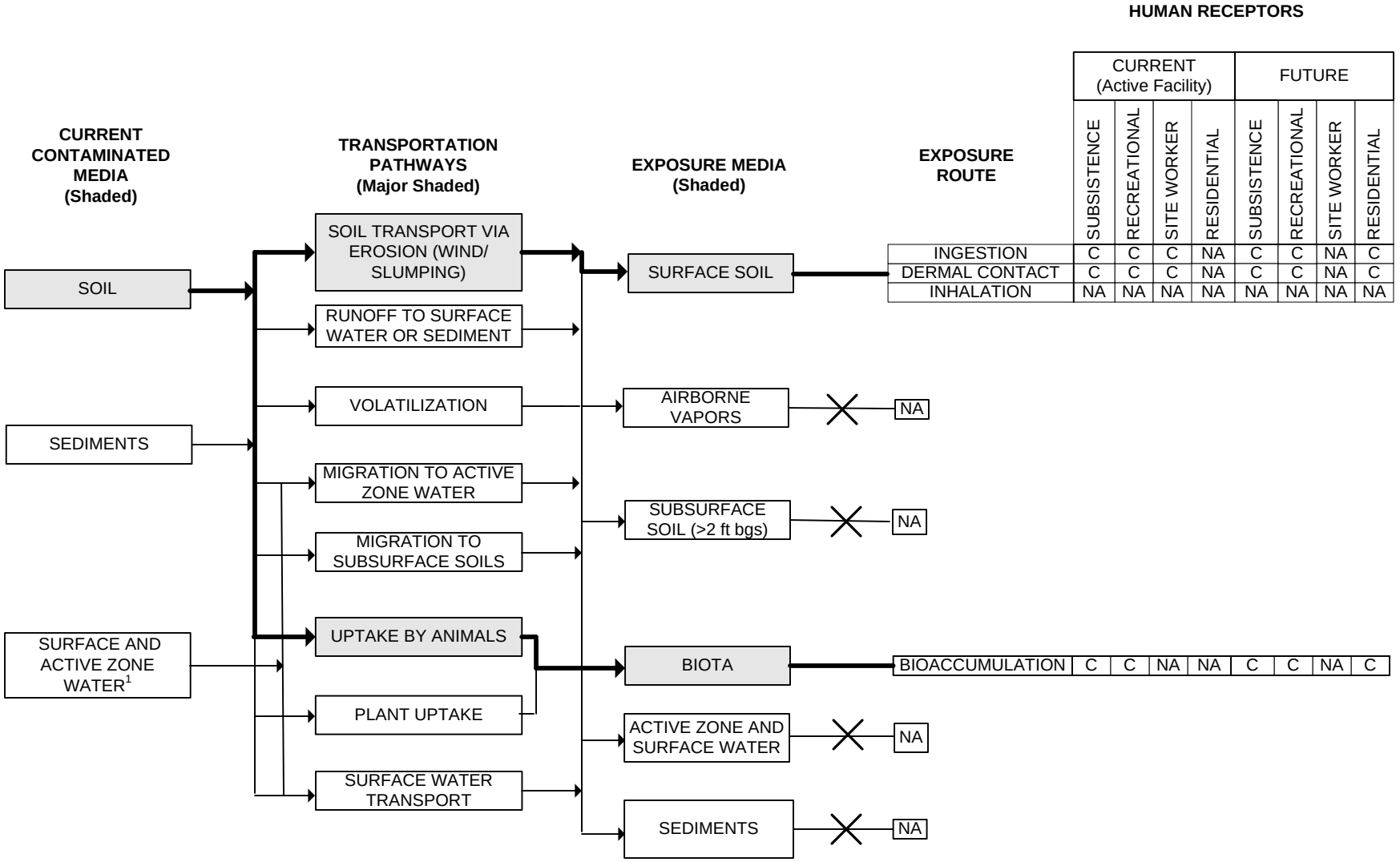
Figure 2-4 Human Health Conceptual Site Model for Site OT003



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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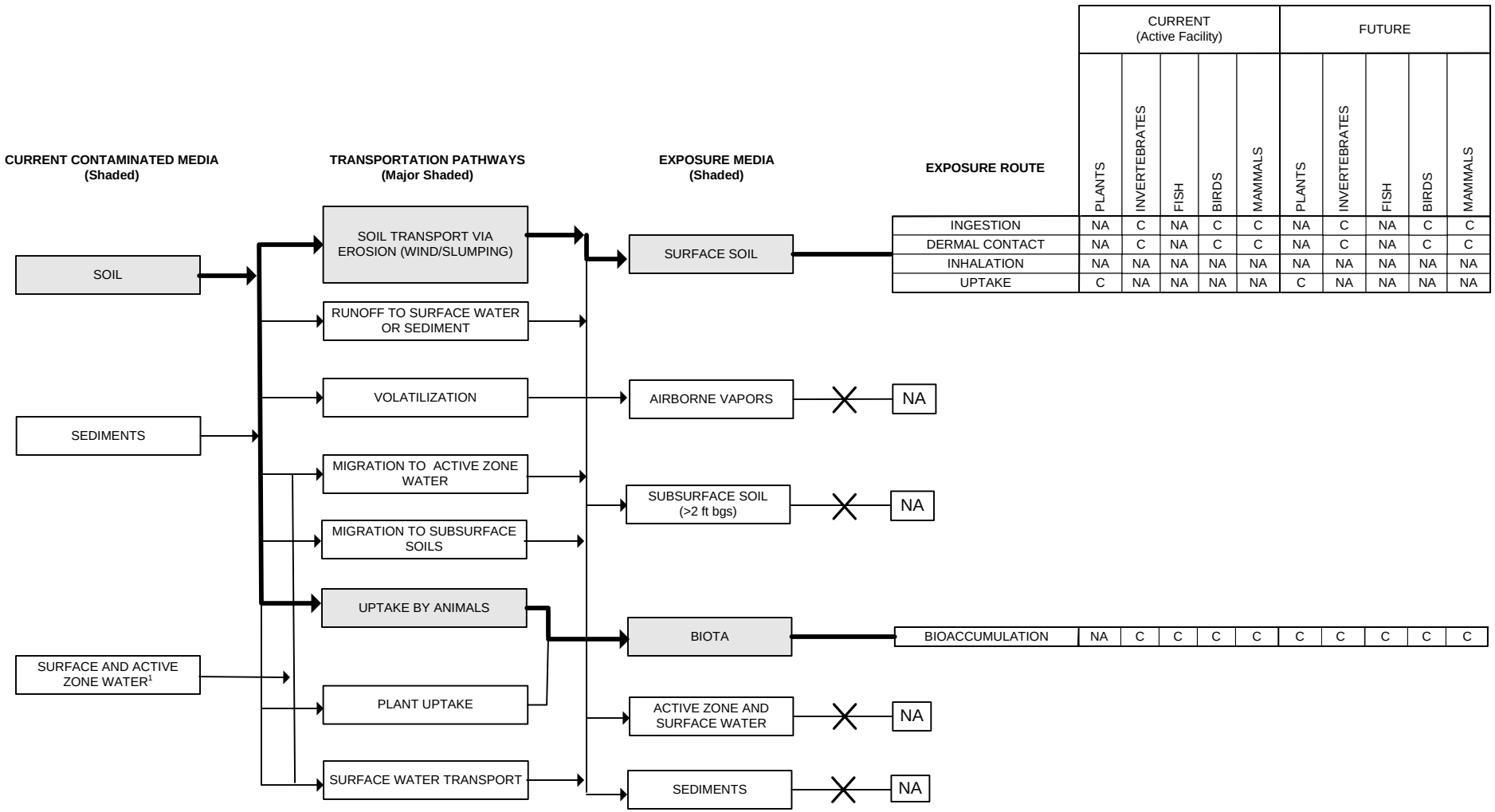
Figure 2-5 Ecological Conceptual Site Model for Site OT003



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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Residents of regional villages (e.g., Kaktovik) utilize the area for subsistence uses. Future land use would be difficult to control due to the remote location. Although future residential land use is considered unlikely at OT003, it has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure, as described within this DD.

2.6 Current and Potential Future Land and Resource Uses

2.6.1 Land Use

The current land use of OT003 is primarily industrial, and associated with operation and maintenance of the SRRS. As the lead agency, the USAF has the authority to determine the future anticipated land use of OT003. After considering input from the State of Alaska and local community, the USAF has determined that the most likely future land use of OT003 is industrial. This determination is made considering the following assumptions:

- USAF intends to transfer the land to the BLM and eventually the State of Alaska
- Based on its location, future use of the transferred property may include industrial uses associated with supporting the oil and gas industry

The current land use of adjacent/surrounding land is subsistence and limited recreational activities. Consequently, portions of the installation may be used by subsistence hunting parties. Access to the area is limited, and no facilities or accommodations are available locally. The area immediately surrounding the platform and module train is sparsely vegetated gravel pad. The building will be removed as part of the Clean Sweep Program. Future use of the property transferred to the State of Alaska may include industrial purposes associated with oil and gas exploration.

2.6.2 Ground and Surface Water Uses

Subsurface water was not encountered at this site during the 2004 RI, but is likely present a few feet below ground surface. The lack of surface water and vegetation on the gravel pad make this a poor environment for most wildlife. The tundra south of the site is characteristic of the area, with marshy wetlands and small pools. There is no use of surface water at this site. Groundwater is not a current or future source of drinking water at Bullen Point SRRS.

2.7 Summary of Site Risks

OT003 was not included in the 1996 baseline human health and ecological risk assessment as no contamination at the time was suspected. Subsequent sampling performed during the 2004 RI identified PCBs as the contaminants of concern (COCs), but did not fully delineate the area exceeding the risk-based ADEC Method Two soil cleanup level of 1 mg/Kg. This section describes the COC identification and evaluation process. Cumulative carcinogenic and noncarcinogenic risk attributed to the presence of PCBs at OT003 is also presented and discussed.

2.7.1 Identification of Chemicals of Concern

This section identifies those chemicals associated with unacceptable risk at the site and that are the basis for the proposed remedial action. The data used in the risk calculations was deemed to be of sufficient quality and quantity for its intended use.

The sampling results from the remedial investigation conducted at OT003 were compared against screening criteria to determine whether there were COCs that require remedial actions to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two cleanup levels for the Arctic Zone. Method Two cleanup levels have been established for specific chemicals (listed in 18 AAC 75.341, Tables B1 and B2) and are protective of long-term exposures under residential land use scenarios. Method Two cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 (1×10^{-5}) and a noncarcinogenic risk standard or hazard index of 1.0, set forth in 18 AAC 75.325(h).

These screening criteria are protective of human health and the environment. They were selected in accordance with the current and projected land use at the site as described in Section 2.6. Criteria protective of people using the site for residential purposes were used to screen the data, even though there is no current or planned residential land use at the site.

A chemical was considered a COC if it exceeded the screening criteria, unless further evaluation indicated the contaminants posed little risk. The detection frequency, range of detected concentrations, and the exposure point concentrations (EPCs) for chemicals and media of concern are presented in Table 2-2.

Table 2-2
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Media	Chemical of Concern	Concentration Detected (mg/Kg)		Frequency Of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
Soil On-Site - Direct Contact	PCBs	1.51	1.51	1/1	1.51	Maximum Concentration
Key PCBs – Polychlorinated Biphenyls Data is taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005)						

2.7.1.1 Risk Characterization

The carcinogenic risks and noncarcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land use settings. Cumulative risks for all relevant pathways and populations are also described. These risk estimates are summarized in Tables 2-3 and 2-4. The results of the cumulative risk calculations are interpreted within the context of the ADEC risk management standards in accordance with 18 AAC 75.325(g).

When applying Method Two cleanup levels for a site, 18 AAC 75.325(g) states that the risk from hazardous substances cannot exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0. As specified in 18 AAC 75.340(k), chemicals that are detected at greater than or equal to 1/10 of the Method Two ingestion or inhalation cleanup levels must be included when calculating cumulative risk. Therefore, as part of the screening process, contaminants exceeding 1/10 the ADEC Method Two cleanup levels were identified and their maximum concentration used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002).

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

Risk = a unitless probability (e.g., 2 x 10^{-5}) of an individual's likelihood of developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$

These risks are probabilities that usually are expressed in scientific notation (e.g., 1x 10^{-6}). An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a hazard quotient (HQ).

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

Where: CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely.

The Hazard Index (HI) is generated by adding the HQs for all COCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI < 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI > 1 indicates that site-related exposures may present a risk to human health.

At OT003, the excess cancer risk under a residential exposure scenario was 3×10^{-6} and the noncancer hazard index under the same scenario was 0.55. These cumulative risk values do not account for additional risk due to the potential for PCBs to bioaccumulate in the food chain.

The current site conditions meet the ADEC risk management standards (risk from hazardous substances does not exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0) for residential land use. However, there is uncertainty regarding long term risk based on the potential for PCBs to bioaccumulate. In addition, the presence of soil with PCBs above the Method Two cleanup level prevents ADEC site closure and transfer of the land to the State of Alaska.

Table 2-3 Risk Characterization Summary – Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
			Inhalation	Dermal	Ingestion	Cumulative Risk
Soil	Soil On-Site -Direct Contact	PCBs	1×10^{-8}	N/A	3×10^{-6}	3×10^{-6}
					Soil risk total =	**3×10^{-6}**
Groundwater	N/A					**N/A**
					Ground-water risk total =	**N/A**
					Total Risk[1] =	**3×10^{-6}**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the total risk at OT003 is 7×10^{-6}. Please see Table D-5 in Appendix D for more detail.

Key
PCBs – Polychlorinated Biphenyls
N/A – Not Applicable

Table 2-4 Risk Characterization Summary – Non-Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
				Inhalation	Dermal	Ingestion	Cumulative Hazard Index
Soil	Soil On-Site -Direct Contact	PCBs	Skin, Eyes	N/A	N/A	0.55	0.55
						Soil Hazard Index Total =	**0.55**
Groundwater	N/A						**N/A**
						Ground-Water Hazard Index Total =	**N/A**
						Receptor Hazard Index[1] =	**0.55**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the hazard index at OT003 is 1.32. Please see Table D-5 in Appendix D for more detail.

Key
PCBs – Polychlorinated Biphenyls N/A – Not Applicable

2.7.2 Summary of Ecological Risk Assessment

As previously discussed, OT003 was not included in the baseline ecological risk assessment as no contamination was suspected at the time. Additional investigation at the site in 2004 indicated that the likely extent of contamination is relatively small given the low concentration of PCBs detected directly below the transformer (1.51 mg/Kg); therefore, the risk of exposure is low and an ecological risk assessment is not considered necessary.

2.7.3 Basis for Action

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

2.8 Remedial Action Objectives

Remedial action objectives (RAOs) provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives which will be presented in the next section.

The RAOs for OT003 are:

- Protect human health and the environment under both current and future conditions by lowering the contaminant levels and/or the exposure routes;
- For human health, prevent ingestion and inhalation of PCB contaminated soil with PCB concentrations greater than 1 mg/Kg.

Although future land use is anticipated to remain industrial, in order to meet the requirements for land transfer these RAOs were developed and based on a residential exposure scenario.

2.9 Description of Alternatives

The remedial alternatives considered for OT003 were presented in the RI/FS Report (USAF 2005) and are summarized in Table 2-5 below.

Table 2-5 Summary of Remedial Alternatives Evaluated for OT003

Alternative Designation	Alternative Description
1	No Action
2	Land Use Controls (Institutional Controls)
3	Solidification
4	Source Removal and Onsite Treatment via Thermal Desorption
5	Source Removal and Offsite Disposal (landfilling)

Previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) served as the basis for this evaluation (Arctic Slope Construction [ASCI] 1998; URS 2002). These studies found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003). Details of the remedy components for each alternative are described in the following section.

2.9.1 Description of Remedy Components

A total of 5 alternatives were developed to address remediation at OT003. This section provides a summary overview of the components of those alternatives.

Alternative 1: No Action

- No response action taken
- This alternative would include performing a site-specific risk assessment to potentially close the site via site specific cleanup levels

Alternative 2: Land Use Controls (Institutional Controls)

- Land use restrictions maintained in the property records and signage
- Control of site access using fencing
- Long term monitoring and maintenance of controls by the property owner

Alternative 3: Containment

- PCB-contaminated soil would be excavated
- Excavated soil would be solidified with a cement grout or other proprietary-like additive using large mechanical mixing equipment to encapsulate the PCBs. Treated soil would be returned to the site.
- Institutional controls in the form of signage and fencing may be required
- Long-term monitoring (e.g. site inspections) required by the property owner

Alternative 4: Source Removal and Onsite Treatment

- Excavate PCB-contaminated soil and treat onsite with a high temperature thermal desorption unit
- Recovered PCBs sent to treatment, storage and disposal (TSD) facility in lower 48 states
- Water separated from soil would be discharged onsite if it meets ADEC criteria

- Air vapors produced during treatment process would be treated to destroy or recover contaminants

Alternative 5: Source Removal and Offsite Disposal

- Excavate PCB-contaminated soil and ship to a TSD facility permitted to accept the waste

2.10 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for OT003 were evaluated using the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria are as follows:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration.

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

All of the alternatives, except the No Action alternative are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the site through treatment of soil contaminants, engineering controls, and institutional controls.

Alternative 2 would reduce exposure due to direct contact or soil ingestion; however future releases due to erosion would not be prevented. Alternative 3 would prevent exposure to contaminated soils as long as the solidification medium (concrete or other additive) remained intact. Alternatives 4 and 5 would eliminate exposure to contaminated soils as they would be permanently removed or treated.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

All of the alternatives, except the no action alternative, are compliant with ARARs.

All of the alternatives, except the no action alternative have common ARARs associated with soil cleanup standards for PCBs (18 AAC 75.341, Table B2, Arctic Zone). Alternative 4 has additional permit requirements associated with operating an on-site treatment system, including meeting emissions standards.

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 provides little long-term effectiveness because PCBs would remain in place and there is a potential future exposure to humans and the possibility of PCBs entering the food chain. Alternative 2 only provides partial reduction in the risk to humans by limiting access to PCB-contaminated soil; future releases of PCBs due to soil erosion would not be prevented by

this alternative. Alternative 3 is effective if maintained, but the long-term stability of the concrete is uncertain in an arctic climate. Alternatives 4 and 5 both remove the PCB-contaminated soil and prevent future human exposure. Alternative 4 provides the greatest long-term effectiveness and permanence of all the options as the PCBs are destroyed during the thermal desorption process.

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 1 and 2 do not include treatment as a component of the remedy. Therefore, these alternatives would not reduce the toxicity, mobility, or volume of contamination at the site.

Alternative 3 would reduce the mobility of the PCBs through encapsulation in the treatment matrix (concrete or other additive); however, the toxicity or volume of the PCBs would not be reduced. Alternatives 4 and 5 both provide permanent reductions in the toxicity, mobility, or volume of waste at the site as the PCB contaminated soil is removed. However, Alternative 4 meets the statutory preference for treatment.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1, No Action, would not be an effective alternative because current risks from direct contact would continue to exist. Alternatives 2 and 3 are anticipated to be completed during one construction season; however, inspection and necessary maintenance of the institutional controls and containment cap would be long-term. Alternatives 4 and 5 can also be completed during one construction season; however during onsite treatment of the PCB soils, there is some risk of adverse air emissions for Alternative 4.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is technically and feasibly simple to implement. Alternative 2 would initially be simple to implement, but long-term maintenance would be required which may prove to be difficult for a remote site. Alternative 3 uses an unconventional technology and construction techniques for Alaska. Long-term monitoring would be required, which would be difficult at a remote site. Alternative 4 requires a large and sophisticated treatment unit that is not readily available in Alaska. In addition, a large volume of fuel would be needed to operate the unit and equipment breakdowns are possible. Alternative 5 requires relatively common shipping practices and permitted disposal facilities are readily available.

2.10.7 Relative Cost

Alternative 5 is likely to be the lowest cost alternative because the USAF is expecting to leave Bullen Point. Alternative 5 does not have long term monitoring costs, which are likely to be

very expensive after the USAF leaves Bullen Point. Alternatives 2 and 3 have long term monitoring costs. Alternative 2 is expected to have the second lowest cost. Alternative 4, source removal and onsite treatment, is the most expensive alternative due to the high cost of shipping the unit and fuel to this remote site. Alternative 1 (no action) would have costs associated with it comparable or greater than Alternative 4. If Alternative 1 were selected this would require the development and approval of an expensive site-specific risk assessment in order to allow closure of the site in accordance with Alaska State regulations.

2.10.8 State/Support Agency Acceptance

The State has expressed its support for Alternative 4 or 5. The State does not support Alternatives 1, 2 and 3 as the site would not meet the conditions for land transfer.

2.10.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 5. Although no specific comments were received regarding the proposed remedies at OT003, based on comments from other sites in the vicinity Alternatives 1, 2 and 3 are not likely to be accepted as adequately protective. No specific comments have been received regarding Alternative 4.

2.11 Principal Threat Wastes

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater or air, or that acts as a source for direct exposure. Pursuant to the EPA Fact Sheet, A Guide to Principal Threat and Low Level Threat Wastes, Publication (9380.3-06FS November 1991) principal threat wastes typically have a potential cancer risk of 10^{-3} or greater, while low toxicity source material presents an excess cancer risk near the acceptable risk range. There are no principal threat wastes at OT003 because the cancer risk attributed to PCBs in soil is 3×10^{-6}.

2.12 Selected Remedy

The primary indicator of remedial action performance will be satisfying the RAOs for OT003 and protecting human health and the environment. Performance measures are defined herein as the RAOs (see Section 2.8 – Remedial Action Objectives) plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for OT003.

The remedy for OT003, Alternative 5 – Source Removal and Offsite Disposal, was selected based upon best overall ability to protect human health and the environment, implementability and cost. This section describes the selected remedy and also provides specific performance measures for the selected remedy.

Remedy selection is based on the detailed evaluation of remedial alternatives presented in the FS (USAF, 2005). This remedy is protective of human health and the environment as the concentrations of PCBs will be below applicable cleanup levels.

The USAF is responsible for implementing, maintaining, and monitoring the remedial action identified herein for the duration of the remedy selected in this DD. The USAF will exercise this responsibility in accordance with CERCLA and the NCP.

2.12.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternative for OT003 is Alternative 5 – Source Removal and Offsite Disposal. The USAF and ADEC believe that 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. The remedy is expected to satisfy the following statutory requirements of CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Toxicity, mobility or volume reduction
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State agency acceptance
  - Community acceptance

A comparative analysis among alternatives for OT003 found Alternative 5 to be the best remedial action alternative for addressing the small volume of soil with PCB exceedances. Due to high mobilization and field support infrastructure costs, additional sampling to delineate the PCB contamination at the site will be performed during commencement of Clean Sweep demolition activities in 2007.

Excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and therefore, provides the best balance of tradeoffs with respect to the balancing and modifying criteria. The other alternatives have deficiencies. Treatment of the soil onsite is more expensive than offsite disposal, and does not provide significantly greater protection of human health and the environment. A remedy with institutional controls would be expensive and hard to maintain at this remote and unmanned location and would prevent land transfer. Solidification of the soil is unlikely to provide long term protection, and is more expensive than offsite disposal given the small soil volume. The no action alternative was rejected because it failed to meet the threshold criteria of protection of human health and the environment. In addition, the no action alternative is rejected as not being in compliance with State of Alaska regulations.

2.12.2 Description of the Selected Remedy

Soil with PCBs above 1 mg/Kg beneath the transformer stand will be removed and disposed at a TSD facility consistent with the Off-Site Rule (40 CFR 300.440). The estimated volume of soil above the cleanup level is 1 cubic yard.

Additional sampling will be performed at OT003 to delineate the extent of PCB contamination prior to or concurrently with the removal action. Contaminated soil removal should be conducted prior to building demolition to the extent practical to avoid dispersion of the contaminated soil by the demolition crew and equipment. Based on previous investigations, at OT003, the contaminated soil volume is small and located close to the surface. Soil removal by hand labor or with very small equipment (e.g., Bobcat) may be the most practical.

It is important to note that the remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to the remedy as described in this DD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or DD amendment.

2.12.3 Summary of Estimated Remedy Costs

Table 2-6 Cost Estimate Summary – Capital Costs for Remedy Component Five

Description:
An estimated 1.5 tons (1.1 CY) of low-level PCB-contaminated soil (1 < PCBs <= 50 mg/Kg) would be excavated from OT003, containerized, barged to Deadhorse, and then trucked to the Fairbanks North Star Borough (FNSB) Landfill for disposal. PCB concentrations in the soil are less than 10 mg/Kg. The extent of PCB contamination at OT003 is not sufficiently characterized and additional sampling is recommended prior to soil removal to delineate contamination. The estimated soil volume for removal may change.

LABOR

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor - Construction Management					
Sr. Construction Manager	per hour	$ 139.09	1	1	$ 139
Administrator	per hour	$ 62.12	1	1	$ 62
Superintendent	per hour	$ 87.32	1	1	$ 87
SSHO/CQC	per hour	$ 80.26	8	1	$ 642
Environmental Scientist (planning & reporting)	per hour	$ 103.39	50	1	$ 5,170
Waste Coordinator	per hour	$ 106.16	16	1	$ 1,699
Local Craft DB Labor (Excavation, Containerization, and Shipping)					
Operator Gp 1	per hour	$ 59.70	6	1	$ 358
Labor Gp 1	per hour	$ 50.53	6	2	$ 606
				SUBTOTAL	$ 8,763

EQUIPMENT

ITEM	Units	Unit	Rate	Quantity	Extension
Forklift (60 ton) for handling filled containers on loading end	1	Month	$ 7,000	0.04	$ 250
Trailer to move filled containers from excavation site to staging area	1	Month	$ 2,000	0.04	$ 71
Excavator, EX 400	1	Month	$ 15,000	0.04	$ 536
Wheeled Loader - Cat 988 (setup w/ forks, fork extension & bucket)	1	Month	$ 15,000	0.04	$ 536
Utility Vehicle, 6 wheeler, crew / tools transport	1	Month	$ 9,000	0.04	$ 321
			Profit	8%	$ 137
				SUBTOTAL	$ 1,851

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	diesel/gas	gallon	$ 4	14	$ 58
PPE/Safety	PPE/Safety	manday	$ 35	6	$ 210
Per diem	per diem	manday	$ 250	6	$ 1,500
			Profit	8%	$ 141
				SUBTOTAL	$ 1,907

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Barging Soil to Deadhorse	Barging	Ton	$ 71	1.5	$ 107
Liner sacks	Containers	ea	$ 635	1	$ 635
Disposal of PCB soil in Fairbanks Landfill	Tipping fee	Ton	$ 106	1.5	$ 159
Trucking Soil from W. Dock to FBX	Trucking	trip	$ 2,500	0.1	$ 150
Test Field Screening (PCBs)	Immunoassay	ea	$ 25	9	$ 225
Chemical Lab Analysis - Confirmation and Waste Characterization (PCBs)	Chemical analysis	ea	$ 85	5	$ 425
			Profit	8%	$ 136
				SUBTOTAL	$ 1,837

COST SUMMARY

COST		$ 14,358
Project Management	5.0%	$ 718
COST ESCALATION	6.0%	$ 905
	TOTAL	$ 15,981

SUBTOTALS	
LABOR	$ 8,763
EQUIPMENT	$ 1,851
MATERIALS	$ -
ODC	$ 1,907
SUBCONTRACT	$ 1,837
TOTAL	$ 14,358

Assumptions:
It is assumed that the soil will be shipped in 9.5 cubic yard liner sacks holding 20,000 pounds (10 tons) each. The small volume of soil to be removed at this site (1.1 CY) will require the use of hand shovels for soil excavation. It is assumed that it will take 2 hours to load, seal, and stage for transport the liner sack after the soil has been excavated. This load rate produces an estimated 1/2 day to excavate, fill, and stage the sack of PCB-contaminated soil. Soil will be excavated directly into the liner sack without stockpiling.
Site specific costs assume work is being done jointly with other contaminated soil remediation efforts, and during Clean Sweep activities. It is assumed that necessary remedial action equipment will already be at Bullen Point for Clean Sweep which eliminates mobilization and demobilization costs.
Screening, confirmation, and stockpile sampling for PCBs are based on EPA's Mega Rule: minimum of 9 screening, 3 confirmation, and 2 stockpile samples per rule. The Waste Coordinator will require 1 hour per sack to process transportation and disposal paperwork and additional time supervising the transfer of sacks in Deadhorse. The percentage for Project Management was reduced from EPA's guidance of 10% to 5% for a project of this dollar value (size range) because it is assumed that all the ERP remediation sites at Bullen Point will be addressed together as one project to maximize efficiency.

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, an ESD, or a DD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.12.4 Expected Outcomes of Selected Remedy

Following completion of the Selected Remedy, OT003 would be available for unrestricted residential land use. It is anticipated that excavation and off-site disposal of PCB contaminated soils will be completed in one construction season. There is no groundwater present at the site and therefore, no expected future uses for groundwater as a result of the Selected Remedy.

The purpose of this response action is to control risks posed by direct contact and ingestion of soil and minimize migration. The current potential for PCBs to migrate from the site is low; however, PCBs are persistent in the environment and could bioaccumulate in human or ecological receptors. Cumulative risk calculations indicated that the excess cancer risk to humans caused by PCBs in the soil under a residential exposure scenario is 3×10^{-6}. The non-cancer HI is 0.55. These cumulative risks are below the ADEC risk management standards (see Section 2.7.1.1).

Table 2-7 Cleanup Levels for Chemicals of Concern at OT003

Media: Soil **Site Area: OT003** **Available Use: Residential** **Controls to Ensure Restricted Use (if applicable): N/A**			
Chemical of Concern	Cleanup Level	Basis for Cleanup Level	Risk at Cleanup Level
PCBs	1 mg/Kg	18 AAC 75.341, Table B1	Cancer Risk = 1×10^{-5} Noncancer Risk = 1
Notes mg/Kg – milligrams per kilogram			

2.13 Statutory Determinations

Under CERCLA §121 (as required by NCP §300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

The selected remedy, Alternative 5, will protect human health and the environment by permanently removing PCB-contaminated soil from the site. Future risk due to ingestion of animals that may bioaccumulate PCBs is also eliminated or reduced. Implementation of Alternative 5 will not pose unacceptable short-term risks or cross-media impacts.

2.13.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment. Location-specific ARARs restrict activities in certain sensitive environments. Action-specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the RCRA). Offsite shipment, treatment and disposal of excavated contaminated soil invoke action-specific ARARs. Criteria to be considered, or TBCs, are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 2-8 summarizes the ARARs and TBCs for the selected remedy at OT003 and describes how the selected remedy addresses each one.

The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs. The implementation of the remedy is required to meet the substantive portions of these requirements and is exempt from administrative requirements such as permitting and notifications.

Table 2-8 Description of ARARs and TBCs

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Action-Specific	Federal Regulatory Requirement	Soil	Toxic Substances Control Act	Applicable	Contains rules relating to the storage and disposal of PCB remediation waste and the PCB spill cleanup policy.	The selected remedy will comply with these regulations through proper disposal of TSCA regulated wastes.
Action-Specific	Federal Regulatory Requirement	Soil	General Industrial Standards for Workers (29 CFR 1910.210)	Applicable	Outlines required protections for workers.	The selected remedy will comply with these regulations through use of appropriate PPE and training for proper handling of hazardous materials or wastes.
Action-Specific	Federal Regulatory Requirement	Soil	HAZWOPER (29 CFR 1910.120 and 40 CFR 311)	Applicable	Outlines worker protection during hazardous waste cleanup.	All on-site workers will be required to have HAZWOPER certification.
Action-Specific	Federal Regulatory Requirement	Soil	Hazardous Materials Transportation	Applicable	Transportation regulations for shippers and transporters of hazardous materials.	The selected remedy will comply with these regulations through proper packaging and transport of all hazardous waste.
Chemical-Specific	42 USC 9620(a)(4)	Soil	Alaska Soil Cleanup Rules 18 AAC 75.340-341	Applicable	In general, cleanup to 1 ppm PCBs in soil is required.	1 ppm PCBs in order to have closure without institutional controls.

Table 2-8 (continued)

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Location-Specific	Federal Regulatory Requirement	Soil	Native American Grave Protection and Repatriation Act	TBC	Provides for the protection of Native American graves and for other related areas.	No Native American grave sites have been identified at the site; however, procedures for reporting and protection of graves will be followed if encountered during implementation of the selected remedy.
Location-Specific	Federal Regulatory Requirement	Soil	Marine Mammal Protection Act	TBC	Provides for the protection and management of marine mammals and their products. Includes walruses, polar bears, sea otters, whales, porpoises, seals, and sea lions.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Migratory Bird Treaty Act	TBC	Protects any migratory bird; any part, nest, or eggs of any such bird.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Endangered Species Act	TBC	Establishes requirements to protect species threatened by extinction and habitats critical to their survival. Federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*);	The selected remedy will not impact protected species through engineering controls or avoidance measures.

2.13.3 Cost Effectiveness

In the USAF's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for OT003 was demonstrated in the comparative analysis of alternatives (Section 2.10 – Summary of Comparative Analysis of Alternatives) and is summarized in Table 2-9 below. The estimated present worth cost of the selected remedy (in 2006 dollars) is $15,981. In addition, the selected remedy will allow the site to meet the conditions for land transfer to the State of Alaska and permit the USAF to construct a new solid waste landfill at Bullen Point. This landfill would receive nonhazardous waste from the Clean Sweep demolition activities, include building debris from OT003. The ability to construct and utilize an onsite landfill results in significant cost savings to the USAF under multiple programs (ERP, Clean Sweep, and Environmental Compliance).

Present-worth costs were not calculated for the other alternatives as previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) (Arctic Slope Construction [ASCI] 1998; URS 2002) found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003).

Table 2-9 Cost and Effectiveness Summary for OT003

Alternative	Present-Worth Cost[1]	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
1 – No Action		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers. Current risk due to direct contact would still exist.
2 – Land Use Controls		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers, community and the environment.
3 – Containment		N/A	Reduction in long-term risk as long as solidification matrix remains intact.	No reduction in volume or toxicity. Mobility of waste is reduced while encapsulated.	No short term risk to workers, community and the environment.

Table 2-9 (continued)

Alternative	Present-Worth Cost	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
4 – Source Removal and Onsite Treatment		N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity through high temperature thermal desorption.	Potential short term risk to workers during treatment due to adverse air emissions.
5 – Source Removal and Offsite Disposal	$ 15,981	N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity by removing PCBs from the site; however, does not meet treatment preference.	No short term risk to workers, community and the environment.
Cost Effectiveness Summary 1 - Preliminary screening of potential alternatives concluded that Alternatives 1-4 were not cost effective for addressing contaminated soils at OT003; therefore, only the present-worth cost for Alternative 5 was presented in the FS. • Alternatives 1 and 4 are not considered to be cost effective. • While Alternatives 2 and 3 are considered to be cost effective, Alternative 5 provides a potentially greater return on investment.					

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The USAF has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP 300.430(f)(1)(i)(B). Although no treatment is being utilized, the selected remedy provides the most effective, long-term solution given the conditions at the site. Offsite landfilling of the PCB-contaminated soil at Bullen Point is protective of human health and the environment, readily implementable, and cost effective in comparison to other alternatives. The equipment required to treat PCBs on site is sophisticated and large, which makes their mobilization and operation difficult and expensive. There is also the risk of air emissions. Offsite treatment would require shipping the soils to the lower 48 states, which is logistically difficult and more costly than disposing of the soils within Alaska or the lower 48 states. The option of solidification would require continued inspections and possibly maintenance. Due to the site location, this maintenance would be logistically difficult and expensive.

The selected remedy manages the potential risks to human health and the environment by permanently removing PCB-contaminated soil from the site.

2.13.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy for OT003 does not satisfy the statutory preference for treatment as a principal element of the remedy because on-site treatment options were not viable given the remote location, limited infrastructure and arctic climate at Bullen Point.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will not be required within five years after initiation of the remedial action to verify that the remedy is, or will be, protective of human health and the environment.

2.14 Documentation of Significant Changes

The Proposed Plan for OT003 was released for public comment on October 17, 2006. The Proposed Plan identified Alternative 5 – Source Removal and Offsite Disposal as the Preferred Alternative for PCB-contaminated soil remediation. The USAF 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.

3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the *Proposed Plan for Eight ERP Sites at Bullen Point Short Range Radar Station*. At the time of the public review period, the USAF had proposed Alternative 5 – Source Removal and Offsite Disposal as the preferred remedy for the Outside Transformer (OT003). *No written or verbal comments were received on the Proposed Plan.*

Decision Document

Inside Transformer (OT004)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

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Figures

1.0 Declaration

1.1 Site Name and Location

Facility Name: Inside Transformer (OT004), Bullen Point Short Range Radar Station (SRRS)
Site Location: Bullen Point, Alaska
CERCLIS ID Number: Not Applicable
Alaska Department of Environmental Conservation (ADEC) Contaminated Site Record Key (reckey) Number: 198931X902549.
Operable Unit/Site: Not Applicable

Bullen Point SRRS is located on the Arctic Coastal Plain at 70°10'N latitude and 146°51'W longitude. The Inside Transformer (OT004) is one of eight different sites located at the Bullen Point SRRS being addressed under the U.S. Air Force (USAF) Environmental Restoration Program (ERP). The Bullen Point SRRS is not listed on the National Priorities List.

OT004 is located near the southwest section of the module train at 70°10'32.9"N latitude, 146°51'26.18"W longitude (this location is the location of sample OT004SS05, which is at the approximate center of the site). It consists of the old radome and the associated soil beneath the building. The "inside transformer" was actually a liquid bath switch suspected of containing PCBs. The area immediately surrounding and below the building is relatively flat. Elevation at the site is approximately 10 feet AMSL. The gravel pad grades into largely undisturbed tundra to the south. The nearest surface water body is the Beaufort Sea located approximately 150 feet to the west. A close-up photograph of the west side of the building is depicted in Figure 2-3.

1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the ERP site Inside Transformer (OT004) in Bullen Point, Alaska which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

This document is issued by the Department of the Air Force (USAF), as the lead agency. The USAF is managing remediation of contamination at OT004 in accordance with CERCLA as required by the Defense Environmental Restoration Program (DERP). The decision put forth in this document is also in accordance with the requirements of Title 18, Chapter 75, Article 3, of the Alaska Administrative Code (AAC) Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances regulations for the State of Alaska.

As the lead agency, the USAF has selected the remedy. The State of Alaska, through the ADEC concurs with the selected remedy. The U.S. Environmental Protection Agency (EPA) has been given the opportunity to review this document and has chosen to defer to the ADEC for regulatory oversight of the ERP at Bullen Point SRRS.

1.3 Assessment of Site

The "inside transformer" was actually a liquid bath switch suspected of containing PCBs (WWC 1990a). The switch and the oil were removed in 1988. The floor of the switch room was heavily coated with oil. In 1988, the spilled oil and most of the oil-saturated floor tiles were removed. However, the floor insulation was not removed, and some staining on the remaining floor tiles and switch pad occurred. Wipe samples collected from stained areas in the building during the 1993 RI detected PCBs up to 391 micrograms (µg) per 100 square centimeters (ICF 1996a). Sampling of the soils beneath the building in 1993 detected PCBs up to 0.9 mg/Kg (estimated value) and near the stairway at a concentration of 0.6 mg/Kg. The risk assessment concluded that the risk to human health or ecological receptors was minimal given current or future site use (ICF 1996a). In August 2003, three additional soil samples were collected near the west side of the building; these samples had PCB concentrations ranging from 1.73 to 3.68 mg/Kg (USACE 2003a). The location of the 1993 and 2003 samples was not precisely documented, so only their general location is known (within 5 to 10 feet). The ADEC Method Two cleanup level for PCBs in the Arctic Zone is 1 mg/Kg (See 18 AAC 75.341, Table B2).

In order to verify current site conditions and better delineate the extent of PCB contamination exceeding 1 mg/Kg, samples were collected from the Inside Transformer site during the 2004 RI. Twenty primary and two replicate soil samples were collected and analyzed for PCBs (HCG 2005). Most samples were collected within 0.5 feet of the surface although some samples were collected as deep as 2.5 feet bgs. Sample results are presented on Figure 2-3 and in Table 2-1. The ADEC Method Two cleanup level of 1.0 mg/Kg for total PCBs was exceeded in six of the twenty primary samples taken. PCBs were only detected in the surface soils (0 to 0.5 feet bgs). The PCBs were located around the stairway on the west side of the building. The highest PCB level (7.31 mg/Kg) was detected approximately 10 feet south of the stairway next to the building (sample OT004SS15). PCB contamination above 1 mg/Kg was not detected underneath the building, including the area where the transformers were located. Based on the distribution of the PCBs, it appears that transformer fluids were discharged or spilled near the door on the west end of the building.

Based on the 2004 sample results, the horizontal extent of PCB-contaminated soils exceeding 1 mg/Kg is estimated to be an approximately 1,234 ft^2 area (Figure 2-3). The maximum depth of PCBs exceeding 1 mg/Kg should be 1.5 feet bgs. The estimated in-place volume of soils exceeding 1 mg/Kg PCBs is 69 yd^3 (HCG 2005).

Based on the findings of the RI and other key documents that can be found in the Administrative Record File for Bullen Point SRRS, the CERCLA response action selected in this Decision Document is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The USAF is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 Description of Selected Remedy

Remedial alternatives for OT004 were developed and evaluated through a Feasibility Study (FS) (USAF 2005). Based on the results of the FS, the USAF selects the following remedy:

- excavation of soil with PCBs above 1 mg/Kg at the west end of the old radome building (an estimated volume of 69 cubic yards [yd^3]);
- transportation of PCB contaminated soil to an offsite treatment, storage and disposal facility (TSD) for disposal; and
- disposal of soils will be consistent with the Off-Site Rule (40 CFR 300.440).

OT004 is one of eight ERP sites at Bullen Point SRRS. The overall cleanup strategy for Bullen Point involves source management and migration and exposure controls. The selected alternative for OT004 fits into the overall site management plan by source reduction in the source area without the need for institutional controls. The cleanup plan for Bullen Point includes the following:

- Cleaning up petroleum contamination in accordance with Alaska's oil and hazardous substance pollution control laws.
- Cleaning up the soil contamination other than petroleum hydrocarbons to 18 AAC 75.341 Method Two cleanup levels for the Arctic Zone.
- Removing the inactive facilities that have no utility (value) to the future landowner (i.e., completion of Clean Sweep Program at Bullen Point)

No source materials constituting principal threats exist at the site, because PCBs in soil at the site are at concentrations that present an excess cancer risk near the acceptable risk range of 10^{-5}.

1.5 Statutory Determinations

The selected remedy for OT004 is protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the site. It provides the best balance or trade-offs in terms of balancing criteria while also considering the bias against offsite treatment and disposal and considering state and community acceptance.

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site whenever practicable (40 CFR 300.430[a] [1] [iii] [A]). The selected remedy for OT004 does not satisfy the statutory preference for treatment as a principal element of the remedy because excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure. Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

Any petroleum contamination will be addressed in accordance with Alaska's oil and hazardous substance pollution control laws.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this DD (Section 2).

- List of chemicals of concern (COCs) and their respective concentrations (Section 2.7.1, Table 2-2)
- Baseline risk represented by the COCs (Section 2.7.1.1, Tables 2-3 and 2-4)
- Cleanup levels established for COCs and the basis for these levels (Section 2.12.4, Table 2-7)
- How source materials constituting principal threats will be addressed (Section 2.11)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and DD (Section 2.7.1.1)
- Potential land and ground water use that will be available at the site as a result of the selected remedy (Section 2.6, 2.12.4)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.12.3, Table 2-6)
- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.12)

Additional information can be found in the Administrative Record file for Bullen Point SRRS, Alaska which can be found at http://www.adminrec.com/PACAF.asp?Location=Alaska

Four information repositories are also located in Kaktovik, these include:

- Mayor's Office
- School Library
- Native Village of Kaktovik
- Kaktovik Inupiat Corporation

1.7 Authorizing Signatures

This signature sheet documents the United States Air Force and ADEC approval of the remedy selected in this Decision Document for Inside Transformer (OT004), Bullen Point SRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson — 1 OCT 07

BRENT A. JOHNSON — Date
Colonel, USAF
Commander, 611th Air Support Group

[signature] — 8/30/07

JOHN HALVERSON — Date
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

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2.0 Decision Summary

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

2.1 Site Name, Location, and Description

2.1.1 Regional Setting

Bullen Point SRRS is located at latitude 70°10'N, longitude 146°51'W on the Arctic Coastal Plain on the shore of the Beaufort Sea. The installation consists of 620 acres of low-lying tundra. The nearest populated area is Deadhorse, 38 miles west of the installation. Air travel provides the only year-round access to Bullen Point SRRS, while marine travel provides summer access. Bullen Point SRRS is not connected by road to Deadhorse or any other populated area. The general location of the Bullen Point SRRS is shown on the inset in Figure 2-1.

The weather station closest to Bullen Point is at Prudhoe Bay, 38 miles to the west. Because of a similarity in elevation and proximity to the Beaufort Sea, conditions at Prudhoe Bay should approximate those at Bullen Point. Average annual precipitation recorded at Prudhoe Bay from 1986 to 1999 was 4.26 inches per year, which included 33.1 inches of snowfall (Western Regional Climate Center 2006). Average daily minimum and maximum temperatures in July were 39.7 degrees Fahrenheit (°F) and 55.4°F, respectively. In December, these average temperatures were -19.2°F and -6.6°F, respectively. The extreme recorded temperatures are -62°F and 83°F.

Surficial deposits in the Bullen Point SRRS area consist of sand and gravel near the shoreline and along stream channels; silt, sand, and gravel deposits in the inland low areas; and eolian (wind) silt and fine sand deposits in the upland areas. Vegetated tundra is present above these deposits and consists of low growing plants including mosses, lichens, sedges, and grasses (Arctic Slope Technical Services [ASTS] 1982). Bullen Point SRRS is located in an area of continuous permafrost up to 2,000 feet deep (Lachenbruch 1982). The seasonal active zone layer typically varies from 2 to 5 feet in thickness.

Small streams, discharging into the Beaufort Sea, drain the lakes and wetlands surrounding the Bullen Point SRRS. Drinking water for Bullen Point SRRS was provided by a reservoir south of the facility that was formed by damming a stream. Since operations ceased, the dam has been breached and the reservoir drained (Hoefler Consulting Group [HCG] 2005).

2.1.2 Regional Ecology

Bullen Point provides habitat for a variety of fish, bird and mammal populations commonly found in the northern arctic coast region (USAF 2005). Fish common to the western Beaufort Sea nearshore habitats include four-horn sculpin, Arctic cisco, and Arctic char (ASTS 1982). Eighty-five species of predominantly waterfowl and shorebirds are also found in the area. Marine mammals that have been reported off Bullen Point include beluga and bowhead whales, walrus, polar bears, and ringed and bearded seals. Land mammals such as caribou, foxes, weasels, moose, grizzly bear, wolverine and wolf are also found in the region.

The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.1.3 Facility History and Background

The Bullen Point SRRS is one of many Distant Early Warning (DEW) Line stations located across the arctic region of North America and Greenland. The installation was in operation between 1953 and 1971 and was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to an SRRS, which has operated since 1994. It is unmanned except for periodic maintenance visits. Operations and support personnel are based out of Elmendorf Air Force Base, located near Anchorage, Alaska.

The Bullen Point SRRS initially consisted of a module train, rotation radar, and support facilities. Presently, facilities include an old, inactive radome; four 30-foot communication antennas; a new radome; a group of eight buildings attached by covered walkways (the module train); two pump houses; a warehouse; seven diesel oil tanks; a 250,000-gallon water storage tank; associated roads and pads; a 3,600-foot gravel airstrip; and a helicopter pad. The inactive structures at Bullen Point SRRS are scheduled for demolition under the Air Force (USAF) Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn would transfer the land to the State of Alaska based on the State's expressed interest in the property.

In addition, the potential advantages of making the property acceptable for land transfer to the BLM, and eventually the State of Alaska, were considered when evaluating the need for remedial action and selecting the appropriate remedial alternative. The State has selected the land as part of its entitlement under the Alaska Statehood Act. However, in its current condition the land is unacceptable to the State. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of DRO in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for RRO in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup level for DRO and RRO in the native soils (e.g., tundra and peat) is the listed Method Two soil cleanup level. At the Old Landfill (LF006), the DRO and RRO cleanup levels are 500 and 2,000 mg/Kg, respectively.
- Removal of contaminated soil, hazardous materials, and solid waste (debris) from the Old Landfill (LF006).
- Removal of inactive facilities that have no utility (value) to the future landowner.

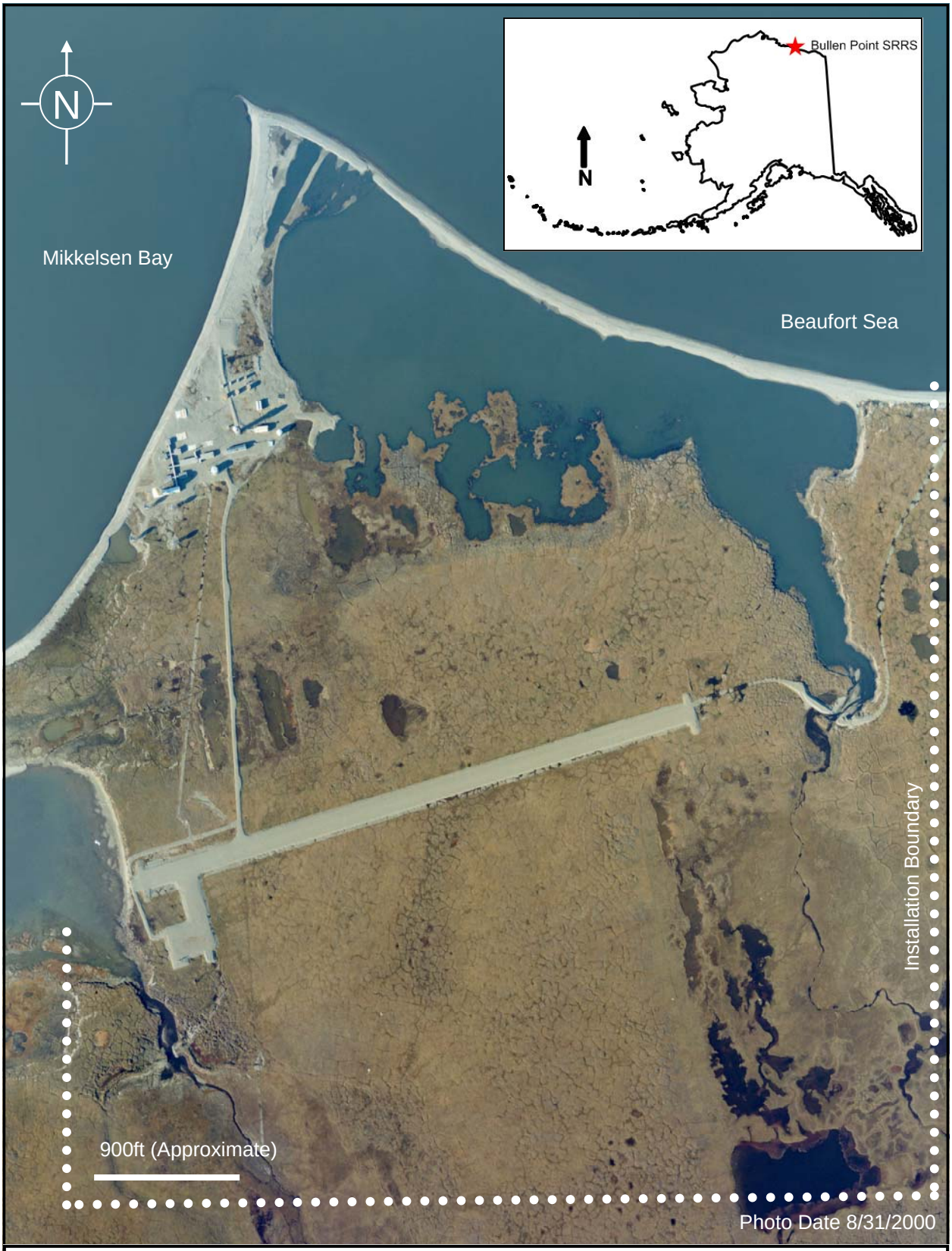

Figure 2-1
Bullen Point SRRS Vicinity Map

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As part of the cleanup at Bullen Point, the USAF will construct a new solid waste landfill at an inland location on its property. The landfill will receive nonhazardous waste from Clean Sweep demolition activities and the cleanup of the Old Landfill (LF006), which is threatened by coastal erosion. The new landfill will be transferred to the State of Alaska after it is closed, along with the rest of the excess USAF property at Bullen Point.

The 2004 RI/FS concluded that the most cost-effective approach to completing all of the USAF objectives under the ERP at Bullen Point, including building demolition and debris removal, was to perform the cleanup activities necessary to make the excess land acceptable for transfer according to State of Alaska requirements. Consequently, six ERP sites were proposed for remedial action.

2.1.4 Facility ERP History

Under the USAF ERP and its predecessor the Installation Restoration Program, environmental investigations have been conducted at the Bullen Point SRRS since 1981. These investigations included preliminary assessments in 1981 and 1986. Environmental samples were collected and limited removal actions performed at Bullen Point SRRS in 1988 as part of a Stage 3 Remedial Investigation/Feasibility Study (RI/FS) at five sites (Woodward Clyde Consultants [WCC] 1990). In preparation for construction activities associated with the SRRS, soils in the construction area were screened for hydrocarbons in 1991 (ENSR 1992, as reported in ICF 1996a). A second, more extensive RI/FS was conducted in 1993 for five sites (ICF 1996a). In an effort to fill data gaps and update previous data, additional sampling occurred in 2004 at Bullen Point SRRS for eight sites (HCG 2005). All eight sites were included in the Proposed Plan and Decision Document process.

Past activities potentially resulting in contaminant release at the Bullen Point SRRS include:

- Spills during the transfer of fuels in and out of storage tanks;
- Leaks from fuel lines, drums, and tanks;
- Spills or leaks of fuel, lubricants, or solvents during vehicle and equipment maintenance activities;
- Spills or leaks from transformers or other electrical equipment containing polychlorinated biphenyls (PCBs); and
- Disposal of wastes and other discarded material containing hazardous substances.

Some of the contaminants encountered during investigations at Bullen Point SRRS are benzene, toluene, ethylbenzene, and total xylenes compounds (BTEX); diesel range organics (DRO); gasoline range organics (GRO); polynuclear aromatic hydrocarbons (PAHs); PCBs; petroleum, oil, and lubricants (POL); residual range organics (RRO); semivolatile organic compounds (SVOCs); metals; and volatile organic compounds (VOCs). Most of these contaminants are the result of fuel or oil spills.

As the lead agency, the USAF has conducted environmental remedial investigation and assessment activities at OT004 in accordance with CERCLA under the Defense Environmental

Restoration Program (DERP) which was established by Section 211 of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

As the support agency, the ADEC provides primary oversight of the environmental restoration actions, in accordance with their contaminated sites regulations (18 AAC 75, Article 3, Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances).

Funding is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense (DoD) installations.

2.2 Site History and Enforcement Activities

This section provides background information and summarizes the series of investigations that led to the Decision Document (DD). It describes the CERCLA response actions undertaken at OT004.

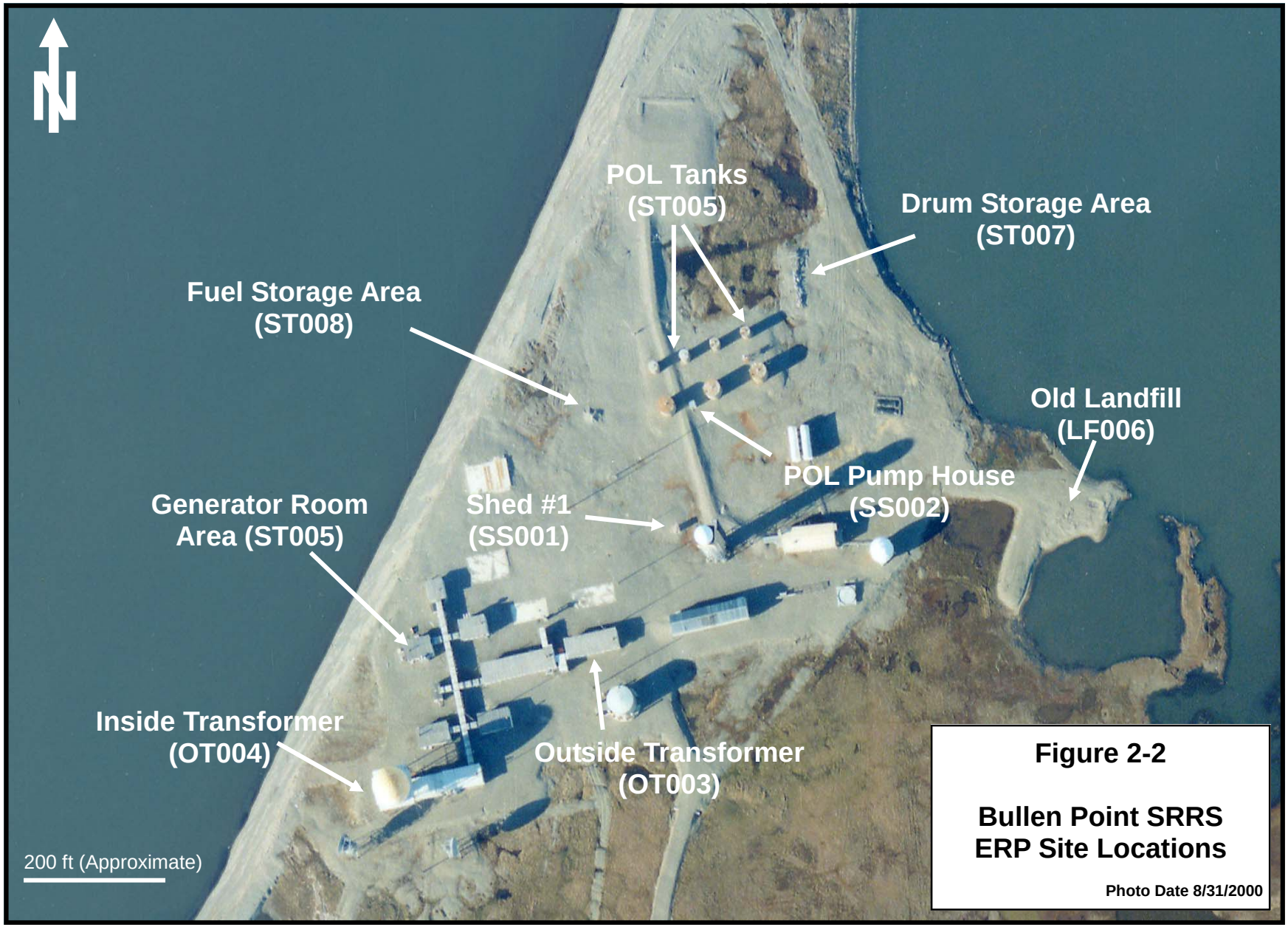
OT004 is located near the southwest section of the module train at 70°10'32.9"N latitude, 146°51'26.18"W longitude (this location is the location of sample OT004SS05, which is at the approximate center of the site) (Figure 2-2). It consists of the old radome and the associated soil beneath the building. The “inside transformer” was actually a liquid bath switch suspected of containing PCBs. The area immediately surrounding and below the building is relatively flat. Elevation at the site is approximately 10 feet AMSL. The gravel pad grades into largely undisturbed tundra to the south. The nearest surface water body is the Beaufort Sea located approximately 150 feet to the west. The site is on land currently owned by the USAF.

In 1988 the switch and the oil were removed from the Inside Transformer. The floor of the switch room was heavily coated with oil. In 1988, the spilled oil and most of the oil-saturated floor tiles were removed. However, the floor insulation was not removed, and some staining on the remaining floor tiles and switch pad occurred. Soil and wipe samples of the stained floor tiles were collected during the 1993 RI. In August 2003, three additional soil samples were collected near the west side of the building and analyzed for PCBs (USACE 2003a). The location of the 1993 and 2003 samples was not precisely documented, so only their general location is known (within 5 to 10 feet). The ADEC Method Two cleanup level for PCBs in the Arctic Zone is 1 mg/Kg.

In order to verify current site conditions and better delineate the extent of PCB contamination exceeding 1 mg/Kg, at the Inside Transformer site, additional soil samples were collected during the 2004 RI. The 2004 RI recommended OT004 for remedial action to address the PCB contamination in the soils.

No land use controls are applicable as part of the selected remedy for this site. In addition, there are no Federal Facility Agreements or state agreements for the Bullen Point SRRS. No sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have been detected at OT004. There have been no regulatory enforcement activities at the site.

In accordance with USAF policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process culminating in this DD. Separate NEPA documentation will not be issued.


N
POL Tanks
(ST005)
Drum Storage Area
(ST007)
Fuel Storage Area
(ST008)
Old Landfill
(LF006)
POL Pump House
(SS002)
Shed #1
(SS001)
Generator Room
Area (ST005)
Inside Transformer
(OT004)
Outside Transformer
(OT003)
200 ft (Approximate)
Figure 2-2
Bullen Point SRRS
ERP Site Locations
Photo Date 8/31/2000

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2.3 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan and review by the support agency. Components of these items and documentation of how each component was satisfied for OT004 are described below.

Proposed Plan. A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review on October 17, 2006. A public meeting was also held at that time.

Public Comment Period. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. A summary of the public comments and responses to public comments are provided in Section 3 of this decision document. The USAF received no requests to extend the public comment period.

Public Meetings. The USAF held a public meeting in Kaktovik on October 17, 2006 to discuss the Proposed Plan and record verbal comments. No comments were received regarding the Proposed Plan. Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board (RAB) meetings. The RAB consists of representatives from the community and the USAF. A RAB was formed in Kaktovik in 1998 and typically meets quarterly. RABs provide a forum for discussion and exchange of information among federal and state agencies and the community regarding cleanup of a military site. The RAB plays an important role in the decision-making process.

Updated Mailing List and Mailing Events. A mailing list of interested parties is maintained and updated regularly by the Air Force Community Relations Coordinator.

Administrative Record. The administrative record located at the 611 Civil Engineering Squadron (CES) office at the Elmendorf Air Force Base, Alaska, is continually updated and developed. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. An index of documents is included in Appendix A. A website with the administrative record current up through 2003 is also available to the public at:
http://www.adminrec.com/PACAF.asp?Location=Alaska

Information Repository. The information repository is a file containing newsletters, fact sheets, and community relations documents relating to Proposed Plans and response actions for all of the ERP sites at Bullen Point SRRS. Four information repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation.

Management Action Plan. The Management Action Plan (MAP) report is updated periodically and made available to the public in order to provide a summary of all restoration activities in one

document. The most recent MAP was published in 2004 (USAF 2004) and is part of the Administrative Record.

USAF responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided as Section 3 of the DD.

2.4 Scope and Role of Operable Unit or Response Action

There are no operable units at Bullen Point SRRS. However, the overall cleanup strategy for the installation includes source reduction and making the property acceptable for transfer to the BLM and eventually the State of Alaska. The conditions for land transfer were discussed in Section 2.1.2.

A Proposed Plan has been issued for eight ERP sites at Bullen Point, including OT004.

2.5 Site Characteristics

2.5.1 Topography and Stratigraphy

The Inside Transformer site is located near the southwest section of the module train (Figure 2-1). The area immediately surrounding and below the building has little relief. Elevation at the site is approximately 10 feet AMSL. The gravel pad grades into largely undisturbed tundra to the south.

2.5.2 Surface and Subsurface Hydrology

Surface runoff generally runs radially from the site. The lowest areas located in the immediate area are some small depressions (<1 foot) located under the building. The nearest surface water body is the Beaufort Sea located approximately 150 feet to the west. Active zone transport may occur between the top of the water table and the permafrost. However, the transport is likely not significant because the surface gradient is low and the site is relatively dry. Sample borings up to 2.5 feet bgs did not encounter active zone water. Permafrost was encountered in one sample boring (OT004SS05-2) at a depth of 2 feet bgs. Permafrost probably underlies the site from 2 to 3 feet bgs.

2.5.3 Ecology

The Inside Transformer is located in the southwestern portion of the gravel pad that supports the active Bullen Point SRRS facilities. It is approximately 600 feet from the active radar. The module train that contains the transformer is inactive and is scheduled for demolition under the Clean Sweep Program. The gravel pad is unvegetated and is relatively poor ecological habitat. The tundra surrounding the pad is typical of the area, with marshy wetlands and small ponds. Regional ecology of the Bullen Point Installation is described in Section 2.1.2. The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.5.4 Previous Site Characterization Activities

The Inside Transformer site consists of the old radome and the associated soil beneath the building. The "inside transformer" was actually a liquid bath switch suspected of containing PCBs (WWC 1990a). The switch and the oil were removed in 1988. The floor of the switch room was heavily coated with oil. In 1988, the spilled oil and most of the oil-saturated floor tiles were removed. However, the floor insulation was not removed, and some staining on the remaining floor tiles and switch pad occurred. Wipe samples collected from stained areas in the building during the 1993 RI detected PCBs up to 391 micrograms (µg) per 100 square centimeters (ICF 1996a). Sampling of the soils beneath the building in 1993 detected PCBs up to 0.9 mg/Kg (estimated value) and near the stairway at a concentration of 0.6 mg/Kg. The risk assessment concluded that the risk to human health or ecological receptors was minimal given current or future site use (ICF 1996a). In August 2003, three additional soil samples were collected near the west side of the building; these samples had PCB concentrations ranging from 1.73 to 3.68 mg/Kg (USACE 2003a). The location of the 1993 and 2003 samples was not precisely documented, so only their general location is known (within 5 to 10 feet). The ADEC Method Two cleanup level for PCBs in the Arctic Zone is 1 mg/Kg. The site was sampled again in 2004 to verify current site conditions and better delineate the extent of PCB contamination exceeding 1 mg/Kg.

As part of the 2004 RI, twenty primary and two replicate soil samples were collected and analyzed for PCBs. Most samples were collected within 0.5 feet of the surface although some samples were collected as deep as 2.5 feet bgs. The ADEC Method Two cleanup level of 1.0 mg/Kg for total PCBs was exceeded in six of the twenty primary samples taken. PCBs were only detected in the surface soils (0 to 0.5 feet bgs). The PCBs were located around the stairway on the west side of the building. The highest PCB level (7.31 mg/Kg) was detected approximately 10 feet south of the stairway next to the building (sample OT004SS15). PCB contamination above 1 mg/Kg was not detected underneath the building, including the area where the transformers were located. Based on the distribution of the PCBs, it appears that transformer fluids were discharged or spilled near the door on the west end of the building (HCG 2005).

Based on the 2004 sample results, the horizontal extent of PCB-contaminated soils exceeding 1 mg/Kg is estimated to be an approximately 1,234 ft^2 area (Figure 6-1). The maximum depth of PCBs exceeding 1 mg/Kg is estimated to be 1.5 feet bgs. The estimated in-place volume of soils exceeding 1 mg/Kg PCBs is 69 yd^3. The sample results are summarized in Table 2-1 and the sample location is shown on Figure 2-3.

2.5.5 Nature and Extent of Contamination

2.5.5.1 Known or Suspected Sources of Contamination

The source of the contamination is likely dielectric (transformer) fluid containing PCBs that was spilled or discharged to the ground surface outside the facility during equipment maintenance activities. Based on the distribution of the PCBs, it appears that transformer fluids were discharged or spilled near the door on the west end of the building (HCG 2005).

2.5.5.2 Types of Contamination and the Affected Media

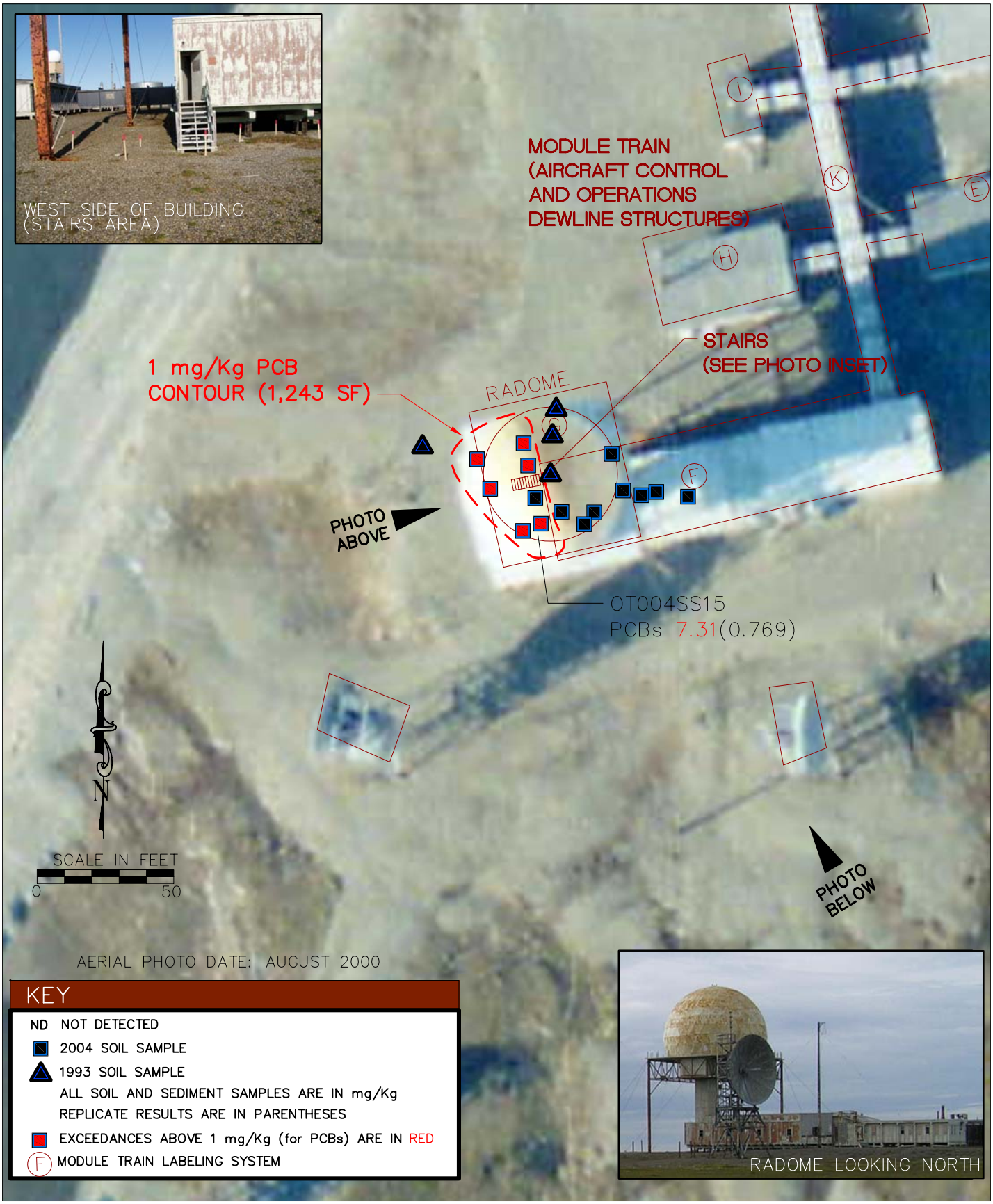
Table 2-1 summarizes the maximum concentrations of detected contaminants. The soil directly beneath the transformer contains PCBs exceeding the ADEC 18 AAC 75.341, Table B2, Method Two cleanup criterion of 1 mg/Kg. It is estimated that approximately 1,234 ft^2 of impacted soil is present at this site with a total in-place volume of 69 cubic yard (yd^3) (HCG 2005).

2.5.5.3 Known or Potential Routes of Migration

There is a low potential for the PCBs to migrate or degrade in their present environment. PCBs are stable compounds and persistent in the environment. Their mobility is limited due to their low solubility in water. However, they may adhere to soil particles and be transported by surface water runoff. This is unlikely at OT004 given the low surface gradient.

PCBs may move vertically by adhering to fine-grained material, which settles into the gravel pad. However, this movement is also anticipated to be limited based on the dry conditions at OT004. Wind could disperse PCBs adhered to the surface soils (upper few inches).

The PCB-contaminated soil at OT004 is unlikely to enter the aquatic environment in the near future because the contaminated soil is located in a stable environment removed from surface water bodies.



BULLEN POINT SRRS

SUMMARY OF SAMPLE LOCATONS INSIDE TRANSFORMER (OT004)

BULLEN POINT, ALASKA

PROJECT NO: 9702-041

DATE: 2-8-07

FIGURE NO: 2-3

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Table 2-1 OT004 Summary of Sample Results

Media	Analyte	Screening Criteria				
		18 AAC 75 Cleanup Level (Arctic Zone) for Soil[1]	1988 RI/FS Maximum Concentration [2,3]	1993 RI/FS Maximum Concentration[2,3]	2004 RI/FS Maximum Concentration[2,3]	2004 RI/FS Frequency of Detections[4]
Soil (mg/Kg)	**PCBs**	1	**5.9**	0.9 J	**7.31**	11/20

Notes
1- Lowest value of ingestion or inhalation shown from 18 AAC 75, Tables B1 and B2, referred to as "Method Two Cleanup Levels" for the Arctic Zone
2- For soil/sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.
3- 1988 data taken from *RI/FS Stage 3 Final Report, Barter Island AFS, Bullen Point AFS, Point Lonely AFS* (WCC 1990), 1993 data taken from the *Final RI/FS, Bullen Point Radar Installation, Alaska* (ICF 1996a).
2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).
4- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

Abbreviations

"--"	Screening criteria does not exist for this compound
PQL	Practical Quantitation Limit
PCBs	Polychlorinated Biphenyls
mg/Kg	milligrams per kilogram
J	Estimated value

Bold indicates an exceedance of the primary screening criteria

2.5.6 Conceptual Exposure Model

A conceptual exposure model was developed to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. These pathways are presented in Figure 2-4, based upon current and reasonably likely future land uses and the potential beneficial use of surface water at OT004.

For purposes of evaluating exposure pathways, it was assumed there are no current site residents on the Bullen Point SRRS. Current site use is limited to periodic site workers, and occasional recreational or subsistence uses by residents of Kaktovik. Future exposure pathways assume the Bullen Point SRRS facility is inactive.

Conceptual human health and ecological site models for OT004 are contained in Figures 2-4 and 2-5, respectively. The accidental ingestion of contaminated soil is considered the most probable exposure pathway at OT004. Groundwater is not a current or future source of drinking water at Bullen Point. There is minimal potential for contaminants to migrate from the soils at OT004 to surface water. Vertical migration is limited by the presence of permafrost. In general, air transportation is not a significant pathway of exposure because PCBs are nonvolatile.

In addition, PCBs are persistent and have the potential to bioaccumulate. If aquatic or terrestrial organisms were exposed to the contaminated soil, the PCBs could be ingested. The PCB-contaminated soil is unlikely to enter aquatic environments because they are located in a stable

environment removed from surface water bodies. The PCBs could then travel up the food chain and eventually be ingested by humans. This risk is low, however, because only occasional recreational and subsistence activities occur in the vicinity of Bullen Point SRRS.
Residents of regional villages (e.g. Kaktovik) utilize the area for subsistence uses. Future land use would be difficult to control due to the remote location. Although future residential land use is considered unlikely at OT004, it has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure, as described within this DD.

2.6 Current and Potential Future Land and Resource Uses

2.6.1 Land Use

The current land use of OT004 is primarily industrial, and associated with operation and maintenance of the SRRS. As the lead agency, the USAF has the authority to determine the future anticipated land use of OT004. After considering input from the State of Alaska and local community, the USAF has determined that the most likely future land use of OT004 is industrial. This determination is made considering the following assumptions:

- USAF intends to transfer the land to the BLM and eventually the State of Alaska
- Based on its location, future use of the transferred property may include industrial uses associated with supporting the oil and gas industry

The current land use of adjacent/surrounding land is subsistence and limited recreational activities. Consequently, portions of the installation may be used by subsistence hunting parties. Access to the area is limited, and no facilities or accommodations are available locally. The area immediately surrounding the platform and module train is sparsely vegetated gravel pad. The building will be removed as part of the Clean Sweep Program. Future use of the property transferred to the State of Alaska may include industrial purposes associated with oil and gas exploration.

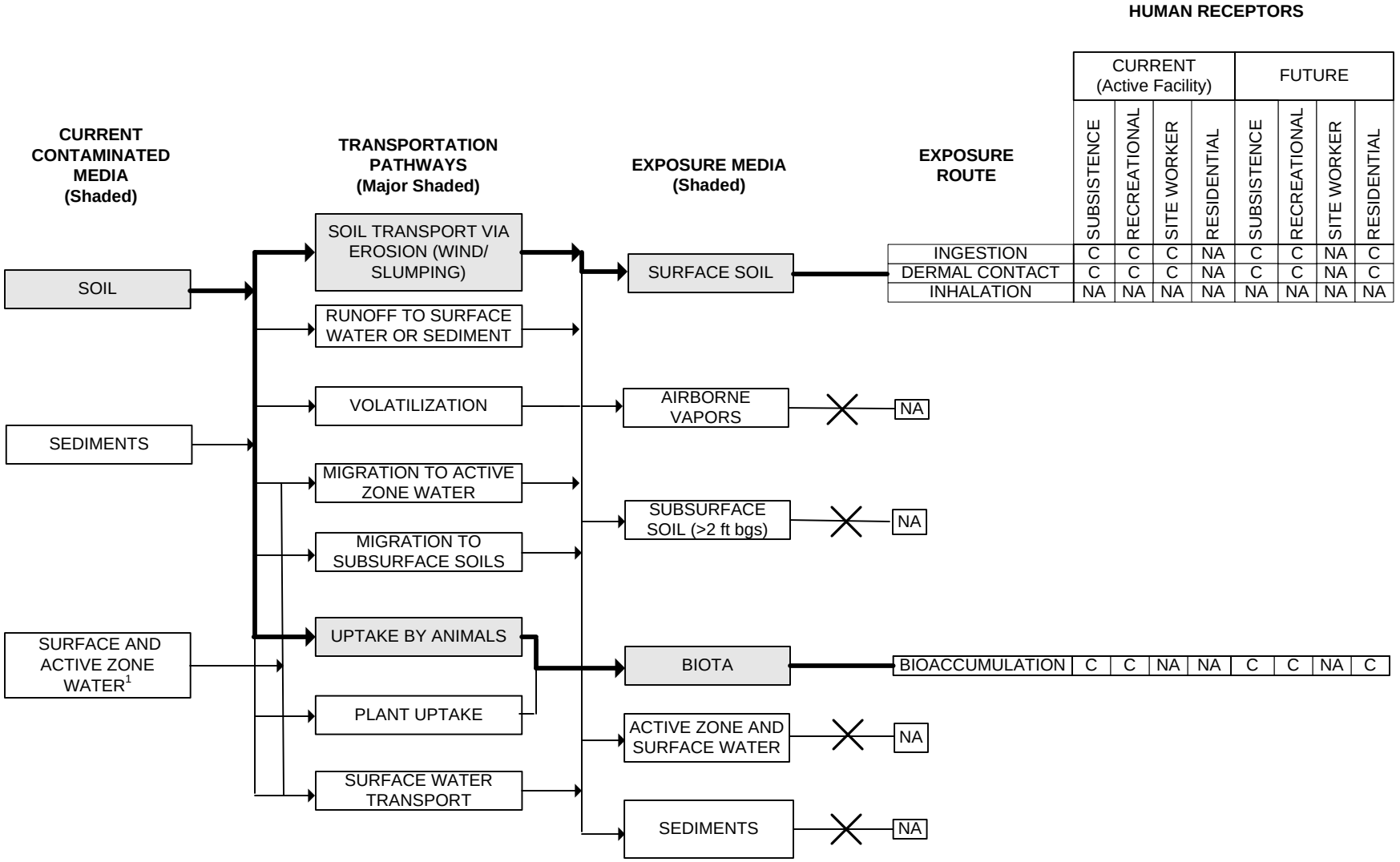
2.6.2 Ground and Surface Water Uses

Subsurface water was not encountered at this site during the 2004 RI, but is likely present a few feet below ground surface. The lack of surface water and vegetation on the gravel pad make this a poor environment for most wildlife. The tundra south of the site is characteristic of the area, with marshy wetlands and small pools. There is no use of surface water at this site.
Groundwater is not a current or future source of drinking water at Bullen Point SRRS.

2.7 Summary of Site Risks

The 1996 baseline human health and ecological risk assessment concluded that the risk to human health or ecological receptors at OT004 was minimal given current or future site use (ICF 1996a). Subsequent sampling performed during 2003 identified soil samples with PCB concentrations ranging from 1.73 to 3.68 mg/Kg (USACE 2003a). The site was sampled again in 2004 to verify current site conditions and to better delineate the extent of PCB contaminating exceeding 1 mg/Kg. This section describes the COC identification and evaluation process. Cumulative carcinogenic and noncarcinogenic risk attributed to the presence of PCBs at OT004 is also presented and discussed.

Figure 2-4 Human Health Conceptual Site Model for Site OT004



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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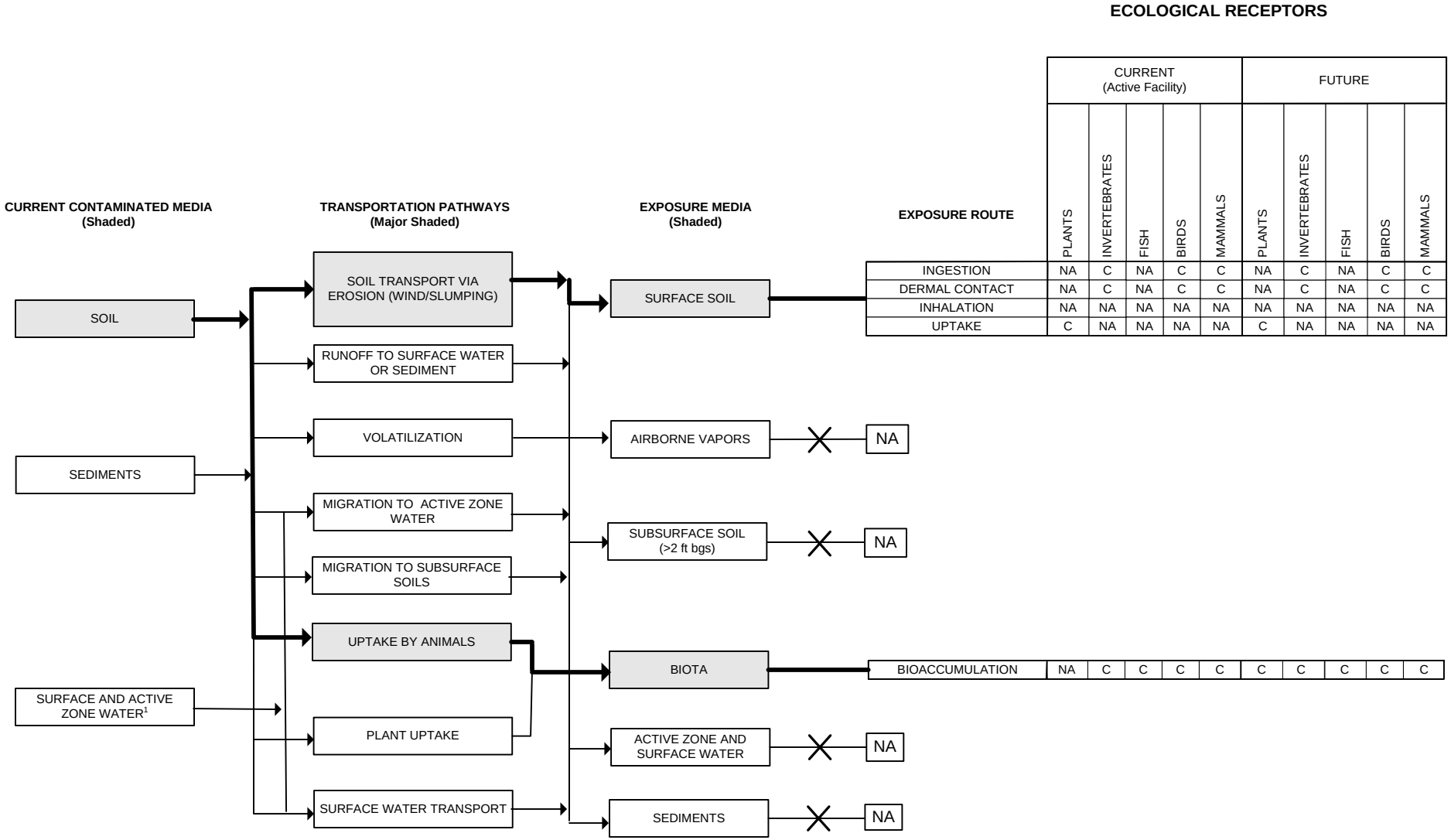
Figure 2-5 Ecological Conceptual Site Model for Site OT004



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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2.7.1 Identification of Chemicals of Concern

This section identifies those chemicals associated with unacceptable risk at the site and that are the basis for the proposed remedial action. The data used in the risk calculations was deemed to be of sufficient quality and quantity for its intended use.

The sampling results from the remedial investigation conducted at OT004 were compared against screening criteria to determine whether there were COCs that require remedial actions to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two cleanup levels for the Arctic Zone. Method Two cleanup levels have been established for specific chemicals (listed in 18 AAC 75.341, Tables B1 and B2) and are protective of long-term exposures under residential land use scenarios. Method Two cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 (1×10^{-5}) and a noncarcinogenic risk standard or hazard index of 1.0, set forth in 18 AAC 75.325(h).

These screening criteria are protective of human health and the environment. They were selected in accordance with the current and projected land use at the site as described in Section 2.6. Criteria protective of people using the site for residential purposes were used to screen the data, even though there is no current or planned residential land use at the site.

A chemical was considered a COC if it exceeded the screening criteria, unless further evaluation indicated the contaminants posed little risk. The detection frequency, range of detected concentrations, and the exposure point concentrations (EPCs) for chemicals and media of concern are presented in Table 2-2.

Table 2-2
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Year	Media	Chemical of Concern	Concentration Detected (mg/Kg)		Frequency Of Detection	Exposure Point Concentration	Statistical Measure
			Min	Max			
1993 RI	**Soil On-Site - Direct Contact**	PCBs	0.63	0.9	2/4	0.9	Maximum Concentration
2004 RI	**Soil On-Site - Direct Contact**	PCBs	0.0996	7.31	6/20	7.31	Maximum Concentration

Key
RI – Remedial Investigation PCBs – Polychlorinated Biphenyls

Baseline Risk Assessment was conducted using 1993 RI data.

2.7.1.1 Risk Characterization

The carcinogenic risks and noncarcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land use settings. Cumulative risks for all relevant pathways and populations are also described. These risk estimates are summarized in Tables 2-3 and 2-4. The results of the cumulative risk calculations

are interpreted within the context of the ADEC risk management standards in accordance with 18 AAC 75.325(g).

When applying Method Two cleanup levels for a site, 18 AAC 75.325(g) states that the risk from hazardous substances cannot exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0. As specified in 18 AAC 75.340(k), chemicals that are detected at greater than or equal to 1/10 of the Method Two ingestion or inhalation cleanup levels must be included when calculating cumulative risk. Therefore, as part of the screening process, contaminants exceeding 1/10 the ADEC Method Two cleanup levels were identified and their maximum concentration used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002).

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's likelihood of developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a hazard quotient (HQ).

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

Where: CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely.

The Hazard Index (HI) is generated by adding the HQs for all COCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI < 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI > 1 indicates that site-related exposures may present a risk to human health.

Based on the maximum concentration of PCBs detected (7.31 mg/Kg) at OT004, the excess cancer risk under a residential exposure scenario was 1×10^{-5} and the noncancer hazard index under the same scenario was 2.7. The HI value exceeds the ADEC risk management standard of 1.0 as set forth in 18 AAC 75.325(h). Based on a less conservative industrial exposure scenario at OT004, the calculated human cancer risk from PCBs in the soil is 2×10^{-6} and the HI is 0.14. Neither of these values exceed the ADEC risk management criteria of 1×10^{-5} and 1.0, respectively. These cumulative risk values do not account for additional risk due to the potential for PCBs to bioaccumulate in the food chain.

The current site conditions exceed the ADEC risk management standards (risk from hazardous substances does exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0) for residential land use. There is uncertainty regarding long term risk based on the potential for PCBs to bioaccumulate. In addition, the presence of soil with PCBs above the Method Two cleanup level prevents ADEC site closure and transfer of the land to the State of Alaska.

Table 2-3 Risk Characterization Summary – Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
			Inhalation	Dermal	Ingestion	Cumulative Risk
Soil	Soil On-Site -Direct Contact	PCBs	7×10^{-8}	N/A	1×10^{-5}	1×10^{-5}
					Soil risk total =	**1×10^{-5}**
Groundwater						
					Ground-water risk total =	**N/A**
					Total Risk[1] =	**1×10^{-5}**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the total risk at OT004 is 3×10^{-5}. Please see Table D-6 in Appendix D for more detail.

Key
PCBs – Polychlorinated biphenyls

Table 2-4 Risk Characterization Summary – Non-Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
				Inhalation	Dermal	Ingestion	Cumulative Hazard Index
Soil	Soil On-Site - Direct Contact	PCBs	Skin, Eyes	N/A	N/A	2.7	2.7
						Soil Hazard Index Total =	**2.7**
Groundwater							
						Ground-Water Hazard Index Total =	**N/A**
						Receptor Hazard Index =	**2.7**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the hazard index at OT004 is 6.4. Please see Table D-6 in Appendix D for more detail.

Key
PCBs – Polychlorinated biphenyls

2.7.2 Summary of Ecological Risk Assessment

As discussed previously, the baseline ecological risk assessment concluded that the potential risks to ecological receptors, specifically bird species due to contaminants detected at OT004 were insignificant. Future risks due to PCBs is low. The Hazard Index for PCBs in soil and sediment at OT004 was below the regulatory threshold of 1.0. Therefore, considering these site-specific factors, the overall risk to birds was not significant and did not warrant any further action.

2.7.3 Basis for Action

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.

2.8 Remedial Action Objectives

Remedial action objectives (RAOs) provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives which will be presented in the next section.

The RAOs for OT004 are:

- Protect human health and the environment under both current and future conditions by lowering the contaminant levels and/or the exposure routes;
- For human health, prevent ingestion and inhalation of PCB contaminated soil with PCB concentrations greater than 1 mg/Kg.

Although future land use is anticipated to remain industrial, in order to meet the requirements for land transfer these RAOs were developed and based on a residential exposure scenario.

2.9 Description of Alternatives

The remedial alternatives considered for OT004 were presented in the RI/FS Report (USAF 2005) and are summarized in Table 2-5 below.

Table 2-5 Summary of Remedial Alternatives Evaluated for OT004

Alternative Designation	Alternative Description
1	No Action
2	Land Use Controls (Institutional Controls)
3	Solidification
4	Source Removal and Onsite Treatment via Thermal Desorption
5	Source Removal and Offsite Disposal (landfilling)

Previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) served as the basis for this evaluation (Arctic Slope Construction [ASCI] 1998; URS 2002). These studies found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003). Details of the remedy components for each alternative are described in the following section.

2.9.1 Description of Remedy Components

A total of 5 alternatives were developed to address remediation at OT004. This section provides a summary overview of the components of those alternatives.

Alternative 1: No Action

- No response action taken
- This alternative would include performing a site-specific risk assessment to potentially close the site via site specific cleanup levels

Alternative 2: Land Use Controls (Institutional Controls)

- Land use restrictions maintained in the property records and signage
- Control of site access using fencing
- Long term monitoring and maintenance of controls by the property owner

Alternative 3: Containment

- PCB-contaminated soil would be excavated
- Excavated soil would be solidified with a cement grout or other proprietary-like additive using large mechanical mixing equipment to encapsulate the PCBs. Treated soil would be returned to the site.
- Institutional controls in the form of signage and fencing may be required
- Long-term monitoring (e.g. site inspections) required by the property owner

Alternative 4: Source Removal and Onsite Treatment

- Excavate PCB-contaminated soil and treat onsite with a high temperature thermal desorption unit
- Recovered PCBs sent to treatment, storage and disposal (TSD) facility in lower 48 states
- Water separated from soil would be discharged onsite if it meets ADEC criteria
- Air vapors produced during treatment process would be treated to destroy or recover contaminants

Alternative 5: Source Removal and Offsite Disposal

- Excavate PCB-contaminated soil and ship to a TSD facility permitted to accept the waste

2.10 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for OT004 were evaluated using the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria are as follows:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration.

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks

posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

All of the alternatives, except the No Action alternative are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the site through treatment of soil contaminants, engineering controls, and institutional controls.

Alternative 2 would reduce exposure due to direct contact or soil ingestion; however future releases due to erosion would not be prevented. Alternative 3 would prevent exposure to contaminated soils as long as the solidification medium (concrete or other additive) remained intact. Alternatives 4 and 5 would eliminate exposure to contaminated soils as they would be permanently removed or treated.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

All of the alternatives, except the no action alternative, are compliant with ARARs.

All of the alternatives, except the no action alternative have common ARARs associated with soil cleanup standards for PCBs (18 AAC 75.341, Table B2, Arctic Zone). Alternative 4 has additional permit requirements associated with operating an on-site treatment system, including meeting emissions standards.

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once

clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 provides little long-term effectiveness because PCBs would remain in place and there is a potential future exposure to humans and the possibility of PCBs entering the food chain. Alternative 2 only provides partial reduction in the risk to humans by limiting access to PCB-contaminated soil, future releases of PCBs should the soil erode would not be prevented. Alternative 3 is effective if maintained, but the long-term stability of the concrete is uncertain in an arctic climate. Alternatives 4 and 5 both remove the PCB-contaminated soil and prevent future human exposure. Alternative 4 provides the greatest long-term effectiveness and permanence of all the options as the PCBs are destroyed during the thermal desorption process.

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 1 and 2 do not include treatment as a component of the remedy. Therefore, these alternatives would not reduce the toxicity, mobility, or volume of contamination at the site.

Alternative 3 would reduce the mobility of the PCBs through encapsulation in the treatment matrix (concrete or other additive); however, the toxicity or volume of the PCBs would not be reduced. Alternatives 4 and 5 both provide permanent reductions in the toxicity, mobility, or volume of waste at the site as the PCB contaminated soil is removed. However, Alternative 4 meets the statutory preference for treatment.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1, No Action, would not be an effective alternative because current risks from direct contact would continue to exist. Alternatives 2 and 3 are anticipated to be completed during one construction season; however, inspection and necessary maintenance of the institutional controls and containment cap would be long-term. Alternatives 4 and 5 can also be completed during one construction season; however during onsite treatment of the PCB soils, there is some risk of adverse air emissions for Alternative 4.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is technically and feasibly simple to implement. Alternative 2 would initially be simple to implement, but long-term maintenance would be required which may prove to be difficult for a remote site. Alternative 3 uses an unconventional technology and construction techniques for Alaska. Long-term monitoring would be required, which would be difficult at a remote site. Alternative 4 requires a large and sophisticated treatment unit that is not readily available in Alaska. In addition, a large volume of fuel would be needed to operate the unit and

equipment breakdowns are possible. Alternative 5 requires relatively common shipping practices and permitted disposal facilities are readily available.

2.10.7 Relative Cost

Alternative 5 is likely to be the lowest cost alternative because the USAF is expecting to leave Bullen Point. Alternative 2, land use controls, is potentially the lowest cost alternative while the USAF has an active presence at Bullen Point. However, when the USAF no longer has an active presence, monitoring of LUCs is likely to be relatively expensive compared to those Alternatives (2 and 3) that require monitoring. Alternative 4, source removal and onsite treatment, is the most expensive alternative due to the high cost of shipping the unit and fuel to the remote site. Alternative 1 (no action), would have costs associated with it comparable or greater than Alternative 4. If Alternative 1 were selected this would require the development and approval of an expensive site-specific risk assessment in order to allow closure of the site in accordance with Alaska State regulations.

2.10.8 State/Support Agency Acceptance

The State has expressed its support for Alternative 4 or 5. The State does not support Alternatives 1, 2 and 3 as the site would not meet the conditions for land transfer.

2.10.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 5. Although no specific comments were received regarding the proposed remedies at OT004, based on comments from other sites in the vicinity Alternatives 1, 2 and 3 are not likely to be accepted as adequately protective. No specific comments have been received regarding Alternative 4.

2.11 Principal Threat Wastes

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater or air, or that acts as a source for direct exposure. Pursuant to the EPA Fact Sheet, A Guide to Principal Threat and Low Level Threat Wastes, Publication (9380.3-06FS November 1991) principal threat wastes typically have a potential cancer risk of 10^{-3} or greater, while low toxicity source material presents an excess cancer risk near the acceptable risk range. There are no principal threat wastes at OT004 because the cancer risk attributed to PCBs in soil is 1×10^{-5}.

2.12 Selected Remedy

The primary indicator of remedial action performance will be satisfying the RAOs for OT004 and protecting human health and the environment. Performance measures are defined herein as the RAOs (see Section 2.8 – Remedial Action Objectives) plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for OT004.

The remedy for OT004, Alternative 5 – Source Removal and Offsite Disposal, was selected based upon best overall ability to protect human health and the environment, implementability and cost. This section describes the selected remedy and also provides specific performance measures for the selected remedy.

Remedy selection is based on the detailed evaluation of remedial alternatives presented in the FS (USAF, 2005). This remedy is protective of human health and the environment as the concentrations of PCBs will be below applicable cleanup levels.

The USAF is responsible for implementing, maintaining, and monitoring the remedial action identified herein for the duration of the remedy selected in this DD. The USAF will exercise this responsibility in accordance with CERCLA and the NCP.

2.12.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternative for OT004 is Alternative 5 – Source Removal and Offsite Disposal. The USAF and ADEC believe that 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. The remedy is expected to satisfy the following statutory requirements of CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Toxicity, mobility or volume reduction
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State agency acceptance
  - Community acceptance

A comparative analysis among alternatives for OT004 found Alternative 5 to be the preferred remedial action alternative for addressing the small volume of soil with PCB exceedances and meeting the conditions for land transfer. Due to high mobilization and field support infrastructure costs, additional sampling to delineate the PCB contamination at the site will be performed during commencement of Clean Sweep demolition activities in 2007.

Excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure and therefore, provides the best balance of tradeoffs with respect to the balancing and modifying criteria. The other alternatives have deficiencies. Treatment of the soil onsite is more expensive than offsite disposal, and does not provide significantly greater protection of human health and the environment. A remedy with institutional controls would be expensive and hard to maintain at this remote and unmanned location, and would prevent land transfer. Solidification of the soil is unlikely to provide long term protection, and is more expensive than offsite disposal given the small soil volume. The no action alternative was rejected because it failed to meet the threshold criteria of protection of

human health and the environment. In addition, the no action alternative is rejected as not being in compliance with State of Alaska regulations.

2.12.2 Description of the Selected Remedy

Soil with PCBs above 1 mg/Kg at the west end of the old radome building will be removed and disposed at a TSD facility consistent with the Off-Site Rule (40 CFR 300.440). The estimated volume of soil above the cleanup level is 69 cubic yards.

Additional sampling will be performed at OT004 to delineate the extent of PCB contamination prior to or concurrently with the removal action. Contaminated soil removal should be conducted prior to building demolition to the extent practical to avoid dispersion of the contaminated soil by the demolition crew and equipment. Based on previous investigations, at OT004, the contaminated soil volume is small and located close to the surface. Soil removal by small equipment (e.g., Bobcat) may be the most practical.

It is important to note that the remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to the remedy as described in this DD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or DD amendment.

2.12.3 Summary of Estimated Remedy Costs

Table 2-6 Cost Estimate Summary – Capital Costs for Remedy Component Five

Description:
An estimated 112 tons (83 CY) of low-level PCB-contaminated soil (1 < PCBs <= 50 mg/Kg) would be excavated from OT004 (69 CY in-place volume), containerized, barged to Deadhorse, and then trucked to the Fairbanks North Star Borough (FNSB) Landfill for disposal. PCB concentrations in the soil are less than 10 mg/kg. The vertical and horizontal extent of PCB contamination at OT004 is not sufficiently characterized and additional sampling is recommended prior to soil removal to delineate contamination. The estimated soil volume for removal may change.

LABOR

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor - Construction Management					
Sr. Construction Manager	per hour	$ 139.09	2	1	$ 278
Administrator	per hour	$ 62.12	1	1	$ 62
Superintendent	per hour	$ 87.32	12	1	$ 1,048
SSHO/CQC	per hour	$ 80.26	12	1	$ 963
Environmental Scientist (planning & reporting)	per hour	$ 103.39	80	1	$ 8,271
Waste Coordinator	per hour	$ 106.16	48	1	$ 5,096
Local Craft DB Labor (Excavation, Containerization, and Shipping)					
Operator Gp 1	per hour	$ 59.70	24	2	$ 2,865
Operator Gp 1 OT	per hour	$ 81.75	12	2	$ 1,962
Labor Gp 1	per hour	$ 50.53	24	2	$ 2,425
Labor Gp 1 OT	per hour	$ 67.55	12	2	$ 1,621
				SUBTOTAL	$ 24,592

EQUIPMENT

ITEM	Units	Unit	Rate	Quantity	Extension
Forklift (60 ton) for handling filled containers on loading end	1	Month	$ 7,000	0.07	$ 500
Trailer to move filled containers from excavation site to staging area	1	Month	$ 2,000	0.07	$ 143
Excavator, EX 400	1	Month	$ 15,000	0.07	$ 1,071
Wheeled Loader - Cat 988 (setup w/ forks, fork extension & bucket)	1	Month	$ 15,000	0.07	$ 1,071
Utility Vehicle, 6 wheeler, crew / tools transport	1	Month	$ 9,000	0.07	$ 643
			Profit	8%	$ 274
				SUBTOTAL	$ 3,703

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	diesel/gas	gallon	$ 4	135	$ 540
PPE/Safety	PPE/Safety	manday	$ 35	21	$ 735
Per diem	per diem	manday	$ 250	21	$ 5,250
			Profit	8%	$ 522
				SUBTOTAL	$ 7,047

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Barging Soil to Deadhorse	Barging	Ton	$ 71	112	$ 7,943
Liner sacks	Containers	ea	$ 635	12	$ 7,620
Disposal of PCB soil in Fairbanks Landfill	Tipping fee	Ton	$ 106	112	$ 11,858
Trucking Soil from W. Dock to FBX	Trucking	trip	$ 2,500	4	$ 11,187
Test Field Screening (PCBs)	Immunoassay	ea	$ 25	52	$ 1,295
Chemical Lab Analysis - Confirmation and Waste Characterization (PCBs)	Chemical analysis	ea	$ 85	12	$ 1,020
			Profit	8%	$ 3,274
				SUBTOTAL	$ 44,197

COST SUMMARY

COST		$ 79,539
Project Management	5.0%	$ 3,977
COST ESCALATION	6.0%	$ 5,011
	TOTAL	**$ 88,527**

SUBTOTALS	
LABOR	$ 24,592
EQUIPMENT	$ 3,703
MATERIALS	$ -
ODC	$ 7,047
SUBCONTRACT	$ 44,197
TOTAL	$ 79,539

Assumptions:
It is assumed that the soil will be shipped in 9.5 cubic yard liner sacks holding 20,000 pounds (10 tons) each. It is assumed that it will take 1.25 hours to load, seal, and stage for transport each liner sack after the soil has been excavated. This load rate produces an estimated 2.5 days to excavate, fill, and stage the sacks of PCB-contaminated soil. Soil will be excavated directly into the liner sacks without stockpiling.
Site specific costs assume work is being done jointly with other contaminated soil remediation efforts, and during Clean Sweep activities. It is assumed that necessary remedial action equipment will already be at Bullen Point for Clean Sweep which eliminates mobilization and demobilization costs.
Screening, confirmation, and stockpile sampling for PCBs are based on EPA's Mega Rule: screening samples are based on a 3-meter grid system with a minimum of 9 screening samples; 3 confirmation samples; and 2 stockpile samples for the first 50 CY, plus 1 stockpile sample for each additional 50 CY.
The Waste Coordinator will require 1 hour per sack to process transportation and disposal paperwork and additional time supervising the transfer of sacks in Deadhorse. The percentage for Project Management was reduced from EPA's guidance of 10% to 5% for a project of this dollar value (size range) because it is assumed that all the ERP remediation sites at Bullen Point will be addressed together as one project to maximize efficiency.

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, an ESD, or a DD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.12.4 Expected Outcomes of Selected Remedy

Following completion of the Selected Remedy, OT004 would be available for unrestricted residential land use. It is anticipated that excavation and off-site disposal of PCB contaminated soils will be completed in one construction season. There is no groundwater present at the site and therefore, no expected future uses for groundwater as a result of the Selected Remedy.

The purpose of this response action is to control risks posed by direct contact and ingestion of soil and minimize migration. The current potential for PCBs to migrate from the site is low; however, PCBs are persistent in the environment and could bioaccumulate in human or ecological receptors. Cumulative risk calculations indicated that the excess cancer risk to humans caused by PCBs in the soil under a residential exposure scenario is 1×10^{-5}. The non-cancer HI is 2.7. These cumulative risks are above the ADEC risk management standards (see Section 2.7.1.1). After the remedy is completed the ADEC risk management standards will be met.

Table 2-7 Cleanup Levels for Chemicals of Concern at OT004

Media: Soil **Site Area: OT004** **Available Use: Residential** **Controls to Ensure Restricted Use (if applicable): N/A**			
Chemical of Concern	Cleanup Level	Basis for Cleanup Level	Risk at Cleanup Level
PCBs	1 mg/Kg	18 AAC 75.341, Table B1	Cancer Risk = 1×10^{-5} Noncancer Risk = 1.0
Notes mg/Kg – milligrams per kilogram			

2.13 Statutory Determinations

Under CERCLA §121 (as required by NCP §300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

The selected remedy, Alternative 5, will protect human health and the environment by permanently removing PCB-contaminated soil from the site. Future risk due to ingestion of animals that may bioaccumulate PCBs is also eliminated or reduced. Implementation of Alternative 5 will not pose unacceptable short-term risks or cross-media impacts.

2.13.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment. Location-specific ARARs restrict activities in certain sensitive environments. Action-specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the RCRA). Offsite shipment, treatment and disposal of excavated contaminated soil invoke action-specific ARARs. Criteria to be considered, or TBCs, are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 2-8 summarizes the ARARs and TBCs for the selected remedy at OT004 and describes how the selected remedy addresses each one.

The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs . The implementation of the remedy is required to meet the substantive portions of these requirements and is exempt from administrative requirements such as permitting and notifications.

Table 2-8 Description of ARARs and TBCs

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Action-Specific	Federal Regulatory Requirement	Soil	Toxic Substances Control Act	Applicable	Contains rules relating to the storage and disposal of PCB remediation waste and the PCB spill cleanup policy.	The selected remedy will comply with these regulations through proper disposal of TSCA regulated wastes.
Action-Specific	Federal Regulatory Requirement	Soil	General Industrial Standards for Workers (29 CFR 1910.210)	Applicable	Outlines required protections for workers.	The selected remedy will comply with these regulations through use of appropriate PPE and training for proper handling of hazardous materials or wastes.
Action-Specific	Federal Regulatory Requirement	Soil	HAZWOPER (29 CFR 1910.120 and 40 CFR 311)	Applicable	Outlines worker protection during hazardous waste cleanup.	All on-site workers will be required to have HAZWOPER certification.
Action-Specific	Federal Regulatory Requirement	Soil	Hazardous Materials Transportation	Applicable	Transportation regulations for shippers and transporters of hazardous materials.	The selected remedy will comply with these regulations through proper packaging and transport of all hazardous waste.
Chemical-Specific	42 USC 9620(a)(4)	Soil	Alaska Soil Cleanup Rules 18 AAC 75.340-341	Applicable	In general, cleanup to 1 ppm PCBs in soil is required.	1 ppm PCBs in order to have closure without institutional controls.

Table 2-8 (continued)

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Location-Specific	Federal Regulatory Requirement	Soil	Native American Grave Protection and Repatriation Act	TBC	Provides for the protection of Native American graves and for other related areas.	No Native American grave sites have been identified at the site; however, procedures for reporting and protection of graves will be followed if encountered during implementation of the selected remedy.
Location-Specific	Federal Regulatory Requirement	Soil	Marine Mammal Protection Act	TBC	Provides for the protection and management of marine mammals and their products. Includes walruses, polar bears, sea otters, whales, porpoises, seals, and sea lions.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Migratory Bird Treaty Act	TBC	Protects any migratory bird; any part, nest, or eggs of any such bird.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Endangered Species Act	TBC	Establishes requirements to protect species threatened by extinction and habitats critical to their survival. Federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*);	The selected remedy will not impact protected species through engineering controls or avoidance measures.

2.13.3 Cost Effectiveness

In the USAF's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for OT004 was demonstrated in the comparative analysis of alternatives (Section 2.10 – Summary of Comparative Analysis of Alternatives) and is summarized in Table 2-9 below. The estimated present worth cost of the selected remedy (in 2006 dollars) is $88,527. In addition, the selected remedy will allow the site to meet the conditions for land transfer to the State of Alaska and permit the USAF to construct a new solid waste landfill at Bullen Point. This landfill would receive nonhazardous waste from the Clean Sweep demolition activities, include building debris from OT004. The ability to construct and utilize an onsite landfill results in significant cost savings to the USAF under multiple programs (ERP, Clean Sweep, and Environmental Compliance).

Present-worth costs were not calculated for the other alternatives as previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) (Arctic Slope Construction [ASCI] 1998; URS 2002) found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003).

Table 2-9 Cost and Effectiveness Summary for OT004

Alternative	Present-Worth Cost[1]	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
1 – No Action		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers. Current risk due to direct contact would still exist.
2 – Land Use Controls		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers, community and the environment.
3 – Containment		N/A	Reduction in long-term risk as long as solidification matrix remains intact.	No reduction in volume or toxicity. Mobility of waste is reduced while encapsulated.	No short term risk to workers, community and the environment.

Table 2-9 (continued)

Alternative	Present-Worth Cost	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
4 – Source Removal and Onsite Treatment		N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity through high temperature thermal desorption.	Potential short term risk to workers during treatment due to adverse air emissions.
5 – Source Removal and Offsite Disposal	$ 88,527	N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity by removing PCBs from the site; however, does not meet treatment preference.	No short term risk to workers, community and the environment.
Cost Effectiveness Summary 1 - Preliminary screening of potential alternatives concluded that Alternatives 1-4 were not cost effective for addressing contaminated soils at OT004; therefore, only the present-worth cost for Alternative 5 was presented in the FS. • Alternatives 1 and 4 are not considered to be cost effective. • While Alternatives 2 and 3 are considered to be cost effective, Alternative 5 provides a potentially greater return on investment.					

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The USAF has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP 300.430(f)(1)(i)(B). Although no treatment is being utilized, the selected remedy provides the most effective, long-term solution given the conditions at the site. Offsite landfilling of the PCB-contaminated soil at Bullen Point is protective of human health and the environment, readily implementable, and cost effective in comparison to other alternatives. The equipment required to treat PCBs on site is sophisticated and large, which makes their mobilization and operation difficult and expensive. There is also the risk of air emissions. Offsite treatment would require shipping the soils to the lower 48 states, which is logistically difficult and more costly than disposing of the soils within Alaska or the lower 48 states. The option of solidification would require continued inspections and possibly maintenance. Due to the site location, this maintenance would be logistically difficult and expensive.

The selected remedy manages the potential risks to human health and the environment by permanently removing PCB-contaminated soil from the site.

2.13.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy for OT004 does not satisfy the statutory preference for treatment as a principal element of the remedy because on-site treatment options were not viable given the remote location, limited infrastructure and arctic climate at Bullen Point.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will not be required within five years after initiation of the remedial action to verify that the remedy is, or will be, protective of human health and the environment.

2.14 Documentation of Significant Changes

The Proposed Plan for OT004 was released for public comment on October 17, 2006. The Proposed Plan identified Alternative 5 – Source Removal and Offsite Disposal as the Preferred Alternative for PCB-contaminated soil remediation. The USAF 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.

3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the *Proposed Plan for Eight ERP Sites at Bullen Point Short Range Radar Station*. At the time of the public review period, the USAF had proposed Alternative 5 – Source Removal and Offsite Disposal as the preferred remedy for the Outside Transformer (OT004). *No written or verbal comments were received on the Proposed Plan.*

Decision Document
Generator Room Area and POL Tanks (ST005)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

Table of Contents

Tables

Figures

1.0 Declaration

1.1 Site Name and Location

Facility Name: Generator Room Area and POL Tanks (ST005)
Site Location: Bullen Point, Alaska
CERCLIS ID Number: Not Applicable
Alaska Department of Environmental Conservation (ADEC) Contaminated Site Record Key (reckey) Number: 198931X102547.
Operable Unit/Site: Not Applicable

Bullen Point SRRS is located on the Arctic Coastal Plain at 70°10'N latitude and 146°51'W longitude. The Generator Room Area and POL Tanks (ST005) is one of eight different sites located at the Bullen Point SRRS being addressed under the U.S. Air Force (USAF) Environmental Restoration Program (ERP). The Bullen Point SRRS is not listed on the National Priorities List.

ST005 is located at 70°10'39.04"N latitude, 146°51'11.59"W longitude and has been divided into two areas of concern: the POL tanks, and the generator room. The POL tanks, which include the north and south fuel pipeline hookup points, are located on the gravel pad north of the module trains and active radar. Three diesel spill locations are associated with the POL tanks area. The generator room is located southwest of the POL tanks, and part of Module Train J. There are two spill locations next to the generator room.

1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the ERP site Generator Room Area and POL Tanks (ST005), in Bullen Point, Alaska which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Contingency Plan (NCP). Releases at this site include both petroleum products and CERCLA hazardous substances. Under CERCLA 42 USC 9601, 101 (14) and (33), petroleum products, to include any fractions or derivatives of crude oil, are excluded from the definitions of hazardous substances, pollutants or contaminants. Therefore, the areas at ST005 where petroleum products are the contaminants of concern will be addressed in a separate Corrective Action Plan that complies with State of Alaska laws and regulations. This decision is based on the Administrative Record for this site.

This document is issued by the Department of the Air Force (USAF), as the lead agency. The USAF is managing remediation of contamination at ST005 in accordance with CERCLA as required by the Defense Environmental Restoration Program (DERP). The decision put forth in this document is also in accordance with the requirements of Title 18, Chapter 75, Article 3, of the Alaska Administrative Code (AAC) Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances regulations for the State of Alaska.

As the lead agency, the USAF has selected the remedy. The State of Alaska, through the ADEC concurs with the selected remedy. The U.S. Environmental Protection Agency (EPA) has been given the opportunity to review this document and has chosen to defer to the ADEC for regulatory oversight of the ERP at Bullen Point SRRS.

1.3 Assessment of Site

Soil, sediment, and surface water samples were collected from the POL tank farm and adjacent areas during a series of remedial investigations (RIs) conducted in 1993 and 2004. The generator room was not investigated as part of the 1993 RI; however, during the Clean Sweep Survey conducted in 2001, PCBs were detected in three soil samples collected north of the building (Generator Room Spill Area). The maximum concentration of PCBs detected in the soil was 2.87 mg/Kg which is above the ADEC Method Two cleanup level of 1 mg/Kg.

During the 2004 RI, darkly stained surface soils were visible in this location, along with two large generators lying on their sides outside the building. Two samples were collected from this stained area and analyzed for fuel-related compounds. A sample collected from the stained area had a maximum RRO concentration of 14,200 mg/Kg, which exceeds the Method Two soil cleanup level. The DRO concentration in this sample was comparatively low (3,030 mg/Kg) indicating it was a probably caused by a spill of lubricating oil. Based on the lateral and vertical extents of the staining observed in the Generator Room Spill Area, co-mingled fuel and PCB contaminated soil greater than 1 mg/Kg was considered to be limited in area, approximately 113 square feet with a total in-place volume of 4 cubic yards.

Based on the findings of the RI and other key documents that can be found in the Administrative Record File for Bullen Point SRRS, the CERCLA response action selected in this Decision Document is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The USAF is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 Description of Selected Remedy

Remedial alternatives for ST005 were developed and evaluated through a Feasibility Study (FS) (USAF 2005) which considered the conditions for land transfer as site cleanup levels. Based on the results of the FS, the USAF selects the following remedy:

- excavation of PCB-contaminated soils with PCBs above 1 mg/Kg (See Figure 2-3) (an estimated volume of 4 cubic yards [yd^3]);
- transportation of PCB contaminated soil to an offsite treatment, storage and disposal facility (TSD) for disposal; and
- disposal of soils will be consistent with the Off-Site Rule (40 CFR 300.440).

ST005 is one of eight ERP sites at Bullen Point SRRS. The overall cleanup strategy for Bullen Point involves source management and migration and exposure controls. The selected alternative for ST005 fits into the overall site management plan by source reduction in the source area without the need for institutional controls. The cleanup plan for Bullen Point includes the following:

- Cleaning up petroleum contamination in accordance with Alaska's oil and hazardous substance pollution control laws.
- Cleaning up the soil contamination other than petroleum hydrocarbons to 18 AAC 75.341 Method Two cleanup levels for the Arctic Zone.
- Removing the inactive facilities that have no utility (value) to the future landowner (i.e., completion of Clean Sweep Program at Bullen Point).

No source materials constituting principal threats exist at the site, because PCBs in soil at the site are at concentrations that present an excess cancer risk near the acceptable risk range of 10^{-6}.

1.5 Statutory Determinations

The selected remedy for ST005 is protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the site. It provides the best balance or trade-offs in terms of balancing criteria while also considering the bias against offsite treatment and disposal and considering state and community acceptance.

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site whenever practicable (40 CFR 300.430[a] [1] [iii] [A]). The selected remedy for ST005 does not satisfy the statutory preference for treatment as a principal element of the remedy for PCB-contaminated soils. Based on the evaluation of alternatives discussed in the FS, excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure. Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

Releases of petroleum and related substances identified at ST005 will be addressed in accordance with State of Alaska laws and regulations; because petroleum is excluded from the definition of hazardous substances and pollutants and contaminants under 42 USC § 9601 (14) and (33).

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this DD (Section 2).

- List of chemicals of concern (COCs) and their respective concentrations (Section 2.7.1, Table 2-2)

- Baseline risk represented by the COCs (Section 2.7.1.1, Tables 2-3 and 2-4)
- Cleanup levels established for COCs and the basis for these levels (Section 2.12.4, Table 2-7)
- How source materials constituting principal threats will be addressed (Section 2.11)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and DD (Section 2.7.1.1)
- Potential land and ground water use that will be available at the site as a result of the selected remedy (Section 2.6, 2.12.4)
- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.12.3, Table 2-6)
- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.12)

Additional information can be found in the Administrative Record file for Bullen Point SRRS, Alaska which can be found at http://www.adminrec.com/PACAF.asp?Location=Alaska

Four information repositories are also located in Kaktovik, these include:

- Mayor's Office
- School Library
- Native Village of Kaktovik
- Kaktovik Inupiat Corporation

1.7 Authorizing Signatures

This signature sheet documents the United States Air Force and ADEC approval of the remedy selected in this Record of Decision for the Generator Room Area and POL Tanks (ST005), Bullen Point SRRS, Alaska. This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson — 1 OCT 07

BRENT A. JOHNSON — Date
Colonel, USAF
Commander, 611th Air Support Group

8/30/07

JOHN HALVERSON — Date
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

2.0 Decision Summary

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

2.1 Site Name, Location, and Description

2.1.1 Regional Setting

Bullen Point SRRS is located at latitude 70°10'N, longitude 146°51'W on the Arctic Coastal Plain on the shore of the Beaufort Sea. The installation consists of 620 acres of low-lying tundra. The nearest populated area is Deadhorse, 38 miles west of the installation. Air travel provides the only year-round access to Bullen Point SRRS, while marine travel provides summer access. Bullen Point SRRS is not connected by road to Deadhorse or any other populated area. The general location of the Bullen Point SRRS is shown on the inset in Figure 2-1.

The weather station closest to Bullen Point is at Prudhoe Bay, 38 miles to the west. Because of a similarity in elevation and proximity to the Beaufort Sea, conditions at Prudhoe Bay should approximate those at Bullen Point. Average annual precipitation recorded at Prudhoe Bay from 1986 to 1999 was 4.26 inches per year, which included 33.1 inches of snowfall (Western Regional Climate Center 2006). Average daily minimum and maximum temperatures in July were 39.7 degrees Fahrenheit (°F) and 55.4°F, respectively. In December, these average temperatures were -19.2°F and -6.6°F, respectively. The extreme recorded temperatures are -62°F and 83°F.

Surficial deposits in the Bullen Point SRRS area consist of sand and gravel near the shoreline and along stream channels; silt, sand, and gravel deposits in the inland low areas; and eolian (wind) silt and fine sand deposits in the upland areas. Vegetated tundra is present above these deposits and consists of low growing plants including mosses, lichens, sedges, and grasses (Arctic Slope Technical Services [ASTS] 1982). Bullen Point SRRS is located in an area of continuous permafrost up to 2,000 feet deep (Lachenbruch 1982). The seasonal active zone layer typically varies from 2 to 5 feet in thickness.

Small streams, discharging into the Beaufort Sea, drain the lakes and wetlands surrounding the Bullen Point SRRS. Drinking water for Bullen Point SRRS was provided by a reservoir south of the facility that was formed by damming a stream. Since operations ceased, the dam has been breached and the reservoir drained (Hoefler Consulting Group [HCG] 2005).

2.1.2 Regional Ecology

Bullen Point provides habitat for a variety of fish, bird and mammal populations commonly found in the northern arctic coast region (USAF 2005). Fish common to the western Beaufort Sea nearshore habitats include four-horn sculpin, Arctic cisco, and Arctic char (ASTS 1982). Eighty-five species of predominantly waterfowl and shorebirds are also found in the area. Marine mammals that have been reported off Bullen Point include beluga and bowhead whales, walrus, polar bears, and ringed and bearded seals. Land mammals such as caribou, foxes, weasels, moose, grizzly bear, wolverine and wolf are also found in the region. The only

federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.1.3 Facility History and Background

The Bullen Point SRRS is one of many Distant Early Warning (DEW) Line stations located across the arctic region of North America and Greenland. The installation was in operation between 1953 and 1971 and was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to an SRRS, which has operated since 1994. It is unmanned except for period maintenance visits. Operations and support personnel are based out of Elmendorf Air Force Base, located near Anchorage, Alaska.

The Bullen Point SRRS initially consisted of a module train, rotation radar, and support facilities. Presently, facilities include an old, inactive radome; four 30-foot communication antennas; a new radome; a group of eight buildings attached by covered walkways (the module train); two pump houses; a warehouse; seven diesel oil tanks; a 250,000-gallon water storage tank; associated roads and pads; a 3,600-foot gravel airstrip; and a helicopter pad. The inactive structures at Bullen Point SRRS are scheduled for demolition under the Air Force (USAF) Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn would transfer the land to the State of Alaska based on the State's expressed interest in the property.

In addition, the potential advantages of making the property acceptable for land transfer to the BLM, and eventually the State of Alaska, were considered when evaluating the need for remedial action and selecting the appropriate remedial alternative. The State has selected the land as part of its entitlement under the Alaska Statehood Act. However, in its current condition the land is unacceptable to the State. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of DRO in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for RRO in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup level for DRO and RRO in the native soils (e.g., tundra and peat) is the listed Method Two soil cleanup level. At the Old Landfill (LF006), the DRO and RRO cleanup levels are 500 and 2,000 mg/Kg, respectively.
- Removal of contaminated soil, hazardous materials, and solid waste (debris) from the Old Landfill (LF006).
- Removal of inactive facilities that have no utility (value) to the future landowner.

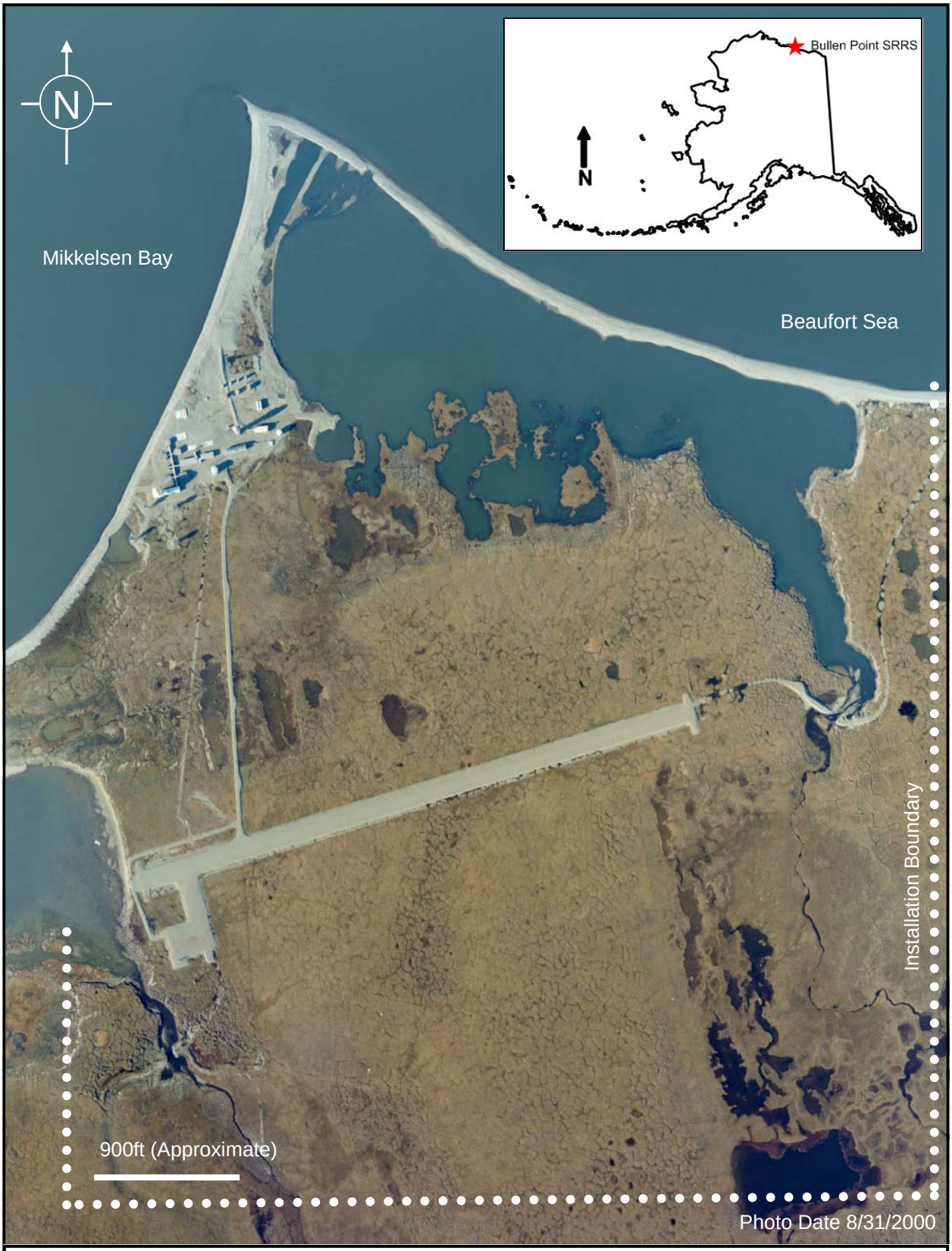

Figure 2-1
Bullen Point SRRS Vicinity Map

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As part of the cleanup at Bullen Point, the USAF will construct a new solid waste landfill at an inland location on its property. The landfill will receive nonhazardous waste from Clean Sweep demolition activities and the cleanup of the Old Landfill (LF006), which is threatened by coastal erosion. The new landfill will be transferred to the State of Alaska after it is closed, along with the rest of the excess USAF property at Bullen Point.

The 2004 RI/FS concluded that the most cost-effective approach to completing all of the USAF objectives under the ERP at Bullen Point, including building demolition and debris removal, was to perform the cleanup activities necessary to make the excess land acceptable for transfer according to State of Alaska requirements. Consequently, six ERP sites were proposed for remedial action.

2.1.4 Facility ERP History

Under the USAF ERP and its predecessor the Installation Restoration Program, environmental investigations have been conducted at the Bullen Point SRRS since 1981. These investigations included preliminary assessments in 1981 and 1986. Environmental samples were collected and limited removal actions performed at Bullen Point SRRS in 1988 as part of a Stage 3 Remedial Investigation/Feasibility Study (RI/FS) at five sites (Woodward Clyde Consultants [WCC] 1990). In preparation for construction activities associated with the SRRS, soils in the construction area were screened for hydrocarbons in 1991 (ENSR 1992, as reported in ICF 1996a). A second, more extensive RI/FS was conducted in 1993 for five sites (ICF 1996a). In an effort to fill data gaps and update previous data, additional sampling occurred in 2004 at Bullen Point SRRS for eight sites (HCG 2005). All eight sites were included in the Proposed Plan and Decision Document process.

Past activities potentially resulting in contaminant release at the Bullen Point SRRS include:

- Spills during the transfer of fuels in and out of storage tanks;
- Leaks from fuel lines, drums, and tanks;
- Spills or leaks of fuel, lubricants, or solvents during vehicle and equipment maintenance activities;
- Spills or leaks from transformers or other electrical equipment containing polychlorinated biphenyls (PCBs); and
- Disposal of wastes and other discarded material containing hazardous substances.

Some of the contaminants encountered during investigations at Bullen Point SRRS are benzene, toluene, ethylbenzene, and total xylenes compounds (BTEX); diesel range organics (DRO); gasoline range organics (GRO); polynuclear aromatic hydrocarbons (PAHs); PCBs; petroleum, oil, and lubricants (POL); residual range organics (RRO); semivolatile organic compounds (SVOCs); metals; and volatile organic compounds (VOCs). Most of these contaminants are the result of fuel or oil spills.

As the lead agency, the USAF has conducted environmental remedial investigation and assessment activities at ST005 in accordance with CERCLA under the Defense Environmental Restoration Program (DERP) which was established by Section 211 of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

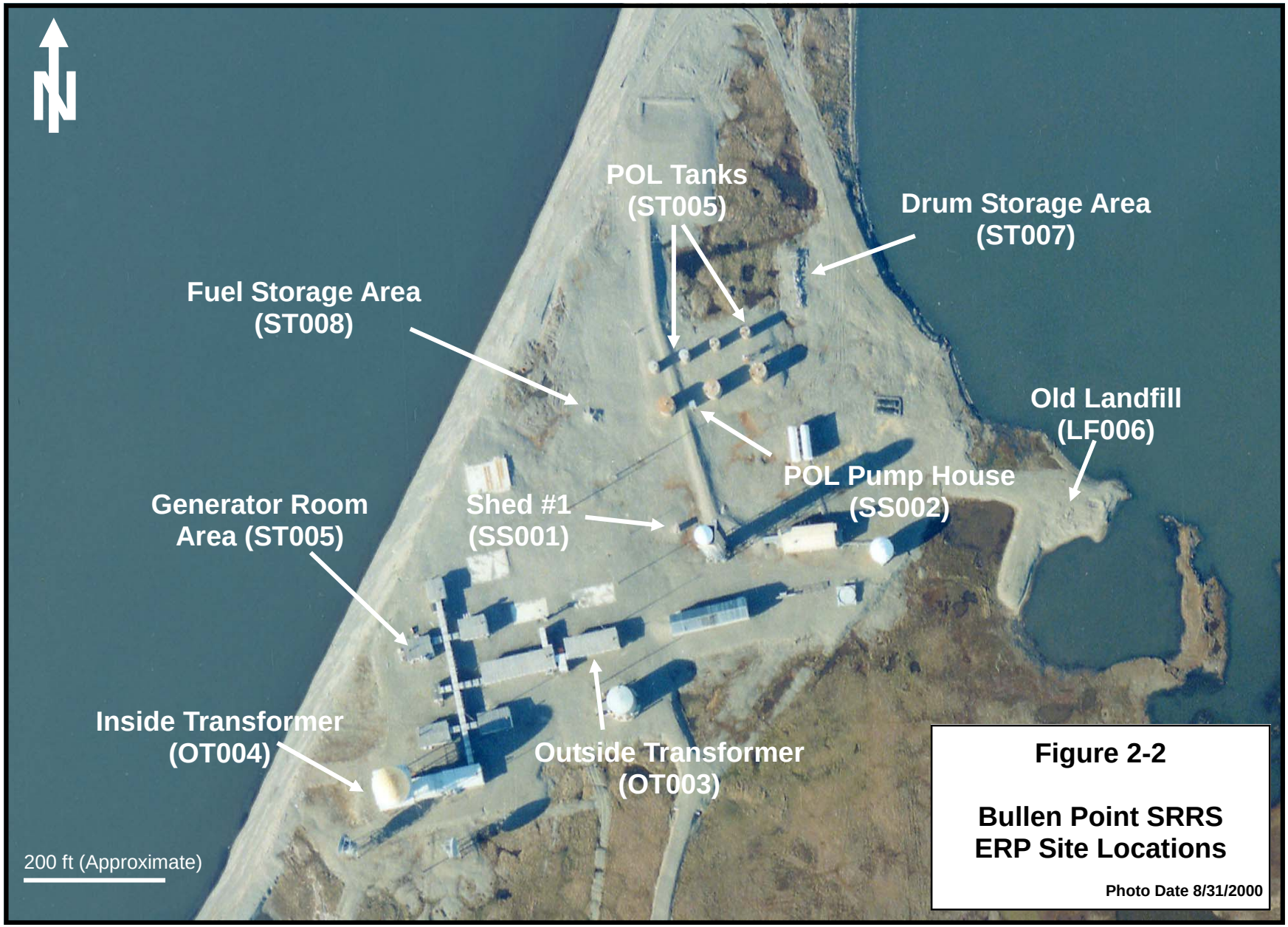
As the support agency, the ADEC provides primary oversight of the environmental restoration actions, in accordance with their contaminated sites regulations (18 AAC 75, Article 3, Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances). Funding is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense (DoD) installations.

2.2 Site History and Enforcement Activities

This section provides background information and summarizes the series of investigations that led to the ROD. It describes the CERCLA response actions undertaken at ST005.

ST005 is located at 70°10'39.04"N latitude, 146°51'11.59"W longitude (Figure 2-2). ST005 has been divided into two areas of concern: the POL tanks, and the generator room. The POL tanks and associated pump house (ERP site SS002) are located on the gravel pad north of the module trains and active radar. There are seven above ground storage tanks (ASTs) in the POL tank farm. The three southern tanks are 65,000 gallons each, and the four northern tanks are 20,000 gallons each. The tanks were used to store diesel fuel. The tank farm was not lined. The tanks were abandoned in 1971 when the installation was closed.

During a 1998 inspection, one of the 65,000-gallon tanks (Tank 7) contained approximately 1,500 gallons of liquid product. Three other tanks had visible pools of liquid in the tank floor depressions. The POL tanks include two fuel pipeline hookup points where diesel fuel spills have occurred. These spill locations appear to be connection points for connecting lines from fuel barges. One is located immediately north of the POL tank farm, and the other is located approximately 400 feet southwest of the tank farm. The generator room is located southwest of the POL tanks, and part of Module Train J. There are two spill locations next to the generator room. The area north of the building is referred to as the “Generator Room Spill Area” and the area south of the building is referred to as the “Generator Room ASTs”.


N
POL Tanks
(ST005)
Drum Storage Area
(ST007)
Fuel Storage Area
(ST008)
Old Landfill
(LF006)
POL Pump House
(SS002)
Shed #1
(SS001)
Generator Room
Area (ST005)
Inside Transformer
(OT004)
Outside Transformer
(OT003)
200 ft (Approximate)
Figure 2-2
Bullen Point SRRS
ERP Site Locations
Photo Date 8/31/2000

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Soil, sediment, and surface water samples were collected from the POL tank farm and adjacent areas during a series of RIs conducted in 1993 and 2004. The investigations indicated there were four diesel spill locations and a lubricating oil spill north of the generator room. The generator room was not investigated as part of the 1993 RI; however, during the Clean Sweep Survey conducted in 2001, PCBs were detected in several soil samples collected north of the building (Generator Room Spill Area). The 1993 and 2004 RIs recommended ST005 for remedial action to address the petroleum and PCB contamination in the soils.

No land use controls are applicable as part of the selected remedy for this site. In addition, there are no Federal Facility Agreements or state agreements for the Bullen Point SRRS. No sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have been detected at ST005. There have been no regulatory enforcement activities at the site.

In accordance with AF policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process culminating in this ROD. Separate NEPA documentation will not be issued.

2.3 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan and review by the support agency. Described below are components of these items and documentation of how each component was satisfied for ST005.

Proposed Plan. A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review on October 17, 2006. A public meeting was also held at that time.

Public Comment Period. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. A summary of the public comments and responses to public comments are provided in Section 3 of this decision document. The USAF received no requests to extend the public comment period.

Public Meetings. The USAF held a public meeting in Kaktovik on October 17, 2006 to discuss the Proposed Plan and record verbal comments. No comments were received regarding the Proposed Plan. Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board (RAB) meetings. The RAB consists of representatives from the community and the USAF. A RAB was formed in Kaktovik in 1998 and typically meets quarterly. RABs provide a forum for discussion and exchange of information among federal and state agencies and the community regarding cleanup of a military site. The RAB plays an important role in the decision-making process.

Updated Mailing List and Mailing Events. A mailing list of interested parties is maintained and updated regularly by the Air Force Community Relations Coordinator.

Administrative Record. The administrative record located at the 611 Civil Engineering Squadron (CES) office at the Elmendorf Air Force Base, Alaska, is continually updated and

developed. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. An index of documents is included in Appendix A. A website with the administrative record current up through 2003 is also available to the public at:
http://www.adminrec.com/PACAF.asp?Location=Alaska

Information Repository. The information repository is a file containing newsletters, fact sheets, and community relations documents relating to Proposed Plans and response actions for all of the ERP sites at Bullen Point SRRS. Four information repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation.

Management Action Plan. The Management Action Plan (MAP) report is updated periodically and made available to the public in order to provide a summary of all restoration activities in one document. The most recent MAP was published in 2004 (USAF 2004) and is part of the Administrative Record.

USAF responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided as Section 3 of the DD.

AF responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided as Section 3 of the ROD.

2.4 Scope and Role of Operable Unit or Response Action

There are no operable units at Bullen Point SRRS. However, the overall cleanup strategy for the installation includes source reduction and making the property acceptable for transfer to the BLM and eventually the State of Alaska. The conditions for land transfer were discussed in Section 2.1.3.

A Proposed Plan has been issued for eight ERP sites at Bullen Point, including ST005.

2.5 Site Characteristics

2.5.1 Topography and Stratigraphy

The tank farm and surrounding pad consists of sandy gravel fill over native soils. The native soils typically consist of a thin peat layer over silt. The thickness of the gravel fill is variable. The gravel thickness in the tank farm area is 3 to 5 feet. The gravel thickness in the surrounding pad is typically 2 to 4 feet. In general, the gravel thickness is thinnest in the northwest portion of the pad where little infrastructure was built.

The topography is depicted in Figure 2-2. The tank farm area is a localized topographical high with an elevation of approximately 11 feet. There is not a containment berm or liner around the tank farm. A raised gravel roadway with an elevation of 13 to 14 feet bisects the tank farm in a north-south direction. This roadway runs from the helicopter pad to the active radar and was built in 1994. The pad outside the tank farm is relatively flat and slopes gently to beach or adjacent tundra. However, there are localized depressions on the surface of the pad.

2.5.2 Surface and Subsurface Hydrology

The gravel pad has no permanent water bodies but does have several low-lying areas, which accumulate water on a temporary basis. There is a freshwater wetland immediately north of the tank farm that drains northeast into the lagoon.

During the 2004 RI, active zone water was encountered in most soil borings within the tank farm at a depth of around 3 feet bgs. This active zone water was presumably located slightly above permafrost (within 1 foot). Soil borings were terminated at the water table, so they generally did not encounter permafrost. However, permafrost was encountered in one boring at a depth of 4 feet bgs within the tank farm. Outside the tank farm, pore water was encountered in approximately two-thirds of the soil borings. The depth of the water table varied from about 0.5 to 2.75 feet bgs. The water table was shallowest in low-lying areas and was deeper where the gravel pad was thicker. Permafrost is presumed to underlie most of the site at a depth of approximately 3 to 4 feet bgs. Permafrost was encountered in most soil borings where active zone water was not encountered first.

The direction of surface water runoff is generally controlled by the topography at the site. The flow of shallow subsurface water occurs along the top of the permafrost. The depth of permafrost generally mimics surface topography although there can be localized differences. Therefore, the direction of subsurface flow is similar to surface flow. Surface drainage from the raised tank farm generally flows in all directions although the elevated roadway serves as an east-west divide. The current drainage pattern is probably slightly different than the historical drainage pattern, due to the presence of the road, which was built in 1994.

2.5.3 Ecology

The site is largely unvegetated. It is comprised of a gravel pad with little organic material. Therefore, it represents poor ecological habitat in comparison to the adjacent tundra. The wetlands north of the tank farm appear to be good aquatic habitat with a mix of vegetation and shallow, open water bodies. Waterfowl were observed in the water bodies during the 2004 RI. The tundra north of the tank farm also contains an archeological site that predates the radar facility (ASTS 1982).

Regional ecology of the Bullen Point Installation is described in Section 2.1.2. The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.5.4 Previous Site Characterization Activities

Soil, sediment, and surface water samples were collected from the POL tank farm and adjacent areas during a series of RIs conducted in 1993 and 2004. The investigations indicated there were four diesel spill locations and a lubricating oil spill north of the generator room. The sample results are summarized in Table 2-1 and the sample locations are shown on Figure 2-3.

The generator room was not investigated as part of the 1993 RI; however, during the Clean Sweep Survey conducted in 2001, PCBs were detected in several soil samples collected north of

the building (Generator Room Spill Area). The maximum concentration of PCBs detected in the soil was 2.87 mg/Kg which is above the Method Two cleanup level of 1 mg/Kg. During the 2004 RI, darkly stained surface soils were visible in this location, along with two large generators lying on their sides outside the building. A sample collected from the stained area had an RRO concentration of 14,200 mg/Kg, which exceeds the Method Two soil cleanup level. The DRO concentration in this sample was comparatively low (3,030 mg/Kg) indicating it was a probably caused by a spill of lubricating oil. Staining was also observed next to two small (~200 gallon) ASTs on the west side of the generator room (Generator Room ASTs). A soil sample collected in this area had concentrations of GRO, DRO, and RRO of 393, 5,420, and 172 mg/Kg, respectively, indicating it was the probable location of a diesel spill.

2.5.5 Nature and Extent of Contamination

2.5.5.1 Known or Suspected Sources of Contamination

The suspected source of the PCB and petroleum products is spills or leaks from two generators lying on their sides immediately north of the generator room.

2.5.5.2 Types of Contamination and the Affected Media

Based on findings from the FS, CERCLA hazardous substances within ST005 were limited to the area north of the Generator Room (See Figure 2-3).

Table 2-1 summarizes the maximum concentrations of detected contaminants. Stained soils located within the vicinity of the generators contained PCBs exceeding the ADEC Method Two cleanup criterion of 1 mg/Kg. DRO and RRO concentrations were also above the cleanup level required for land transfer to the State of Alaska (2,000 mg/Kg). The stained soils are cohesive and extend less than 1.5 feet into the pad surface. It is estimated that approximately 113 ft^2 of impacted soil is present at this site with a total in-place volume of 4 cubic yards (yd^3) (HCG 2005).

2.5.5.3 Known or Potential Routes of Migration

The occurrence of PCBs and petroleum products is probably limited and confined to the gravel pad area near the generators and north of the building. PCBs are relatively insoluble and tend to bind to soil particles; therefore, the potential for transport is considered to be minimal. The PCBs would not have traveled in surface water runoff except if the flow was strong enough to entrain soil particles. This is unlikely considering the low surface gradient at ST005. DRO and RRO compounds are also bound to the fine-grained material in the gravel and lack significant percentage of water-soluble or volatile compounds.

611 CES
PRIDE IN PROGRESS

BULLEN POINT SRRS

GENERATOR ROOM AREA (ST005)
SUMMARY OF SAMPLE LOCATIONS

BULLEN POINT, ALASKA

PROJECT NO: 9702-041

DATE: 3-26-07

FIGURE NO: 2-3

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Table 2-1 ST005 Summary of Sample Results

Media	Analyte	Screening Criteria: 18 AAC 75 Cleanup Level (Arctic Zone) for Soil[1]	2001 Clean Sweep Survey Maximum Concentration[2,3]	2004 RI/FS Maximum Concentration[2,3]	2004 RI/FS Frequency of Detections[4]
Soil (mg/Kg)	**Fuels**				
	GRO	1,400	NS	393 R*	1/1
	DRO	2,000	NS	5,420 R*, M	2/2
	RRO	2,000	NS	**14,200 J**	2/2
	VOCs				
	Benzene	13	NS	U (0.045)	0/1
	Ethylbenzene	89	NS	U (0.169)	0/1
	Toluene	180	NS	U (0.169)	0/1
	Xylene (total)	81	NS	7.61 R*	1/1
	PCBs	1	**2.87**	NS	NA

Notes

Bold and shaded values indicate an exceedance of the applicable screening criteria.

1- The cleanup level is a requirement of land transfer to the State of Alaska at Bullen Point. The listed cleanup levels apply to gravel fill areas (pads). The soil cleanup levels for native soils (peat or tundra) are Method Two Cleanup Levels for the Arctic Zone (18 AAC 75.341, Table A2). Therefore, the DRO and RRO cleanup level for native soils is 12,500 and 13,700 mg/kg, respectively.

2- For soil/sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.

3- 2001 data taken from the Year 2001 *Clean Sweep Environmental Survey Report, Bullen Point SRRS, Alaska* (USAF 2002).
2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).

4- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

* - Data was rejected due to the hold time being missed by 24 hours; concentration may be biased low.

Abbreviations

"--"	Screening criteria does not exist for this compound	PQL	Practical Quantitation Limit
NS	Not Sampled	M	Matrix effect noted
NA	Not Applicable	R	Rejected data
J	Estimated value	VOC	Volatile organic compounds
mg/Kg	milligrams per kilogram	U	Compound not detected w/PQL in adjacent parentheses
PCBs	Polychlorinated biphenyls		

Furthermore, the oil is located near the pad surface and is not in contact with surface water or the water table. Neither free product nor dissolved phase transport is likely.

2.5.6 Conceptual Exposure Model

A conceptual exposure model was developed to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. These pathways are presented in Figure 2-4, based upon current and reasonably likely future land uses and the potential beneficial use of surface water at ST005.

For purposes of evaluating exposure pathways, it was assumed there are no current site residents on the Bullen Point SRRS. Current site use is limited to periodic site workers, and occasional recreational or subsistence uses by residents of Kaktovik. Future exposure pathways assume the Bullen Point SRRS facility is inactive.

Conceptual human health and ecological site models for ST005 are contained in Figures 2-4 and 2-5, respectively. The accidental ingestion of contaminated soil is considered the most probable exposure pathway at ST005. Groundwater is not a current or future source of drinking water at Bullen Point. There is minimal potential for contaminants to migrate from the soils at ST005 to surface water. Vertical migration is limited by the presence of permafrost. In general, air

transportation is not a significant pathway of exposure because PCBs and residual oils (RRO) are nonvolatile.

In addition, PCBs are persistent and have the potential to bioaccumulate. If aquatic or terrestrial organisms were exposed to the contaminated soil, the PCBs could be ingested. The PCB-contaminated soil is unlikely to enter aquatic environments because they are located in a stable environment removed from surface water bodies. Some types of terrestrial animals such as borrowing ground squirrels could potentially come into contact with the PCB-contaminated soils. The PCBs could then travel up the food chain and eventually be ingested by humans. This risk is low, however, because only occasional recreational and subsistence activities occur in the vicinity of Bullen Point SRRS.

Residents of regional villages (e.g. Kaktovik) utilize the area for subsistence uses. Future land use would be difficult to control due to the remote location. Although future residential land use is considered unlikely at ST005, it has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure, as described within this DD.

2.6 Current and Potential Future Land and Resource Uses

2.6.1 Land Use

The current land use of ST005 is primarily industrial, and associated with operation and maintenance of the SRRS. As the lead agency, the USAF has the authority to determine the future anticipated land use of ST005. After considering input from the State of Alaska and local community, the USAF has determined that the most likely future land use of ST005 is industrial. This determination is made considering the following assumptions:

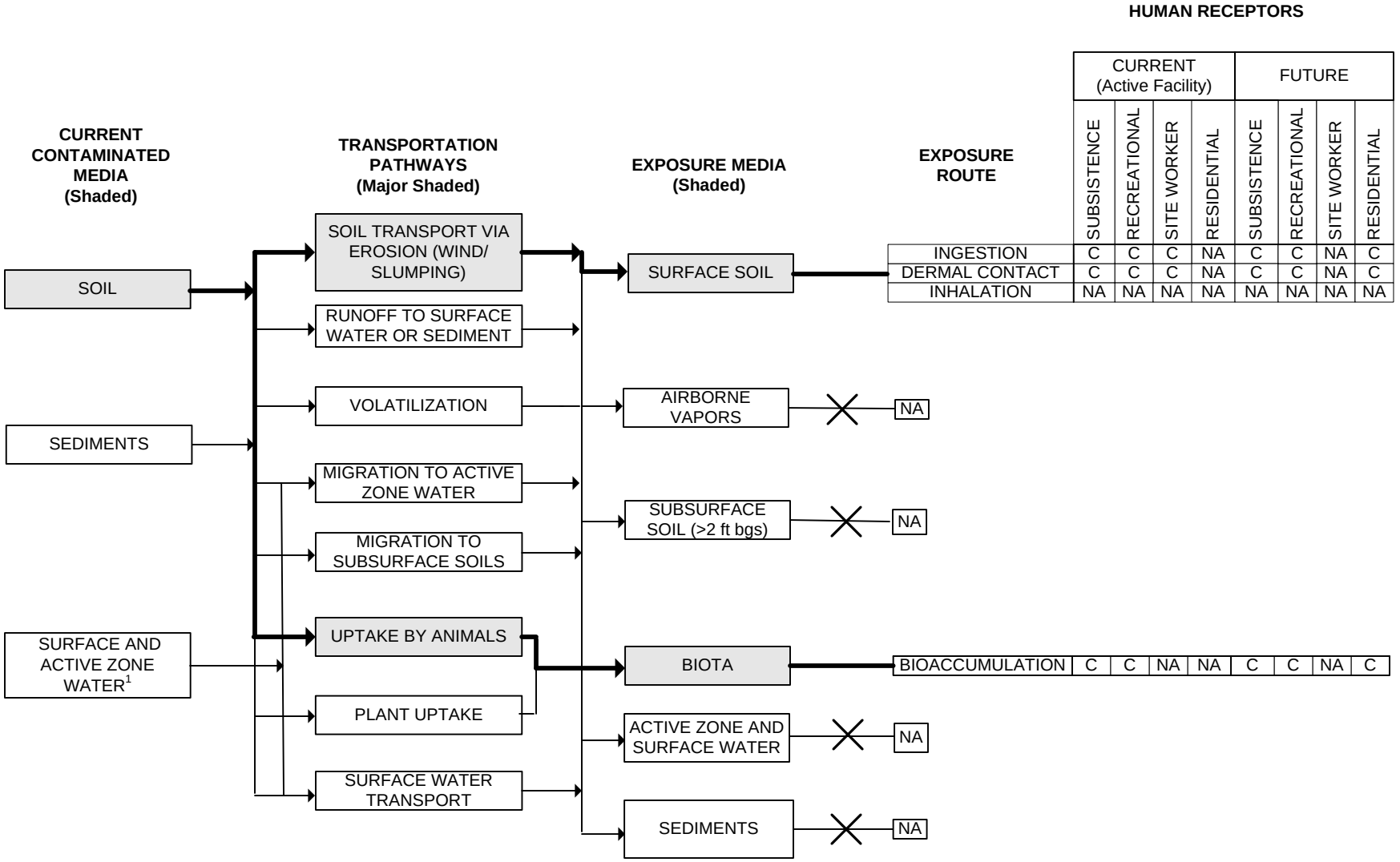
- USAF intends to transfer the land to the BLM and eventually the State of Alaska
- Based on its location, future use of the transferred property may include industrial uses associated with supporting the oil and gas industry

The current land use of adjacent/surrounding land is subsistence and limited recreational activities. Consequently, portions of the installation may be used by subsistence hunting parties. Access to the area is limited, and no facilities or accommodations are available locally. The area immediately surrounding the platform and module train is sparsely vegetated gravel pad. The building will be removed as part of the Clean Sweep Program. Future land use at Bullen Point SRRS is unlikely to be residential due to its remote location. Future use of the property transferred to the State of Alaska may include industrial purposes associated with oil and gas exploration.

2.6.2 Ground and Surface Water Uses

The gravel pad has no permanent water bodies but does have several low-lying areas, which accumulate water on a temporary basis. There is a freshwater wetland immediately north of the tank farm that drains northeast into the lagoon. The wetland appears to be habitat for local area waterfowl as described in Section 2.5.3. Groundwater is not a current or future source of drinking water at Bullen Point SRRS.

Figure 2-4 Human Health Conceptual Site Model for Site ST005



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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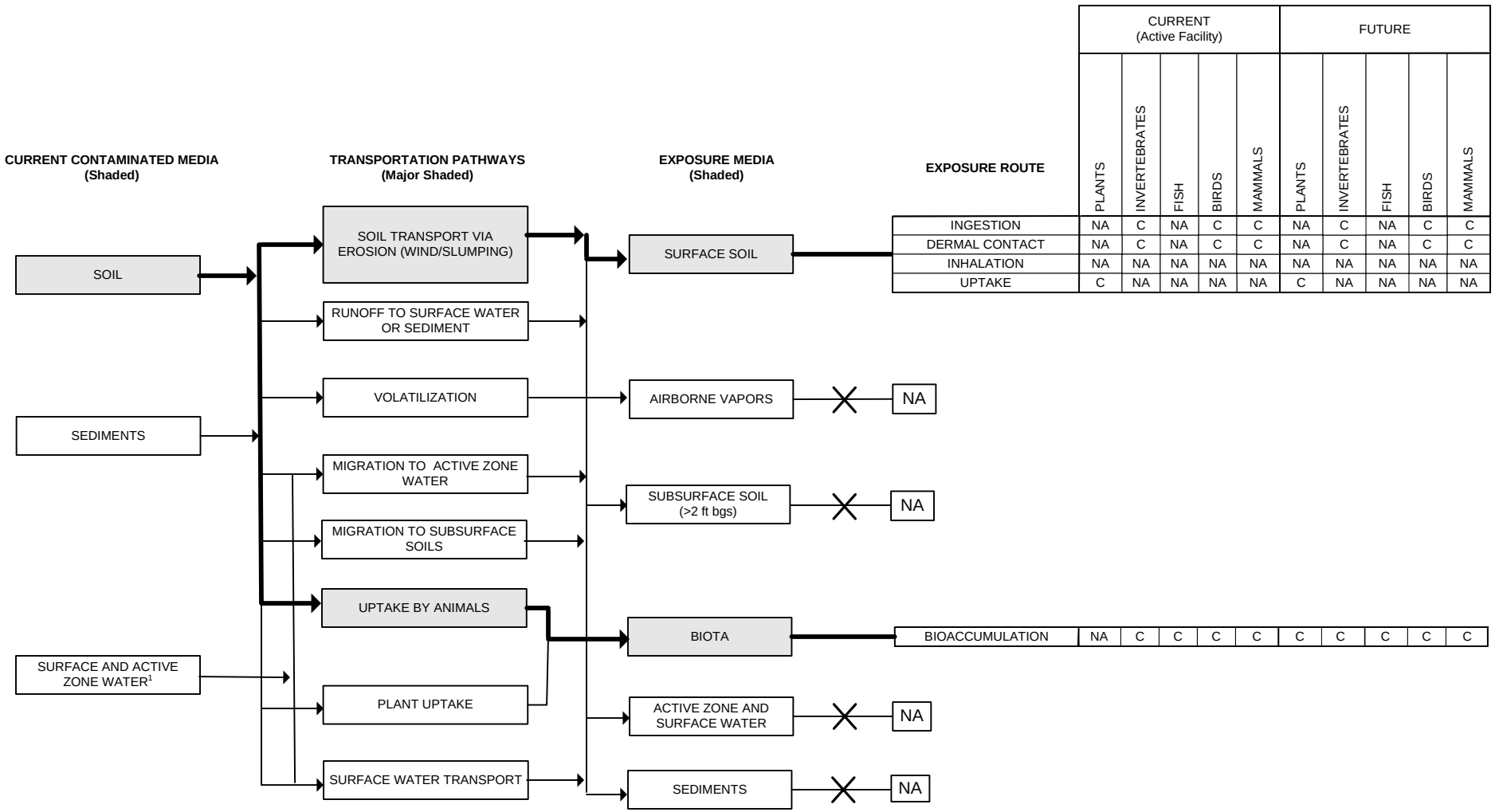
Figure 2-5 Ecological Conceptual Site Model for Site ST005



[1] Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable IC = Insufficiently Characterized

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2.7 Summary of Site Risks

During the 1993 RI, only the POL Tanks Area at ST005 was suspected of having contamination; therefore, the Generator Room Area was not included in the baseline human health and ecological risk assessment. Subsequent sampling at the Generator Room Area performed during the 2001 Clean Sweep Survey and the 2004 RI identified PCBs, DRO and RRO as the contaminants of concern (COCs). This section describes the COC identification and evaluation process. Cumulative carcinogenic and noncarcinogenic risk attributed to the presence of PCBs at ST005 is also presented and discussed.

2.7.1 Identification of Chemicals of Concern

This section identifies those chemicals associated with unacceptable risk at the site and that are the basis for the proposed remedial action. The data used in the risk calculations was deemed to be of sufficient quality and quantity for its intended use.

The sampling results from the remedial investigation conducted at ST005 were compared against screening criteria to determine whether there were COCs that require remedial actions to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two cleanup levels for the Arctic Zone. Method Two cleanup levels have been established for specific chemicals (listed in 18 AAC 75.341, Tables B1 and B2) and are protective of long-term exposures under residential land use scenarios. Method Two cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 (1×10^{-5}) and a noncarcinogenic risk standard or hazard index of 1.0, set forth in 18 AAC 75.325(h).

These screening criteria are extra protective of human health and the environment. They were selected in accordance with the current and projected land use at the site as described in Section 2.6. Criteria protective of people using the site for residential purposes were used to screen the data, even though there is no current or planned residential land use at the site.

A chemical was considered a COC if it exceeded the screening criteria, unless further evaluation indicated the contaminants posed little risk. The detection frequency, range of detected concentrations, and the exposure point concentrations (EPCs) for chemicals and media of concern are presented in Table 2-2.

Table 2-2 Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Media	Chemical of Concern	Concentration Detected (mg/Kg)		Frequency Of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
Soil On-site – Direct Contact	PCBs	0.528	2.87	3/3	2.87	Maximum Concentration
Key PCBs – Polychlorinated Biphenyls Data is taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005)						

2.7.1.1 Risk Characterization

The carcinogenic risks and noncarcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land use settings. Cumulative risks for all relevant pathways and populations are also described. These risk estimates are summarized in Tables 2-3 and 2-4. The results of the cumulative risk calculations are interpreted within the context of the ADEC risk management standards in accordance with 18 AAC 75.325(g).

When applying Method Two cleanup levels for a site, 18 AAC 75.325(g) states that the risk from hazardous substances cannot exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0. As specified in 18 AAC 75.340(k), chemicals that are detected at greater than or equal to 1/10 of the Method Two ingestion or inhalation cleanup levels must be included when calculating cumulative risk. Therefore, as part of the screening process, contaminants exceeding 1/10 the ADEC Method Two cleanup levels were identified and their maximum concentration used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002).

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's likelihood of developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., 1×10^{-6}). An excess lifetime cancer risk of 1×10^{-6} indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a hazard quotient (HQ).

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

Where: CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely.

The Hazard Index (HI) is generated by adding the HQs for all COCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI < 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI > 1 indicates that site-related exposures may present a risk to human health.

At ST005, the excess cancer risk under a residential exposure scenario was 5×10^{-6} and the noncancer hazard index under the same scenario was 1.0. These cumulative risk values do not account for additional risk due to the potential for PCBs to bioaccumulate in the food chain.

The current site conditions meet the ADEC risk management standards (risk from hazardous substances does not exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0) for residential land use. However, there is uncertainty regarding long term risk based on the potential for PCBs to bioaccumulate. In addition, the presence of soil with PCBs above the Method Two cleanup level prevents ADEC site closure and transfer of the land to the State of Alaska.

Table 2-3 Risk Characterization Summary - Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
			Inhalation	Dermal	Ingestion	Cumulative Risk
Soil	Soil On-Site -Direct Contact	PCBs	3×10^{-8}	N/A	5×10^{-6}	5×10^{-6}
					Soil risk total =	**5×10^{-6}**
Groundwater						**N/A**
					Ground-water risk total =	**N/A**
					Total Risk[1]=	**5×10^{-6}**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the total risk at ST005 is 1×10^{-5}. Please see Table D-7 in Appendix D for more detail.

Key
PCBs – Polychlorinated Biphenyls

Table 2-4 Risk Characterization Summary - Non-Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Primary Target Organ	Non-Carcinogenic Hazard Quotient			
				Inhalation	Dermal	Ingestion	Cumulative Hazard Index
Soil	Soil On-Site -Direct Contact	PCBs	Eyes, skin	N/A	N/A	1.0	1.0
						Soil Hazard Index Total =	**1.0**
Groundwater							**N/A**
						Ground-Water Hazard Index Total =	**N/A**
						Receptor Hazard Index[1] =	**1.0**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the hazard index at ST005 is 2.5. Please see Table D-7 in Appendix D for more detail.

Key
PCBs – Polychlorinated Biphenyls

2.7.2 Summary of Ecological Risk Assessment

As previously discussed, the Generator Room Area at ST005 was not included in the baseline ecological risk assessment as no contamination was suspected at the time. Additional investigation at the site in 2001 and 2004 indicated that the likely extent of contamination is relatively small given the low concentration of PCBs detected; therefore, the risk of exposure is low and an ecological risk assessment is not considered necessary.

2.7.3 Basis for Action

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

2.8 Remedial Action Objectives

Remedial action objectives (RAOs) provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives which will be presented in the next section.

The RAOs for ST005 are:

- Protect human health and the environment under both current and future conditions by lowering the contaminant levels and/or the exposure routes;
- For human health, prevent inhalation and ingestion of soil with PCB concentrations greater than the preliminary remediation goal of 1 mg/Kg

Although future land use is anticipated to remain industrial, in order to meet the requirements for land transfer these RAOs were developed and based on a residential exposure scenario.

2.9 Description of Alternatives

The remedial alternatives considered for ST005 were presented in the RI/FS Report (USAF 2005) and are summarized in Table 2-5 below.

Table 2-5
Summary of Remedial Alternatives Evaluated for ST005

Alternative Designation	Alternative Description
1	No Action
2	Land Use (Institutional Controls)
3	Solidification
4	Source Removal and Onsite Treatment via Thermal Desorption
5	Source Removal and Offsite Disposal (landfilling)

Previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) served as the basis for this evaluation (Arctic Slope Construction [ASCI] 1998; URS 2002). These studies found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003). Details of the remedy components for each alternative are described in the following section.

2.9.1 Description of Remedy Components

A total of 5 alternatives were developed to address remediation at ST005. This section provides a summary overview of the components of those alternatives.

Alternative 1: No Action

- No response action taken
- This alternative would include performing a site-specific risk assessment to potentially close the site via site specific cleanup levels

Alternative 2: Land Use (Institutional Controls)

- Land use restrictions maintained in the property records and signage
- Control of site access using fencing
- Long term monitoring and maintenance of controls by the property owner

Alternative 3: Containment

- PCB-contaminated soil would be excavated
- Excavated soil would be solidified with a cement grout or other proprietary-like additive using large mechanical mixing equipment to encapsulate the PCBs. Treated soil would be returned to the site.
- Institutional controls in the form of signage and fencing may be required
- Long-term monitoring (e.g. site inspections) required by the property owner

Alternative 4: Source Removal and Onsite Treatment

- Excavate PCB-contaminated soil and treat onsite with a high temperature thermal desorption unit
- Recovered PCBs sent to treatment, storage and disposal (TSD) facility in lower 48 states
- Water separated from soil would be discharged onsite if it meets ADEC criteria
- Air vapors produced during treatment process would be treated to destroy or recover contaminants

Alternative 5: Source Removal and Offsite Disposal

- Excavate PCB-contaminated soil and ship to a TSD facility permitted to accept the waste

2.10 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for ST005 were evaluated using the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria are as follows:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration.

2.10.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks

posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

All of the alternatives, except the No Action alternative are protective of human health and the environment by eliminating, reducing, or controlling risks posed by the site through treatment of soil contaminants, engineering controls, and institutional controls.

Alternative 2 would reduce exposure due to direct contact or soil ingestion; however future releases due to erosion would not be prevented. Alternative 3 would prevent exposure to contaminated soils as long as the solidification medium (concrete or other additive) remained intact. Alternatives 4 and 5 would eliminate exposure to contaminated soils as they would be permanently removed or treated.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

All of the alternatives, except the no action alternative, are compliant with ARARs.

All of the alternatives, except the no action alternative have common ARARs associated with soil cleanup standards for PCBs (18 AAC 75.341, Table B2, Arctic Zone). Alternative 4 has additional permit requirements associated with operating an on-site treatment system, including meeting emissions standards.

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once

clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 provides little long-term effectiveness because PCBs would remain in place and there is a potential future exposure to humans and the possibility of PCBs entering the food chain. Alternative 2 only provides partial reduction in the risk to humans by limiting access to PCB-contaminated soil, future releases of PCBs should the soil erode would not be prevented. Alternative 3 is effective if maintained, but the long-term stability of the concrete is uncertain in an arctic climate. Alternatives 4 and 5 both remove the PCB-contaminated soil and prevent future human exposure. Alternative 4 provides the greatest long-term effectiveness and permanence of all the options as the PCBs are destroyed during the thermal desorption process.

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

Alternatives 1 and 2 do not include treatment as a component of the remedy. Therefore, these alternatives would not reduce the toxicity, mobility, or volume of contamination at the site.

Alternative 3 would reduce the mobility of the PCBs through encapsulation in the treatment matrix (concrete or other additive); however, the toxicity or volume of the PCBs would not be reduced. Alternatives 4 and 5 both provide permanent reductions in the toxicity, mobility, or volume of waste at the site as the PCB contaminated soil is removed. However, Alternative 4 meets the statutory preference for treatment.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1, No Action, would not be an effective alternative because current risks from direct contact would continue to exist. Alternatives 2 and 3 are anticipated to be completed during one construction season; however, inspection and necessary maintenance of the institutional controls and containment cap would be long-term. Alternatives 4 and 5 can also be completed during one construction season; however during onsite treatment of the PCB soils, there is some risk of adverse air emissions for Alternative 4.

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is technically and feasibly simple to implement. Alternative 2 would be simple to implement, but long-term maintenance would be required. Alternative 3 uses an unconventional technology and construction techniques for Alaska. Long-term monitoring would be required, which would be difficult at a remote site. Alternative 4 requires a large and sophisticated treatment unit that is not readily available in Alaska. In addition, a large volume of fuel would be needed to operate the unit and equipment breakdowns are possible. Alternative 5 requires relatively common shipping practices and permitted disposal facilities are readily available.

2.10.7 Relative Cost

Alternative 5 is likely to be the lowest cost alternative because the USAF is expecting to leave Bullen Point. Alternative 2, land use controls, is potentially the lowest cost alternative while the USAF has an active presence at Bullen Point. However, when the USAF no longer has an active presence, monitoring of LUCs (Alternatives 2 and 3) is likely to be relatively expensive compared to those alternatives that do not require monitoring. Alternative 4, source removal and onsite treatment, is the most expensive alternative due to the high cost of shipping the unit and fuel to the remote site. Alternative 1 (no action), would have costs associated with it comparable or greater than Alternative 4. If Alternative 1 were selected this would require the development and approval of an expensive site-specific risk assessment in order to allow closure of the site in accordance with Alaska state regulations.

2.10.8 State/Support Agency Acceptance

The State has expressed its support for Alternative 4 or 5. The State does not support Alternatives 1, 2 and 3 as the site would not meet the conditions for land transfer.

2.10.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 5. Although no specific comments were received regarding the proposed remedies at ST005, based on comments from other sites in the vicinity Alternatives 1, 2 and 3 are not likely to be accepted as adequately protective. No specific comments have been received regarding Alternative 4.

2.11 Principal Threat Wastes

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater or air, or that acts as a source for direct exposure. Pursuant to the EPA Fact Sheet, A Guide to Principal Threat and Low Level Threat Wastes, Publication (9380.3-06FS November 1991) principal threat wastes typically have a potential cancer risk of 10^{-3} or greater, while low toxicity source material presents an excess cancer risk near the acceptable risk range. There are no principal threat wastes at ST005 because the cancer risk attributed to PCBs in soil is 5×10^{-6}.

2.12 Selected Remedy

The primary indicator of remedial action performance will be satisfying the RAOs for ST005 and protecting human health and the environment. Performance measures are defined herein as the RAOs (see Section 2.8 – Remedial Action Objectives) plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for ST005.

The remedy for ST005, Alternative 5 – Source Removal and Offsite Disposal, was selected based upon best overall ability to protect human health and the environment, implementability

and cost. This section describes the selected remedy and also provides specific performance measures for the selected remedy.

Remedy selection is based on the detailed evaluation of remedial alternatives presented in the FS (USAF, 2005). This remedy is protective of human health and the environment as the concentrations of PCBs will be below applicable cleanup levels.

The USAF is responsible for implementing, maintaining, and monitoring the remedial action identified herein for the duration of the remedy selected in this DD. The USAF will exercise this responsibility in accordance with CERCLA and the NCP.

2.12.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternative for ST005 is Alternative 5 – Source Removal and Offsite Disposal. The USAF and ADEC believe that 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. The remedy is expected to satisfy the following statutory requirements of CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Toxicity, mobility or volume reduction
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State agency acceptance
  - Community acceptance

A comparative analysis among alternatives for ST005 found Alternative 5 to be the preferred remedial action alternative for addressing the small volume of soil with PCB exceedances and meeting the conditions for land transfer. Due to high mobilization and field support infrastructure costs, additional sampling to delineate the PCB contamination at the site will be performed during commencement of Clean Sweep demolition activities in 2007.

Excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure and therefore, provides the best balance of tradeoffs with respect to the balancing and modifying criteria. The other alternatives have deficiencies. Treatment of the soil onsite is more expensive than offsite disposal, and does not provide significantly greater protection of human health and the environment. A remedy with institutional controls would be expensive and hard to maintain at this remote and unmanned location, and would prevent land transfer. Solidification of the soil is unlikely to provide long term protection, and is more expensive than offsite disposal given the small soil volume. The no action alternative was rejected because it failed to meet the threshold criteria of protection of human health and the environment. In addition, the no action alternative is rejected as not being in compliance with State of Alaska regulations.

2.12.2 Description of the Selected Remedy

Soil with PCBs above 1 mg/Kg at the Generator Spill area will be excavated and disposed of at a TSD facility consistent with the Off-Site Rule (40 CFR 300.440). The estimated volume of PCB contaminated soil above the cleanup level is 4 cubic yards. Petroleum contaminated soil (DRO and RRO concentrations greater than 2000 mg/Kg) remaining after the removal of the PCB contaminated soil will be addressed under a separate Corrective Action Plan.

Additional sampling will be performed at ST005 to delineate the extent of PCB contamination prior to or concurrently with the removal action. Contaminated soil removal should be conducted prior to building demolition to the extent practical to avoid dispersion of the contaminated soil by the demolition crew and equipment.

The Clean Sweep Program will, in its work plan for the site demolition, include the remediation of soils contaminated with petroleum above the site transfer criteria.

It is important to note that the remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to the remedy as described in this DD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or DD amendment.

2.12.3 Summary of Estimated Remedy Costs

Table 2-6
Cost Estimate Summary – Capital Costs for Remedy Component Five

Description:
An estimated 7 tons (5 CY) of low-level PCB-contaminated soil (1 < PCBs <= 50 mg/Kg) would be excavated from ST005 (Generator Room Spills area), barged to Deadhorse, and then trucked to Anchorage for transport to and disposal at a TSDF in the Pacific Northwest. This soil cannot be treated or disposed of in Alaska due to the high concentration of petroleum (DRO >1,000 and RRO >11,000 mg/Kg), and the presence of PCBs (>1mg/Kg). PCB concentrations in the soil are less than 10 mg/Kg. The vertical and horizontal extent of PCB contamination at this site is not sufficiently characterized and additional sampling is recommended prior to soil removal to delineate contamination. The estimated soil volume for removal may change.

LABOR

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor - Construction Management					
Sr. Construction Manager	per hour	$ 139.09	1	1	$ 139
Administrator	per hour	$ 62.12	1	1	$ 62
Superintendent	per hour	$ 87.32	1	1	$ 87
SSHO/CQC	per hour	$ 80.26	8	1	$ 642
Environmental Scientist (planning & reporting)	per hour	$ 103.39	50	1	$ 5,170
Waste Coordinator	per hour	$ 106.16	16	1	$ 1,699
Local Craft DB Labor (Excavation, Containerization, and Shipping)					
Operator Gp 1	per hour	$ 59.70	17	1	$ 1,015
Operator Gp 1 OT	per hour	$ 81.75	8	1	$ 654
Labor Gp 1	per hour	$ 50.53	17	2	$ 1,718
Labor Gp 1 OT	per hour	$ 67.55	8	2	$ 1,081
				SUBTOTAL	$ 12,266

EQUIPMENT

ITEM	Units	Unit	Rate	Quantity	Extension
Forklift (60 ton) for handling filled containers on loading end	1	Month	$ 7,000	0.07	$ 500
Trailer to move filled containers from excavation site to staging area	1	Month	$ 2,000	0.07	$ 143
Excavator, EX 400	1	Month	$ 15,000	0.07	$ 1,071
Wheeled Loader - Cat 988 (setup w/ forks, fork extension & bucket)	1	Month	$ 15,000	0.07	$ 1,071
Utility Vehicle, 6 wheeler, crew / tools transport	1	Month	$ 9,000	0.07	$ 643
			Profit	8%	$ 274
				SUBTOTAL	$ 3,703

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	diesel/gas	gallon	$ 4	14	$ 56
PPE/Safety	PPE/Safety	manday	$ 35	12	$ 420
Per diem	per diem	manday	$ 250	12	$ 3,000
			Profit	8%	$ 278
				SUBTOTAL	$ 3,754

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Barging Soil to Deadhorse	Barging	Ton	$ 71	7	$ 481
Liner sacks	Containers	ea	$ 635	1	$ 635
Transport to and Disposal of PCB soil in Oregon TSDF	Barge/Truck/Tip Fee	Ton	$ 200	7	$ 1,356
Trucking Soil from W. Dock to Anchorage	Trucking	Ton	$ 100	7	$ 678
Test Field Screening (PCBs)	Immunoassay	ea	$ 25	9	$ 225
Chemical Lab Analysis - Confirmation and Waste Characterization (PCBs)	Chemical analysis	ea	$ 85	5	$ 425
Lab analysis for excavation confirmation (DRO/RRO, GRO/BTEX)	Chemical analysis	set	$ 90	2	$ 180
			Profit	8%	$ 318
				SUBTOTAL	$ 4,299

COST SUMMARY

COST		$ 24,022
Project Management	5.0%	$ 1,201
COST ESCALATION	6.0%	$ 1,513
	TOTAL	$ 26,737

SUBTOTALS

LABOR	$ 12,266
EQUIPMENT	$ 3,703
MATERIALS	$ -
ODC	$ 3,754
SUBCONTRACT	$ 4,299
TOTAL	$ 24,022

Assumptions:
It is assumed that the soil will be shipped in 9.5 cubic yard liner sacks holding 20,000 pounds (10 tons) each. The small volume of soil to be removed at this site will require the use of hand shovels for soil excavation. It is assumed that it will take 4 hours to load, seal, and stage for transport the liner sack after the soil has been excavated. This load rate produces an estimated 2 days to excavate, fill, and stage the sack of PCB-contaminated soil. Soil will be excavated directly into the liner sack without stockpiling.
Site specific costs assume work is being done jointly with other contaminated soil remediation efforts, and during Clean Sweep activities. It is assumed that necessary remedial action equipment will already be at Bullen Point for Clean Sweep which eliminates mobilization and demobilization costs.
Screening, confirmation, and stockpile sampling for PCBs are based on EPA's Mega Rule: screening samples are based on a 3-meter grid system with a minimum of 9 screening samples; 3 confirmation samples; and 2 stockpile samples for the first 50 CY, plus 1 stockpile sample for each additional 50 CY.
Confirmation samples for DRO/RRO will be collected at ADEC-recommended intervals of 2 samples for first 250 ft^2 area and one sample for each additional 250 ft^2. The Waste Coordinator will require 1 hour per sack to process transportation and disposal paperwork and additional time supervising the transfer of sacks in Deadhorse. The percentage for Project Management was reduced from EPA's guidance of 10% to 5% for a project of this dollar value (size range) because it is assumed that all the ERP remediation sites at Bullen Point will be addressed together as one project to maximize efficiency.

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, an ESD, or a ROD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.12.4 Expected Outcomes of Selected Remedy

Following completion of the Selected Remedy, ST005 would be available for unrestricted residential land use. It is anticipated that excavation and off-site disposal of PCB and fuel contaminated soils will be completed in one construction season. There is no groundwater present at the site and therefore, no expected future uses for groundwater as a result of the Selected Remedy.

The purpose of this response action is to control risks posed by direct contact and ingestion of soil and minimize migration. The current potential for PCBs to migrate from the site is low; however, PCBs are persistent in the environment and could bioaccumulate in human or ecological receptors. Cumulative risk calculations indicated that the excess cancer risk to humans caused by PCBs in the soil under a residential exposure scenario is 5×10^{-6}. The non-cancer HI is 1.0. These cumulative risks are below the ADEC risk management standards (see Section 2.7.1.1).

Table 2-7
Cleanup Levels for Chemicals of Concern at ST005

Media: Soil
Site Area: ST005
Available Use: Residential
Controls to Ensure Restricted Use (if applicable): N/A

Chemical of Concern	Cleanup Level (mg/Kg)	Basis for Cleanup Level	Risk at Cleanup Level
PCBs	1	18 AAC 75.341, Table B1	Cancer Risk = 1×10^{-5} Noncancer Risk = 1

Notes
mg/Kg – milligrams per kilogram

2.13 Statutory Determinations

Under CERCLA §121 (as required by NCP §300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

The selected remedy, Alternative 5, will protect human health and the environment by permanently removing PCB-contaminated soil from the site. Future risk due to ingestion of animals that may bioaccumulate PCBs is also eliminated or reduced. Implementation of Alternative 5 will not pose unacceptable short-term risks or cross-media impacts.

2.13.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are health-based or risk-management-based numbers that provide concentration limits for the occurrence of a chemical in the environment. Location-specific ARARs restrict activities in certain sensitive environments. Action-specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the RCRA). Offsite shipment, treatment and disposal of excavated contaminated soil invoke action-specific ARARs. Criteria to be considered, or TBCs, are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 2-8 summarizes the ARARs and TBCs for the selected remedy at ST005 and describes how the selected remedy addresses each one.

The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs . The implementation of the remedy is required to meet the substantive portions of these requirements and is exempt from administrative requirements such as permitting and notifications.

Table 2-8
Description of ARARs and TBCs

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Action-Specific	Federal Regulatory Requirement	Soil	Toxic Substances Control Act	Applicable	Contains rules relating to the storage and disposal of PCB remediation waste and the PCB spill cleanup policy.	The selected remedy will comply with these regulations through proper disposal of TSCA regulated wastes.
Action-Specific	Federal Regulatory Requirement	Soil	General Industrial Standards for Workers (29 CFR 1910.210)	Applicable	Outlines required protections for workers.	The selected remedy will comply with these regulations through use of appropriate PPE and training for proper handling of hazardous materials or wastes.
Action-Specific	Federal Regulatory Requirement	Soil	HAZWOPER (29 CFR 1910.120 and 40 CFR 311)	Applicable	Outlines worker protection during hazardous waste cleanup.	All on-site workers will be required to have HAZWOPER certification.
Action-Specific	Federal Regulatory Requirement	Soil	Hazardous Materials Transportation	Applicable	Transportation regulations for shippers and transporters of hazardous materials.	The selected remedy will comply with these regulations through proper packaging and transport of all hazardous waste.
Chemical-Specific	42 USC 9620(a)(4)	Soil	Alaska Soil Cleanup Rules 18 AAC 75.340-341	Applicable	In general, cleanup to 1 ppm PCBs in soil is required.	1 ppm PCBs in order to have closure without institutional controls.

Table 2-8 (continued)

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Location-Specific	Federal Regulatory Requirement	Soil	Native American Grave Protection and Repatriation Act	TBC	Provides for the protection of Native American graves and for other related areas.	No Native American grave sites have been identified at the site; however, procedures for reporting and protection of graves will be followed if encountered during implementation of the selected remedy.
Location-Specific	Federal Regulatory Requirement	Soil	Marine Mammal Protection Act	TBC	Provides for the protection and management of marine mammals and their products. Includes walruses, polar bears, sea otters, whales, porpoises, seals, and sea lions.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Migratory Bird Treaty Act	TBC	Protects any migratory bird; any part, nest, or eggs of any such bird.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Endangered Species Act	TBC	Establishes requirements to protect species threatened by extinction and habitats critical to their survival. Federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*);	The selected remedy will not impact protected species through engineering controls or avoidance measures.

2.13.3 Cost Effectiveness

In the USAF's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for ST005 was demonstrated in the comparative analysis of alternatives (Section 2.10 – Summary of Comparative Analysis of Alternatives) and is summarized in Table 2-9 below. The estimated present worth cost of the selected remedy (in 2006 dollars) is $26,737. In addition, the selected remedy will allow the site to meet the conditions for land transfer to the State of Alaska and permit the USAF to construct a new solid waste landfill at Bullen Point. This landfill would receive nonhazardous waste from the Clean Sweep demolition activities, include building debris from ST005. The ability to construct and utilize an onsite landfill results in significant cost savings to the USAF under multiple programs (ERP, Clean Sweep, and Environmental Compliance).

Present-worth costs were not calculated for the other alternatives as previous studies evaluating remedial alternatives for PCB-contaminated soils at another radar site along the arctic coast (Cape Lisburne LRRS) (Arctic Slope Construction [ASCI] 1998; URS 2002) found that removal and offsite disposal was the preferred alternative for addressing PCB-contaminated soil. These findings were supported by the approved DDs for the sites, which required the PCB-contaminated soil to be shipped off site for disposal (USAF 2003).

Table 2-9
Cost and Effectiveness Summary for ST005

Alternative	Present-Worth Cost[1]	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
1 – No Action		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers. Current risk due to direct contact would still exist.
2 – Land Use Controls		N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers, community and the environment.
3 – Containment		N/A	Reduction in long-term risk as long as solidification matrix remains intact.	No reduction in volume or toxicity. Mobility of waste is reduced while encapsulated.	No short term risk to workers, community and the environment.

Table 2-9 (continued)

Alternative	Present-Worth Cost	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
4 – Source Removal and Onsite Treatment		N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity through high temperature thermal desorption.	Potential short term risk to workers during treatment due to adverse air emissions.
5 – Source Removal and Offsite Disposal	$ 26,737	N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	Reduction in volume, mobility and toxicity by removing PCBs from the site; however, does not meet treatment preference.	No short term risk to workers, community and the environment.
Cost Effectiveness Summary 1 - Preliminary screening of potential alternatives concluded that Alternatives 1-4 were not cost effective for addressing contaminated soils at ST005; therefore, only the present-worth cost for Alternative 5 was presented in the FS. • Alternatives 1 and 4 are not considered to be cost effective. • While Alternatives 2 and 3 are considered to be cost effective, Alternative 5 provides a potentially greater return on investment.					

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The USAF has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP 300.430(f)(1)(i)(B). Although no treatment is being utilized, the selected remedy provides the most effective, long-term solution given the conditions at the site. Offsite landfilling of the PCB-contaminated soil at Bullen Point is protective of human health and the environment, readily implementable, and cost effective in comparison to other alternatives. The equipment required to treat PCBs on site is sophisticated and large, which makes their mobilization and operation difficult and expensive. There is also the risk of air emissions. Offsite treatment would require shipping the soils to the lower 48 states, which is logistically difficult and more costly than disposing of the soils within Alaska or the lower 48 states. The option of solidification would require continued inspections and possibly maintenance. Due to the site location, this maintenance would be logistically difficult and expensive.

The selected remedy manages the potential risks to human health and the environment by permanently removing PCB-contaminated soil from the site.

2.13.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy for ST005 does not satisfy the statutory preference for treatment as a principal element of the remedy because on-site treatment options were not viable given the remote location, limited infrastructure and arctic climate at Bullen Point.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will not be required within five years after initiation of the remedial action to verify that the remedy is, or will be, protective of human health and the environment.

2.14 Documentation of Significant Changes

The Proposed Plan for ST005 was released for public comment on October 17, 2006. The Proposed Plan identified Alternative 5 – Source Removal and Offsite Disposal as the Preferred Alternative for PCB-contaminated soil remediation. The USAF 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.

3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the *Proposed Plan for Eight ERP Sites at Bullen Point Short Range Radar Station*. At the time of the public review period, the USAF had proposed Alternative 5 – Source Removal and Offsite Disposal as the preferred remedy for the POL Tanks and Generator Area (ST005). *No written or verbal comments were received on the Proposed Plan.*

Decision Document
Old Landfill (LF006)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

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Figures

1.0 Declaration

1.1 Site Name and Location

Facility Name: Old Landfill (LF006), Bullen Point Short Range Radar Station (SRRS)
Site Location: Bullen Point, Alaska
CERCLIS ID Number: Not Applicable
Alaska Department of Environmental Conservation (ADEC) Contaminated Site Record Key (reckey) Number: 198931X902548.
Operable Unit/Site: Not Applicable

Bullen Point SRRS is located on the Arctic Coastal Plain at 70°10'N latitude and 146°51'W longitude. The Old Landfill (LF006) is one of eight different sites located at the Bullen Point SRRS being addressed under the U.S. Air Force (USAF) Environmental Restoration Program (ERP). The Bullen Point SRRS is not listed on the National Priorities List.

The Old Landfill (LF006) is an old dump site located approximately 400 feet east of the new radome at 70°10'37.01"N latitude, and 146°50'57.27"W longitude (this location is sample point LF006SS02, which is at the approximate center of the site). LF006 is bordered by a lagoon connected with the Beaufort Sea on its eastern side, and tundra with ponded surface water along its southern and northern sides. The landfill covers an area of approximately 0.6 acres. The site topography and surrounding features are depicted in Figure 2-3.

1.2 Statement of Basis and Purpose

This decision document presents the Selected Remedy for the ERP site Old Landfill (LF006) in Bullen Point, Alaska which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the Administrative Record for this site.

This document is issued by the Department of the Air Force (USAF), as the lead agency. The USAF is managing remediation of contamination at LF006 in accordance with CERCLA as required by the Defense Environmental Restoration Program (DERP). The decision put forth in this document is also in accordance with the requirements of Title 18, Chapter 75, Article 3, of the Alaska Administrative Code (AAC) Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances regulations for the State of Alaska.

As the lead agency, the USAF has selected the remedy. The State of Alaska, through the ADEC concurs with the selected remedy. The U.S. Environmental Protection Agency (EPA) has been given the opportunity to review this document and has chosen to defer to the ADEC for regulatory oversight of the ERP at Bullen Point SRRS.

1.3 Assessment of Site

Soil, sediment and surface water samples were collected from LF006 during a series of remedial investigations (RIs) conducted in 1993 and 2004. During these RIs, CERCLA regulated

hazardous substances were detected. PCBs were detected in 3 out of 8 soil samples, with the highest concentration being 0.648 mg/Kg. Lead was detected in one sediment sample at 130 mg/Kg. Based upon the most current sampling results, the excess carcinogenic risk attributed to PCBs detected at LF006 is 6×10^{-6}. ADEC does not typically require remedial action for PCBs at sites where the excess carcinogenic risk is below 1×10^{-5} or less than 1 mg/Kg PCBs in soil; however, at LF006 there is a substantial risk that PCBs are present at concentrations above regulatory and risk-based cleanup standards. In other words, it is likely that PCBs are present in the soil at LF006 at concentrations above 1 mg/Kg.

Erosion of the landfill is a potential future migration pathway that could expose receptors to hazardous substances within the landfill. The average rate of erosion along the eastern point of the landfill is 0.7 feet per year. If this rate of erosion continues, approximately 30 feet of the landfill will be eroded over the next 50 years. This would expose a significant quantity of landfill debris and soil to the lagoon. In addition, PCBs are persistent and have the potential to bioaccumulate. If aquatic or terrestrial organisms were exposed to the contaminated soil, the PCBs could be ingested. If the landfill erodes, PCB-contaminated soil could enter into surrounding surface water bodies. The PCBs could then travel up the food chain and eventually be ingested by humans.

Based on the findings of the RI and other key documents that can be found in the Administrative Record File for Bullen Point SRRS, the CERCLA response action selected in this Decision Document is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

The USAF is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 Description of Selected Remedy

Remedial alternatives for LF006 were developed and evaluated through a Feasibility Study (FS) (USAF 2005). Based on the results of the FS, the USAF selects the following remedy:

- Excavation/removal of contaminated soil and related debris from the Old Landfill (LF006);
- Material from the excavation suitable for disposal under State of Alaska solid waste regulations will be disposed of in a new landfill near the existing gravel runway at Bullen Point; and
- Soil contaminated with PCBs above 1 mg/Kg will be transported and disposed of consistent with the Off-Site Rule (40 CFR 300.440).

LF006 is one of eight ERP sites at Bullen Point SRRS. The overall cleanup strategy for Bullen Point involves source management and migration and exposure controls. The selected alternative for LF006 fits into the overall site management plan by source reduction in the source area without the need for institutional controls. The cleanup plan for Bullen Point includes the following:

- Cleaning up petroleum contamination in accordance with Alaska's oil and hazardous substance pollution control laws.
- Cleaning up the soil contamination other than petroleum hydrocarbons to 18 AAC 75.341 Method Two cleanup levels for the Arctic Zone.
- Removing the inactive facilities that have no utility (value) to the future landowner (i.e., completion of Clean Sweep Program at Bullen Point)

No source materials constituting principal threats exist at the site, because PCBs in soil at the site are at concentrations that present an excess cancer risk near the acceptable risk range of 10^{-6}.

1.5 Statutory Determinations

The selected remedy for LF006 is protective of human health and the environment, complies with promulgated requirements that are applicable or relevant and appropriate to the remedial action, and is cost effective.

The selected remedy represents the maximum extent to which permanent solutions can be used in a practicable manner at the site. It provides the best balance of trade-offs in terms of balancing criteria while also considering the bias against offsite treatment and disposal and considering state and community acceptance.

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site whenever practicable (40 CFR 300.430[a] [1] [iii] [A]). The selected remedy for LF006 does not satisfy the statutory preference for treatment as a principal element of the remedy because excavation and offsite disposal is the most cost-effective and readily implementable approach to reduce the risk posed by PCBs and obtain site closure. Because this remedy will not result in hazardous substances, pollutants, or contaminants remaining on-site above levels that allow for unlimited use and unrestricted exposure, a five-year review will not be required for this remedial action.

Any petroleum contamination will be addressed in accordance with Alaska's oil and hazardous substance pollution control laws.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this DD (Section 2).

- List of chemicals of concern (COCs) and their respective concentrations (Section 2.7.1, Table 2-2)
- Baseline risk represented by the COCs (Section 2.7.1.1, Tables 2-3 and 2-4)
- Cleanup levels established for COCs and the basis for these levels (Section 2.12.4, Table 2-8)
- How source materials constituting principal threats will be addressed (Section 2.11)
- Current and reasonably anticipated future land use assumptions and current and potential future beneficial uses of ground water used in the baseline risk assessment and DD (Section 2.7.1.1)
- Potential land and ground water use that will be available at the site as a result of the selected remedy (Section 2.6, 2.12.4)

- Estimated capital, annual operation and maintenance (O&M), and total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.12.3, Table 2-6)
- Key factor(s) that led to selecting the remedy (i.e., describe how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision) (Section 2.12)

Additional information can be found in the Administrative Record file for Bullen Point SRRS, Alaska which can be found at http://www.adminrec.com/PACAF.asp?Location=Alaska

Four information repositories are also located in Kaktovik, these include:

- Mayor's Office
- School Library
- Native Village of Kaktovik
- Kaktovik Inupiat Corporation

1.7 Authorizing Signatures

This signature sheet documents the United States Air Force and ADEC approval of the remedy selected in this Decision Document for the Old Landfill (LF006) Bullen Point SRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson

1 OCT 07

BRENT A. JOHNSON
Colonel, USAF
Commander, 611th Air Support Group

Date

John Halverson

8/30/07

JOHN HALVERSON
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

2.0 Decision Summary

The Decision Summary identifies the Selected Remedy, explains how the remedy fulfills statutory and regulatory requirements, and provides a substantive summary of the Administrative Record file that supports the remedy selection decision.

2.1 Site Name, Location, and Description

2.1.1 Regional Setting

Bullen Point SRRS is located at latitude 70°10'N, longitude 146°51'W on the Arctic Coastal Plain on the shore of the Beaufort Sea. The installation consists of 620 acres of low-lying tundra. The nearest populated area is Deadhorse, 38 miles west of the installation. Air travel provides the only year-round access to Bullen Point SRRS, while marine travel provides summer access. Bullen Point SRRS is not connected by road to Deadhorse or any other populated area. The general location of the Bullen Point SRRS is shown on the inset in Figure 2-1.

The weather station closest to Bullen Point is at Prudhoe Bay, 38 miles to the west. Because of a similarity in elevation and proximity to the Beaufort Sea, conditions at Prudhoe Bay should approximate those at Bullen Point. Average annual precipitation recorded at Prudhoe Bay from 1986 to 1999 was 4.26 inches per year, which included 33.1 inches of snowfall (Western Regional Climate Center 2006). Average daily minimum and maximum temperatures in July were 39.7 degrees Fahrenheit (°F) and 55.4°F, respectively. In December, these average temperatures were -19.2°F and -6.6°F, respectively. The extreme recorded temperatures are -62°F and 83°F.

Surficial deposits in the Bullen Point SRRS area consist of sand and gravel near the shoreline and along stream channels; silt, sand, and gravel deposits in the inland low areas; and eolian (wind) silt and fine sand deposits in the upland areas. Vegetated tundra is present above these deposits and consists of low growing plants including mosses, lichens, sedges, and grasses (Arctic Slope Technical Services [ASTS] 1982). Bullen Point SRRS is located in an area of continuous permafrost up to 2,000 feet deep (Lachenbruch 1982). The seasonal active zone layer typically varies from 2 to 5 feet in thickness.

Small streams, discharging into the Beaufort Sea, drain the lakes and wetlands surrounding the Bullen Point SRRS. Drinking water for Bullen Point SRRS was provided by a reservoir south of the facility that was formed by damming a stream. Since operations ceased, the dam has been breached and the reservoir drained (Hoefler Consulting Group [HCG] 2005).

2.1.2 Regional Ecology

Bullen Point provides habitat for a variety of fish, bird and mammal populations commonly found in the northern arctic coast region (USAF 2005). Fish common to the western Beaufort Sea nearshore habitats include four-horn sculpin, Arctic cisco, and Arctic char (ASTS 1982). Eighty-five species of predominantly waterfowl and shorebirds are also found in the area. Marine mammals that have been reported off Bullen Point include beluga and bowhead whales, walrus, polar bears, and ringed and bearded seals. Land mammals such as caribou, foxes, weasels, moose, grizzly bear, wolverine and wolf are also found in the region.

The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.1.3 Facility History and Background

The Bullen Point SRRS is one of many Distant Early Warning (DEW) Line stations located across the arctic region of North America and Greenland. The installation was in operation between 1953 and 1971 and was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to an SRRS, which has operated since 1994. It is unmanned except for period maintenance visits. Operations and support personnel are based out of Elmendorf Air Force Base, located near Anchorage, Alaska.

The Bullen Point SRRS initially consisted of a module train, rotation radar, and support facilities. Presently, facilities include an old, inactive radome; four 30-foot communication antennas; a new radome; a group of eight buildings attached by covered walkways (the module train); two pump houses; a warehouse; seven diesel oil tanks; a 250,000-gallon water storage tank; associated roads and pads; a 3,600-foot gravel airstrip; and a helicopter pad. The inactive structures at Bullen Point SRRS are scheduled for demolition under the Air Force (USAF) Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn would transfer the land to the State of Alaska based on the State's expressed interest in the property.

In addition, the potential advantages of making the property acceptable for land transfer to the BLM, and eventually the State of Alaska, were considered when evaluating the need for remedial action and selecting the appropriate remedial alternative. The State has selected the land as part of its entitlement under the Alaska Statehood Act. However, in its current condition the land is unacceptable to the State. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of DRO in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for RRO in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup level for DRO and RRO in the native soils (e.g., tundra and peat) is the listed Method Two soil cleanup level. At the Old Landfill (LF006), the DRO and RRO cleanup levels are 500 and 2,000 mg/Kg, respectively.
- Removal of contaminated soil, hazardous materials, and solid waste (debris) from the Old Landfill (LF006).
- Removal of inactive facilities that have no utility (value) to the future landowner.

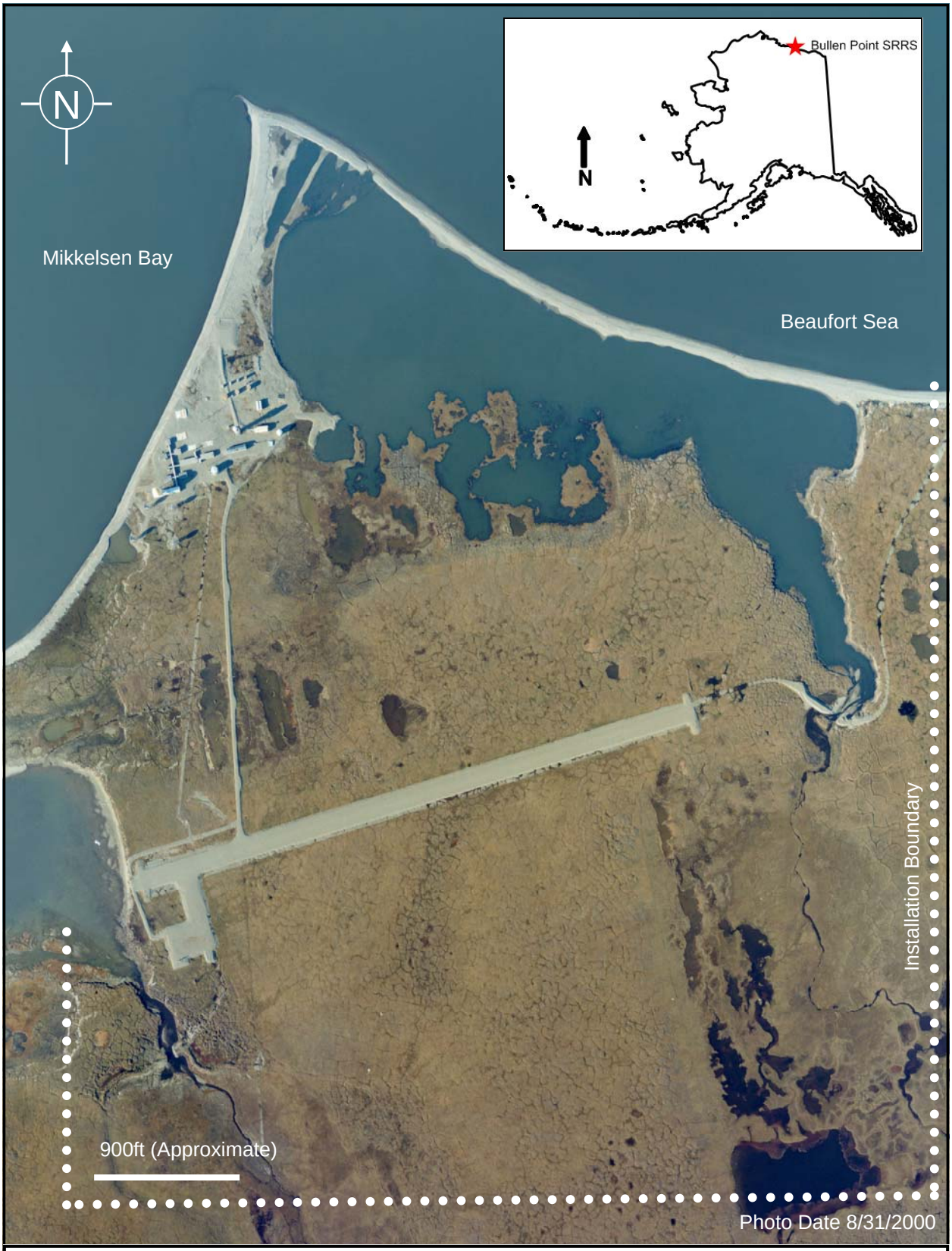

Figure 2-1
Bullen Point SRRS Vicinity Map

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As part of the cleanup at Bullen Point, the USAF will construct a new solid waste landfill at an inland location on its property. The landfill will receive nonhazardous waste from Clean Sweep demolition activities and the cleanup of the Old Landfill (LF006), which is threatened by coastal erosion.

The 2004 RI/FS concluded that the most cost-effective approach to completing all of the USAF objectives under the ERP at Bullen Point, including building demolition and debris removal, was to perform the cleanup activities necessary to make the excess land acceptable for transfer according to State of Alaska requirements. Consequently, six ERP sites were proposed for remedial action.

2.1.4 Facility ERP History

Under the USAF ERP and its predecessor the Installation Restoration Program, environmental investigations have been conducted at the Bullen Point SRRS since 1981. These investigations included preliminary assessments in 1981 and 1986. Environmental samples were collected and limited removal actions performed at Bullen Point SRRS in 1988 as part of a Stage 3 Remedial Investigation/Feasibility Study (RI/FS) at five sites (Woodward Clyde Consultants [WCC] 1990). In preparation for construction activities associated with the SRRS, soils in the construction area were screened for hydrocarbons in 1991 (ENSR 1992, as reported in ICF 1996a). A second, more extensive RI/FS was conducted in 1993 for five sites (ICF 1996a). In an effort to fill data gaps and update previous data, additional sampling occurred in 2004 at Bullen Point SRRS for eight sites (HCG 2005). All eight sites were included in the Proposed Plan and Decision Document process.

Past activities potentially resulting in contaminant release at the Bullen Point SRRS include:

- Spills during the transfer of fuels in and out of storage tanks;
- Leaks from fuel lines, drums, and tanks;
- Spills or leaks of fuel, lubricants, or solvents during vehicle and equipment maintenance activities;
- Spills or leaks from transformers or other electrical equipment containing polychlorinated biphenyls (PCBs); and
- Disposal of wastes and other discarded material containing hazardous substances.

Some of the contaminants encountered during investigations at Bullen Point SRRS are benzene, toluene, ethylbenzene, and total xylenes compounds (BTEX); diesel range organics (DRO); gasoline range organics (GRO); polynuclear aromatic hydrocarbons (PAHs); PCBs; petroleum, oil, and lubricants (POL); residual range organics (RRO); semivolatile organic compounds (SVOCs); metals; and volatile organic compounds (VOCs). Most of these contaminants are the result of fuel or oil spills.

As the lead agency, the USAF has conducted remedial investigation and assessment activities at LF006 in accordance with CERCLA under the Defense Environmental Restoration Program

(DERP) which was established by Section 211 of the Superfund Amendments and Reauthorization Act (SARA) of 1986.

As the support agency, the ADEC provides primary oversight of the environmental restoration actions, in accordance with their contaminated sites regulations (18 AAC 75, Article 3, Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances).

Funding is provided by the Defense Environmental Restoration Account; a funding source approved by Congress to clean up contaminated sites on U.S. Department of Defense (DoD) installations.

2.2 Site History and Enforcement Activities

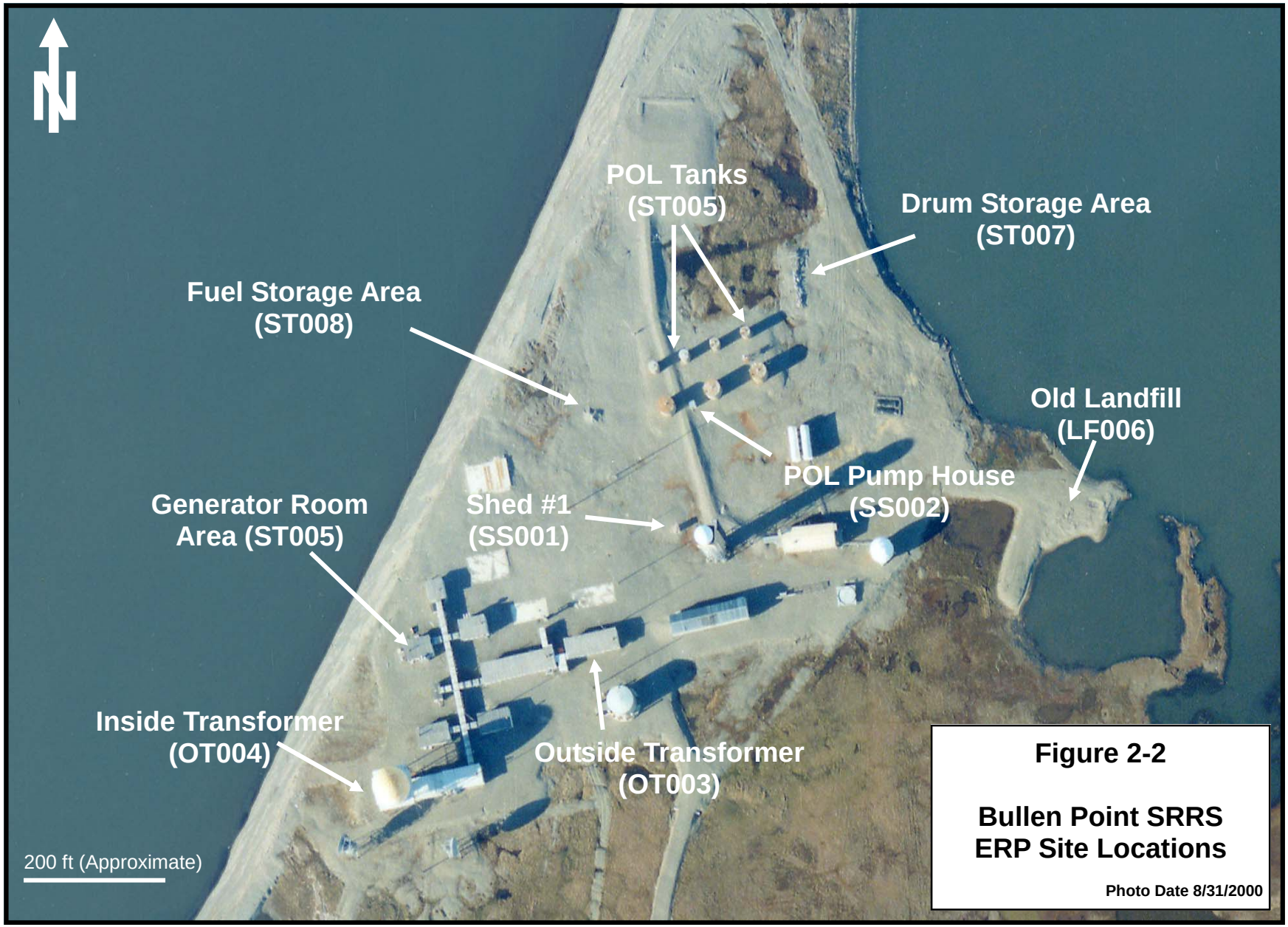
This section provides background information and summarizes the series of investigations that led to the Decision Document (DD). It describes the CERCLA response actions undertaken at LF006.

The Old Landfill (LF006) is an old dump site located approximately 400 feet east of the new radome at 70°10'37.01"N latitude, and 146°50'57.27"W longitude (this location is sample point LF006SS02, which is at the approximate center of the site). LF006 is bordered by a lagoon connected with the Beaufort Sea on its eastern side, and tundra with ponded surface water along its southern and northern sides. The landfill covers an area of approximately 0.6 acres (Figure 2-2).

The landfill received waste from the installation between 1956 and 1971. In 1993, drums and other landfill debris were visible along the edge of the landfill bordering the lagoon. The material had been exposed by shoreline erosion. In August 2000, a large storm event eroded a portion of the landfill and exposed additional debris, including drums and scrap metal.

No land use controls are applicable as part of the selected remedy for this site. In addition, there are no Federal Facility Agreements or state agreements for the Bullen Point SRRS. No sites are listed on the National Priorities List. Hazardous substances regulated under CERCLA have been detected at LF006. There have been no regulatory enforcement activities at the site.

In accordance with USAF policy, to the extent practicable, National Environmental Policy Act (NEPA) values have been incorporated throughout the CERCLA process culminating in this DD. Separate NEPA documentation will not be issued.


N
POL Tanks
(ST005)
Drum Storage Area
(ST007)
Fuel Storage Area
(ST008)
Old Landfill
(LF006)
POL Pump House
(SS002)
Shed #1
(SS001)
Generator Room
Area (ST005)
Inside Transformer
(OT004)
Outside Transformer
(OT003)
200 ft (Approximate)
Figure 2-2
Bullen Point SRRS
ERP Site Locations
Photo Date 8/31/2000

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2.3 Community Participation

NCP Section 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct following preparation of the Proposed Plan and review by the support agency. Components of these items and documentation of how each component was satisfied for LF006 are described below.

Proposed Plan. A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review on October 17, 2006. A public meeting was also held at that time.

Public Comment Period. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. A summary of the public comments and responses to public comments are provided in Section 3 of this decision document. The USAF received no requests to extend the public comment period.

Public Meetings. The USAF held a public meeting in Kaktovik on October 17, 2006 to discuss the Proposed Plan and record verbal comments. No comments were received regarding the Proposed Plan. Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board (RAB) meetings. The RAB consists of representatives from the community and the USAF. A RAB was formed in Kaktovik in 1998 and typically meets quarterly. RABs provide a forum for discussion and exchange of information among federal and state agencies and the community regarding cleanup of a military site. The RAB plays an important role in the decision-making process.

Updated Mailing List and Mailing Events. A mailing list of interested parties is maintained and updated regularly by the Air Force Community Relations Coordinator.

Administrative Record. The administrative record located at the 611 Civil Engineering Squadron (CES) office at the Elmendorf Air Force Base, Alaska, is continually updated and developed. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. An index of documents is included in Appendix A. A website with the administrative record current up through 2003 is also available to the public at:
http://www.adminrec.com/PACAF.asp?Location=Alaska

Information Repository. The information repository is a file containing newsletters, fact sheets, and community relations documents relating to Proposed Plans and response actions for all of the ERP sites at Bullen Point SRRS. Four information repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation.

Management Action Plan. The Management Action Plan (MAP) report is updated periodically and made available to the public in order to provide a summary of all restoration activities in one

document. The most recent MAP was published in 2004 (USAF 2004) and is part of the Administrative Record.

USAF responses to comments received during the public comment period are included in the Responsiveness Summary, which is provided as Section 3 of the DD.

2.4 Scope and Role of Operable Unit or Response Action

There are no operable units at Bullen Point SRRS. However, the overall cleanup strategy for the installation includes source reduction and making the property acceptable for transfer to the BLM and eventually the State of Alaska. The conditions for land transfer were discussed in Section 2.1.2.

A Proposed Plan has been issued for eight ERP sites at Bullen Point, including LF006.

2.5 Site Characteristics

2.5.1 Topography and Stratigraphy

The surface of the landfill is comprised of sandy gravel. The top of the landfill is relatively flat and is approximately 4 to 5 feet AMSL. There are occasional depressions on its eastern surface where the fill has subsided about 1 foot. The edges of the landfill slope downward toward the water surface of the lagoon. The slope of the landfill face is about 2.5 horizontal to 1 vertical. The base of the landfill appears to be constructed on top of the native tundra. Based on the elevation, the thickness of the landfill material including the gravel cover is estimated to be 3 to 5 feet. The gravel cover appears to be approximately 1 foot thick based on soil boring and visual observations.

Erosion is visible along the edge of the landfill boarding the lagoon. Analysis of aerial photography from 1983 to 2001 indicated the shoreline eroded an average of 0.2 to 0.7 feet per year. Coastal erosion was anticipated to continue at this rate or higher based on the area's geology and climatic trends.

2.5.2 Surface and Subsurface Hydrology

This landfill borders the lagoon on its eastern side and wet tundra (wetlands) with ponded surface water along its southern and northern sides. The largest pond is along its southwestern side. Surface water runoff from the landfill flows toward these water bodies.

Based on soil borings, the water table beneath the surface of the landfill is 1 to 3 feet bgs. This corresponds to an elevation of approximately 2 feet AMSL. Permafrost was not encountered in borings up to 3 feet bgs in the landfill area during the 2004 RI, but permafrost is assumed to underlie the landfill given its arctic location. However, the depth to permafrost is probably deeper than more inland locations due to the nearby lagoon. The estimated permafrost depth at the landfill is 5 to 7 ft bgs.

2.5.3 Ecology

The landfill is inactive and there are no known human uses of the immediate area. In its current condition, the landfill is considered poor ecological habit. Its surface is comprised of gravel with

no vegetation. However, the site borders tundra wetlands and the lagoon, which appear to be good ecological habitat for species native to the area. It is not known whether the lagoon contains a transient or permanent fish population. However, it is a large enough water body that it probably supports some fish and other aquatic life at least on a seasonal basis. Waterfowl also frequent the wetlands and lagoon in the summer months.

Regional ecology of the Bullen Point Installation is described in Section 2.1.2. The only federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*); the whales pass offshore during their spring or fall migration.

2.5.4 Previous Site Characterization Activities

Eight soil, one sediment, and two surface water samples were collected during the 1993 RI/FS. These samples were analyzed for fuel-related compounds, metals, PCBs and pesticides. The risk assessment performed in conjunction with the 1993 RI/FS determined that the risk posed to human health and ecological receptors by the site contaminants was low given the current and future site uses, and did not exceed a level that normally requires remedial action (excess cancer risk of less than 10^{-6}) based on EPA guidance. Based on the low levels of contaminants at the site and the low risk, the site was recommended for no further action.

In 2001, the USAF and U.S. Army Corps of Engineers inspected the landfill following a large storm that had occurred in August 2000. Based on the inspection, it had appeared that some of the landfill capping material had eroded and metal debris had become exposed. Some debris, including drums, had already deposited into the lagoon. The post-inspection report recommended stabilization of the landfill. An Engineering Evaluation/Cost Analysis was completed for the site which also recommended stabilizing the landfill with a geoweb (cellular) mat backfilled with gravel.

During the 2004 RI, soil, sediment and surface water samples were collected for a wide variety of analytes, including VOCs, PAHs, PCBs and metals, both within and at the perimeter of the landfill. Surface and subsurface samples were collected to a depth of up to 3 feet. No contaminants were detected at concentrations above the ADEC 18 AAC 75.341, Tables B1 and B2, Method Two soil cleanup levels for the Arctic Zone. Only one of 13 samples exceeded the most stringent Method One cleanup levels for petroleum hydrocarbons. PCBs were detected in three of eight soil samples at a maximum concentration of 0.648 mg/Kg, below the 1 mg/Kg cleanup standard. Only limited subsurface soil sampling was performed; therefore, the maximum levels of contaminants in the soils were likely not detected. Heavy equipment (e.g. drill rig or excavator) were not available at the remote site to enable deep subsurface sampling through the debris. Lead was detected in one sediment sample at 130 mg/Kg, above the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Table (SQuiRT) criteria for marine sediment (112 mg/Kg). No exceedances of the Alaska Water Quality Standards were detected in surface water samples collected both within the lagoon and nearby wetlands; therefore, water quality was not affected by petroleum hydrocarbons or other compounds detected at the landfill.

Based on the findings of these RIs, a CERCLA response action is warranted to address the high likelihood of PCBs present in soil at concentrations in excess of state regulatory standards and to address the risk posed by erosion of these PCBs into the nearby surface water bodies. The sample results are summarized in Table 2-1 and a summary of the sample locations are shown on Figure 2-3.

2.5.5 Nature and Extent of Contamination

2.5.5.1 Known or Suspected Sources of Contamination

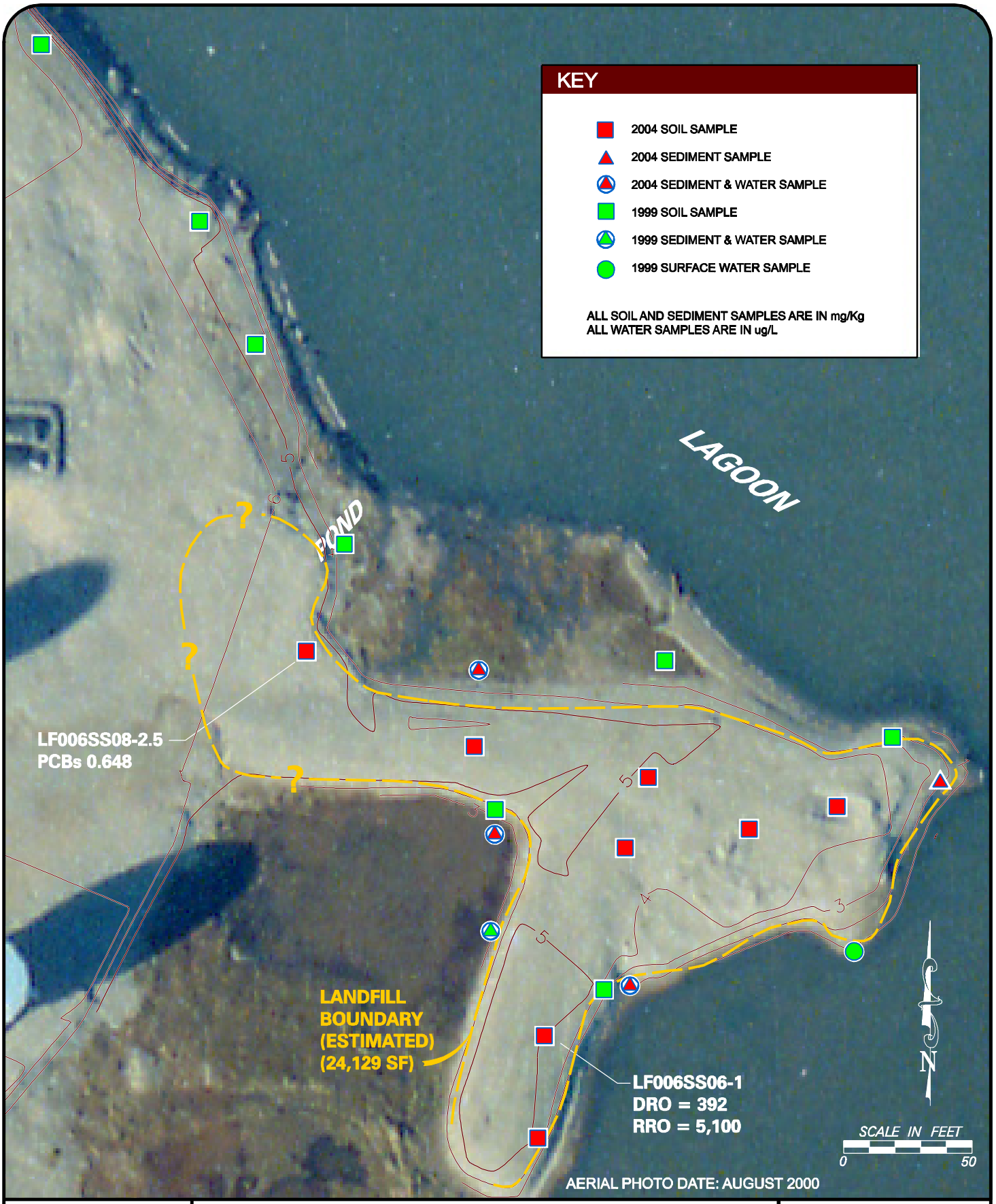
The suspected sources of the PCBs, VOCs, and metals detected at LF006 are spills or leaks from the debris (miscellaneous scrap metal and drums) that was disposed at the landfill.

2.5.5.2 Types of Contamination and the Affected Media

Table 2-1 summarizes the maximum concentrations of detected contaminants, or highest practical quantitation limit (PQL) if all samples were not detected for a given analyte. PCBs, VOCs, SVOCs and metals were detected in the soil at concentrations below the ADEC 18 AAC 75.341, Table B2, Method Two cleanup criteria (HCG 2005). Lead was detected in one sediment sample at 130 mg/Kg, NOAA SQuiRT criteria for marine sediment (112 mg/Kg). However, lead was not considered a COC due to the limited extent; relatively minor exceedance above the screening criteria (1.16 times the screening criteria); and uncertainty regarding application of the NOAA criteria to the sediment at Bullen Point. Contaminants detected in the surface water were below the 18 AAC 70 Alaska Water Quality Standards or NOAA SQuiRT fresh water screening criteria for aquatic life.

2.5.5.3 Known or Potential Routes of Migration

Given the low concentration of volatile compounds detected in the soil and the depth at which they were detected, air transportation of contaminants is not expected to be a significant mode of contaminant migration. Surface water runoff and active zone water transport also are not significant because of the low precipitation in the summer months and flat gradient. In addition, no significant concentration of water-soluble contaminants such as diesel fuel, gasoline or solvents was detected in the landfill. The PCBs detected in the landfill have a low solubility and are not anticipated to be mobilized in solution. Sampling around the perimeter of the landfill supports the conclusion that the low-level contaminants detected within the landfill are remaining in place and not migrating through surface water runoff or active zone water transport. However, erosion of the landfill is a potential future migration pathway that could expose receptors to landfill contaminants.



611 CES

PRIDE IN PROGRESS

BULLEN POINT SRRS

SUMMARY OF SAMPLE LOCATIONS
OLD LANDFILL (LF006)

BULLEN POINT, ALASKA

PROJECT NO: 9702-041

DATE: 2-1-07

FIGURE NO: 2-3

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Table 2-1 LF006 Summary of Sample Results

Media	Analyte	Screening Criteria				1988 RI/FS Maximum Concentration[5,6]	1993 RI/FS Maximum Concentration[5,6]	2004 RI/FS Maximum Concentration[5,6]	2004 RI/FS Frequency of Detections[7]
		18 AAC 75 Cleanup Level (Arctic Zone) for Soil[1]	NOAA SQuiRT for Freshwater Sediment[2]	18 AAC 70 MCL for Surface Water[3]	NOAA SQuiRT for Fresh Surface Water[4]				
Soil (mg/Kg)	**Fuels**[8]								
	GRO	1,400	--	--	--	NS	U (0.6)	NS	NA
	DRO	500[9]	--	--	--	NS	219	392 J	12/13
	RRO	2,000	--	--	--	NS	NS	**5,100 J**	13/13
	VOCs								
	Acetone	1,400	--	--	--	180	U (0.085)	U (0.361)	0/5
	Benzene	13	--	--	--	U (0.5)	U (0.085)	U (0.0047)	0/5
	Ethylbenzene	89	--	--	--	U (0.5)	U (0.085)	U (0.0174)	0/5
	Methylene Chloride	270	--	--	--	U (0.5)	U (0.085)	0.0609 F	2/5
	Toluene	180	--	--	--	U (0.5)	U (0.085)	U (0.0174)	0/5
	1,1,1-Trichloroethane	460	--	--	--	U (0.5)	U (0.085)	0.00558 F	1/5
	Xylene (total)	81	--	--	--	U (0.5)	U (0.17)	U (0.0174)	0/5
	SVOCs								
	bis(2-ethylhexyl)phthlate	800	--	--	--	NS	0.447	NS	NA
	RCRA Metals								
	Arsenic	8	--	--	--	U (10)	U (5.3)	3.7	5/5
	Barium	9,600	--	--	--	24	19	19.1	5/5
	Cadmium	140	--	--	--	0.6	U (2.6)	0.396	5/5
	Chromium	410	--	--	--	5	18	4.79	5/5
	Lead	400	--	--	--	45	40	17.1	5/5
	Mercury	26	--	--	--	NS	NS	0.236 F	1/5
	Selenium	680	--	--	--	U (20)	U (53)	0.0418 F	1/5
	PCBs								
	Arochlor-1254	1	--	--	--	NS	U (0.02)	0.648	3/8
Sediment (mg/Kg)	**Fuels**								
	GRO	--	--	--	--	NS	U (0.500)	NS	NA
	DRO	--	--	--	--	NS	111 J	NS	NA
	RRO	--	--	--	--	NS	NS	NS	NA
	VOCs								
	Benzene	--	--	--	--	U (0.5)	U (0.025)	U (0.0135)	0/4
	Ethylbenzene	--	--	--	--	U (0.5)	U (0.025)	U (0.0504)	0/4
	Xylene (total)	--	--	--	--	U (0.5)	U (0.050)	U (0.0504)	0/4
	Toluene	--	--	--	--	U (0.5)	U (0.025)	U (0.0504)	0/4
	1,3,5-Trimethylbenzene					NS	U (0.025)	0.0773 F	1/4
	SVOCs/PAH								
	Anthracene	--	(0.010)[10]	--	--	NS	U (0.2)	0.00245 F	1/4
	Benzo(a)Anthracene	--	0.385	--	--	NS	U (0.2)	0.0171	1/4
	Benzo[a]pyrene	--	0.782	--	--	NS	U (0.2)	0.0101	1/4
	Chrysene	--	0.862	--	--	NS	U (0.2)	0.019	1/4
	Dibenzo[a,h]anthracene	--	(0.010)[10]	--	--	NS	U (0.2)	0.0029 F	1/4
	Fluoranthene	--	2.355	--	--	NS	U (0.2)	0.0332	1/4
	Indeno[1,2,3-c,d] pyrene	--	(0.0173)[10]	--	--	NS	U (0.2)	0.0053 F	1/4
	4-Methylphenol	--	--	--	--	NS	0.58	NS	NA
	Phenanthrene	--	0.515	--	--	NS	U (0.2)	0.0095	1/4
	Pyrene	--	0.875	--	--	NS	U (0.2)	0.0264	1/4
	RCRA Metals								
	Arsenic	--	17	--	--	U (10)	U (5.8)	9.13	4/4
	Barium	--	--	--	--	13	32	93.8	4/4
	Cadmium	--	3.53	--	--	2.5	U (2.9)	0.492 F	3/4
	Chromium	--	90	--	--	5	6.7	18.5	4/4
	Lead	--	91.3	--	--	19	U (5.8)	130[11]	4/4
	Mercury	--	0.486	--	--	NS	NS	0.0659 F	2/4
	Selenium	--	--	--	--	U (20)	U (58)	1.06 F	3/4
	PCBs								
	Arochlor-1254	--	0.277	--	--	NS	U (0.02)	U (0.0677)	0/4
Surface Water (µg/L)	**Fuels**								
	GRO	--	--	--	--	NS	U (125)	NS	NA
	DRO	--	--	--	--	NS	1,870	NS	NA
	VOCs								
	Benzene	--	--	5	5,300[CMC]	U (0.70)	U (1)	0.56	1/3
	1,2-Dichloroethane	--	--	5	20,000	U (0.50)	1.68	U (0.15)	0/3
	Dichlorodifluoromethane	--	--	--	11,000[CMC]	15	U (1)	U (0.31)	0/3
	Ethylbenzene	--	--	700	32,000[CMC]	U (1.0)	7.8	0.43 F	1/3
	Methylene Chloride	--	--	5	11,000[CMC]	U (2.0)	U (1)	0.92 F,B	3/3
	Toluene	--	--	1,000	17,500[CMC]	U (1.0)	1.2	U (0.31)	0/3
	Trichlorofluoromethane	--	--	--	11,600[CMC]	19	U (1)	U (0.31)	0/3
	Xylene (total)	--	--	10,000	--	U (2.0)	19.2	1.26 F	1/3
	PAH								
	Fluorene	--	--	--	300[CMC]	NS	U (10)	0.0669	1/3
	Naphthalene	--	--	--	620	NS	U (10)	1.60	1/3
	RCRA Metals								
	Arsenic	--	--	--	850[CMC]	U (1,000)	U (100)	76.1	3/3
	Lead	--	--	--	2.5[HD]	U (500)	U (100)	0.749 F	1/3
	TAH	--	--	10	--	NS	NS	2.25 F	1/3
	TAqH	--	--	15	--	NS	NS	2.82	3/3

Notes

1- Lowest value of ingestion or inhalation shown from 18 AAC 75.341, Tables B1 and B2, referred to as "Method Two Cleanup Levels" for the Arctic Zone, with exception of the cleanup levels listed for DRO and RRO. For DRO and RRO the 18 AAC 75.341, Table A2, Method One Cleanup Levels are shown.
2- NOAA SQuiRT value is the probable effects level (PEL) for freshwater values indicated.
3- 18 AAC 70 Maximum Contaminant Level (ADEC 2003).
4- NOAA SQuiRT values shown for fresh water criteria continuous concentration (CCC) unless otherwise indicated (NOAA 1999). Criteria maximum concentration (CMC) shown if no CCC available.
5- For soil/sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U. For water: highest detected values shown.
6- 1993 data taken from the *Final RI/FS, Vol. 1 and 2, Barter Island Radar Installation, Alaska* (ICF 1996a). 2003 data taken from the *Final RI/FS Study Report for 15 Sites, Barter Island LRRS, Alaska* (USAF 2004).
7- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.
8- Methods used in 1993 were GRPH, DRPH and RRPH, which are comparable to current AK Methods for GRO, DRO and RRO.
9- 8 AAC 75.341, Table A2 lists both 200 and 500 mg/Kg cleanup levels for DRO. The 500 mg/Kg level is considered sufficiently protective for the site conditions.
10- Threshold effects level (TEL) for freshwater sediment indicated.
11- Exceedance detected in one sample; RI concluded that lead was not considered a COC.

Abbreviations

"--"	Screening criteria does not exist for this compound	PQL	Practical Quantitation Limit
F	Estimated quantity below the PQL	PAH	Polynuclear aromatic hydrocarbons
NS	Not Sampled	TAH	Total Aromatic Hydrocarbons
NA	Not Applicable	TAqH	Total Aqueous Hydrocarbons
ND	Not Determined	µg/L	Micrograms per Liter
J	Estimated value	VOC	Volatile organic compounds
mg/Kg	milligrams per kilogram	U	Compound not detected w/PQL in adjacent parentheses
B		HD	Hardness dependent
TPH	Total petroleum hydrocarbons	(TAH = Total of BTEX components)	
		(TAqH = Total PAH + TAH)	

Bold, shaded result indicates an exceedance of the proposed cleanup level or screening criteria.

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2.5.6 Conceptual Exposure Model

A conceptual exposure model was developed to depict the potential relationship or exposure pathway between chemical sources and receptors. An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. These pathways are presented in Figure 2-4, based upon current and reasonably likely future land uses and the potential beneficial use of surface water at LF006.

For purposes of evaluating exposure pathways, it was assumed there are no current site residents on the Bullen Point SRRS. Current site use is limited to periodic site workers, and occasional recreational or subsistence uses by residents of Kaktovik. Future exposure pathways assume the Bullen Point SRRS facility is inactive.

Conceptual human health and ecological site models for LF006 are contained in Figures 2-4 and 2-5, respectively. The accidental ingestion of contaminated soil is considered the most probable exposure pathway at LF006. Surface water runoff and active zone water transport also are not significant because of the low precipitation in the summer months and flat gradient. Groundwater is not a current or future source of drinking water at Bullen Point. In general, air transportation is not a significant pathway of exposure because volatile contaminants were detected at low concentrations.

Erosion of the landfill is a potential future migration pathway that could expose receptors to hazardous substances within the landfill, if present. The average rate of erosion along the eastern point of the landfill is 0.7 feet per year. If this rate of erosion continues, approximately 30 feet of the landfill will be eroded over the next 50 years. This would expose a significant quantity of landfill debris and soil to the lagoon.

In addition, PCBs are persistent and have the potential to bioaccumulate. If aquatic or terrestrial organisms were exposed to the contaminated soil, the PCBs could be ingested. If the landfill erodes, PCB-contaminated soil could enter into surrounding surface water bodies. The PCBs could then travel up the food chain and eventually be ingested by humans.

Residents of regional villages (e.g Kaktovik) utilize the area for subsistence uses. Future land use would be difficult to control due to the remote location. Although future residential land use is considered unlikely at LF006, it has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure, as described within this DD.

2.6 Current and Potential Future Land and Resource Uses

2.6.1 Land Use

The landfill is inactive and there are no known human uses of the immediate area. In its current condition, the landfill is considered poor ecological habitat; however, the site borders tundra wetlands and the lagoon. These adjacent areas appear capable of supporting a wide array of species typical of the Arctic environment.

As the lead agency, the USAF has the authority to determine the future anticipated land use of LF006. After considering input from the State of Alaska and local community, the USAF has determined that the most likely future land use of LF006 is industrial. This determination is made considering the following assumptions:

- USAF intends to transfer the land to the BLM and eventually the State of Alaska
- Based on its location, future use of the transferred property may include industrial uses associated with supporting the oil and gas industry

The current land use of adjacent/surrounding land is subsistence and limited recreational activities. Consequently, portions of the installation may be used by subsistence hunting parties. Access to the area is limited, and no facilities or accommodations are available locally. Future use of the property transferred to the State of Alaska may include industrial purposes associated with oil and gas exploration; however, it is unlikely LF006 will be used for industrial or residential purposes by humans because of its susceptibility to flooding and erosion.

2.6.2 Ground and Surface Water Uses

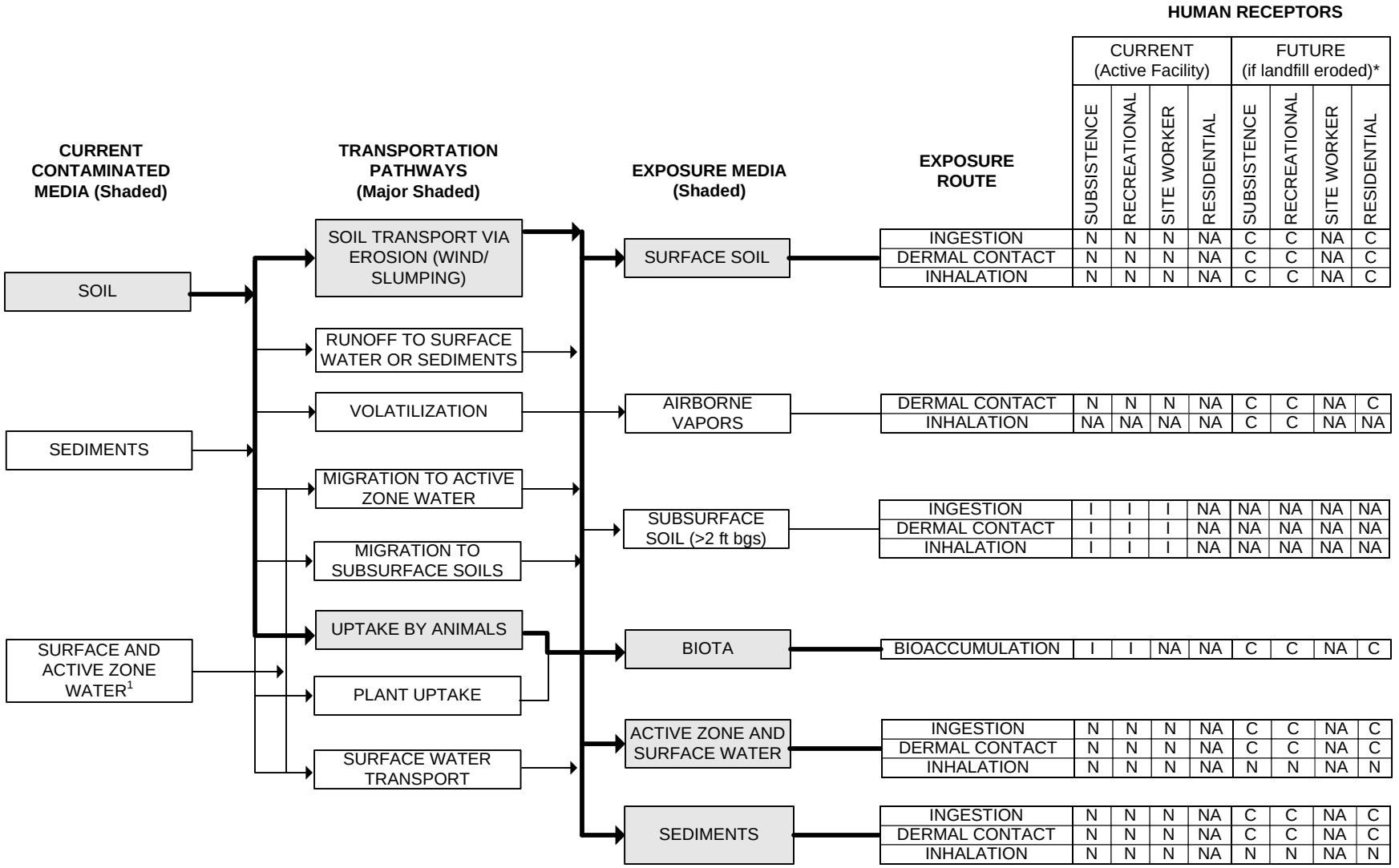
Subsurface water was encountered at an average depth of 1 to 3 feet bgs. The lack of surface water and vegetation on the gravel pad make this a poor environment for most wildlife. The landfill is bordered by a lagoon along its eastern edge and tundra characteristic of the area, with marshy wetlands and small pools to the north and south. A large pond is also located along the landfill's southwestern edge. There is no use of surface water at this site. Groundwater is not a current or future source of drinking water at Bullen Point SRRS.

2.7 Summary of Site Risks

This section summarizes the human health and ecological risk assessments that have been performed at LF006. The 1996 baseline human health and ecological risk assessment concluded that the risk attributed to the contaminants detected at LF006 was insignificant. Both the carcinogenic and noncarcinogenic risks calculated for the site were below the regulatory benchmarks that normally require remedial action. Based on the low levels of contaminants at the site and the low risk, the site was recommended for no further action (ICF 1996b).

Subsequent sampling performed during the 2004 RI identified only DRO and RRO as the contaminants of concern (COCs); no CERCLA hazardous substances were identified as COCs. This section describes the COC identification and evaluation process. Cumulative carcinogenic and noncarcinogenic risk attributed to the presence of PCBs and arsenic is also presented and discussed.

Figure 2-4 Human Health Conceptual Site Model for LF006



[1]Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.
*Assumes contaminants are present in the landfill.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable

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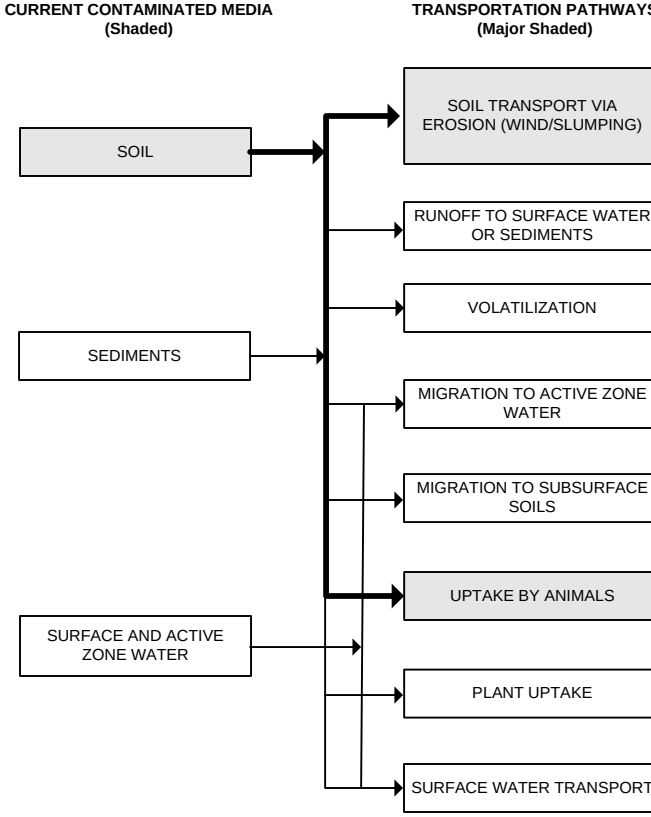
Figure 2-5 Ecological Conceptual Site Model for LF006



ECOLOGICAL RECEPTORS

EXPOSURE ROUTE	CURRENT (Active Facility)					FUTURE (if landfill eroded)*				
	PLANTS	INVERTEBRATES	FISH	BIRDS	MAMMALS	PLANTS	INVERTEBRATES	FISH	BIRDS	MAMMALS
SURFACE SOIL										
INGESTION	N	N	NA	N	N	NA	C	NA	C	C
DERMAL CONTACT	N	N	NA	N	N	NA	C	NA	C	C
INHALATION	N	N	NA	N	N	NA	NA	NA	NA	NA
UPTAKE	N	NA	NA	NA	NA	C	NA	NA	NA	NA
AIRBORNE VAPORS										
DERMAL CONTACT	NA	N	NA	N	N	NA	N	NA	N	N
INHALATION	NA	N	NA	N	N	NA	N	NA	N	N
UPTAKE	I	NA	NA	NA	NA	C	NA	NA	NA	NA
SUBSURFACE SOIL (>2 ft bgs)										
INGESTION	NA	I	NA	I	I	NA	NA	NA	NA	NA
DERMAL CONTACT	NA	I	NA	I	I	NA	NA	NA	NA	NA
INHALATION	NA	N	I	I	I	NA	NA	NA	NA	NA
UPTAKE	I	NA	NA	NA	NA	NA	NA	NA	NA	NA
BIOTA										
BIOACCUMULATION	NA	I	I	I	I	C	C	C	C	C
ACTIVE ZONE AND SURFACE WATER										
INGESTION	N	N	N	N	N	C	C	C	NA	C
DERMAL CONTACT	N	N	N	N	N	C	C	C	NA	C
INHALATION	NA	N	N	N	N	N	C	N	NA	N
SEDIMENTS										
INGESTION	N	N	N	N	N	C	C	C	NA	C
DERMAL CONTACT	N	N	N	N	N	C	C	C	NA	C
INHALATION	NA	N	N	N	N	N	C	N	NA	N

[1]Surface water includes active zone water located in subsurface soils above the permafrost. There is no "groundwater" at the site.
*Assumes contaminants are present in the landfill.

Primary Pathways

X = Not a Pathway C = Complete Exposure Pathway N = Negligible Effect I = Incomplete Exposure Pathway NA = Not Applicable

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2.7.1 Identification of Chemicals of Concern

This section identifies those chemicals associated with unacceptable risk at the site and that are the basis for the proposed remedial action. The data used in the risk calculations was deemed to be of sufficient quality and quantity for its intended use.

The sampling results from the remedial investigation conducted at LF006 were compared against screening criteria to determine whether there were COCs that require remedial actions to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two cleanup levels for the Arctic Zone. Method Two cleanup levels have been established for specific chemicals (listed in 18 AAC 75.341, Tables B1 and B2) and are protective of long-term exposures under residential land use scenarios. Method Two cleanup levels are risk-based cleanup levels based on a cancer risk management standard of 1 in 100,000 (1×10^{-5}) and a noncarcinogenic risk standard or hazard index of 1.0, set forth in 18 AAC 75.325(h).

These screening criteria are protective of human health and the environment. They were selected in accordance with the current and projected land use at the site as described in Section 2.6. Criteria protective of people using the site for residential purposes were used to screen the data, even though there is no current or planned residential land use at the site.

A chemical was considered a COC if it exceeded the screening criteria, unless further evaluation indicated the contaminants posed little risk. At LF006, PCBs are considered a COC because of the substantial risk that PCBs are present in the soil at concentrations above regulatory and risk-based cleanup standards and the likelihood that erosion could increase exposure to human and ecological receptors . The detection frequency, range of detected concentrations, and the exposure point concentrations (EPCs) for chemicals and media of concern are presented in Table 2-2.

Table 2-2
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Media	Chemical of Concern	Concentration Detected (mg/Kg)		Frequency Of Detection	Exposure Point Concentration	Statistical Measure
		Min	Max			
Soil On-Site - Direct Contact	PCBs	U (0.0157)	0.648	3/8	0.648	Maximum Concentration
Key PCBs – Polychlorinated Biphenyls U – Compound not detected with practical quantitation limit in adjacent parentheses. Data is taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005)						

2.7.1.1 Risk Characterization

The carcinogenic risks and noncarcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land use settings. Cumulative risks for all relevant pathways and populations are also described. These risk estimates are summarized in Tables 2-3 and 2-4. The results of the cumulative risk calculations are interpreted within the context of the ADEC risk management standards in accordance with 18 AAC 75.325(g).

When applying Method Two cleanup levels for a site, 18 AAC 75.325(g) states that the risk from hazardous substances cannot exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0. As specified in 18 AAC 75.340(k), chemicals that are detected at greater than or equal to 1/10 of the Method Two ingestion or inhalation cleanup levels must be included when calculating cumulative risk. Therefore, as part of the screening process, contaminants exceeding 1/10 the ADEC Method Two cleanup levels were identified and their maximum concentration used to calculate the cumulative human health risk in accordance with ADEC guidelines (ADEC 2002).

For carcinogens, risks are generally expressed as the incremental probability of an individual's likelihood of developing cancer over a lifetime as a result of exposure to the carcinogen. Excess lifetime cancer risk is calculated from the following equation:

Risk = CDI x SF

Where:

Risk = a unitless probability (e.g., 2×10^{-5}) of an individual's likelihood of developing cancer

CDI = chronic daily intake averaged over 70 years (mg/kg-day)

SF = slope factor, expressed as $(mg/kg\text{-}day)^{-1}$.

These risks are probabilities that usually are expressed in scientific notation (e.g., $1x\ 10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that an individual experiencing the reasonable maximum exposure estimate has a 1 in 1,000,000 chance of developing cancer as a result of site-related exposure. This is referred to as an "excess lifetime cancer risk" because it would be in addition to the risks of cancer individuals face from other causes such as smoking or exposure to too much sun. The chance of an individual's developing cancer from all other causes has been estimated to be as high as one in three. EPA's generally acceptable risk range for site-related exposure is 10^{-4} to 10^{-6}.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a reference dose (RfD) derived for a similar exposure period. An RfD represents a daily individual intake that an individual may be exposed to that is not expected to cause any deleterious effect. The ratio of site-related daily intake to the RfD is called a hazard quotient (HQ).

The HQ is calculated as follows:

Non-cancer HQ = CDI/RfD

Where: CDI = chronic daily intake

RfD = reference dose

CDI and RfD are expressed in the same units and represent the same exposure period (i.e., chronic, subchronic, or short-term).

An HQ < 1 indicates that a receptor's dose of a single contaminant is less than the RfD, and that toxic noncarcinogenic effects from that chemical are unlikely.

The Hazard Index (HI) is generated by adding the HQs for all COCs at a site that affect the same target organ (e.g., liver) or that act through the same mechanism of action within a medium or across all media to which an individual may reasonably be exposed. An HI < 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI > 1 indicates that site-related exposures may present a risk to human health.

At LF006, the excess cancer risk under a residential exposure scenario was 6 X 10^{-6}, based on the presence of PCBs and arsenic in the site soil. The noncancer hazard index under the same scenario was 0.33. These cumulative risk values do not account for additional risk due to the potential for PCBs to bioaccumulate in the food chain.

The current site conditions meet the ADEC risk management standards (risk from hazardous substances does not exceed a cumulative carcinogenic risk of 1 in 100,000 and a cumulative noncarcinogenic hazard index of 1.0) for residential land use. However, there is uncertainty regarding long term risk based on the potential for PCBs to bioaccumulate. In addition, based current site conditions, erosion of the landfill is a potential future migration pathway that could expose receptors to landfill contaminants such as PCBs.

Table 2-3 Risk Characterization Summary – Carcinogens

Scenario Timeframe: Current
Receptor Population: Resident
Receptor Age: Child

Medium	Exposure Point	Chemical of Concern	Carcinogenic Risk			
			Inhalation	Dermal	Ingestion	Cumulative Risk
Soil	Soil On-Site -Direct Contact	PCBs	6×10^{-9}	N/A	1×10^{-6}	1×10^{-6}
	Soil On-Site -Direct Contact	Arsenic	N/A	N/A	5×10^{-6}	5×10^{-6}
					Soil risk total =	**6×10^{-6}**
Groundwater						N/A
					Ground-water risk total =	N/A
					Total Risk =	**6×10^{-6}**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the total risk at LF006 is 8×10^{-6}. Please see Table D-8 in Appendix D for more detail.

Key
PCBs – Polychlorinated Biphenyls
N/A – Not Applicable

Table 2-4 Risk Characterization Summary – Non-Carcinogens

Scenario Timeframe: Current **Receptor Population: Resident** **Receptor Age: Child**							
Medium	**Exposure Point**	**Chemical of Concern**	**Primary Target Organ**	**Non-Carcinogenic Hazard Quotient**			
				Inhalation	**Dermal**	**Ingestion**	**Cumulative Hazard Index**
Soil	Soil On-Site -Direct Contact	PCBs	Skin, Eyes	N/A	N/A	0.24	0.24
	Soil On-Site -Direct Contact	Arsenic	Liver	N/A	N/A	0.09	0.09
						Soil Hazard Index Total =	**0.33**
Groundwater							N/A
						Ground-Water Hazard Index Total =	N/A
						Receptor Hazard Index[1] =	**0.33**

1 – Per ADEC request, cumulative risk was additionally calculated using USEPA Region 6 Human Health Medium-Specific Screening Levels. Based on this calculation, the hazard index at LF006 is 1.1. Please see Table D-8 in Appendix D for more detail.

Key

PCBs – Polychlorinated Biphenyls

N/A – Not Applicable

2.7.2 Summary of Ecological Risk Assessment

As discussed previously, the baseline ecological risk assessment concluded that the potential risks to ecological receptors, specifically aquatic species due to contaminants detected at LF006 were insignificant. The HQ for iron in the surface water at LF006 was 2.9, above the regulatory threshold of 1.0. However, this risk was attributed to elevated iron concentrations detected in one sample. The risk assessment concluded that the iron result was isolated and insufficient to characterize potential metal contamination. In addition, the potential risk to aquatic species was based on total metal concentrations. If dissolved metal concentrations were used in the risk evaluation the risks would be significantly lower. Therefore, considering these site-specific factors, the overall risk to aquatic organisms was not significant and did not warrant any further action.

2.7.3 Basis for Action

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

2.8 Remedial Action Objectives

Remedial action objectives (RAOs) provide a general description of what the cleanup will accomplish. These goals typically serve as the design basis for the remedial alternatives which will be presented in the next section.

The RAOs for LF006 are:

- Protect human health and the environment under both current and future conditions by lowering the contaminant levels and/or the exposure routes;

- For human health, prevent inhalation and ingestion of PCB contaminated soil with PCB concentrations greater than 1 mg/Kg.

Although future land use is anticipated to remain industrial, in order to meet the requirements for land transfer these RAOs were developed based on a residential exposure scenario.

2.9 Description of Alternatives

The remedial alternatives considered for LF006 were presented in the RI/FS Report (USAF 2005) and are summarized in Table 2-5 below.

Table 2-5 Summary of Remedial Alternatives Evaluated for OT003

Alternative Designation	Alternative Description
1	No Action
2	Landfill Stabilization
3	Landfill Removal and Onsite Disposal (Inland)
4	Landfill Removal and Offsite Disposal

2.9.1 Description of Remedy Components

A total of four alternatives were developed to address remediation at LF006. This section provides a summary overview of the components of those alternatives.

Alternative 1: No Action

- No response action taken
- This alternative would include performing a site-specific risk assessment to potentially close the site via site specific cleanup levels

Alternative 2: Landfill Stabilization

- Construct slope protection, a barrier, or both, to prevent erosion of the shoreline surrounding the landfill. The potential process options are described in detail in Table 14-2 of the FS.
- Supplement with long-term monitoring (site inspections) and maintenance.

Alternative 3: Landfill Removal and Onsite (local) Disposal

- Excavate contaminated soil and debris.
- Disposal of non-hazardous debris and acceptable petroleum contaminated soils (<2,000 mg/Kg DRO) in the new landfill.
- Disposal of other hazardous or regulated wastes offsite at a permitted treatment, storage and disposal (TSD) facility in accordance with the Off-Site Rule (40 CFR 300.440).
- Post-closure monitoring and maintenance of the new landfill for 5 years.

Alternative 4: Landfill Removal and Offsite Disposal

- Excavate contaminated soil and debris.

- Disposal of non-hazardous debris and other hazardous or regulated wastes offsite at a permitted treatment, storage and disposal (TSD) facility in accordance with the Off-Site Rule (40 CFR 300.440). .

2.10 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for OT003 were evaluated using the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). These criteria are classified as threshold criteria, balancing criteria, and modifying criteria.

Threshold criteria are standards that an alternative must meet to be eligible for selection as a remedial action. There is little flexibility in meeting the threshold criteria—the alternative must meet them or it is unacceptable. The following are classified as threshold criteria:

- Overall protection of human health and the environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

Balancing criteria weigh the tradeoffs between alternatives. These criteria represent the standards upon which the detailed evaluation and comparative analysis of alternatives are based. In general, a high rating on one criterion can offset a low rating on another balancing criterion. Five of the nine criteria are considered balancing criteria:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying criteria are as follows:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how it compares to the other alternatives under consideration.

2.10.1 Overall Protection of Human Health and the Environment

Alternative 1 does not sufficiently protect human health and the environment from future risk. If no action is taken, it is probable that the LF006 landfill will erode, and the debris will enter a surface water body. The debris may have both chemical and physical hazards. Alternatives 2, 3, and 4 provide adequate protection of human health and the environment and provide long-term effectiveness at varying levels. Alternative 4 provides the most complete long-term protection of human health and the environment. However, Alternative 3 has close to the same amount of protection as Alternative 4.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA and NCP §300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites at least attain legally applicable or relevant and appropriate Federal and State requirements, standards, criteria, and limitations which are collectively referred to as "ARARs," unless such ARARs are waived under CERCLA section 121(d)(4).

Applicable requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. State standards that are identified by a state in a timely manner and that are more stringent than Federal requirements may be applicable.

Relevant and appropriate requirements are those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under Federal environmental or State environmental or facility citing laws that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site address problems or situations sufficiently similar to those encountered at the CERCLA site (relevant) that their use is well-suited (appropriate) to the particular site. Only those State standards that are identified in a timely manner and are more stringent than Federal requirements may be relevant and appropriate.

Compliance with ARARs addresses whether a remedy will meet all of the applicable or relevant and appropriate requirements of other Federal and State environmental statutes or provides a basis for invoking a waiver.

Alternative 1 does not comply with ARARs if the landfill is eroded and the debris and soil with PCB concentrations greater than 1 mg/Kg are discharged to surface waters. Alternatives 2, 3 and 4 comply with ARARs for the foreseeable future.

All of the alternatives, except the no action alternative have common ARARs associated with soil cleanup standards for PCBs (18 AAC 75.341, Table B2, Arctic Zone).

2.10.3 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative 1 does not provide long-term effectiveness because it is highly probable that the landfill will erode in the near future if no action is taken. Erosion of the landfill will result in circumstances that are not protective of human health and not in compliance with ARARs. Alternative 2 requires the landfill to be maintained indefinitely. That will increase in cost and difficulty as the shoreline erodes. Thus, the long-term effectiveness of this option is questionable. Alternative 4 is considered to have the greatest long-term effectiveness because the disposal location for the nonhazardous debris is permanent. However, both Alternatives 3 and 4 prevent the release of contaminants and debris into the environment for the foreseeable future (hundreds of years).

2.10.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

No treatment or significant volume reduction would occur in Alternatives 1 or 2. Under Alternative 1, the mobility of the debris would increase as the landfill erodes. Under such circumstances, the debris may pose physical hazards to humans and wildlife. Alternatives 2, 3, and 4 would significantly reduce the future mobility of the debris. As indicated, the potential for mobility may be the lowest at a landfill located off Bullen Point SRRS provided it is located in a stable environment.

2.10.5 Short-Term Effectiveness

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until cleanup levels are achieved.

Alternative 1 poses no additional short term risk while the action is being completed because no site activities are performed. Alternative 2 has the best short-term effectiveness. No contaminated soil or hazardous or nonhazardous debris will be excavated and handled under Alternative 2. Therefore, the risks of exposure to site workers or releases to the environment are less than under the landfill removal Alternatives (3 and 4). However, the short-term impacts of Alternatives 3 and 4 are not considered substantial

2.10.6 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is technically and administratively easy to implement if it is acceptable. Alternative 2 is the easiest action to implement in terms of the administrative and technical requirements, and the availability of materials and services. However, the long-term maintenance of the shoreline protection measures may be difficult because of erosion along the shore. The landfill removal Alternatives (3 and 4) are slightly more difficult to implement than Alternative 2. The greatest potential risk to implementation of these alternatives is that waste types or volumes may differ significantly from current estimates. Unanticipated hazards may cause increased levels of PPE and engineering controls and increase the project duration. Alternative 2 will not be impacted by unanticipated waste types or increased waste volumes, as long as the surface area of the landfill remains unchanged.

2.10.7 Relative Cost

The lowest cost alternative is Alternative 1, no further action. The second lowest alternative is Alternative 3. The ultimate cost of Alternative 2 is the highest because the protective structure would need to be maintained indefinitely. Otherwise, the landfill would have to be moved at a later date to meet the remedial action objectives. The cost of Alternatives 3 and 4 are highly dependent upon the types and volumes of wastes encountered in the landfill. Thus, the costs could be less or more than estimated. Alternative 3 would be less susceptible to a significant price increase if the volume of solid waste is greater than anticipated.

2.10.8 State/Support Agency Acceptance

The State has expressed its support for Alternatives 3 or 4.

2.10.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 3. Although no specific comments were received regarding the proposed remedies at LF006, based on comments from other sites in the vicinity of Bullen Point, Alternatives 1 and 2 are not likely to be accepted as adequately protective.

2.11 Principal Threat Wastes

The NCP expects that treatment that reduces the toxicity, mobility, or volume of the principal threat wastes will be used to the extent practicable. The principal threat concept refers to the source materials at a CERCLA site considered to be highly toxic or highly mobile that generally cannot be reliably controlled in place or present a significant risk to human health or the environment should exposure occur. A source material is material that contains hazardous substances, pollutants or contaminants that act as a reservoir for migration of contamination to groundwater or air, or that acts as a source for direct exposure. Pursuant to the EPA Fact Sheet, A Guide to Principal Threat and Low Level Threat Wastes, Publication (9380.3-06FS November 1991) principal threat wastes typically have a potential cancer risk of 10^{-3} or greater, while low toxicity source material presents an excess cancer risk near the acceptable risk range. There are no principal threat wastes at LF006 based upon the most current sampling results because the cancer risk attributed to PCBs and arsenic in soil is 6×10^{-6}.

2.12 Selected Remedy

The primary indicator of remedial action performance will be satisfying the RAOs for LF006 and protecting human health and the environment. Performance measures are defined herein as the RAOs (see Section 2.8 – Remedial Action Objectives) plus the required actions to achieve the objectives, as defined in this section. It is anticipated that successful implementation, operation, maintenance, and completion of the performance measures will achieve a protective and legally compliant remedy for LF006.

The remedy for LF006, Alternative 3 – Landfill Removal and Onsite Disposal, was selected based upon best overall ability to protect human health and the environment, implementability and cost. This section describes the selected remedy and also provides specific performance measures for the selected remedy.

Remedy selection is based on the detailed evaluation of remedial alternatives presented in the FS (USAF, 2005). This remedy is protective of human health and the environment as the concentrations of PCBs will be below applicable cleanup levels.

The USAF is responsible for implementing, maintaining, and monitoring the remedial action identified herein for the duration of the remedy selected in this DD. The USAF will exercise this responsibility in accordance with CERCLA and the NCP.

2.12.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternative for LF006 is Alternative 3 – Landfill Removal and Onsite Disposal. The USAF and ADEC believe that 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. The remedy is expected to satisfy the following statutory requirements of CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Toxicity, mobility or volume reduction
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying criteria
  - State agency acceptance
  - Community acceptance

The recommended remedial action alternative for addressing the risk posed by LF006 is Alternative 3 – removal of the landfill and disposal of the nonhazardous debris in an onsite landfill. This alternative is cost effective because the majority of the waste does not need to be shipped off site. It also is protective of human health and the environment and provides good long-term effectiveness. Although Alternative 4 may provide slightly better long-term effectiveness, it does so at a significantly greater cost, which is not warranted based on the risk. Alternative 2 is the least cost-effective due to the high cost of maintaining the erosion protection measures.

The preferred alternative requires constructing a new landfill at Bullen Point. There is some risk that this landfill would not meet substantive requirements for a landfill. However, there appears to be agency support for the new landfill based on preliminary meetings. It is assumed that the cost of the new landfill will be shared proportionally with the Clean Sweep Program because the landfill will also receive demolition debris. .

2.12.2 Description of the Selected Remedy

- Excavation/removal of contaminated soil and related debris from the Old Landfill (LF006);
- material from the excavation suitable for disposal under State of Alaska solid waste regulations will be disposed of in the new landfill being constructed near the existing gravel runway Bullen Point; and
- soil contaminated with PCBs above 1 mg/Kg will be transported and disposed of consistent with the Off-Site Rule (40 CFR 300.440).

It is important to note that the remedy may change somewhat as a result of the remedial design and construction processes. Changes, if they occur, to the remedy as described in this DD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or DD amendment.

2.12.3 Summary of Estimated Remedy Costs

Table 2-6 Cost Estimate Summary - Capital and O& M Costs for Remedy Component Three

Onsite Landfilling (LF006 removal followed by petroleum-contaminated soil treatment and onsite landfilling)	Excavation (includes regulated waste disposal)	$367,442	Table D-3a: Alternative B; Tables D-2e, D-3b, and D-3c
	Petroleum-Contaminated Soil Treatment	$42,878	
	Landfill Construction, Transport and Disposal of Nonhazardous Debris/Soil (LF006 19% of total volume)	$165,197	
	5 year O&M (LF006 is 19% of total volume)	$43,124	
	Total Cost	**$618,641**	

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, an ESD, or a DD amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost. Detailed cost summaries are provided in Table 2-7.

Table 2-7 Detailed Capital and O&M Costs for Remedy Component Three

Table D-3a, Alternative B: Construction of Onsite Landfill for Debris from LF006 and Clean Sweep

Description:
This scenario includes costs to place the debris excavated from LF006 (2,188 CY of debris and soil) into a landfill built at Bullen Point. This alternative includes the costs to build the new landfill near the runway and to transport the debris to that location. Also included is the disposal of the demolition debris from the Clean Sweep project (9,390 CY). The total volume of debris for the new landfill is 11,578 CY.
The Clean Sweep survey report assumed that the demolition debris would have to be taken off site. Clean Sweep survey did not include concrete or scrap metal in the demolition debris estimate. Scrap metal from the demolition of the facility can be recycled in Fairbanks. Concrete from the demolition of the facilities will be disposed of in the new landfill rather than at the site as called for in the Clean Sweep survey report. Construction of the new landfill will be performed in conjunction with Clean Sweep activities. The cost estimate was used to determine the unit rate cost ($80.71/CY) for landfill construction, transportation of debris to the new landfill, and disposal. This rate was used to calculate the proportional cost for LF006 remedial action costs.

LABOR

Planning/Reporting (Documentation Labor)

Classification	Percentage	Subtotal	Extension
Professional Labor			
Various labor categories provide landfill permitting, work plans and reports for	8%	$ 715,964	$ 57,277
		SUBTOTAL	$ 57,277

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor - Construction Management					
Sr. Construction Manager	per hour	$ 139.09	104	1	$ 14,488
Administrator	per hour	$ 62.12	104	1	$ 6,470
Superintendent	per hour	$ 87.32	521	1	$ 45,476
SSHO/CQC	per hour	$ 80.26	521	1	$ 41,799
Local Craft DB Labor					
Operator Gp 1 (dozer)	per hour	$ 59.70	246	1	$ 14,709
Operator Gp1 OT	per hour	$ 81.75	271	1	$ 22,157
Operator Gp 1 (excavator)	per hour	$ 59.70	248	1	$ 14,805
Operator Gp1 OT	per hour	$ 81.75	273	1	$ 22,301
Operator Gp 1 (drivers)	per hour	$ 59.70	248	3	$ 44,414
Operator Gp1 OT	per hour	$ 81.75	273	3	$ 66,903
Labor Gp 1	per hour	$ 50.53	248	2	$ 25,063
Labor Gp 1 OT	per hour	$ 67.55	273	2	$ 36,857
				SUBTOTAL	$ 355,443

EQUIPMENT / TOOLING

ITEM	Units	Unit	Rate	Quantity	Extension
Utility Vehicle , 6 wheeler, crew / tools transport - 2ea - Purchase	2	L.S.	$ 9,000	1	$ 18,000
Culvert drains through runway (18in galvanized steel) - installed cost	2	ft	$ 25	150	$ 7,500
Tooling / Rigging	1	L.S.	$ 3,788	1	$ 3,788
End Dump (12 yard Capacity)	3	Month	$ 8,000	1.5	$ 37,200
Dozer, D-7 with ripper - 1 ea.	1	Month	$ 13,500	1.5	$ 20,790
Excavator, EX 400	1	Month	$ 15,000	1.5	$ 23,250
Truck, pickup, crew cab - 2ea	2	Week	$ 2,000	1.5	$ 6,200
			Profit	8%	$ 9,338
				SUBTOTAL	$ 126,066

MATERIALS / CONSUMABLES

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	Diesel/gas	gallon	$ 4	18,688	$ 74,753
			Profit	8%	$ 5,980
				SUBTOTAL	$ 80,733

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Communication (on site, long distance, etc)	COMMS	Month	$ 2,432	1.5	$ 3,770
Office Trailer (local supply)	Office type	Month	$ 1,500	1.5	$ 2,325
Per Diem	Per Diem	manday	$ 250	390	$ 97,579
PPE/Safety	PPE/Safety	manday	$ 35	390	$ 13,661
			Profit	8%	$ 9,387
				SUBTOTAL	$ 126,722

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Survey of new landfill	survey	L.S.	$ 25,000	1	$ 25,000
			Profit	8%	$ 2,000
				SUBTOTAL	$ 27,000

SUBTOTALS

TOTAL LABOR	$ 412,720
EQUIPMENT	$ 126,066
MATERIALS	$ 80,733
ODC	$ 126,722
SUBCONTRACT	$ 27,000
TOTAL	$ 773,241

COST SUMMARY

COST		$ 773,241	
Project Management	5.0%	$ 38,662	
COST ESCALATION	6.0%	$ 48,714	
	TOTAL	**$ 860,617**	
Constuction Cost of Landfill Per Cubic Yard		$ 74.06	
LF006 Debris Transportation and Disposal Costs Based on Cost per Cubic Yard		$ 165,197	19.2%
Clean Sweep Debris Transportation and Disposal Costs Based on Cost per Cubic Yard		$ 695,420	80.8%

Assumptions:
Mobilization of equipment and personnel is assumed to be part of the Clean Sweep demolition costs. Labor, per diem, and travel costs are escalated to projected 2006 pricing based on Standard and Poor's DRI indices. The site for the new landfill will take 20 days to prep for accepting debris. The landfill will be large enough to accept the waste from LF006 and the nonhazardous demolition debris, concrete, and metal from the Clean Sweep project (9,390 cubic yards). The Clean Sweep survey report assumed that all wastes from the demolition of the facility would be disposed of off-site. It will take approximately 14 days to haul the LF006 and building debris to the new landfill. It will take approximately 10 days to cover the new landfill once all the debris has been placed. Many of these tasks are assumed to be taking place concurrent with other Clean Sweep work, which results in an over statement of the amount of labor and per diem being estimated in this task. The debris will be capped with native soil mined during the creation of the landfill. The final cap material will be the top soil mined to make the new landfill. This material may not meet the ADEC landfill cap permeability requirements.
Material moving rates with a D-7 dozer vary from 78 cy/hour for sand and gravel to 53 cy/hr for loose rock. Assume a rate of 60 cy/hr for all materials.

Table 2-7 Detailed Capital and O&M Costs for Remedy Component Three (continued)

Table D-2e: Removal Action And Treatment Estimate for Petroleum-Contaminated Soil from LF006 (Old Landfill)

Description:
This scenario includes costs to remove and transport the high-level petroleum contaminated soil (DRO >2,000 and/or RRO >4,000 mg/Kg) from LF006. The actual volume of petroleum-contaminated soil in LF006 has not been quantified. For cost estimating purposes it has been assume that 2% of the volume of the landfill may be contaminated with high-level petroleum contaminated soil. The total in-place volume for removal is estimated to be 71 yd^3. The excavated volume is estimated to be 86 yd^3 (97 tons). Planning and management would involve site-specific plans and post action (closure) reporting. Cost estimate assumes soil would be landfarmed on site.

LABOR
Planning and Reporting (Documentation Labor)

Classification	Percentage	Subtotal	Extension	
Professional Labor - Planning and Reporting				
Various Labor Catagories to Produce Documents	8%	$ 35,671	$ 2,854	
			SUBTOTAL	$ 2,854

LABOR

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension	
Professional Labor						
Construction Manager	per hour	$ 139.09	2	1	$ 306	
Administrator	per hour	$ 62.12	2	1	$ 124	
Chemist/Sampler	per hour	$ 103.39	8	1	$ 827	
Superintendent	per hour	$ 87.32	4	1	$ 349	
SSHO/CQC	per hour	$ 80.26	8	1	$ 642	
Craft DB Labor						
Operator Gp 1	per hour	$ 59.70	4	2	$ 478	
Labor Gp 1	per hour	$ 50.53	4	2	$ 404	
					SUBTOTAL	$ 3,131

EQUIPMENT / TOOLING

ITEM	Units	Unit	Rate	Quantity	Extension	
Articulating End Dump (30 Ton Capacity)	1	Month	$ 13,500	0.04	$ 482	
ATV - 2ea	2	Month	$ 1,350	0.04	$ 96	
Excavator, EX 400 -	1	Month	$ 15,000	0.04	$ 536	
Genset, 35kw	1	Month	$ 2,000	0.04	$ 71	
Wheeled Loader - Cat 988 - 2 ea (setup w/ forks, fork extension & bucket)	1	Month	$ 15,000	0.04	$ 536	
Truck, pickup, crew cab - 2ea	2	Month	$ 2,000	0.04	$ 143	
			Profit	8%	$ 149	
					SUBTOTAL	$ 2,013

MATERIALS / CONSUMABLES

ITEM	Description	Unit	Rate	Quantity	Extension	
Fuel	Diesel/gas	gallon	$ 3.41	200	$ 682	
Misc materials and consumables	Misc	L.S.	$ 1,000	1	$ 1,000	
Liners/covers	Consumables	SqFt	$ 0.50	400	$ 200	
			Profit	8%	$ 151	
					SUBTOTAL	$ 2,033

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension	
Office Trailer (local supply)	Office type	Month	$ 1,500	0.1	$ 100	
Per Diem	Per Diem	manday	$ 250	7	$ 1,750	
PPE/Safety	PPE/Safety	manday	$ 35	7	$ 245	
Petroleum contaminated Soil Treatment (cost based on Tbl D-2a, Alt C)	Onsite landfarm	Ton	$ 232.23	97	$ 22,414	
			Profit	8%	$ 1,961	
					SUBTOTAL	$ 26,469

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension	
Lab Analysis or Field Test Kit Sampling to guide excavation	Chemical analysis	10 cy	$ 25	9	$ 225	
Lab analysis for excavation confirmation (DRO/RRO, GRO/BTEX)	Chemical analysis	set	$ 275	3	$ 825	
Lab analysis for stockpile characterization (DRO/RRO, GRO/BTEX)	Chemical analysis	set	$ 275	3	$ 825	
			Profit	8%	$ 150	
					SUBTOTAL	$ 2,025

COST SUMMARY

COST		$ 38,525
Project Management	5.0%	$ 1,926
COST ESCALATION	6.0%	$ 2,427
	TOTAL	**$ 42,878**

SUBTOTALS	
TOTAL LABOR	$ 5,984
EQUIPMENT	$ 2,013
MATERIALS	$ 2,033
ODC	$ 26,469
SUBCONTRACT	$ 2,025
TOTAL	$ 38,525

Assumptions:
This estimate assumes mobilization and demobilization of equipment is covered under the Clean Sweep project, since it will rely on the same equipment. Mobilizing equipment for this job only would increase cost by approximately $200,000. Excavation work will require 1 day of field time.
One day of time is allotted for a crew of two to collect excavation confirmation and stockpile samples. Confirmation samples would be submitted for laboratory analysis on an expedited turnaround and analyzed for GRO/BTEX and DRO/RRO. Confirmation samples to be collected at ADEC-recommended intervals of 2 samples for first 250 ft^2 area and 1 sample for each additional 250 ft^2; stockpile samples would be collected 1 sample per 50 yd^3. Pricing assumes the tanks and piping are removed prior to excavation work.

Table 2-7 Detailed Capital and O&M Costs for Remedy Component Three (continued)

Table D-3b: Excavation of LF006

Description:
This scenario includes costs to excavate the contents of LF006. The landfill debris would be excavated using 2 excavators and 1 tracked dozer. The material would be separated using a Grizzly sorter/screener. Field screening of soil would be conducted and soils suspected of hydrocarbon and/or PCB contamination would be segregated. Confirmation and stockpile samples would be collected and submitted for laboratory analysis for DRO/RRO, GRO/BTEX, and PCBs. Hazcat field screening and waste characterization sampling would be conducted on an as-needed basis.
This does not include the costs for containerization of the debris and soil. It does not include the costs for transporting the debris and soil to an onsite landfill.

LABOR

Planning/Reporting (Documentation Labor)

Classification	Percentage	Subtotal	Extension
Professional Labor			
Various labor categories provide work plans and reports	8%	$ 305,682	$ 24,455
		SUBTOTAL	$ 24,455

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor - Construction Management					
Sr. Construction Manager	per hour	$ 139.09	36	1	$ 4,954
Administrator	per hour	$ 62.12	18	1	$ 1,106
Superintendent	per hour	$ 87.32	178	1	$ 15,551
SSHO/CQC/Sampler	per hour	$ 80.26	178	1	$ 14,294
Environmental Scientist (planning & reporting)	per hour	$ 103.39	178	1	$ 18,413
Local Craft DB Labor					
Operator Gp 1	per hour	$ 59.70	85	4	$ 20,251
Operator Gp 1 OT	per hour	$ 81.75	93	4	$ 30,505
Labor Gp 1	per hour	$ 50.53	85	2	$ 8,571
Labor Gp 1 OT	per hour	$ 67.55	93	2	$ 12,604
				SUBTOTAL	$ 134,743

EQUIPMENT / TOOLING

ITEM	Units	Unit	Rate	Qty. months	Extension
Air Compressor , tow behind 185 CFM -Purchase	1	L.S.	$ 4,500	0.53	$ 2,385
Utility Vehicle , 6 wheeler, crew / tools transport - 2ea - Purchase	2	L.S.	$ 9,000	0.53	$ 9,541
Tooling / Rigging	1	L.S.	$ 1,257	0.53	$ 666
End Dump (12 yard Capacity) - 1 truck	1	Month	$ 8,000	0.53	$ 4,240
Dozer, D-7 with ripper - 1 ea.	1	Month	$ 13,500	0.53	$ 7,156
Excavator, EX 400 - 2 ea	1	Month	$ 15,000	0.53	$ 7,951
Genset, 35kw	1	Month	$ 2,000	0.53	$ 1,060
Grizzly Sorter / Screener System	1	Month	$ 9,000	0.53	$ 4,770
Truck, pickup, crew cab - 2ea	2	Week	$ 2,000	0.53	$ 2,120
			Profit	8%	$ 3,191
				SUBTOTAL	$ 43,081

MATERIALS / CONSUMABLES

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	Diesel/gas	gallon	$ 4	1931	$ 7,722
O2, Acetylene, Cutoff Blades, Filters, etc.	Consumables	L.S.	$ 399	1	$ 399
			Profit	8%	$ 650
				SUBTOTAL	$ 8,771

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Per Diem	Per Diem	manday	$ 250	119	$ 29,683
PPE/Safety	PPE/Safety	manday	$ 35	119	$ 4,156
			Profit	8%	$ 2,707
				SUBTOTAL	$ 36,545

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Low level PCB soil transport and disposal in FBX	PCB soil	Ton	$ 650	17	$ 11,292
Non-RCRA regulated waste transport and disposal	Non-RCRA	Ton	$ 650	11	$ 6,971
RCRA regulated waste transport and disposal	RCRA	Ton	$ 1,500	4	$ 6,434
Laboratory analysis of excavated soil, wastes, and field screening	Chemical analysis	L.S.	$ 51,730	1	$ 51,730
			Profit	8%	$ 6,114
				SUBTOTAL	$ 82,542

COST SUMMARY

COST		$ 330,137
Project Management	5.0%	$ 16,507
COST ESCALATION	6.0%	$ 20,799
	TOTAL	**$ 367,442**

SUBTOTALS	
TOTAL LABOR	$ 159,198
EQUIPMENT	$ 43,081
MATERIALS	$ 8,771
ODC	$ 36,545
SUBCONTRACT	$ 82,542
TOTAL	$ 330,137

Assumptions:
Excavation work will require 12 days of field time. The excavation work level of effort is assumed to be equivalent for each disposal option for LF006. Mobilization of equipment and personnel is assumed to be part of the Clean Sweep demolition costs.
Backfill material will be separated from screened clean soil at LF006. The screened soil from LF006 will be used for filling the LF006 excavation to a height of 1.5 feet above mean sea level. Labor and equipment usage for this task are included in this cost estimate.
The estimated volume of the landfill is based on the estimated surface area provided by the CAD calculated area on Figure 11-1 in the RI report. It is assumed that the landfill debris is an average of 4 feet deep. It is assumed that the soil used to backfill will be compacted with tracked equipment at the site and not require specialized equipment.
Assumes any lead based paint on excavated landfill debris is not sufficient to make it a RCRA hazardous waste. Excavated debris will not need decontamination prior to disposal, other than gross removal of any contaminated soil.
Confirmation and stockpile sampling are based on ADEC guidance: 1 sample per 250 SF of surface area; 1 sample per 50 CY.

Table 2-7 Detailed Capital and O&M Costs for Remedy Component Three (continued)

Table D-3c: Onsite Landfill O&M for One Event in 5 Years

Description:
This scenario includes costs to fill a depressed area on the landfill that resulted from settling of the debris over time and annual inspections of the landfill for 5 years. For cost estimating purposes, a total area of 200 feet by 200 feet to a depth of 1 foot is assumed to need filling. Native material to be used to backfill the depression(s) should come from stockpiles from the construction of the landfill. If no material remains, gravel fill can be obtained from one end of the runway or from the former Bullen Point SRRS site area.

LABOR
Planning/Reporting (Documentation Labor)

Classification	Percentage	Sub Total	Quantity	Extension
Professional Labor				
Various labor categories provide annual inspections (5 years)	Each	$ 12,500	5	$ 62,500
Various labor categories report on O&M work	8%	$ 129,029	1	$ 10,322
			SUBTOTAL	$ 72,822

Classification	Pay Unit	Hourly Rate	Hours	Workers	Extension
Professional Labor					
Sr. Construction Manager	per hour	$ 139.09	6	1	$ 835
Administrator	per hour	$ 62.12	6	1	$ 373
Superintendent	per hour	$ 87.32	60	1	$ 5,239
Local Craft DB Labor					
Operator Gp 1	per hour	$ 59.70	40	2	$ 4,776
Operator Gp 1 OT	per hour	$ 81.75	20	2	$ 3,270
Labor Gp 1	per hour	$ 50.53	40	1	$ 2,021
Labor Gp 1 OT	per hour	$ 67.55	20	1	$ 1,351
				SUBTOTAL	$ 17,864

EQUIPMENT / TOOLING

ITEM	Units	Unit	Rate	Quantity	Extension
End Dump (12 yard Capacity) - 1 truck	1	Month	$ 8,000	0.3	$ 2,000
Dozer, D-7 with ripper - 1 ea.	1	Month	$ 13,500	0.3	$ 3,375
Wheeled Loader - Cat 988 - 2 ea (setup w/ forks, fork extension & bucket)	1	Month	$ 15,000	0.3	$ 3,750
			Profit	8%	$ 730
				SUBTOTAL	$ 9,855

MATERIALS / CONSUMABLES

ITEM	Description	Unit	Rate	Quantity	Extension
Fuel	Diesel/gas	gallon	$ 4	400	$ 1,600
			Profit	8%	$ 128
				SUBTOTAL	$ 1,728

OTHER DIRECT COSTS

ITEM	Description	Unit	Rate	Quantity	Extension
Airfare (Anch.>DHSE>Bullen)	Anch.>Bullen	round trip	$ 1,200	9	$ 10,800
Per Diem	Per Diem	manday	$ 250	33	$ 8,250
PPE/Safety	PPE/Safety	manday	$ 35	33	$ 1,155
			Profit	8%	$ 1,616
				SUBTOTAL	$ 21,821

SUBCONTRACTORS

COMPANY	Description	Unit	Rate	Quantity	Extension
Barge equipment to Bullen	mob	L.S.	$ 32,000	1	$ 32,000
Barge equipment to DHSE	demob	L.S.	$ 32,000	1	$ 32,000
Survey of new landfill	survey	L.S.	$ 8,000	1	$ 8,000
			Profit	8%	$ 5,760
				SUBTOTAL	$ 77,760

COST SUMMARY

COST		$	201,851
Project Management	5.0%	$	10,093
COST ESCALATION	6.0%	$	12,717
	TOTAL	**$**	**224,660**

LF006 Debris Onsite Landfill O&M costs for 5 years based on proportionate landfill volume	$ 43,124	19.2%
Clean Sweep Debris Onsite Landfill O&M costs for 5 years based on proportionate landfill volume	$ 181,536	80.8%

SUBTOTALS	
TOTAL LABOR	$ 90,687
EQUIPMENT	$ 9,855
MATERIALS	$ 1,728
ODC	$ 21,821
SUBCONTRACT	$ 77,760
TOTAL	$ 201,851

Assumptions:
Mobilization of equipment and personnel is included. Barge costs are assumed to be $32,000 per trip to bring the heavy equipment into the site and then take it back to Deadhorse. It is estimated to take 5 days for mob/demob and filling the depression(s).
The material used to fill the depression will be material mined from the runway or the SRRS site, or native material left over from building the landfill. However, gravel will not meet the permeability requirements for the final landfill cover material. Approval of either of these areas for removal of clean material will have to be approved prior to conducting this work.

2.12.4 Expected Outcomes of Selected Remedy

Following completion of the Selected Remedy, LF006 would be available for unrestricted residential land use. It is anticipated that excavation and off-site disposal of contaminated soils and debris will be completed in one construction season. There is no groundwater present at the site and therefore, no expected future uses for groundwater as a result of the Selected Remedy.

The purpose of this response action is to control risks posed by direct contact and ingestion of soil and minimize migration. The current potential for PCBs to migrate from the site is significant because of the erosion potential. PCBs are persistent in the environment and could bioaccumulate in human or ecological receptors.

Table 2-8 Cleanup Levels for Chemicals of Concern at LF006

Media: Soil
Site Area: LF006
Available Use: Residential
Controls to Ensure Restricted Use (if applicable): N/A

Chemical of Concern	Cleanup Level	Basis for Cleanup Level	Risk at Cleanup Level
PCBs	1 mg/Kg	18 AAC 75.341, Table B1	Cancer Risk = 1 X 10^{-5} Noncancer Risk = 1

Notes
mg/Kg – milligrams per kilogram

2.13 Statutory Determinations

Under CERCLA §121 (as required by NCP §300.430(f)(5)(ii)), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes: 1) a preference for remedies that employ treatment which permanently and significantly reduces the volume, toxicity, or mobility of hazardous wastes as a principal element; and 2) a bias against offsite disposal of untreated wastes. The following sections discuss how the selected remedy meets these statutory requirements.

2.13.1 Protection of Human Health and the Environment

The selected remedy, Alternative 3, will protect human health and the environment by permanently removing PCB-contaminated soil from the site. Future risk due to ingestion of animals that may bioaccumulate PCBs is also eliminated or reduced. Implementation of Alternative 3 will not pose unacceptable short-term risks or cross-media impacts.

2.13.2 Compliance with ARARs

Remedial actions must comply with both Federal and State ARARs. ARARs are legally applicable or relevant and appropriate requirements, standards, criteria, or limitations of Federal and State environmental laws and regulations.

ARARs fall into three categories: chemical-specific, location-specific, and action-specific. Chemical-specific ARARs are health-based or risk-management-based numbers that provide

concentration limits for the occurrence of a chemical in the environment. Location-specific ARARs restrict activities in certain sensitive environments. Action-specific ARARs are activity-based or technology-based, and typically control remedial activities that generate hazardous wastes (such as with those covered under the RCRA). Offsite shipment, treatment and disposal of excavated contaminated soil invoke action-specific ARARs. Criteria to be considered, or TBCs, are non-promulgated advisories or guidance issued by federal or state government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances, TBCs are considered along with ARARs.

Table 2-9 summarizes the ARARs and TBCs for the selected remedy at LF006 and describes how the selected remedy addresses each one.

The selected remedy complies with the chemical-specific, location-specific, and action-specific ARARs .

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Table 2-9 Description of ARARs and TBCs

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Action-Specific	Federal Regulatory Requirement	Soil	Toxic Substances Control Act	Applicable	Contains rules relating to the storage and disposal of PCB remediation waste and the PCB spill cleanup policy.	The selected remedy will comply with these regulations through proper disposal of TSCA regulated wastes.
Action-Specific	Federal Regulatory Requirement	Soil	General Industrial Standards for Workers (29 CFR 1910.210)	Applicable	Outlines required protections for workers.	The selected remedy will comply with these regulations through use of appropriate PPE and training for proper handling of hazardous materials or wastes.
Action-Specific	Federal Regulatory Requirement	Soil	HAZWOPER (29 CFR 1910.120 and 40 CFR 311)	Applicable	Outlines worker protection during hazardous waste cleanup.	All on-site workers will be required to have HAZWOPER certification.
Action-Specific	Federal Regulatory Requirement	Soil	Hazardous Materials Transportation	Applicable	Transportation regulations for shippers and transporters of hazardous materials.	The selected remedy will comply with these regulations through proper packaging and transport of all hazardous waste.
Action-Specific	State Regulatory Requirement	Soil	Those provisions within 18 AAC 60 (May 2007) applying to Class III MSWLF at Bullen Point	Applicable	Provides standards and requirements for solid waste management to ensure that landfills are designed, built, and operated to minimize health and safety threats, pollution, and nuisances. Each type of waste must be placed only in a landfill that meets the standards for that type of waste.	The selected remedy will comply with these regulations during construction of the new landfill.
Chemical-Specific	42 USC 9620(a)(4)	Soil	Alaska Soil Cleanup Rules 18 AAC 75.340-341	Applicable	In general, cleanup to 1 ppm PCBs in soil is required.	1 ppm PCBs in order to have closure without institutional controls.

Table 2-9 (continued)

Type	Authority	Medium	Requirement	Status	Synopsis of Requirement	Action to be Taken to Attain Requirement
Location-Specific	Federal Regulatory Requirement	Soil	Native American Grave Protection and Repatriation Act	TBC	Provides for the protection of Native American graves and for other related areas.	No Native American grave sites have been identified at the site; however, procedures for reporting and protection of graves will be followed if encountered during implementation of the selected remedy.
Location-Specific	Federal Regulatory Requirement	Soil	Marine Mammal Protection Act	TBC	Provides for the protection and management of marine mammals and their products. Includes walruses, polar bears, sea otters, whales, porpoises, seals, and sea lions.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Migratory Bird Treaty Act	TBC	Protects any migratory bird; any part, nest, or eggs of any such bird.	The selected remedy will not impact protected species through engineering controls or avoidance measures.
Location-Specific	Federal Regulatory Requirement	Soil	Endangered Species Act	TBC	Establishes requirements to protect species threatened by extinction and habitats critical to their survival. Federally listed threatened and endangered species known to occur in the Bullen Point area are the threatened spectacled eider (*Somateria fischeri*) and Steller's eider (*Polysticta stelleri*) and the endangered bowhead whale (*Balaena mysticeus*);	The selected remedy will not impact protected species through engineering controls or avoidance measures.

2.13.3 Cost Effectiveness

In the USAF's judgment, the selected remedy is cost-effective and represents a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (40 CFR 300.430[f][1][ii][D]). This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria (that is, is protective of human health and the environment and ARAR-compliant).

Overall effectiveness was evaluated by assessing three of the five balancing criteria in combination: long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; and short-term effectiveness. Overall effectiveness was then compared to costs to determine cost-effectiveness. The overall effectiveness of the selected remedy for LF006 was demonstrated in the comparative analysis of alternatives (Section 2.10 – Summary of Comparative Analysis of Alternatives) and is summarized in Table 2-9 below. The estimated present worth cost of the selected remedy (in 2006 dollars) is $618,641. In addition, the selected remedy will allow the site to meet the conditions for land transfer to the State of Alaska and permit the USAF to construct a new solid waste landfill at Bullen Point. This landfill would receive nonhazardous waste from the Clean Sweep demolition activities, include non-hazardous debris and acceptable petroleum contaminated soils from LF006. The ability to construct and utilize an onsite landfill results in significant cost savings to the USAF under multiple programs (ERP, Clean Sweep, and Environmental Compliance).

Table 2-10 Cost and Effectiveness Summary for LF006

Alternative	Present-Worth Cost[1]	Incremental Cost (if applicable)	Long-Term Effectiveness and Permanence	Reduction of TMV Through Treatment	Short-Term Effectiveness
1 – No Action	$0	N/A	No reduction in long-term risk to human health and the environment.	No reduction in toxicity, mobility or volume.	No short term risk to workers. Current risk due to direct contact would still exist.
2 – Landfill Stabilization	$2,439,349	N/A	Effective at minimizing contaminant migration if maintained. Long-term stability (>75 years) of the structure is uncertain.	No reduction in volume or toxicity. Mobility of waste is reduced while maintained.	No short term risk to workers, community and the environment.
3 – Landfill Removal and Onsite Disposal	$618,641	N/A	Prevents dispersion of waste for the long term, except for the possibility that an interior landfill at Bullen Point may be subject to erosion at a later date (approximately 800 year time frame).	PCB-contaminated soil, if present, would not be treated but its mobility would be reduced. The volume of nonhazardous debris would remain constant. However, its potential for mobility would decrease significantly.	There may be some physical hazards to workers while handling the debris. Debris could disperse during transport if not managed properly. The construction of a new landfill would result in a disturbance to the environment (native tundra).
4 – Landfill Removal and Offsite Disposal	$1,399,169	N/A	Permanent reduction in long-term risk. Future risk due to bioaccumulation potential of PCBs is also reduced.	No reduction in volume or toxicity; however, the potential for mobility of PCBs would be decreased through shipment of the contaminated soils or debris off-site.	The physical hazards and risk of debris dispersion is slightly greater than an on site landfill because of the greater handling and transport distance. No new areas would need to be disturbed.

Cost Effectiveness Summary

- Alternatives 1 and 2 are not considered to be cost effective.
- While Alternative 4 is considered to be cost effective, Alternative 3 provides a potentially greater return on investment.

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies

The USAF has determined that the selected remedy provides the best balance of trade-offs among the alternatives with respect to the five balancing criteria set out in NCP 300.430(f)(1)(i)(B). Although no treatment is being utilized, the selected remedy provides the most effective, long-term solution given the conditions at the site. The selected remedy for addressing the risk posed by LF006 is Alternative 3 – removal of the landfill and disposal of the nonhazardous debris in an onsite landfill. This alternative is cost effective because the majority of the waste does not need to be shipped off site. It also is protective of human health and the environment and provides good long-term effectiveness. Although Alternative 4 may provide slightly better long-term effectiveness, it does so at a significantly greater cost, which is not warranted based on the risk.

As a component of the selected remedy, offsite landfilling of any PCB-contaminated soil greater than 1 mg/Kg at Bullen Point is protective of human health and the environment, readily implementable, and cost effective in comparison to other alternatives. The equipment required to treat PCBs on site is sophisticated and large, which makes their mobilization and operation difficult and expensive. There is also the risk of air emissions. Offsite treatment would require shipping the soils to the lower 48 states, which is logistically difficult and more costly than disposing of the soils within Alaska or the lower 48 states. The option of landfill stabilization would require continued inspections and possibly maintenance. Due to the site location, this maintenance would be logistically difficult and expensive.

The selected remedy manages the potential risks to human health and the environment by permanently removing PCB-contaminated soil from the site.

2.13.5 Preference for Treatment as a Principal Element

The NCP establishes the expectation that treatment will be used to address the principal threats posed by a site wherever practicable (40 CFR 300.430[a][1][iii][A]). The selected remedy for LF006 does not satisfy the statutory preference for treatment as a principal element of the remedy because on-site treatment options were not viable given the remote location, limited infrastructure and arctic climate at Bullen Point.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy will not result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure, a statutory review will not be required within five years after initiation of the remedial action to verify that the remedy is, or will be, protective of human health and the environment.

2.14 Documentation of Significant Changes

The Proposed Plan for LF006 was released for public comment on October 17, 2006. The Proposed Plan identified Alternative 3 – Landfill Removal and Onsite Disposal as the Preferred Alternative for PCB-contaminated soil remediation. The USAF 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.

3.0 Responsiveness Summary

This section provides a summary of the public comments regarding the *Proposed Plan for Eight ERP Sites at Bullen Point Short Range Radar Station*. At the time of the public review period, the USAF had proposed Alternative 3 – Landfill Removal and Onsite Disposal as the preferred remedy for the Old Landfill (LF006); however, remediation of petroleum contamination will be performed in accordance with Alaska State regulations. *No written or verbal comments were received on the Proposed Plan.*

Decision Document
Shed No. 1 (SS001)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

PART 1: THE DECLARATION

SITE NAME AND LOCATION: This Environmental Restoration Program (ERP) site is known as the Shed No. 1, or SS001. It is located at Bullen Point Short Range Radar Station (SRRS), near Mikkelson Bay and Deadhorse, Alaska. The Alaska Department of Environmental Conservation (ADEC) Record Key number for this site is 200436X121301, and it is located at 70°10'36.77" N latitude, 146°51'13.58" W longitude (these coordinates represent the location of sample SS001SS03, which is at the approximate center of the site).

STATEMENT OF BASIS AND PURPOSE: This Decision Document presents the Air Force's decision that no action is necessary under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to respond to the location "Shed No. 1" (SS001), at Bullen Point SRRS, Alaska. Under CERCLA, no action is appropriate because the site does not pose unacceptable potential risk to human health or the environment. Releases at this site are solely petroleum products, and under CERCLA 101 (14) and (33), petroleum products, including any fractions or derivatives of crude oil, are excluded from the definitions of hazardous substances, pollutants, or contaminants. The decision is made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record file for this site. The State of Alaska, Department of Environmental Conservation, concurs that no action is necessary under CERCLA. The U.S. Environmental Protection Agency (USEPA) has deferred regulatory authority at Bullen Point SRRS to the ADEC.

DESCRIPTION OF THE SELECTED REMEDY: No remedy has been proposed or selected under CERCLA, as releases at the site are excluded from the CERCLA definitions of hazardous substances, pollutants, or contaminants.

STATUTORY DETERMINATIONS: No further action is required under CERCLA. Releases of petroleum and related substances identified at SS001 will be addressed in accordance with State of Alaska laws and regulations; because petroleum is excluded from the definition of hazardous substances and pollutants and contaminants under 42 USC § 9601 (14) and (33).

AUTHORIZING SIGNATURES: These signatures document the United States Air Force and ADEC approval of the remedy selected in this Decision Document for Shed No. 1 (SS001) Bullen Point SRRS, Alaska.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson

10 OCT 07

BRENT A. JOHNSON
Colonel, USAF
Commander, 611th Air Support Group

Date

8/30/07

JOHN HALVERSON
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

PART 2: THE DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION: The location "Shed No. 1" is designated as SS001. SS001 is part of Bullen Point SRRS, located on the east-central shore of Mikkelson Bay. The shed is located within the POL tank farm (ERP Site ST005) on the gravel pad north of the module trains and active radar. The Shed No. 1 is a wood-framed structure with a concrete floor. The POL tank farm and surrounding pad consists of sandy gravel fill over native soils. A site map is included in Figure 2-1. The CERCLA lead agency addressing SS001 is the United States Air Force (USAF), and the support agency is the State of Alaska Department of Environmental Conservation.

SITE HISTORY AND ENFORCEMENT ACTIVITIES: Bullen Point SRRS was operated as an auxiliary Distant Early Warning Line Station between 1953 and 1971. The installation was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to a SRRS, consisting of a new radar system, a support building, and a helicopter landing area. The SRRS has operated since 1994 and is unmanned except for periodic maintenance visits. Shed No. 1 (SS001) is a former flammable liquid storage shed located north of the module train near the new radome. It is located on the same gravel pad as the POL Tanks, approximately 150 feet south of the tank farm. The inactive structures at Bullen Point SRRS are scheduled for demolition under the USAF Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn will transfer the land to the State of Alaska based on the State's expressed interest in the property. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of Diesel Range Organics (DRO) in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for Residual Range Organics (RRO) in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup levels for DRO and RRO in the native soils (e.g., tundra and peat) are the Method Two soil cleanup levels for the Arctic Zone.
- Removal of inactive facilities that have no utility (value) to the future landowner.

SS001 was investigated in 2004. Studies and reports providing details can be found in the Administrative Record file or the Information Repository. All SS001 investigations and actions from 2004 are summarized or documented in the "*Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites, Final, June 2005*" (USAF 2005).

COMMUNITY PARTICIPATION: A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review at a public meeting in Kaktovik on October 17, 2006. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. The USAF received no requests to extend the public comment period, and no written or verbal comments were received regarding the Proposed Plan.

Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board meetings. A Restoration Advisory Board was formed in Kaktovik in 1998 and typically meets quarterly. A mailing list of interested parties is also maintained and updated

regularly by the Air Force Community Relations Coordinator. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. A website with the administrative record current up through 2003 is also available to the public at: http://www.adminrec.com/PACAF.asp?Location=Alaska. Four Information Repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation. The most recent Management Action Plan was published in 2004 (USAF 2004) and is part of the Administrative Record.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION: The site is not part of an operable unit. There are seven other sites at Bullen Point being addressed under the Air Force Environmental Restoration Program; however, there is no anticipated migration of contaminants or chemical interaction between this site and the other sites. There is no potential for a response action at this site to affect response actions at any other site.

SITE CHARACTERISTICS: In 1987, several dozen 1- to 5-gallon containers of paint thinner, degreaser, and oil were found in the shed. These were removed in 1988 and shipped off site for disposal. Seven soil samples were collected from five borings in the vicinity of Shed No. 1 and analyzed for fuels (DRO, RRO, and gasoline range organics [GRO]), volatile organic compounds, polynuclear aromatic hydrocarbons, polychlorinated biphenyls, and Resource Conservation and Recovery Act-designated metals during a remedial investigation (RI) conducted by HCG in 2004. The RI confirmed that petroleum substances (primarily diesel fuel) have been released to the soil surrounding the shed. CERCLA regulated hazardous substances such as lead, arsenic and other heavy metals were detected; however, these hazardous substances were detected at concentrations below the regulatory and risk-based cleanup standards. PCBs were not detected. A summary of the sample results in which compounds were detected is provided in Table 2-1. Subsurface water was encountered in some of the soil borings at a depth of approximately 0.75 to 2.5 feet below ground surface; permafrost was not encountered at this site. Groundwater is not a current or future source of drinking water at Bullen Point SRRS. The RI determined that contamination is not likely to pose a threat to surrounding surface waters. No additional investigation is necessary. The contaminants of concern are limited to fuel and related substances. No CERCLA contaminants of concern have been identified at SS001. The ADEC has indicated that the remedial investigation report has met the requirements of State regulation in regards to the investigation of SS001. Details may be found in the Administrative Record File or the Information Repository.

STATUTORY AUTHORITY FINDING: Only fuel and related substances are associated with this site. No action is necessary under CERCLA because petroleum is excluded from the definition of hazardous substances and pollutants and contaminants under 42 USC § 9601 (14) and (33). Releases of petroleum and related substances identified at SS001 will be addressed in accordance with State of Alaska laws and regulations.

REFERENCES:

USAF. 2004. *Management Action Plan, Bullen Point Short Range Radar Station, Alaska.* February.

USAF. 2005. *Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites (Final).* June.

Table 2-1 SS001 Summary of Soil Sample Results

Analyte[1]	Screening Criteria		2004 RI/FS Maximum Concentration[5,6]	2004 RI/FS Frequency of Detections[6,7]
	18 AAC 75 Method Two Soil Cleanup Level for the Arctic Zone [2] (mg/Kg)	Land Transfer Criteria (mg/Kg)		
Fuels				
GRO	1,400	1,400	236 J	3/3
DRO	12,500	2,000[3]	**7,320**	7/7
RRO	13,700	2,000[4]	1,000 J	7/7
VOCs (Method 8260)				
Benzene	13	13	0.00886 F	1/3
Ethylbenzene	89	89	0.225	2/3
Methylene chloride	270	270	0.165 B,F	3/3
1,2,4-Trimethylbenzene	138	138	8.72	3/3
1,3,5-Trimethylbenzene	48.8	48.8	4.26	3/3
Toluene	180	180	0.0503 F	1/3
Xylene (total)	81	81	2.553	3/3
PAH (Method 8270C SIM)				
Anthracene	41,000	41,000	0.0327 F	1/3
Benzo(a)Anthracene	15	15	0.00213 F	2/3
Benzo(b)]Fluoranthene	15	15	0.00312 F	1/3
Benzo(k)fluoranthene	150	150	0.00258 F	1/3
Chrysene	1,500	1,500	0.00473 F	2/3
Fluoranthene	5,500	5,500	0.00686	1/3
Fluorene	5,500	5,500	0.959	2/3
Naphthalene	180	180	2.49	3/3
Pyrene	4,100	4,100	0.0137	2/3
RCRA Metals (Method 6020)				
Arsenic	8	8	4.35	2/2
Barium	9,600	9,600	41.7 M	2/2
Cadmium	140	140	0.306	2/2
Chromium	410	410	5.56	2/2
Lead	400	400	5.53	2/2
Mercury	26	26	0.0489 F	1/2
Selenium	680	680	0.513 F	2/2

Notes:

1- Only detected compounds or compounds of interest are shown. PCBs were not detected.

2- The Method Two soil cleanup level for the Arctic Zone corresponds to the lowest value for ingestion or inhalation as listed in 18 AAC 75.341, Tables B1 and B2. Method Two soil cleanup levels are protective of human health under a residential scenario. In native soils or below 2 feet bgs, the Method Two soil cleanup levels for DRO and RRO of 12,500 and 13,700 mg/Kg will apply.

3- The land transfer criteria of 2,000 mg/Kg DRO is based on the American Petroleum Institute (1996) residual saturation value for DRO in coarse gravel. This cleanup level will be applied to surface soils and gravel fill areas (0-2 feet bgs). For the site conditions, this cleanup level is considered "protective of migration to surface water" as required by 18 AAC 75.342, Table B2, Note 7.

4- The 2,000 mg/Kg RRO cleanup level is the 18 AAC 75.341, Table A2 Method One soil cleanup level for the Arctic Zone. This cleanup level is applicable to surface soils and gravel fill areas (0-2 feet bgs).

5- The highest detected values are shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.

6- 2004 data taken from the Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska (USAF 2005).

7- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

Abbreviations

F	Estimated quantity below the PQL	PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act	PAH	Polynuclear aromatic hydrocarbons
M	Matrix effect was noted	VOCs	Volatile organic compounds
U	Compound not detected; PQL in adjacent parentheses	J	Estimated value
mg/Kg	milligrams per kilogram	NS	Not Sampled

Bold and shaded result indicates an exceedance of the screening criteria.

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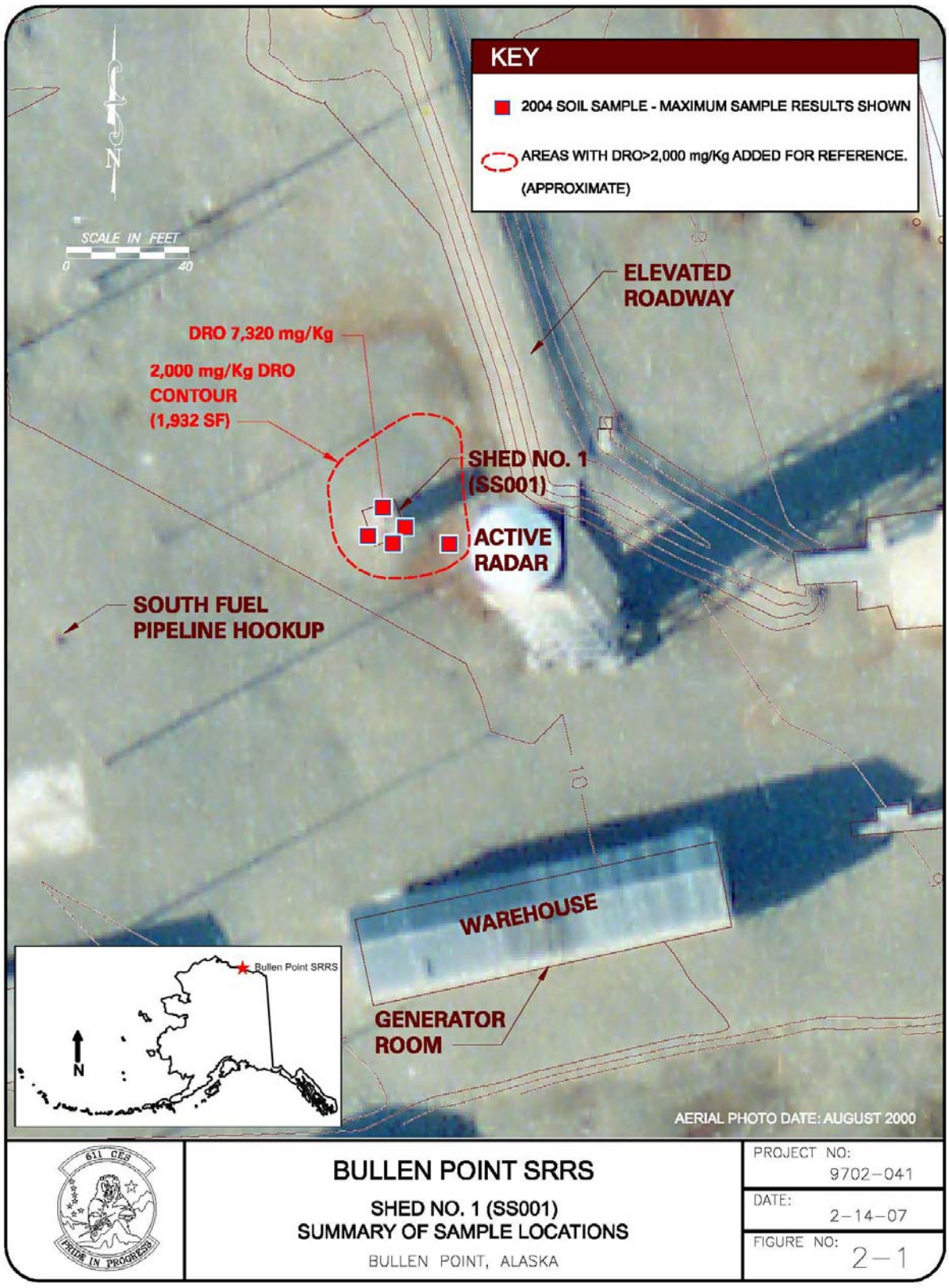
Figure 2-1 SS001 Site Map and Summary of Sample Locations



Decision Document
Pump House/Shed No. 2 (SS002)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

PART 1: THE DECLARATION

SITE NAME AND LOCATION: This Environmental Restoration Program (ERP) site is known as the Pump House, SS002. It is located at Bullen Point Short Range Radar Station (SRRS), near Mikkelson Bay and Deadhorse, Alaska. The Alaska Department of Environmental Conservation (ADEC) Record Key number for this site is 198936X102502, and it is located at 70°10'38.52" N latitude, 146°51'12.74" W longitude (these coordinates represent the location of sample SS002SS01, which is at the approximate center of the site).

STATEMENT OF BASIS AND PURPOSE: This Decision Document presents the Air Force's decision that no action is necessary under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to respond to the Pump House (SS002), at Bullen Point SRRS, Alaska. Releases at this site are solely petroleum products, and under CERCLA 101 (14) and (33), petroleum products, including any fractions or derivatives of crude oil, are excluded from the definitions of hazardous substances, pollutants, or contaminants. The decision is made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record file for this site. The State of Alaska, Department of Environmental Conservation, concurs that no further action is required under CERCLA. The United States Environmental Protection Agency (USEPA) has deferred regulatory authority at Bullen Point SRRS to the ADEC.

DESCRIPTION OF THE SELECTED REMEDY: No remedy has been proposed or selected under CERCLA, as releases at the site are excluded from the CERCLA definitions of hazardous substances, pollutants, or contaminants.

STATUTORY DETERMINATIONS: Only fuel and related substances are associated with this site. No action is required under CERCLA because petroleum is excluded from the definition of hazardous substances and pollutants and contaminants under 42 USC § 9601 (14) and (33). Releases of petroleum and related substances identified at SS002 will be addressed in accordance with State of Alaska laws and regulations.

AUTHORIZING SIGNATURE: This Decision Document documents the United States Air Force's Bullen Point SRRS site SS002.

This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may cause a risk to human health or the environment.

Brent A. Johnson — 1 OCT 07

BRENT A. JOHNSON
Colonel, USAF
Commander, 611th Air Support Group

Date

8/30/07

JOHN HALVERSON
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

PART 2: THE DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION: The Pump House is designated as SS002 and is also known as "Shed No. 2." SS002 is part of Bullen Point SRRS, located on the east-central shore of Mikkelson Bay. The shed is located within the POL tank farm (ERP Site ST005) on the gravel pad north of the module trains and active radar. The Pump House is a wood-framed structure with a concrete floor. The POL tank farm and surrounding pad consists of sandy gravel fill over native soils. A site map is included in Figure 2-1. The CERCLA lead agency addressing SS002 is the United States Air Force (USAF), and the support agency is the State of Alaska Department of Environmental Conservation.

SITE HISTORY AND ENFORCEMENT ACTIVITIES: Bullen Point SRRS was operated as an auxiliary Distant Early Warning Line Station between 1953 and 1971. The installation was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to a SRRS, consisting of a new radar system, a support building, and a helicopter landing area. The SRRS has operated since 1994 and is unmanned except for periodic maintenance visits. The POL Pump House, or Shed No. 2 (SS002) is located within the POL tank farm, on the gravel pad north of the module trains and active radar. The inactive structures at Bullen Point SRRS are scheduled for demolition under the USAF Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn will transfer the land to the State of Alaska based on the State's expressed interest in the property. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of Diesel Range Organics (DRO) in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for Residual Range Organics (RRO) in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup levels for DRO and RRO in the native soils (e.g., tundra and peat) are the Method Two soil cleanup levels for the Arctic Zone.
- Removal of inactive facilities that have no utility (value) to the future landowner.

SS002 was investigated in 1993 and 2004. Studies and reports providing details can be found in the Administrative Record file or the Information Repository. All SS002 investigations and actions from 1993 to 2004 are summarized or documented in the "*Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites, Final, June 2005*" (USAF 2005).

COMMUNITY PARTICIPATION: A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review at a public meeting in Kaktovik on October 17, 2006. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. The USAF received no requests to extend the public comment period, and no written or verbal comments were received regarding the Proposed Plan.

Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board meetings. A Restoration Advisory Board was formed in Kaktovik in 1998 and

typically meets quarterly. A mailing list of interested parties is also maintained and updated regularly by the Air Force Community Relations Coordinator. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. A website with the administrative record current up through 2003 is also available to the public at: http://www.adminrec.com/PACAF.asp?Location=Alaska. Four Information Repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation. The most recent Management Action Plan was published in 2004 (USAF 2004) and is part of the Administrative Record.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION: The site is not part of an operable unit. There are seven other sites at Bullen Point being addressed under the Air Force Environmental Restoration Program; however, there is no anticipated migration of contaminants or chemical interaction between this site and the other sites. There is no potential for a response action at this site to affect response actions at any other site.

SITE CHARACTERISTICS: In 1988, approximately 8 inches of water and half an inch of oil were discovered on top of the concrete floor of the Pump House. That same year, the water and oil were removed from the building and sent off site for disposal. Five soil samples were collected from the POL tank farm, including within the vicinity of the Pump House during a remedial investigation in 2004. These samples were analyzed for fuels (DRO, RRO, and gasoline range organics [GRO]), benzene, toluene, ethylbenzene, xylenes, and polynuclear aromatic hydrocarbons. A summary of the sample results in which compounds were detected is provided in Table 2-1. Subsurface water was encountered in most of the soil borings at a depth of approximately 3 feet below ground surface. Groundwater is not a current or future source of drinking water at Bullen Point SRRS. The remedial investigations determined that contamination is not likely to pose a threat to surrounding surface waters. No additional investigation is necessary. The contaminants of concern are limited to fuel and related substances. No CERCLA hazardous substances are associated with the site. The ADEC has indicated that the remedial investigation report has met the requirements of State regulation in regards to the investigation of SS002. Details may be found in the Administrative Record File or the Information Repository.

STATUTORY AUTHORITY FINDING: Only fuel and related substances are associated with this site. No further action is required under CERCLA because petroleum is excluded from the definition of hazardous substances and pollutants and contaminants under 42 USC § 9601 (14) and (33). Releases of petroleum and related substances identified at SS002 will be addressed in accordance with State of Alaska laws and regulations.

REFERENCES:

ICF. 1996. *Final Remedial Investigation and Feasibility Study, Bullen Point Radar Installation, Alaska*. March 18.

USAF. 2004. *Management Action Plan, Bullen Point Short Range Radar Station, Alaska.* February.

USAF. 2005. *Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites (Final).* June.

Table 2-1 SS002 Summary of Soil Sample Results

Analyte[1]	Screening Criteria		2004 RI/FS Maximum Concentration[5,6]	2004 RI/FS Frequency of Detections[6,7]
	18 AAC 75 Method Two Soil Cleanup Level for the Arctic Zone [2] (mg/Kg)	Land Transfer Criteria (mg/Kg)		
Fuels				
GRO	1,400	1,400	183 J	3/3
DRO	12,500	2,000[3]	**3,340**	5/5
RRO	13,700	2,000[4]	**12,200**	5/5
VOCs (Method 8021)				
Benzene	13	13	0.00772 F	2/3
Ethylbenzene	89	89	0.141	3/3
Toluene	180	180	U (0.0201)	0/3
Xylene (total)	81	81	2.082	3/3
PAHs (Method 8270C SIM)				
Anthracene	41,000	41,000	0.0032 F	1/1
Fluorene	5,500	5,500	0.0565	1/1
Naphthalene	180	180	0.11	1/1
Phenathrene	--	--	0.0272	1/1

Notes

1- Only detected compounds or compounds of interest are shown.

2- The Method Two soil cleanup level for the Arctic Zone corresponds to the lowest value for ingestion or inhalation as listed in 18 AAC 75.341, Tables B1 and B2. Method Two soil cleanup levels are protective of human health under a residential scenario. In native soils or below 2 feet bgs, the Method Two soil cleanup levels for DRO and RRO of 12,500 and 13,700 mg/Kg will apply.

3- The land transfer criteria of 2,000 mg/Kg DRO is based on the American Petroleum Institute (1996) residual saturation value for DRO in coarse gravel. This cleanup level will be applied to surface soils and gravel fill areas (0-2 feet bgs). For the site conditions, this cleanup level is considered "protective of migration to surface water" as required by 18 AAC 75.342, Table B2, Note 7.

4- The 2,000 mg/Kg RRO cleanup level is the 18 AAC 75.341, Table A2 Method One soil cleanup level for the Arctic Zone. This cleanup level is applicable to surface soils and gravel fill areas (0-2 feet bgs).

5- For soil/sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.

6- 2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).

7- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

Abbreviations

"--"	Screening criteria does not exist for this compound	PQL	Practical Quantitation Limit
F	Estimated quantity below the PQL	PAH	Polynuclear aromatic hydrocarbons
NS	Not Sampled	VOCs	Volatile organic compounds
U	Compound not detected w/PQL in adjacent parentheses	J	Estimated value
mg/Kg	milligrams per kilogram		

Bold and shaded results indicate exceedances of the applicable screening criteria.

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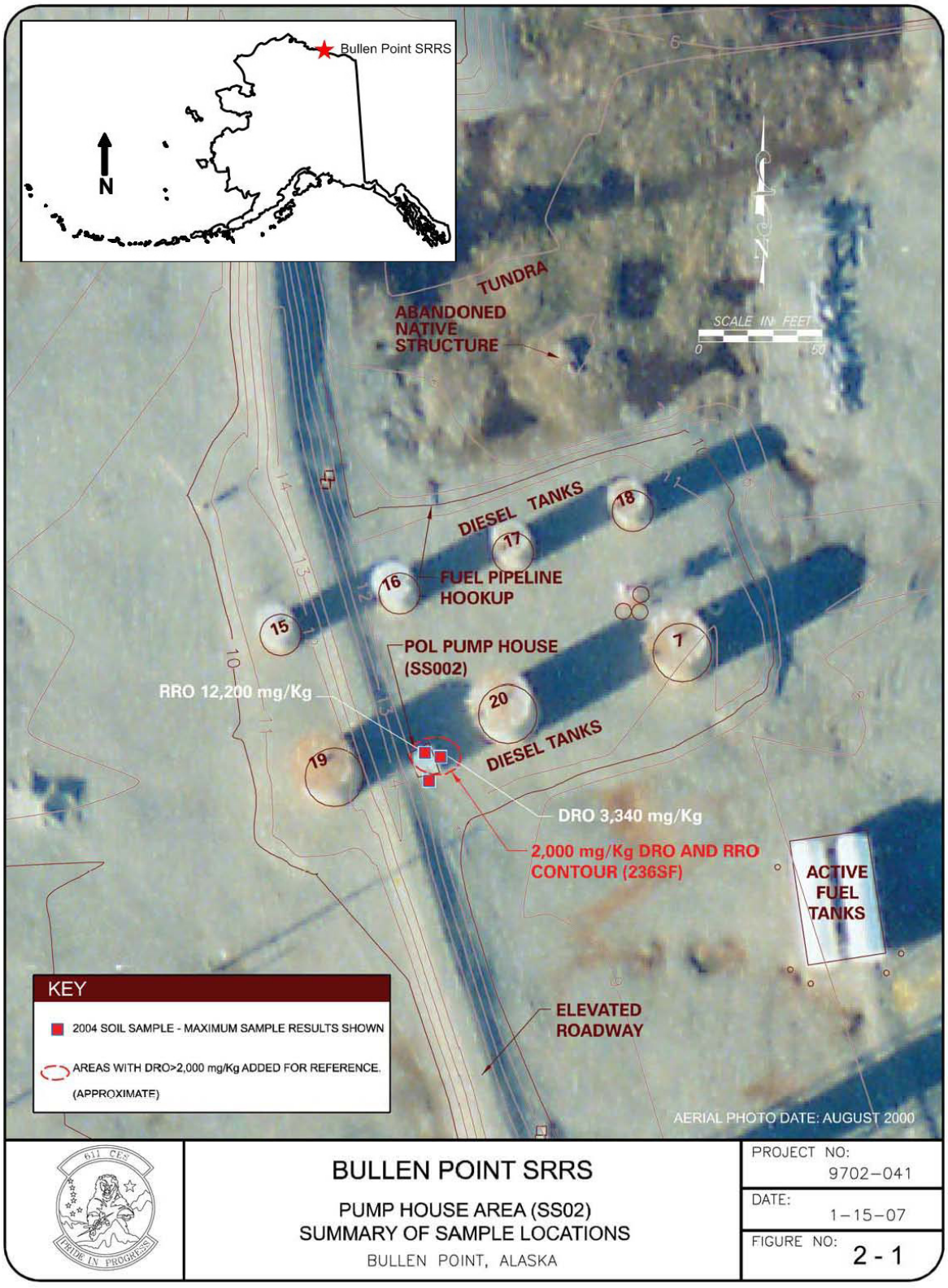
Figure 2-1 SS002 Site Map and Summary of Sample Locations



Decision Document
Drum Storage Area (ST007)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

PART 1: THE DECLARATION

SITE NAME AND LOCATION: This Environmental Restoration Program (ERP) site is known as the Drum Storage Area, ST007. It is located at Bullen Point Short Range Radar Station (SRRS), near Mikkelson Bay and Deadhorse, Alaska. The Alaska Department of Environmental Conservation (ADEC) Record Key number for this site is 198936X102503, and it is located at 70°10'40.21" N latitude, 146°51'8.31" W longitude (these coordinates represent the location of sample ST007SS02, which is at the approximate center of the site).

STATEMENT OF BASIS AND PURPOSE: This Decision Document presents the Air Force's decision that no further action is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or under State of Alaska laws and regulations to respond to the Drum Storage Area (ST007), at Bullen Point SRRS, Alaska. Releases at this site are solely petroleum products, and under CERCLA 101 (14) and (33), petroleum products, including any fractions or derivatives of crude oil, are excluded from the definitions of hazardous substances, pollutants, or contaminants. The decision is made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record file for this site. The State of Alaska, Department of Environmental Conservation concurs. The United States Environmental Protection Agency (USEPA) has deferred regulatory authority at Bullen Point SRRS to the ADEC.

DESCRIPTION OF THE SELECTED REMEDY: No further action is the selected remedy under state law.

STATUTORY DETERMINATIONS: Only fuel and related substances are associated with this site. The risk attributed to the concentrations of petroleum and related substances detected at ST007 has been determined to be insignificant and below risk thresholds established by ADEC. The site conditions are protective of human health under all current and projected site uses, including unrestricted residential land use. Concentrations of petroleum and related compounds do not exceed the most stringent Method Two Soil Cleanup Levels and Groundwater Cleanup Levels established in 18 AAC 75, therefore the site is considered closed.

AUTHORIZING SIGNATURE: These signatures document the USAF and ADEC approval of the remedy selected in this Record of Decision for site ST007 at Bullen Pont. This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may pose an unacceptable risk to human health or the environment.

Brent A. Johnson — 10 OCT 07

BRENT A. JOHNSON
Colonel, USAF
Commander, 611th Air Support Group

Date

8/30/07

JOHN HALVERSON
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

Date

PART 2: THE DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION: The Drum Storage Area is designated as ST007. ST007 is part of Bullen Point SRRS, located on the east-central shore of Mikkelson Bay. The drum storage area is located on the same gravel pad as the POL tank farm (ERP Site ST005), and approximately 100 feet northeast of the berm surrounding the tanks. The site was reportedly used to store drummed fluids, including solvents, antifreeze, and lube oil. The area consists of a gravel pad elevated approximately two feet above the tundra. Wooden posts that supported a platform to store drums are still present. A site map is included in Figure 2-1. The CERCLA lead agency addressing ST007 is the United States Air Force (USAF), and the support agency is the State of Alaska Department of Environmental Conservation.

SITE HISTORY AND ENFORCEMENT ACTIVITIES: Bullen Point SRRS was operated as an auxiliary Distant Early Warning Line Station between 1953 and 1971. The installation was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to a SRRS, consisting of a new radar system, a support building, and a helicopter landing area. The SRRS has operated since 1994 and is unmanned except for periodic maintenance visits. The Drum Storage Area (ST007) is located on the same gravel pad as the POL tanks (ST005), approximately 100 feet northeast of the berm surrounding the tanks. The inactive structures at Bullen Point SRRS are scheduled for demolition under the USAF Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn will transfer the land to the State of Alaska based on the State's expressed interest in the property. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of Diesel Range Organics (DRO) in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for Residual Range Organics (RRO) in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup levels for DRO and RRO in the native soils (e.g., tundra and peat) are the Method Two soil cleanup levels for the Arctic Zone.
- Removal of inactive facilities that have no utility (value) to the future landowner.

ST007 was investigated in 1993 and 2004. Studies and reports providing details can be found in the Administrative Record file or the Information Repository. All ST007 investigations and actions from 1993 to 2004 are summarized or documented in the "*Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites, Final, June 2005*" (USAF 2005).

COMMUNITY PARTICIPATION: A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review at a public meeting in Kaktovik on October 17, 2006. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. The USAF received no requests to extend the public comment period, and no written or verbal comments were received regarding the Proposed Plan.

Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board meetings. A Restoration Advisory Board was formed in Kaktovik in 1998 and typically meets quarterly. A mailing list of interested parties is also maintained and updated regularly by the Air Force Community Relations Coordinator. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. A website with the administrative record current up through 2003 is also available to the public at: http://www.adminrec.com/PACAF.asp?Location=Alaska. Four Information Repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation. The most recent Management Action Plan was published in 2004 (USAF 2004) and is part of the Administrative Record.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION: The site is not part of an operable unit. There are seven other sites at Bullen Point being addressed under the Air Force Environmental Restoration Program; however, there is no anticipated migration of contaminants or chemical interaction between this site and the other sites. There is no potential for a response action at this site to affect response actions at any other site.

SITE CHARACTERISTICS: Soil samples were collected from the Drum Storage area during a series of remedial investigations (RIs) in 1993 and 2004. These samples were analyzed for fuels (DRO, RRO, and gasoline range organics[GRO]), polynuclear aromatic hydrocarbons, volatile organic compounds, and polychlorinated biphenyls. A summary of the sample results in which compounds were detected is provided in Table 2-1. Groundwater is not a current or future source of drinking water at Bullen Point SRRS. The RIs determined that contamination is not likely to pose a threat to surrounding surface waters. No additional investigation is necessary. The contaminants of concern are limited to fuel and related substances. No CERCLA hazardous substances, including PCBs are associated with the site. The ADEC has indicated that the remedial investigation report has met the requirements of State regulation in regards to the investigation of ST007. Details may be found in the Administrative Record File or the Information Repository.

STATUTORY AUTHORITY FINDING: Only fuel and related substances are associated with this site. The risk attributed to the concentrations of petroleum and related substances detected at ST007 has been determined to be insignificant and below risk thresholds established by ADEC. The site conditions are protective of human health under all current and projected site uses, including unrestricted residential land use. Concentrations of petroleum and related compounds do not exceed the most stringent Method Two Soil Cleanup Levels and Groundwater Cleanup Levels established in 18 AAC 75, therefore the site is considered closed.

REFERENCES:

ICF. 1996. *Final Remedial Investigation and Feasibility Study, Bullen Point Radar Installation, Alaska*. March 18.

USAF. 2004. *Management Action Plan, Bullen Point Short Range Radar Station, Alaska.* February.

USAF. 2005. *Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites (Final).* June.

Table 2-1 ST007 Summary of Soil Sample Results

Analyte[1]	Screening Criteria		1993 RI/FS Maximum Concentration[3,4]	2004 RI/FS Maximum Concentration[3,4]	2004 RI/FS Frequency of Detections[4,5]
	18 AAC 75 Method Two Soil Cleanup Level for the Arctic Zone[2] (mg/Kg)	Land Transfer Criteria (mg/Kg			
Fuels[6]					
GRO	1,400	1,400	14.3	NS	NA
DRO	12,500	2,000 [7]	775 J	72.7	4/5
RRO	13,700	2,000 [8]	NS	199	5/5
VOCs (Method 8260)					
Benzene	13	13	U (0.02)	U (0.0029)	0/2
Ethylbenzene	89	89	U (0.02)	U (0.0107)	0/2
Toluene	180	180	U (0.02)	U (0.0107)	0/2
Xylene (total)	81	81	U (0.04)	U (0.0107)	0/2
PAH (Method 8270C SIM)					
Benzo(b)fluoranthene	15	15	U (0.21)	0.0018 F	1/2

Notes

1- Only detected compounds or compounds of interest are shown. PCBs were not detected

2- The Method Two soil cleanup level for the Arctic Zone corresponds to the lowest value for ingestion or inhalation as listed in 18 AAC 75.341, Tables B1 and B2. Method Two cleanup levels are protective of human health under a residential scenario. In native soils or below 2 feet bgs, the Method Two soil cleanup levels for DRO and RRO of 12,500 and 13,700 mg/Kg will apply.

3- Highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.

4- 1993 data taken from the *Final RI/FS, Bullen Point Radar Installation, Alaska* (ICF 1996). 2004 data taken from the Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska (USAF 2005).

5- The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

6- Methods used in 1993 were GRPH, DRPH and RRPH, which are comparable to current Alaska Methods for GRO, DRO and RRO.

7- The land transfer criteria of 2,000 mg/Kg DRO is based on the American Petroleum Institute (1996) residual saturation value for DRO in coarse gravel. This cleanup level iwill be applied to surface soils and gravel fill ares (0-2 feet bgs). For the site conditions, this cleanup level is considered "protective of migration to surface water" as required by 18 AAC 75.342, Table B2, Note 7.

8- The 2,000 mg/Kg RRO cleanup level is the 18 AAC 75.341, Table A2 Method One soil cleanup level for the Arctic Zone. This cleanup level is applicable to surface soils and gravel fill areas (0-2 feet bgs).

Abbreviations

F	Estimated quantity below the PQL	PQL	Practical Quantitation Limit
NS	Not Sampled	PAH	Polynuclear Aromatic Hydrocarbons
NA	Not Applicable	VOC	Volatile Organic Compounds
ND	Not Determined	GRPH	Gasoline Range Petroleum Hydrocarbons
U	Compound not detected; PQL in adjacent parentheses	DRPH	Diesel Range Petroleum Hydrocarbons
mg/Kg	milligrams per kilogram	RRPH	Residual Range Petroleum Hydrocarbons

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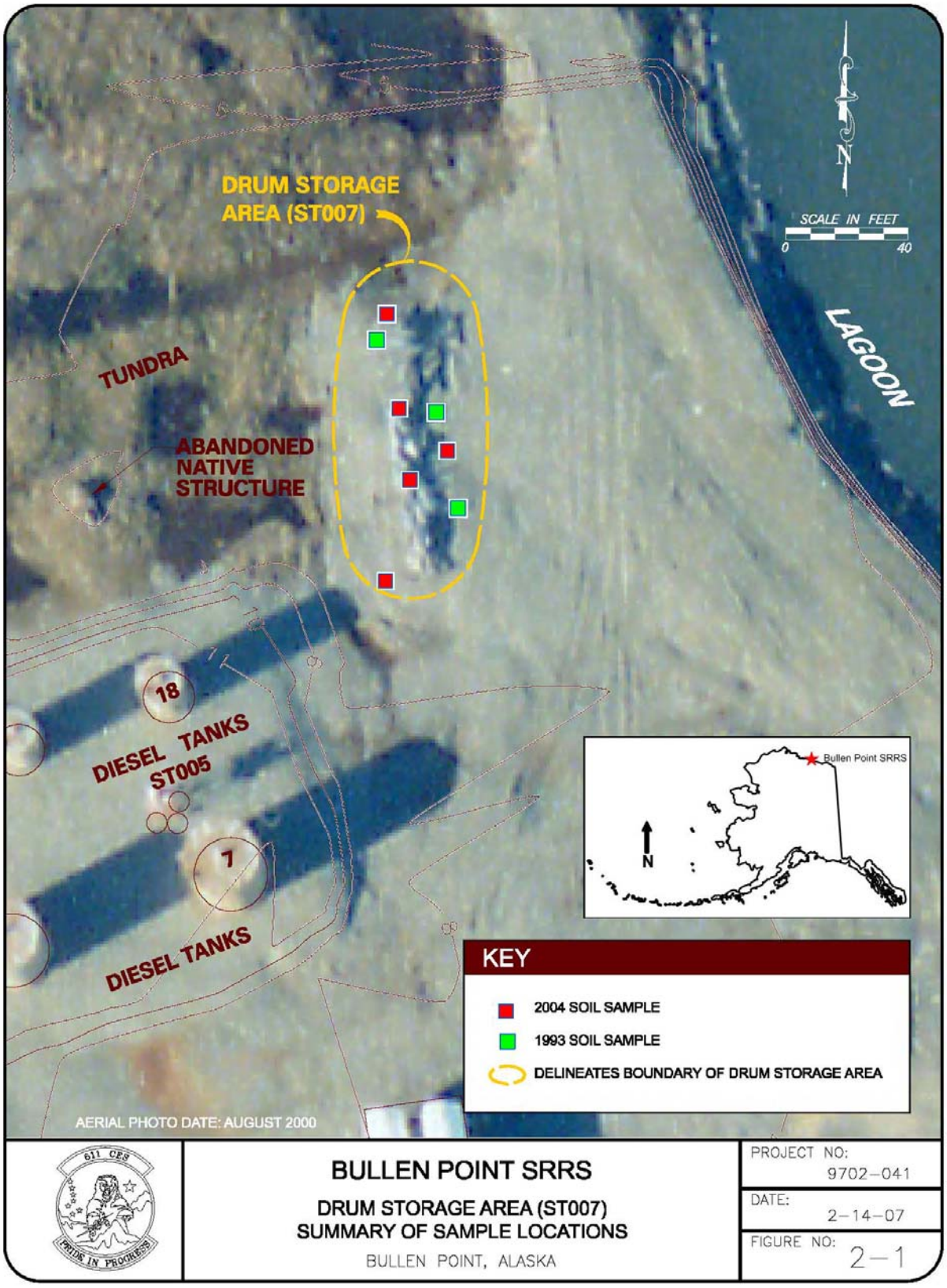
Figure 2-1 ST007 Site Map and Summary of Sample Locations



Decision Document
Fuel Storage Area (ST008)

Final

Bullen Point SRRS, Alaska

Prepared By

United States Air Force
Pacific Air Forces Command
611 CES, Alaska

September 2007

PART 1: THE DECLARATION

SITE NAME AND LOCATION: This Environmental Restoration Program (ERP) site is known as the Fuel Storage Area, ST008. It is located at Bullen Point Short Range Radar Station (SRRS), near Mikkelson Bay and Deadhorse, Alaska. The Alaska Department of Environmental Conservation (ADEC) Record Key number for this site is 198936X102504, and it is located at 70°10'38.37" N latitude, 146°51'18.22" W longitude (these coordinates represent the location of sample ST005SS23, which is at the approximate center of the site).

STATEMENT OF BASIS AND PURPOSE: This Decision Document presents the Air Force's decision that no further action is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to respond to the Fuel Storage Area (ST008), at Bullen Point SRRS, Alaska. Releases at this site are solely petroleum products, and under CERCLA 101 (14) and (33), petroleum products, including any fractions or derivatives of crude oil, are excluded from the definitions of hazardous substances, pollutants, or contaminants. The release of petroleum products at this site are being addressed under State of Alaska laws and regulations. The decision is made in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act, and to the extent practicable, the National Contingency Plan. This decision is based on the Administrative Record file for this site. The State of Alaska, Department of Environmental Conservation concurs. The United States Environmental Protection Agency (USEPA) has deferred regulatory authority at Bullen Point SRRS to the ADEC.

DESCRIPTION OF THE SELECTED REMEDY UNDER CERCLA: No remedy has been proposed or selected under CERCLA, as releases at the site are excluded from the CERCLA definitions of hazardous substances, pollutants, or contaminants.

STATUTORY DETERMINATIONS: Because only fuel and related substances are associated with this site, no further action is required under CERCLA. The release of petroleum products at this site are being addressed under State of Alaska laws and regulations.

DESCRIPTION OF THE SELECTED REMEDY UNDER STATE LAW: The risk attributed to the concentrations of petroleum and related substances detected at ST008 has been determined to be insignificant to human health and the environment in its present location. The detected substances were all below risk thresholds established by ADEC.

However, residual levels of petroleum contaminants remain at ST008 above the most stringent Method Two soil cleanup levels (18 AAC 75.341, Table B2, Over 40-inch Zone, Migration to Groundwater); therefore, the site is appropriate for conditional closure. In accordance with 18 AAC 75.325(i), the landowner of a site granted conditional closure shall obtain approval from ADEC prior to disposing (or transporting) soil from the site. In addition, soil may not be disposed in surface water or other environmentally sensitive areas. The following is the selected remedy for site ST008 under state law is:

- Site boundaries will be surveyed to provide a description of the location where soil has a concentration of diesel range organics above 230 mg/Kg;

- The Base Master Plan for Bullen Point SRRS will include a statement that ADEC approval is required prior to off-site transportation or disposal of site ST008 soil containing diesel range organics above 230 mg/Kg;
- If the site is transferred, the statement that ADEC approval is required prior to off-site transportation or disposal of site ST008 soil containing diesel range organics above 230 mg/Kg will be included in the property transfer documents;

The site status will be listed as "conditional closure" in the ADEC contaminated sites database. The site will be granted closure without conditions when diesel range organics concentrations in the soil degrade below 230 mg/Kg.

AUTHORIZING SIGNATURE: This signature sheet documents the USAF decision in this DD for site ST008 at Bullen Point LRRS, Alaska. ADEC concurs with Air Forces's decision. This decision may be reviewed and modified in the future if new information becomes available which indicates the presence of contamination or exposure that may pose an unacceptable risk to human health or the environment.

Brent A. Johnson — 10 OCT 07

BRENT A. JOHNSON — Date
Colonel, USAF
Commander, 611th Air Support Group

8/30/07

JOHN HALVERSON — Date
DoD Cleanup Unit Lead
Contaminated Sites Program
Alaska Department of Environmental Conservation

PART 2: THE DECISION SUMMARY

SITE NAME, LOCATION, AND DESCRIPTION: The Fuel Storage Area is designated as ST008. ST008 is part of Bullen Point SRRS, located on the east-central shore of Mikkelson Bay. The fuel storage area is located on the same gravel pad as the POL tank farm (ERP Site ST005), and approximately 100 feet west of the tanks. The site is believed to have been used for the storage of drummed fuel products. The site slopes gradually to the west toward the ocean. The elevation in the area is 8 to 9 feet. There are small, shallow pools of surface water near the edge of the site, which receive runoff and seepage from the gravel pad. The site is unvegetated, except next to the ponds. A site map is included in Figure 2-1. The CERCLA lead agency addressing ST008 is the United States Air Force (USAF), and the support agency is the State of Alaska Department of Environmental Conservation.

SITE HISTORY AND ENFORCEMENT ACTIVITIES: Bullen Point SRRS was operated as an auxiliary Distant Early Warning Line Station between 1953 and 1971. The installation was closed between 1971 and 1992. Between 1992 and 1994, the station was converted to a SRRS, consisting of a new radar system, a support building, and a helicopter landing area. The SRRS has operated since 1994 and is unmanned except for periodic maintenance visits. The Fuel Storage Area (ST008) is located on the same gravel pad as the POL tanks (ST005), approximately 100 feet west of the tanks. The inactive structures at Bullen Point SRRS are scheduled for demolition under the USAF Clean Sweep Program in 2007. After demolition and remediation activities are complete, the USAF will likely transfer the excess property at Bullen Point to the Bureau of Land Management (BLM). The BLM in turn will transfer the land to the State of Alaska based on the State's expressed interest in the property. Based on discussions with the BLM and State of Alaska representatives, the conditions for land transfer include:

- Cleaning up the soil contamination to 18 Alaska Administrative Code (AAC) 75.341 Method Two cleanup levels for the Arctic Zone. In addition, the maximum acceptable concentration of Diesel Range Organics (DRO) in the developed portions of the property (gravel pads and fill areas) is 2,000 milligrams per kilogram (mg/Kg). The cleanup level for Residual Range Organics (RRO) in the surface soils of gravel pads (0-2 feet) is also 2,000 mg/Kg. The cleanup levels for DRO and RRO in the native soils (e.g., tundra and peat) are the Method Two soil cleanup levels for the Arctic Zone.
- Removal of inactive facilities that have no utility (value) to the future landowner.

ST008 was investigated in 1993 and 2004. Studies and reports providing details can be found in the Administrative Record file or the Information Repository. All ST008 investigations and actions from 1993 to 2004 are summarized or documented in the "*Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites, Final, June 2005*" (USAF 2005).

COMMUNITY PARTICIPATION: A Proposed Plan that presented the cleanup alternatives proposed by the USAF for Bullen Point SRRS was submitted for public review at a public meeting in Kaktovik on October 17, 2006. The public comment period for the Proposed Plan was October 17, 2006 to November 16, 2006. The USAF received no requests to extend the public comment period, and no written or verbal comments were received regarding the Proposed Plan.

Additional community involvement activities for Bullen Point SRRS include Restoration Advisory Board meetings. A Restoration Advisory Board was formed in Kaktovik in 1998 and typically meets quarterly. A mailing list of interested parties is also maintained and updated regularly by the Air Force Community Relations Coordinator. The administrative record for the Bullen Point SRRS contains the information used to support this decision and is accessible to the public. A website with the administrative record current up through 2003 is also available to the public at: http://www.adminrec.com/PACAF.asp?Location=Alaska. Four Information Repositories are located in Kaktovik: the Mayor's Office, the school, the Native Village of Kaktovik, and the Kaktovik Inupiat Corporation. The most recent Management Action Plan was published in 2004 (USAF 2004) and is part of the Administrative Record.

SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION: The site is not part of an operable unit. There are seven other sites at Bullen Point being addressed under the Air Force Environmental Restoration Program; however, there is no anticipated migration of contaminants or chemical interaction between this site and the other sites. There is no potential for a response action at this site to affect response actions at any other site.

SITE CHARACTERISTICS: Soil, sediment, and surface water samples were collected from the Fuel Storage area during a series of remedial investigations (RIs) in 1993 and 2004. Samples were analyzed for fuels (DRO, RRO, and gasoline range organics [GRO]), benzene, toluene, ethylbenzene, xylenes, and polynuclear aromatic hydrocarbons. A summary of the sample results in which compounds were detected is provided in Table 2-1. Groundwater is not a current or future source of drinking water at Bullen Point SRRS. The RIs determined that contamination is not likely to pose a threat to surrounding surface waters. No additional investigation is necessary. The contaminants of concern are limited to fuel and related substances. No CERCLA hazardous substances are associated with the site. The ADEC has indicated that the remedial investigation report has met the requirements of State regulation in regards to the investigation of ST008. Details may be found in the Administrative Record File or the Information Repository.

STATUTORY AUTHORITY FINDING: Because only fuel and related substances are associated with this site, no further action is required under CERCLA. The release of petroleum products at this site are being addressed under State of Alaska laws and regulations.

REFERENCES:

ICF. 1996. *Final Remedial Investigation and Feasibility Study, Bullen Point Radar Installation, Alaska*. March 18.

USAF. 2004. *Management Action Plan, Bullen Point Short Range Radar Station, Alaska.* February.

USAF. 2005. *Bullen Point SRRS, Remedial Investigation/Feasibility Study Report for 8 Sites (Final).* June.

Table 2-1 ST008 Summary of Soil Sample Results

Media	Analyte[1]	Screening Criteria			1993 RI/FS Maximum Concentration[4,5]	2004 RI/FS Maximum Concentration[4,5]	2004 RI/FS Frequency of Detections[6]
		18 AAC 75 Method Two Soil Cleanup Level for the Arctic Zone[2]	Land Transfer Criteria	Full Closure Criteria [3]			
Soil (mg/Kg)	**Fuels[7]**						
	GRO	1,400	1,400	260	406	0.53 F	1/1
	DRO	12,500	2,000[8]	230	3,830 J [10]	891	5/5
	RRO	13,700	2,000 [9]	9,700	NS	3,580 [11]	5/5
	VOCs (Methods 8021/8260)						
	Benzene	13	13	0.02	0.035	U (0.0032)	0/1
	Ethylbenzene	89	89	5	1.57	U (0.0119)	0/1
	1,2,4-Trimethylbenzene	138	138	85.2	2.71 J	NS	NA
	1,3,5-Trimethylbenzene	48.8	48.8	23	0.848 J	NS	NA
	Toluene	180	180	4.8	0.533 J	U (0.0119)	0/1
	Xylene (total)	81	81	69	6.63	U (0.0119)	0/1
	PAHs (Method 8270C SIM)						
	di-n-Butylphthalate	1,400	1,400	1,400	0.534	NS	0/1
	Naphthalene	180	180	180	4.37 J	0.0229	1/1

Notes

1 – Only detected compounds or compounds of interest are shown.

2 – The Method Two soil cleanup level for the Arctic Zone corresponds to the lowest value for ingestion or inhalation as listed in 18 AAC 75.341, Tables B1 and B2. Method Two cleanup level are protective of human health under a residential scenario. In native soils or below 2 feet bgs, the Method Two soil cleanup levels for DRO and RRO of 12,400 and 13,700 mg/Kg will apply.

3 – To achieve full closure instead of conditional closure, the most stringent Method Two soil cleanup levels must be achieved. These levels are listed in 18 AAC 75.341, Tables B1 and B2 for the Over 40 Inch Zone, Migration to Groundwater pathway.

4 – For soil: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U.

5 – 1993 data taken from the *Final RI/FS, Bullen Point Radar Installation, Alaska* (ICF 1996). 2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).

6 – The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

7 – Methods used in 1993 were GRPH, DRPH, and RRPH, which are comparable to current AK Methods for GRO, DRO, and RRO.

8 – The land transfer criteria of 2,000 mg/Kg DRO is based on the American Petroleum Institute (1996) residual saturation value for DRO in coarse gravel. This cleanup level will be applied to surface soils and gravel fill areas (0-2 feet bgs). For the site conditions, this cleanup level is considered "protective of migration to surface water" as required by 18 AAC 75.342, Table B2, Note 7.

9 – The 2,000 mg/Kg RRO cleanup level is the 18 AAC 75.341, Table A2 Method One soil cleanup level for the Arctic Zone. This cleanup level is applicable to surface soils and gravel fill areas (0-2 feet bgs).

10 – Investigation of this area in 2004 determined that DRO concentrations at this site had decreased significantly since the 1993 RI. This reduction is attributed to natural attenuation. 2004 RI recommended no further action in the expectation that concentrations will continue to decrease in the future (USAF 2005).

11 – The sample with high RRO (ST005SS25-2.75) was collected from the peat layer beneath the gravel pad. The gas chromatographic pattern for this sample is consistent with biogenic hydrocarbons commonly extracted from the peat and other vegetative matter. Therefore, the RRO is likely not caused by a petroleum product.

Abbreviations

F	Estimated quantity below the PQL
NS	Not Sampled
NA	Not Applicable
ND	Not Determined
J	Estimated value
GRPH	Gasoline Range Petroleum Hydrocarbons
DRPH	Diesel Range Petroleum Hydrocarbons
RRPH	Residual Range Petroleum Hydrocarbons
PQL	Practical Quantitation Limit
PAHs	Polynuclear Aromatic Hydrocarbons
VOCs	Volatile Organic Compounds
U	Compounds not detected w/PQL in parentheses
mg/Kg	Milligrams per kilogram

Bold and shaded indicates an exceedance of the land transfer criteria.

Table 2-2 ST008 Summary of Sediment and Surface Water Sample Results

Media	Analyte[1]	Screening Criteria					
		NOAA SQuiRT for Freshwater Sediment [2]	18 AAC 70 MCL for Surface Water [3]	NOAA SQuiRT for Fresh Surface Water [4]	1993 RI/FS Maximum Concentration[5,6]	2004 RI/FS Maximum Concentration[5,6]	2004 RI/FS Frequency of Detections[7]
Sediment (mg/Kg)	**VOCs (Method 8021)**						
	Xylene (total)	--	--	--	0.028	U (0.0109)	0/1
	PAHs (Method 8270C SIM)						
	Naphthalene	(0.0146) [8]	--	--	NS	0.00358 F	1/1
	Phenanthrene	0.515	--	--	NS	0.00173 F	1/1
Surface Water (µg/L)	**VOCs (Method 8021)**						
	Benzene	--	5	5,300[CMC]	U (1)	0.18 F	1/1
	1,2-Dichloroethane	--	5	20,000	1.7	NS	NA
	PAHs (Method 8270C SIM)						
	Naphthalene	--	--	620	U (10)	0.426	1/1
	TAH	--	10	--	ND	0.18 F	1/1
	TAqH	--	15	--	ND	0.606 F	1/1

Notes

1 – Only detected compounds or compounds of interest are shown.

2 – NOAA SQuiRT value is the probable effects level (PEL) for freshwater values indicated.

3 – 18 AAC 70 Maximum Contaminant Level (ADEC 2003).

4 – NOAA SQuiRT values shown for freshwater criteria continuous concentration (CCC) unless otherwise indicated (NOAA 1999). Criteria maximum concentration (CMC) shown if no CCC available.

5 – For sediment: highest detected values shown. Maximum concentration is the maximum detection or highest PQL if all samples were U. For water: highest detected values shown.

6 – 1993 data taken from the *Final RI/FS, Bullen Point Radar Installation, Alaska* (ICF 1996). 2004 data taken from the *Final RI/FS Study Report for Eight Sites, Bullen Point SRRS, Alaska* (USAF 2005).

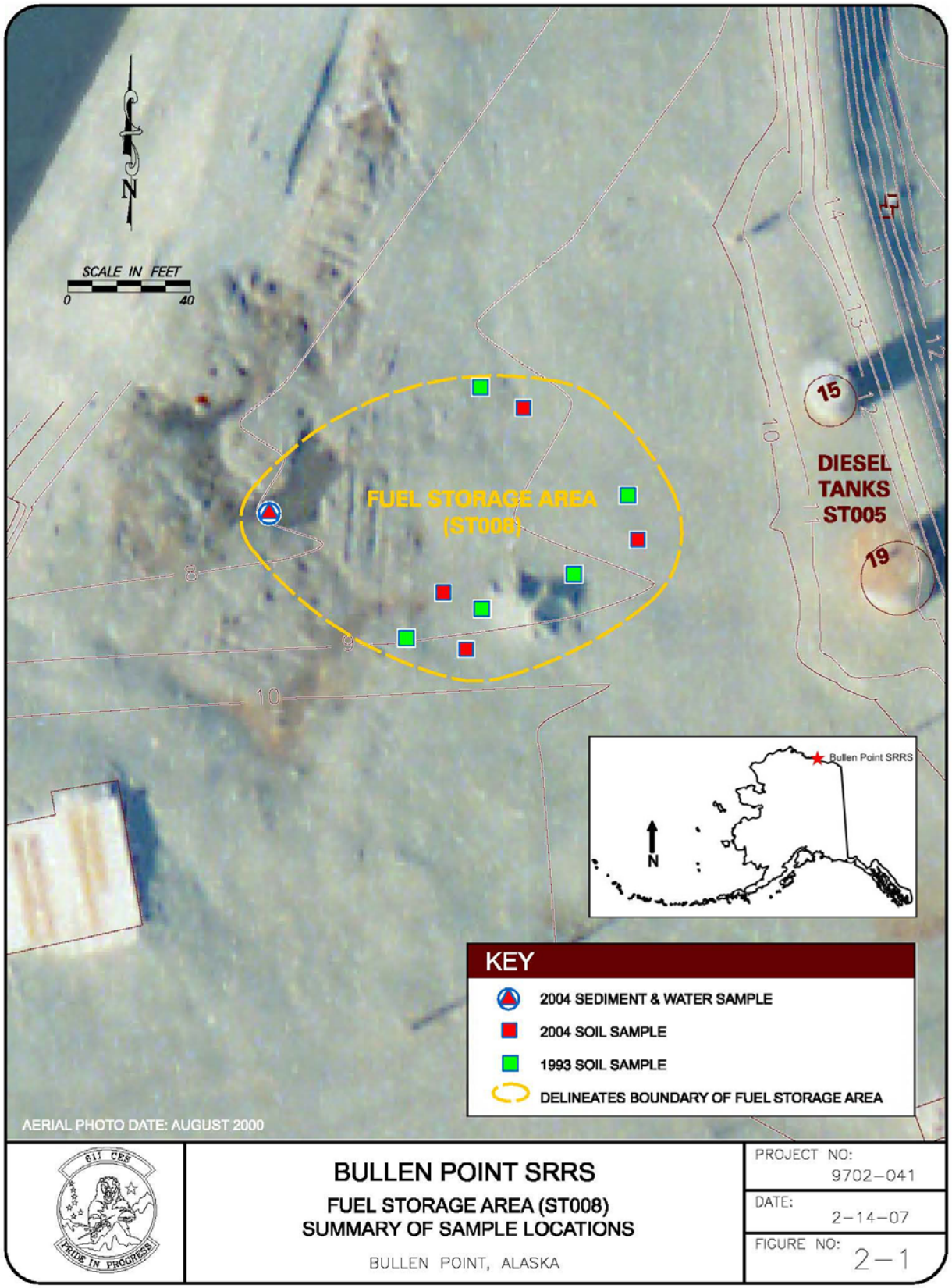
7 – The frequency of detections is the number of times the analyte was detected in the samples collected at the site. Frequencies do not include replicate samples collected.

8 – Threshold effects level (TEL) for freshwater sediment shown.

Abbreviations

"--"	Screening criteria does not exist for this compound	PAHs	Polynuclear aromatic hydrocarbons
F	Estimated quantity below the PQL	TAH	Total Aromatic Hydrocarbons
U	Compound not detected w/PQL in adjacent parentheses	TAqH	Total Aqueous Hydrocarbons
NS	Not Sampled	µg/L	Micrograms per Liter
NA	Not Applicable	VOCs	Volatile organic compounds
ND	Not Determined	mg/Kg	milligrams per kilogram
PQL	Practical Quantitation Limit		

Figure 2-1 ST008 Site Map and Summary of Sample Locations



Appendix A
Bullen Point SRRS List of Project Reports

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Primary Bullen Point SRRS ERP Project Reports

Phase	Document	Sites Examined	Year	Author
Phase I	Installation Assessment/ Records Search	Entire facility	1981	CH2M Hill
Phase II, Stage 1	Confirmation/ Quantification	LF006	1986	Dames and Moore
Phase II, Stage 2	Confirmation/ Quantification	LF006	1988	Dames and Moore
EA	Environmental Assessment	None	1987	Hart Crowser
RI	RI/FS Stage 3	OT004, ST005, LF006, ST007, ST008	1990	Woodward Clyde Consultants
DD	Technical Document to Support No Further Action	OT004, ST005, LF006, ST007, ST008	1990	Woodward Clyde Consultants
SI	SRR Preconstruction Site Inspection	All	1992	ENSR
PA	Literature Search	All	1993	ICF Technology Incorporated
	Community Relations Plan	None	1993	ICF Technology Incorporated
RI/FS	RI/FS	OT004, ST005, LF006, ST007, ST08	1996	ICF Technology Incorporated
RI/FS	Risk Assessment	OT004, ST005, LF006, ST007, ST008	1996	ICF Technology Incorporated
DD	Decision Document for NFRAP	LF006, ST007	1996	ICF Technology Incorporated
EE/CA	Preliminary Landfill Design	LF006	2000	U.S. Army Corp of Engineers
EE/CA	Clean Sweep Survey	None	2002	Montgomery Watson
RI/FS	Data Collection Report	OT004, ST007, ST008	2003	USACE
RI/FS	RI/FS	OT003, OT004, SS002, ST005, ST008, SS001, ST007, LF006	2005	Hoefler

Acronyms:

DD	Decision Document
EA	Environmental Assessment
EE/CA	Engineering Evaluation and Cost Analysis
ICF	ICF Technology Incorporated
PA	Preliminary Assessment
RI/FS	Remedial Investigation/Feasibility Study
SI	Site Investigation

Appendix B
References and Bibliography

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Appendix C
Acronyms and Abbreviations

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Acronyms

USAF	Air Force
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
BLM	Bureau of Land Management
BTEX	benzene, toluene, ethylbenzene, xylenes
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COC	chemical of concern
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DRO	diesel range organics
EPA	Environmental Protection Agency
EPC	exposure point concentration
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ESD	Explanation of Significant Differences
ft^2	square feet
FS	Feasibility Study
GRO	gasoline range organics
HCG	Hoefler Consulting Group
HI	Hazard Index
HQ	hazard quotient
HRA	human health risk assessment
LUC	land use control
MAP	Management Action Plan
NCP	National Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
O&M	operations and maintenance
OU	Operable Unit
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
POL	petroleum, oil and lubricants
RAB	Restoration Advisory Board
RAO	remedial action objective
RfC	reference concentration
RfD	reference dose
RI	Remedial Investigation

RI/FS	Remedial Investigation/Feasibility Study
DD	Record of Decision
RRO	residual range organics
SARA	Superfund Amendments and Reauthorization Act
SF	slope factor
SRRS	short range radar station
SVOC	semi-volatile organic compound
TBC	to be considered
TMV	toxicity, mobility, volume
TSDF	treatment, storage, disposal facility
VOC	volatile organic compound
yd^3	cubic yard

Appendix D
Cumulative Risk Calculations

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Table D-1 Cancer Risk-based Concentration Calculation Inputs for the Ingestion of Total Polychlorinated Biphenyls (Residential Scenario)

Parameter	Default Residential Values (ADEC Method Two)
Target cancer risk (TR)	1.00E-05 (unitless)
Averaging time (AT)	70 yr
Oral slope factor (SF)	2.0 $(mg/Kg\text{-}d)^{-1}$
Exposure frequency (EF) Arctic Zone	200 d/y
Age-adjusted soil ingestion factor (IF)	114 mg-yr/Kg-d
Calculated Risk-based Concentration	**5.6 mg/Kg**

Key:
d/y – days per year
Kg-d – kilograms per day
mg/Kg – milligrams per kilogram
mg/Kg-d – milligrams per kilogram per day
mg-yr – milligrams per year
yr – year

Table D-2 Noncancer Risk-based Concentration Calculation Inputs for the Ingestion of Total Polychlorinated Biphenyls (Residential Scenario)

Parameter	Default Residential Values (ADEC Method Two)
Target hazard quotient (THQ)	1 (unitless)
Body weight (BW)	15 Kg
Averaging time (AT)	6 yr
Oral reference dose (RfD)[1]	0.00002 mg/Kg-d
Exposure frequency (EF) Arctic Zone	200 d/y
Exposure duration	6 yr
Soil ingestion rate (IR)	200 mg/d
Calculated Risk-based concentration	**2.7 mg/Kg**

Note:
[1]RfD from IRIS. Value shown is for Aroclor 1254.

Key:
d/y – days per year
Kg – kilogram
mg/d – milligrams per day
mg/Kg – milligrams per kilogram
mg/Kg-d – milligrams per kilogram per day
yr – year

Table D-3 Cancer Risk-based Concentration Calculation Inputs for Inhalation of Total Polychlorinated Biphenyls (Residential Scenario)

Parameter	Default Residential Values (ADEC Method Two)
Target cancer risk (TR)	1.00E-05 (unitless)
Averaging time (AT)	70 yr
Inhalation slope factor (ISF)	0.07 $(mg/Kg\text{-}d)^{-1}$
Inhalation unit risk factor (URF)[1]	0.00002[1] $(\mu g/m^3)^{-1}$
Exposure frequency (EF) Arctic Zone	200 d/y
Exposure duration (ED)	30 yr
Soil-to-air volatilization factor (VF)	5.10E+05 m^3/Kg
Calculated Risk-based concentration	**1,085.7 mg/Kg**

Note:
[1] URF based on low risk Inhalation Slope Factor from EPA Region 9 preliminary remediation goals (PRGs).
Key:
d/y – days per year
Kg – kilogram
$\mu g/m^3$ – micrograms per cubic meter
mg/d – milligrams per day
mg/Kg – milligrams per kilogram
yr – year

Table D-4 Derivation of Volatilization Factor used in Risk-based Concentration Calculation for Inhalation of Polychlorinated Biphenyls

Parameter	Residential Scenario
Inverse of the mean conc. at the center of a 0.5 acre square source (Arctic Zone) (Q/C)[1]	100.13 g/m^2-s per Kg/m^3
Exposure interval (T)	9.5E+08 s
Dry soil bulk density (pb)	2 g/cm^3
Soil particle density (ps)	2.65 g/cm^3
Total soil porosity (n)	0.434 L_{pore}/L_{soil}
Water-filled soil porosity (θw)	0.15 L_{water}/L_{soil}
Air-filled soil porosity (θa)	0.284 L_{air}/L_{soil}
Diffusivity in air (Di)[2]	0.0156 cm^2/s
Dimensionless Henry's law constant (H')[2]	0.0116
Average soil moisture content (w)	0.1 g_{water}/g_{soil} or $cm^3{}_{water}/g_{soil}$
Diffusivity in water (Dw)[2]	0.000005 cm^2/s
Soil-water partition coefficient (Kd)	75.6 cm^3/g
Organic carbon partition coefficient (Koc)[2]	75,600 cm^3/g
Organic carbon content of soil (foc)	0.001 g/g
Calculated Volatilization Factor (VF)	**5.10E+05 m^3/Kg**

Notes:
[1] 2004 ADEC *Cleanup Levels Guidance*, Eqn. 8 Arctic Zone
[2] Parameters from EPA RAIS. Value shown is for Aroclor 1254.
Key:
d/y – days per year
g/cm^3 – grams per cubic centimeter
s – second
cm^2/s – square centimeter per second
mg/Kg – milligrams per kilogram
mg/Kg-d – milligrams per kilogram per day
cm^3/g – cubic centimeters per gram
m^3/Kg – cubic meters per kilogram
L – liter
yr – year

Table D-5 OT003 Cumulative Risk Calculations-Soil[1] (Residential Scenario)

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]	RBC[4] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]
Carcinogens: Inhalation Risk							
PCBs	1.51	1,085.7	0.001391	1.4E-08	44,000	0.000034	3.4E-10
			Total	**1E-08**		**Total**	**3E-10**
Carcinogens: Ingestion Risk							
PCBs	1.51	5.6	0.27	2.7E-06	3.2	0.47	4.7E-06
			Total	**3E-06**		**Total**	**5E-06**
Carcinogens: Dermal Risk							
PCBs	1.51	--	--	--	7.2	0.21	2.1E-06
			Total	**--**		**Total**	**2E-06**
	Carcinogenic Cumulative Risk			**3E-06**			**7E-06**

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]	RBC[4] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]
Noncarcinogens: Inhalation Hazard							
PCBs	1.51	--	--	--	41,000	0.000037	0.000037
			Total	**--**		**Total**	**0.000037**
Noncarcinogens: Ingestion Risk							
PCBs	1.51	2.7	0.55	0.55	1.6	0.94	0.94
			Total	**0.55**		**Total**	**0.94**
Noncarcinogens: Dermal Risk							
PCBs	1.51	--	--	--	4	0.38	0.38
			Total	**--**		**Total**	**0.38**
	Noncarcinogenic Hazard Index (HI)			**0.55**			**1.32**

Notes

[1] Methodology and Risk Based Concentration (RBC) per ADEC *Cumulative Risk Guidance* (ADEC 2002)

[2] Under ADEC *Cumulative Risk Guidance*, if no RBCs exist for a compound in Appendix B (ADEC 2002), then RBCs should be calculated. The PCB RBCs were calculated from values in Tables D-1, D-2, D-3, and D-4 based on equations in ADEC *Cumulative Risk Guidance* (ADEC 2002).

[3] Risk at site concentration = (site concentration/RBC) x 10^{5}

[4] RBCs from U.S. EPA Region 6 Human Health Medium-Specific Screening Levels dated 2/6/07. ADEC *Cumulative Risk Guidance* uses a target carcinogenic risk of 10^{5}. USEPA Region 6 uses a target carcinogenic risk of 10^{6}. Therefore, the Region 6 carcinogenic values were multiplied by a factor of 10. Noncarcinogenic values were not altered.

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

Shaded cell Risk at site exceeds screening criteria (Carcinogens > 1 x 10^{5} and/or HI > 1.0)

Abbreviations

COC - Contaminant of Concern
mg/Kg - Milligrams per Kilogram
HQ - Hazard Quotient for noncarcinogenic risk
HI - Hazard Index for noncarcinogenic risk
RBC - Risk Based Concentration
"--" - Value does not exist for this compound

Table D-6 OT004 Cumulative Risk Calculations-Soil[1] (Residential Scenario)

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]	RBC[4] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]
Carcinogens: Inhalation Risk							
PCBs	7.31	1,085.7	0.00673	6.7E-08	44,000	0.000166	1.7E-09
			Total	**7E-08**		**Total**	**2E-09**
Carcinogens: Ingestion Risk							
PCBs	7.31	5.6	1.3	1.3E-05	3.2	2.3	2.3E-05
			Total	**1E-05**		**Total**	**2E-05**
Carcinogens: Dermal Risk							
PCBs	7.31	--	--	--	7.2	1.0	1.0E-05
			Total	**--**		**Total**	**1E-05**
	Carcinogenic Cumulative Risk			**1E-05**			**3E-05**

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]	RBC[4] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]
Noncarcinogens: Inhalation Hazard							
PCBs	7.31	--	--	--	41,000	0.00018	0.00018
			Total	**--**		**Total**	**0.00018**
Noncarcinogens: Ingestion Risk							
PCBs	7.31	2.7	2.7	2.7	1.6	4.6	4.6
			Total	**2.7**		**Total**	**4.6**
Noncarcinogens: Dermal Risk							
PCBs	7.31	--	--	--	4	1.8	1.8
			Total	**--**		**Total**	**1.8**
	Noncarcinogenic Hazard Index (HI)			**2.7**			**6.4**

Notes

[1] Methodology and Risk Based Concentration (RBC) per ADEC *Cumulative Risk Guidance* (ADEC 2002)

[2] Under ADEC *Cumulative Risk Guidance*, if no RBCs exist for a compound in Appendix B (ADEC 2002), then RBCs should be calculated. The PCB RBCs were calculated from values in Tables D-1, D-2, D-3, and D-4 based on equations in ADEC *Cumulative Risk Guidance* (ADEC 2002).

[3] Risk at site concentration = (site concentration/RBC) x 10^{5}

[4] RBCs from U.S. EPA Region 6 Human Health Medium-Specific Screening Levels dated 2/6/07. ADEC *Cumulative Risk Guidance* uses a target carcinogenic risk of 10^{5}. USEPA Region 6 uses a target carcinogenic risk of 10^{6}. Therefore, the Region 6 carcinogenic values were multiplied by a factor of 10. Noncarcinogenic values were not altered.

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

Shaded cell Risk at site exceeds screening criteria (Carcinogens > 1 x 10^{5} and/or HI > 1.0)

Abbreviations

COC - Contaminant of Concern
mg/Kg - Milligrams per Kilogram
HQ - Hazard Quotient for noncarcinogenic risk
HI - Hazard Index for noncarcinogenic risk
RBC - Risk Based Concentration
"--" - Value does not exist for this compound

Table D-7 ST005 Cumulative Risk Calculations-Soil [1] (Residential Scenario)

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]	RBC[4] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]
Carcinogens: Inhalation Risk							
PCBs	2.87	1,085.7	0.00264	2.6E-08	44,000	0.000065	6.5E-10
			Total	**3E-08**		**Total**	**7E-10**
Carcinogens: Ingestion Risk							
PCBs	2.87	5.6	0.51	5.1E-06	3.2	0.90	9.0E-06
			Total	**5E-06**		**Total**	**9E-06**
Carcinogens: Dermal Risk							
PCBs	2.87	--	--	--	7.2	0.40	4.0E-06
			Total	**--**		**Total**	**4E-06**
	Carcinogenic Cumulative Risk			**5E-06**			**1E-05**

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]	RBC[4] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]
Noncarcinogens: Inhalation Hazard							
PCBs	2.87	--	--	--	41,000	0.000070	0.00007
			Total	**--**		**Total**	**0.00007**
Noncarcinogens: Ingestion Risk							
PCBs	2.87	2.7	1.0	1.0	1.6	1.8	1.8
			Total	**1.0**		**Total**	**1.8**
Noncarcinogens: Dermal Risk							
PCBs	2.87	--	--	--	4	0.7	0.7
			Total	**--**		**Total**	**0.7**
	Noncarcinogenic Hazard Index (HI)			**1.0**			**2.5**

Notes

[1] Methodology and Risk Based Concentration (RBC) per ADEC *Cumulative Risk Guidance* (ADEC 2002)

[2] Under ADEC *Cumulative Risk Guidance*, if no RBCs exist for a compound in Appendix B (ADEC 2002), then RBCs should be calculated. The PCB RBCs were calculated from values in Tables D-1, D-2, D-3, and D-4 based on equations in ADEC *Cumulative Risk Guidance* (ADEC 2002).

[3] Risk at site concentration = (site concentration/RBC) x 10^{5}

[4] RBCs from U.S. EPA Region 6 Human Health Medium-Specific Screening Levels dated 2/6/07. ADEC *Cumulative Risk Guidance* uses a target carcinogenic risk of 10^{-5}. USEPA Region 6 uses a target carcinogenic risk of 10^{-6}. Therefore, the Region 6 carcinogenic values were multiplied by a factor of 10. Noncarcinogenic values were not altered.

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

Shaded cell Risk at site exceeds screening criteria (Carcinogens > 1 x 10^{-5} and/or HI > 1.0)

Abbreviations

COC - Contaminant of Concern
mg/Kg - Milligrams per Kilogram
HQ - Hazard Quotient for noncarcinogenic risk
HI - Hazard Index for noncarcinogenic risk
RBC - Risk Based Concentration
"--" - Value does not exist for this compound

Table D-8 LF006 Cumulative Risk Calculations-Soil [1] (Residential Scenario)

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]	RBC[4] (mg/Kg)	Site Conc./ RBC	Risk at Site Conc.[3]
Carcinogens: Inhalation Risk							
PCBs	0.648	1,085.7	0.00060	6.0E-09	44,000	0.000015	1.5E-10
Arsenic[6]	3.7	--	--	--	--	--	--
			Total	**6E-09**		**Total**	**1E-10**
Carcinogens: Ingestion Risk							
PCBs	0.648	5.6	0.12	1.2E-06	3.2	0.20	2.0E-06
Arsenic[6]	3.7	7.5	0.49	4.9E-06	7.5	0.49	4.9E-06
			Total	**6E-06**		**Total**	**7E-06**
Carcinogens: Dermal Risk							
PCBs	0.648	--	--	--	7.2	0.09	9.0E-07
Arsenic[6]	3.7	--	--	--	--	--	--
			Total	**--**		**Total**	**9E-07**
	Carcinogenic Cumulative Risk			**6E-06**			**8E-06**

COC	Max Site Concentration (mg/Kg)	ADEC RBC Calculation (2004 RI)			USEPA Region 6 RBC Calculation		
		RBC[2] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]	RBC[4] (mg/Kg)	Site Conc./ RBC	HQ at Site Conc.[5]
Noncarcinogens: Inhalation Hazard							
PCBs	0.648	--	--	--	41,000	0.000016	0.000016
Arsenic[6]	3.7	--	--	--	--	--	--
			Total	**--**		**Total**	**0.000016**
Noncarcinogens: Ingestion Risk							
PCBs	0.648	2.7	0.24	0.24	1.6	0.4	0.41
Arsenic[6]	3.7	41.1	0.09	0.09	7.5	0.5	0.49
			Total	**0.33**		**Total**	**0.90**
Noncarcinogens: Dermal Risk							
PCBs	0.648	--	--	--	4	0.2	0.16
Arsenic[6]	3.7	--	--	--	--	--	--
			Total	**--**		**Total**	**0.16**
	Noncarcinogenic Hazard Index (HI)			**0.33**			**1.1**

Notes

[1] Methodology and Risk Based Concentration (RBC) per ADEC *Cumulative Risk Guidance* (ADEC 2002)

[2] Under ADEC *Cumulative Risk Guidance* , if no RBCs exist for a compound in Appendix B (ADEC 2002), then RBCs should be calculated. The PCB RBCs were calculated from values in Tables D-1, D-2, D-3, and D-4 based on equations in ADEC *Cumulative Risk Guidance* (ADEC 2002).

[3] Risk at site concentration = (site concentration/RBC) x 10^{-5}

[4] RBCs from U.S. EPA Region 6 Human Health Medium-Specific Screening Levels dated 2/6/07. ADEC *Cumulative Risk Guidance* uses a target carcinogenic risk of 10^{-5}. USEPA Region 6 uses a target carcinogenic risk of 10^{-6}. Therefore, the Region 6 carcinogenic values were multiplied by a factor of 10. Noncarcinogenic values were not altered.

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

[6] RBCs exist for arsenic in the ADEC *Cumulative Risk Guidance* , Appendix B. Therefore, the USEPA Region 6 RBCs were not used in the calculation.

Shaded cell Risk at site exceeds screening criteria (Carcinogens > 1 x 10^{-5} and/or HI > 1.0)

Abbreviations

COC - Contaminant of Concern
mg/Kg - Milligrams per Kilogram
HQ - Hazard Quotient for noncarcinogenic risk
HI - Hazard Index for noncarcinogenic risk
RBC - Risk Based Concentration
"--" - Value does not exist for this compound