CERCLA Record of Decision
Site SS004 Equipment Building

Final

Bear Creek Radio Relay Station, Alaska

Submitted To:
U.S. Air Force
611th Air Support Group
611th Civil Engineer Squadron
Joint Base Elmendorf-Richardson, Alaska

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Appendices

Appendix A – Proposed Plan for Final Remedial Actions, Site SS004, Bear Creek RRS

Attachments

Attachment 1 – Notice of Availability

Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFB	Air Force Base
ARARs	Applicable or Relevant and Appropriate Requirements
bgs	below ground surface
CDI	chronic daily intake
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CES	Civil Engineer Squadron
CFR	Code of Federal Regulations
COC	chemical of concern
COPC	chemical of potential concern
CRP	Community Relations Plan
CSM	conceptual site model
DCCED	Department of Commerce, Community, and Economic Development
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DRO	Diesel Range Organics
ENSR	ENSR Consulting and Engineering
EPA	Environmental Protection Agency
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ESD	Explanation of Significant Differences
°F	Degrees Fahrenheit
FS	Feasibility Study
HAZWOPER	Hazardous Waste Operations and Emergency Response
HI	Hazard Index
HMTC	Hazardous Materials Technical Center
HQ	hazard quotient
HRA	human health risk assessment
IC	institutional control
JBER	Joint Base Elmendorf-Richardson
LUC	land use control
µg/100cm^2	micrograms per 100 square centimeters
µg/m^3	micrograms per meter cubed
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
O&M	operations and maintenance
PA	Preliminary Assessment
PCB	polychlorinated biphenyls
POL	Petroleum, Oil, and Lubricants
RAB	Restoration Advisory Board

Acronyms (Continued)

RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RfD	reference dose
RI	Remedial Investigation
ROD	Record of Decision
RRS	Radio Relay Station
SARA	Superfund Amendments and Reauthorization Act
SF	slope factor
SI	Site Inspection
TBC	to be considered
TBD	to be determined
TMV	toxicity, mobility, volume
UCL	upper confidence limit
U.S.	United States
USAF	United States Air Force
VOC	volatile organic compound

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1.0 Declaration

1.1 Site Name and Location

Facility Name: Former Equipment Building, Bear Creek Radio Relay Station (RRS), Alaska

Site Location: Tanana, Alaska; Section 17, Township 5 North, Range 21 West, Fairbanks Meridian

Latitude and Longitude: 65.254300 North, -151.924100 West

Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) ID Number: AK4570028619

Alaska Department of Environmental Conservation Contaminated Sites Hazard ID Number: 772, site status is active

Operable Unit/Site: SS004

The former Bear Creek RRS is located in central Alaska approximately 130 air miles west of Fairbanks near the community of Tanana. Tanana is located on the north bank of the Yukon River approximately two miles west of the confluence of the Yukon and Tanana Rivers. Tanana is accessible by river and by air; there are no roads connecting Tanana to other regional communities.

The Bear Creek RRS facilities were located on 16.21 acres of federal land withdrawn from the public domain by public land order for military purposes. The 16.21 acres were divided into three parcels: the Bear Creek RRS installation was constructed on a 14.69-acre parcel, the water collection system was located on a separate 0.92-acre parcel north of the installation, and the petroleum, oil, and lubricants (POL) Site at the Yukon River was located on a 0.6-acre parcel on the north bank of the Yukon River.

Road access to the former Bear Creek RRS is provided by a gravel road beginning at the POL Site at the Yukon River, about one mile east of Tanana. The gravel road travels approximately eight miles up the south side of a heavily forested ridge to the former installation site.

1.2 Statement of Basis and Purpose

This document is issued by the Department of the Air Force as the lead agency. The U.S. Air Force (USAF) is managing remediation at SS004 in accordance with CERCLA as required by the Defense Environmental Restoration Program (DERP). This Record of Decision (ROD) is issued in accordance with and satisfies requirements of the DERP, United States Code (USC), Title 10, Section 2701 et seq.; Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 42 USC 9601 et seq.; Executive Order 12580, Federal Register, Title 52, Section 2923 (23 January 1987); and National Contingency Plan (NCP), Code of Federal Regulations (CFR), Title 40, Chapter 300.

As the lead agency, the USAF has selected the remedy. The Alaska Department of Environmental Conservation (ADEC) agrees that the selected remedy will comply with State

law. The 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 Environmental Restoration Program (ERP) at the Former Bear Creek RRS.

1.3 Assessment of Site

1.3.1 Assessment of Site under CERCLA

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. The contaminant of concern (COC) is polychlorinated biphenyls (PCBs) which have been detected above 18 Alaska Administrative Code (AAC) soil cleanup levels.

1.3.2 Assessment of Site under State of Alaska Regulations

Response action is required under State of Alaska Regulations to address PCBs on the site that are greater than 1 part per million (ppm). The response action under CERCLA, which also fulfills the requirements of State law, is being taken at this site as indicated in **Section 1.3.1** to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 Description of Selected Remedy

1.4.1 CERCLA Selected Remedy

Remedial alternatives for the Equipment Building (SS004) were developed and evaluated through a Feasibility Study (FS) (HDR, 2010). Based on the results of the 2010 FS and public comments received regarding the Proposed Plan (see **Appendix A**), the USAF selected excavation of soil contaminated with PCBs above 1 milligram per kilogram (mg/kg) as the chosen remedy for SS004. The major components of the selected response action are as follows:

- Excavation of soil contaminated with PCBs above 1 mg/kg and backfill excavation with clean fill from an off-site source,
- Transportation of PCB-contaminated soil off-site for treatment or land disposal at a permitted facility in the continental United States.

1.4.2 Remedy Required under State of Alaska Regulations

No additional remedies are required under State of Alaska Regulations. The USAF has selected a CERCLA remedy for the site which meets all applicable requirements of the State of Alaska including but not limited to 18 AAC 75.

Table 1-1
Soil Contaminants of Concern and Cleanup Levels

Site	COC	Maximum Detected Concentration (mg/kg)	ADEC Method Two Cleanup Level (mg/kg)	Regulatory Authority
SS004	PCBs	8.6	1.0	CERCLA

1.5 Statutory Determinations

The selected remedy for SS004 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 SS004 satisfies the statutory preference for treatment as a principal element of the remedy because soils contaminated with PCBs will be shipped to a permitted facility off-site for treatment or disposal.

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, no statutory reviews will be conducted at five-year intervals after initiation of remedial action to verify that the remedy is, or will be, protective of human health and the environment.

1.6 Data Certification Checklist

The following information is included in the Decision Summary section of this ROD (**Section 2**). Additional information can be found in the Administrative Record file for the Equipment Building (SS004), Bear Creek RRS, Alaska which can be found at Joint Base Elmendorf-Richardson (JBER). The file is also available at www.adminrec.com (select DOD, then PACAF, the Alaska, then Bear Creek) although the most recent documents may not be available yet on the internet.

- List of COCs and their respective concentrations (page 2-23 through 2-24; **Section 2.7.1.1**)
- Baseline risk represented by the COCs (pages 2-27 through 2-28; **Section 2.7.14**)
- Cleanup levels established for COCs and the basis for these levels (page 2-29; **Section 2.8**)
- How source materials constituting principal threats will be addressed (page 2-38; **Section 2.12.2**)

- 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 ROD (page 2-20; **Sections 2.6.1** and **2.6.2**, respectively)
- Potential land and groundwater use that will be available at the site as a result of the selected remedy (page 2-39; **Section 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 (page 2-38 through 2-39; **Section 2.12.3**)
- 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) (pages 2-39 through 2-43; **Section 2.13**)

1.7 Authorizing Signatures

This signature sheet documents the USAF approval of the remedy selected in this ROD for the Equipment Building (SS004), Bear Creek RRS, Alaska. The State of Alaska agrees that, when properly implemented, the selected remedy will comply with state law. The decision may be reviewed and modified in the future if information becomes available that indicates the presence of contaminants or exposures that may cause unacceptable risk to human health or the environment.

_____ _____

ROBYN M. BURK, Colonel, USAF Date
Commander, 611th Air Support Group

_____ _____

JOHN HALVERSON, Environmental Program Manager Date
Federal Facilities Section, 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 Site Name and Location

Site Name	Equipment Building (SS004) –
Site Location:	Bear Creek RRS, Alaska
Latitude and Longitude:	65.254300 North, -151.924100 West
Point of Contact:	Mr. Steve Hunt, Remedial Project Manager Steve.Hunt@elmendorf.af.mil (907) 552-4869 USAF 611 CES/CEAR 10471 20th Street, Suite 348 JBER, AK 99506-2200

The former Bear Creek RRS is located in central Alaska approximately 6 miles from the community of Tanana and approximately 130 air miles west of Fairbanks (**Figure 2-1**). Tanana is located on the north bank of the Yukon River, approximately two miles west of the confluence of the Yukon and Tanana Rivers. The population of Tanana is 251 based on the 2009 Alaska Department of Commerce, Community, and Economic Development (DCCED) Certified Population (DCCED, 2010). Tanana is accessible by river and air; there are no roads connecting Tanana to other regional communities. The Bear Creek RRS property is connected to Tanana by approximately eight miles of gravel road leading north from the Yukon River and Tanana. The gravel road travels up the south side of a heavily forested ridge to the former installation site.

The Bear Creek RRS facilities were located on 16.21 acres of federal land withdrawn from the public domain by public land order for military purposes. The 16.21 acres were divided into three parcels: the main Bear Creek RRS installation located on a 14.69-acre parcel, the water collection system location on a separate 0.92-acre parcel north of the installation, and the POL Site at the Yukon River located on a 0.19-acre parcel on the north bank of the Yukon River.

SS004 was an equipment building and dormitory complex located within the main 14.69-acre installation. The Equipment Building was used to store electrical equipment and other materials. The electrical equipment used oil that contained PCBs.

2.2 Site History and Enforcement Activities

This section provides background information and summarizes the series of previous site activities and investigations that led to the ROD. It describes the CERCLA response actions undertaken at the Equipment Building.

Bear Creek RRS was built in 1956 and 1957 and became active in January 1959. The station was part of the original White Alice Communication System. The purpose of the station was to relay radio information to and from Indian Mountain RRS, Kalakaket Creek RRS and Pedro Dome RRS. With communication technology upgrades, the installation's mission was phased out into the late 1970s, and the installation was decommissioned in 1981.

While it was operational, the Bear Creek RRS included four White Alice scatter antennae, two smaller antennae, associated transmission framework, a water supply system, a solid waste disposal area, an equipment building and personnel dormitory, primary and temporary vehicle maintenance shops, a 40,000-gallon water aboveground storage tank, two POL storage tank areas, an airstrip, and other support facilities (**Figure 2-2**). The USAF removed the remaining structures as part of the Clean Sweep effort conducted in 1996 and the entire site was graded and covered with fill during additional Clean Sweep activities in 1997.

Beginning with a 1981-1982 hazardous materials inspection and continuing through a 2005-2006 RI, USAF has investigated the Bear Creek RRS area for environmental impacts from former installation operations. Site investigation and restoration events for the Equipment Building are summarized below:

- In 1981-1982, USAF inspected Bear Creek and other former White Alice installations. Hazardous and toxic materials and wastes and most moveable equipment were shipped off-site to Elmendorf Air Force Base (AFB).
- In 1984, USAF performed a follow-up inspection and found several areas of soil containing PCBs. An unknown volume of PCB-contaminated soil was removed from the site and reportedly buried in a pit located approximately 0.25 miles east of the RRS.
- In the summer of 1985, PCB-contaminated soil in areas A, B, and D (**Figure 2-3**) was excavated and placed in drums. 53 drums of PCB-contaminated soil and 5 drums of PCB-contaminated debris were removed from the site and shipped to Elmendorf AFB for disposal. After excavation, each area was backfilled with clean soil.
- In 1992, 5 soil samples were collected from around the Equipment Building doorways. PCBs were identified at concentrations between 0.076 mg/kg and 1,000 mg/kg.
- In 1996, the Equipment Building was demolished. Prior to demolition, floor tiles were sampled for PCBs. Contaminated floor tiles were drummed and shipped to Elmendorf AFB for disposal. Debris that may have contained asbestos was segregated into regulated and non-regulated portions. Regulated material was removed and transported to Galena, Alaska, for disposal at the Campion asbestos landfill. Non-regulated asbestos-containing material was buried with other demolition waste in a permitted landfill east of the installation. The concrete floor and foundation remain in place. The site was graded and covered with 18 inches of fill.

Figure 2-1: Bear Creek RRS Location Map

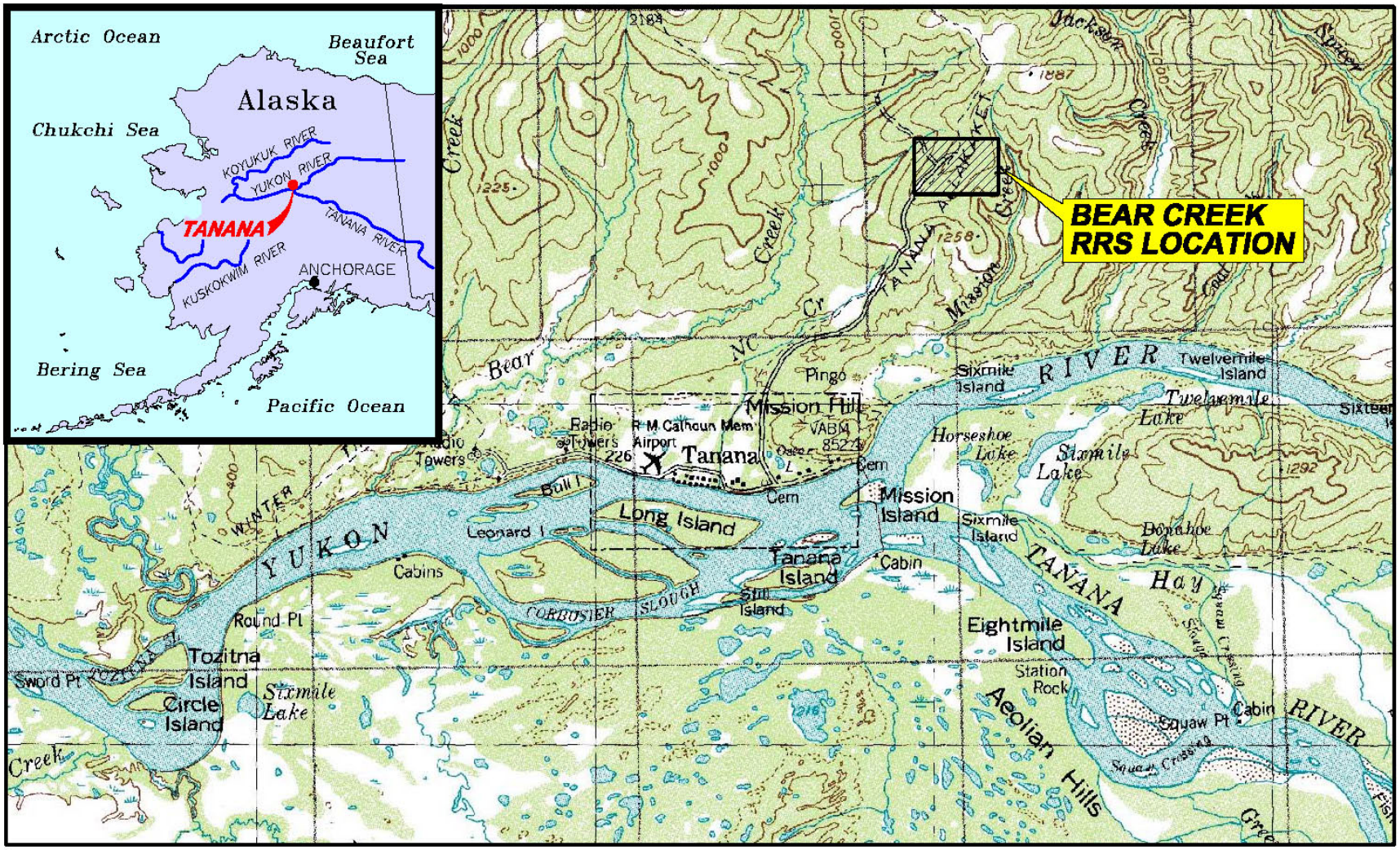

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Figure 2-2: Equipment Building (SS004) Site Location Map

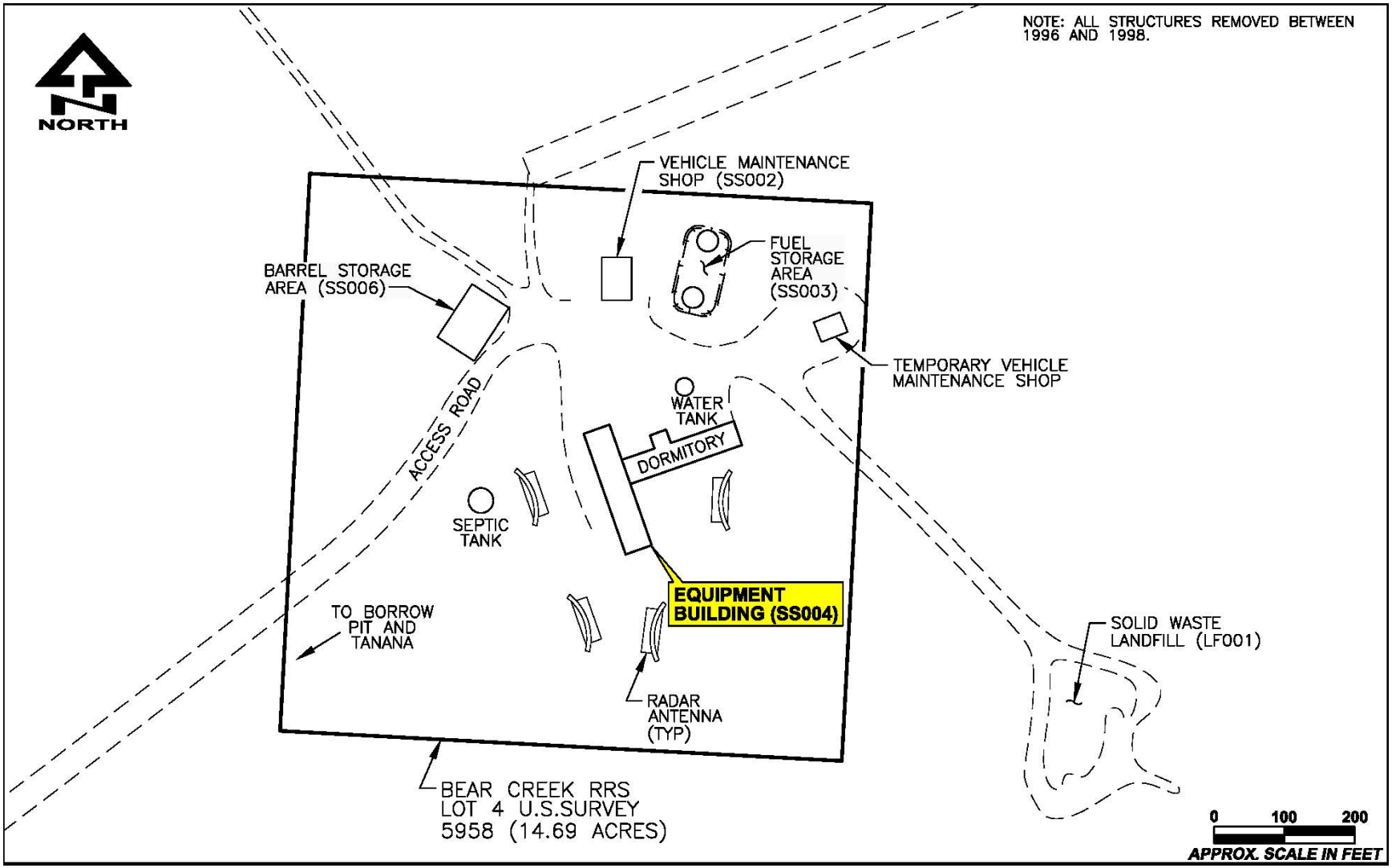

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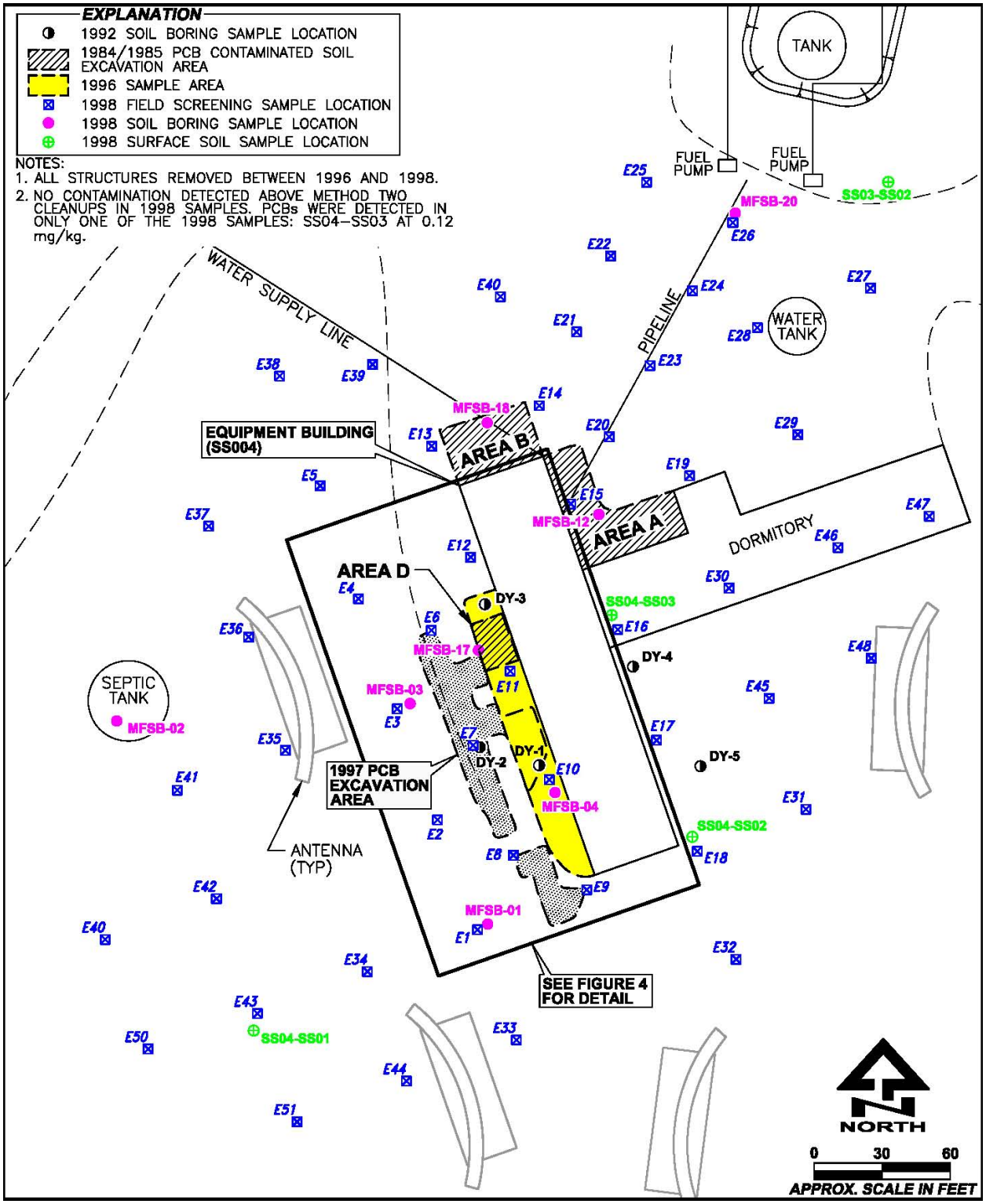
Figure 2-3: Equipment Building (SS004) Site Plan and Sample Locations



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- In 1997, wipe sampling documented PCB contamination of the concrete floor, and sequential solvent technology was used to clean the PCB contamination from the floor. Also in 1997, approximately 1,050 square feet of surface soils contaminated with PCBs over 10 mg/kg were excavated to an initial depth of 6-inches below ground surface (bgs). Excavation base and perimeter sampling verified that all soil containing PCBs greater than 10 mg/kg had been removed. In several areas, the excavation depth was extended to 12 inches bgs. After excavation clean fill material from a gravel pit along the Yukon River was used to cover remaining soils contaminated with PCBs between 1 mg/kg and 10 mg/kg. A total of 92.5 tons of PCB-contaminated soil was excavated and removed from the site in 245 55-gallon drums. PCB-contaminated floor tiles, decontamination solvent, and soil were transported to Elmendorf AFB for disposal.
- In 2000, due to the poor success of previous reseeding efforts and erosion occurring at the site, erosion channels were repaired and the Equipment Building foundation was covered with 2 feet of soil and reseeded. The rest of SS004 was covered with an additional 6 to 12 inches of soil and reseeded.

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. Components of these items and documentation of how each component was satisfied for the Equipment Building are described in **Tables 2-1** and **2-2** below.

A **community relations plan** (CRP) was initially prepared for Bear Creek RRS in December 1998 (USAF, 1998), and then updated and revised in April 2002 (USAF, 2002). A CRP is prepared to promote communication between the USAF and the general public during environmental restoration activities at Bear Creek RRS.

The USAF has sponsored several **public meetings** in Tanana with community members and tribal leaders since 1998 regarding site restoration actions under the ERP. The meetings were held to introduce interested stakeholders to USAF personnel and regulatory personnel and to discuss the future paths of environmental restoration at the former USAF installation. The community has expressed an interest historically in forming a R**estoration Advisory Board** (RAB) to serve as a forum for discussion and exchange of information between the federal/state government agencies regarding the cleanup program at Bear Creek RRS. Currently, there is no RAB for the Bear Creek RRS installation.

Table 2-1
Public Notification of Document Availability

Requirement:	Satisfied by:
Notice of availability of the Proposed Plan and RI/FS must be made in a general circulation major local newspaper.	Notice of availability was initially published in the Fairbanks Daily News Miner newspaper on 4 April 2010, which also indicated that a public meeting was scheduled in Tanana, Alaska on April 14 2010. At the request of the local community, the meeting was rescheduled for 25 May 2010 in Tanana, Alaska. Therefore, a revised notice of availability was published in the Fairbanks Daily News Miner on 16 May 2010. In addition, the public comment period, which commenced on 12 April 2010, was extended by 30 days and covered the period of 12 April to 12 June 2010.
Notice of availability must include a brief abstract of the proposed plan which describes the alternatives evaluated and identifies the preferred alternative (NCP Section 300.430(f)(3)(i)(A)	The revised notice of availability included all of these components and is included for reference as **Attachment 1** to this ROD.
Notice of availability should consist of the following information: • Site name and location • Date and location of public meeting • Identification of lead and support agencies • Alternatives evaluated in the detailed analysis • Identification of preferred alternative • Request for public comments • Public participation opportunities including: – Location of information repositories and Administrative Record file – Methods by which the public may submit written and oral comments, including a contact person – Dates of public comment period – Contact person for the community advisory group (e.g., Restoration Advisory Board), if applicable	The revised notice of availability included all of the components except: • Alternatives evaluated in the detailed analysis • Identification of the preferred alternative • Location of Administrative Record File. The notice of availability is included for reference as **Attachment 1** to this ROD.

Table 2-2
Public Comment Period Requirements

Requirement:	Satisfied by:
Lead agency should make document available to public for review on same date as newspaper notification.	The notices of availability published in the newspaper on 4 April and 16 May 2010 indicated that the proposed plan was sent to local residents on the current project mailing list, and also included a URL for online availability on the internet. The public comment period commenced on 12 April 2010 and ended on 12 June 2010, including an extension of 30 days to accommodate the rescheduled public meeting on 25 May 2010. A fact sheet on the proposed plan was also provided for public availability.
Lead agency must ensure that all information that forms the basis for selecting the response action is included as part of the Administrative Record file and made available to the public during the public comment period.	The Administrative Record file for Bear Creek RRS is maintained by the USAF at JBER. The file is also available online at www.adminrec.com.
CERCLA Section 117(a)(2) requires the lead agency to provide the public with a reasonable opportunity to submit written and oral comments on the Proposed Plan. NCP Section 300.430(f)(3)(i) requires the lead agency to allow the public a minimum of 30 days to comment on the RI/FS and the Proposed Plan and other supporting information located in the administrative record and information repository.	The public comment period for the Proposed Plan started on 12 April 2010, and was extended by 30 days to end on 12 June 2010, as the public meeting had to be rescheduled from 14 April to 25 May 2010. The USAF received one written comment on the proposed plan during the public comment period.
The lead agency must extend the public comment period by at least 30 additional days upon timely request.	The USAF received no requests to extend the public comment period. However, the USAF did extend the public comment period by 30 days to accommodate rescheduling of the public meeting for 25 May 2010.
The lead agency must provide the opportunity for a public meeting to be held at or near the site during the public comment period. A transcript of this meeting must be made available to the public and be maintained in the Administrative Record and information repository for the site (pursuant to NCP Section 300.430(f)(3)(i)(E)).	A public meeting was held on 25 May 2010 at the Elders Basement of the Tanana Tribal Council Compound. A transcript of this meeting has been added to the Administrative Record file and information repository.

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

As required by CERCLA, an **Administrative Record** has been established for Bear Creek RRS by the 611th Civil Engineer Squadron (CES) Environmental Restoration Section. The Administrative Record contains the information that has been used to support decision-making and is accessible to the public. The Administrative Record is located at 10471 20th Street, Suite 302 at JBER, Alaska; the Administrative Record is also available on the internet at: www.adminrec.com.

The USAF Community Relations Coordinator, Mr. Tommie Baker, is also the point of contact for the Administrative Record. A **statewide toll-free telephone number** (**800-222-4137**) is available throughout Alaska to enable interested individuals to contact the Community Relations Coordinator. Interested individuals are encouraged to use this toll-free number to obtain information about the activities at Bear Creek RRS or the ERP process.

2.4 Scope and Role of Operable Unit or Response Action

Site SS004 is one of 7 ERP sites located at the former Bear Creek RRS. Restoration at Bear Creek RRS is being accomplished under the authority of CERCLA. In addition, certain closure activities (e.g., petroleum sites) have been conducted in accordance with State of Alaska regulations (18 AAC 75 and 78).

The USAF, with concurrence from ADEC, has organized the environmental restoration work at Bear Creek RRS as described in **Table 2-3**.

Table 2-3
Bear Creek RRS ERP Site Summary

Site	Name	Environmental Concern	Status
SS004	**Equipment Building**	**PCBs in soil**	**Preferred alternative is excavation**
LF001	Landfill No. 1	PCBs in soil; site not on USAF-controlled property	Preferred alternative is excavation with ICs, Cap Maintenance, and Periodic Reporting.
SS002	Vehicle Maintenance Shop	No unacceptable risk at the site	ROD signed July 2009 CERCLA – No Action State of Alaska – No Action; Cleanup Complete
SS003	Fuel Storage Area	No unacceptable risk at the site	ROD signed July 2009 CERCLA – No Action State of Alaska – No Action; Cleanup Complete
SS006	Barrel Storage Area	No unacceptable risk at the site	ROD signed July 2009 CERCLA – No Action State of Alaska – No Action; Cleanup Complete
SS007	Borrow Pit	Commingled pesticide and petroleum contamination in soil; site not on USAF-controlled property.	Interim soil removal and supplemental remedial investigation planned
S008	POL Site by the Yukon River	No unacceptable risk at the site	ROD signed July 2009 CERCLA – No Action State of Alaska – No Action; Cleanup Complete

*Note: Subject site of this ROD is shown in **bold blue font.***

2.5 Site Characteristics

2.5.1 Physiography and Climate

Bear Creek RRS is located in central Alaska, approximately 130 air miles west of Fairbanks. The site is located at the top of a heavily forested ridge at an elevation of 1,650 feet above mean sea level. The topography of the site slopes towards the west and southwest.

The area lies within the continental climate zone, which is characterized by low precipitation and extreme seasonal temperatures. Typical of interior Alaska, the summers are short and warm and winters are longs and cold. Average annual precipitation is approximately 13 inches, with half of the annual precipitation generally occurring between June and August. Typical annual snowfall is approximately 50 inches, which generally occurs between October and March. Daily maximum temperatures at Tanana during July are 64 to 70 degrees Fahrenheit (°F), with a maximum recorded temperature of 94 °F. Daily minimum temperatures during January are -14 to -48 °F with a minimum recorded temperature of -71 °F.

2.5.2 Geology

Bear Creek RRS is located within the unglaciated portions of the Yukon-Tanana Upland physiographic province. A major structural feature in the region is the Kaltag Fault system, which is located between the former installation and the Yukon River and affects the course of the Yukon River in this area.

Local bedrock at the main installation is primarily composed of metamorphic assemblages of quartz-mica schist, quartzite, and phyllite and is highly fractured due to the proximity of the Kaltag Fault. Soil borings installed at the area have typically encountered weathered bedrock between 2 to 10 feet bgs with more competent, fractured bedrock between 10 to 20 feet bgs (USAF, 1999). The most common lithology described from these borings included interbedded layers of quartz-mica schist and weather phyllite.

The U.S. Soil Conservation Service identifies the soil at Bear Creek RRS as belonging to the Typic Cryachrepts and Histic Pergelic Cryaquepts association. This association of soils includes silty to sandy loam which grades to gravelly and stony material in areas where permafrost is absent. Specifically, the surface soils in the mountains north of Tanana are comprised mainly of well-drained, brown silty and gravelly loam with no permafrost and poorly drained olive brown, gravelly, silty, and sandy loams with discontinuous areas of permafrost. Peat (up to 16 inches thick) and other vegetation overlie these soils. Permafrost, where found, is reportedly at depths between 10 to 20 inches bgs (HMTC, 1989); however, permafrost has not been encountered at the site. The soil is generally less than 40 inches thick in the area.

2.5.3 Hydrogeology

No specific groundwater data are available for Bear Creek RRS; groundwater has not been detected or assessed at the installation. During installation operations, drinking water was obtained from a surface water collection system north of the installation area. Historically, soil borings installed as deep as 50 feet bgs did not encounter groundwater before encountering competent bedrock. Localized intervals of saturated soil encountered in some soil borings

between bedrock fractures were characterized as pore water because they occur only intermittently (after precipitation events) and are not part of a larger or continuous groundwater zone.

2.5.4 Surface Water Hydrology

The Yukon River is a significant surface water body in the area. The former installation area is located on a ridge approximately 1,400 feet above the Yukon River floodplains.

Surface water runoff from precipitation and snowmelt likely occurs as seasonal overland flow to nearby creeks. The headwaters of Mission Creek, NC Creek and Bear Creek are located approximately 3,500 feet to 10,000 feet downhill from the former installation and discharge directly into the Yukon River several miles downgradient of the site. These creeks have low seasonal flow rates and are not year-round fish habitat. Year round surface water bodies were not observed within a two-mile radius of the former installation area.

2.5.5 Ecology

Typical vegetation for the area includes upland tussock tundra with herbs and various berry plants such as cranberries, blueberries, and bearberries interspersed with black spruce. The vegetation around much of the area consists of dense willow and alders.

Wildlife common to the area and observed locally include, but are not limited to, the Alaska marmot, arctic ground squirrel, black bear, brown bear, common shrew, dusky shrew, lynx, marten, meadow jumping mouse, moose, northern red-backed vole, pygmy shrew, singing vole, tundra vole, wolf, wolverine, and yellow-cheeked vole (University of Alaska – Fairbanks, 1998).

A large number of bird species have also been observed in the area. Frequently observed species include the Canada goose, American Widgeon, spotted sandpiper, common snipe, alder flycatcher, bank swallow, black-capped chickadee, ruby-crowned kinglet, Swainson's thrush, varied thrush, orange-crowned warbler, yellow warbler, slate-colored junco, and the common redpoll (Sauer, et al. 1997).

Year-round surface water bodies have not been observed within a two-mile radius of the former installation area. Based upon interviews with local residents and field observations, area creeks (Mission Creek, NC Creek, and Bear Creek) are known to have very low seasonal flow rates and are not a year round habitat for fish. However, species of fish known to inhabit the Yukon River include salmon, burbot, sheefish, rainbow trout, northern pike, and blackfish.

The environment around Bear Creek RRS is not classified as critical habitat as defined by 50 CFR 424.02; however, the area is classified as a sensitive environment. According to the U.S. Fish and Wildlife Service, there are two American peregrine falcon nests and one bald eagle nest within 15 miles and 6 miles, respectively, of the installation (ADFG, 2003). The bald eagles are protected under the Bald and Golden Eagle Protection Act of 1940.

2.5.6 Previous Site Characterization Activities

Beginning with a 1981-1982 hazardous materials inspection and continuing through a 2007 RI/FS, USAF has conducted investigations of the Bear Creek RRS area to determine if former

installation operations caused environmental impacts. Historical site investigation and restoration events for SS004 are summarized below.

- *Equipment and Hazardous Waste Removals.* In 1981 and 1982, USAF inspected Bear Creek and other former White Alice installations. Hazardous and toxic materials and wastes and most moveable equipment were shipped off-site to Elmendorf AFB.
- *Soil Removal:* In 1984, USAF performed a follow-up inspection and found soils containing PCBs in the vicinity of the Equipment Building (SS004) and the Vehicle Maintenance Shop (SS002). In 1985, 53 drums of PCB-contaminated soil were removed from SS002 and SS004. It should be noted SS002 has received a "No Action, Cleanup Complete" status from ADEC and is not included in this ROD.
- *Preliminary Assessment, Bear Creek Radio Relay Station* (HMTC, 1989).

  The PA was performed by the Hazardous Material Technical Center (HMTC) in June 1988. The work scope included a site visit, a records search, and the acquisition of available geologic, hydrologic, meteorologic, land use, and critical habitat data from Federal, State and local agencies. HMTC reported batteries, PCB-contaminated soils and materials, some electrical equipment and fuel had been removed from Bear Creek RRS. HMTC observed electrical materials, including four generators, two empty fuel tanks, rows of power control panels, fuse boxes, and switch/circuit control boards in the Equipment Building during the PA site visit. Residual fuel was observed on the concrete floor adjacent to the generators; however, floor drains were not observed in the area. Although there were no visible indications of contamination evident at Bear Creek RRS, further investigation was recommended.
- *Preliminary Assessment, Bear Creek Radio Relay Station* (USAF [ENSR], 1993a).

  In 1992 and 1993, ENSR Consulting and Engineering (ENSR) performed a second PA at Bear Creek RRS. Appendix 2 of the report includes documentation of the 1985 USAF PCB cleanup activities. The PA recommended further investigation due to the high PCB concentrations in soil found during the 1984 – 1985 USAF activities at Bear Creek RRS.
- *Site Investigation, Bear Creek Radio Relay Station* (USAF [ENSR], 1993b).

  In 1992 and 1993, ENSR performed a SI at Bear Creek RRS. In August 1992, ENSR collected several samples from the Equipment Building (SS004), as well as samples from the Solid Waste Disposal Area (LF001), Vehicle Maintenance Shop (SS002), and Fuel Storage Area (SS003), which are not addressed in this ROD. PCB-contaminated soils were identified in at the Equipment Building. Sample results are discussed in **Section 2.5.7.2** of this ROD. The SI recommended further investigation.
- *Field and Analytical Report for 1997 Clean Sweep Activities at Bear Creek RRS Station* (USAF, 1997)

  In 1997, the USAF conducted additional Clean Sweep activities at Bear Creek RRS. Between July and September 2007, the 611th CES/CEVO collected soil samples from the area immediately west of the Equipment Building and from directly below sumps and drains in the Equipment Building floor. In addition, wipe samples and composite concrete samples were collected from the Equipment Building floor to determine the presence of

PCB compounds remaining on the floor. Sampling details and results are discussed in **Section 2.5.7.2** of this ROD.

Following the 1997 soil sampling activities, approximately 92.52 tons of soil contaminated with PCBs above 10 mg/kg was excavated from the western side of the Equipment Building foundation. Excavated soil was placed in 245 55-gallon drums for transportation to Elmendorf AFB. Following the removal of soil with PCB concentrations of 10 mg/kg and greater, clean fill material from a gravel pit along the Yukon River was used as backfill. Soil with PCB concentrations between 1 and 10 mg/kg was left in place and covered with a minimum of 18 inches of clean fill.

Surface wipe samples from the Equipment Building floor indicated the presence of PCBs above the target cleanup level of 10 micrograms per 100 square centimeters (µg/100 cm^2) on two areas of the floor. Both areas were located in the former power room in generator/power plant secondary containment basins. In August 1997, the floor was decontaminated using three cycles of a sequential solvent extraction decontamination procedure.

- *Remedial Investigation Report for the Bear Creek Radio Relay Station* (USAF [Radian], 1999).

  The RI included site reconnaissance, field screening, soil sampling, groundwater and surveying of sample points. Surface water samples were also taken at SS008, which is not included in this ROD. A phased approach was used for sampling activities. Field reconnaissance and a review of historical information were used to identify field screening locations, and field screening results were used to identify location for collecting samples for laboratory analysis.

2.5.7 Nature and Extent of Contamination

2.5.7.1 Known or Suspected Sources of Contamination

The source of contamination at the Equipment Building is likely PCB-containing oil that was spilled or discharged to the ground surface outside the facility during equipment maintenance activities. The Equipment Building was used to store electrical equipment and other materials. The electrical equipment used oil that contained PCBs.

2.5.7.2 Types of Contamination and Affected Media

Between 1984 and 1997, a series of soil sample events and subsequent excavations were performed to delineate and remove PCB-contaminated soil from the vicinity of the Equipment Building. As discussed previously, all soil identified as containing PCBs greater than 10 mg/kg was excavated and removed from the site. 1997 excavation verification samples detected PCB concentrations below 10 mg/kg around the excavation at the limits of the excavation and around the excavation perimeter (**Figure 2-4**).

Soil sample results from areas that were not excavated are summarized in **Table 2-4**, which includes results from pre-excavation samples that were below 10 mg/kg and therefore not excavated, as well as the excavation verification samples from the bottom and sides of the excavation.

Figure 2-4: Equipment Building (SS004) 1997-1998 Soil Sample Locations and Results

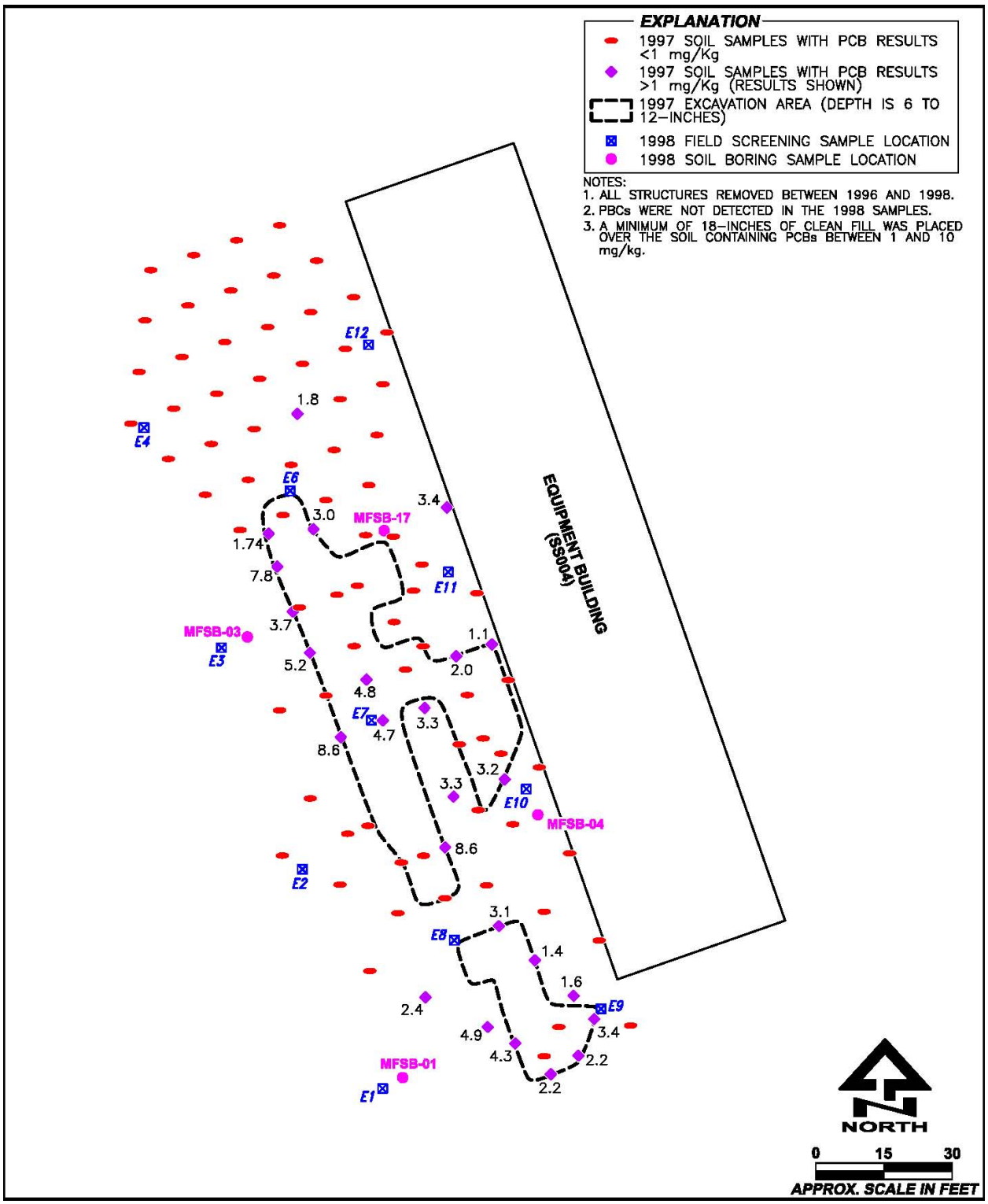

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Table 2-4
1997 PCB Result Summary (Unexcavated Soil)

Analyte	Number of Samples (Outside of Excavation)	Number of Detections	Number Detected Below 1 mg/kg	Number Detected Above 1 mg/kg	Maximum Detection (mg/kg)
PCBs	114	69	41	28	8.6

Notes:

1. 1 mg/kg = 18 AAC 75.341 Table B1 cleanup level protective of residential use. Per Note 9, soil contaminated by PCBs at concentrations between 1 mg/kg and 10 mg/kg can be left in-place if the contaminated soil is covered by a protective cap.

In addition to the PCB sampling described above, six soil samples were collected from the soil below the Equipment Building foundation's sumps and drains and analyzed for barium, lead, diesel range organics (DRO), volatile organic compounds (VOCs), and PCBs. The samples were collected from a depth of approximately 18 inches below the foundation below each sump. The results are summarized in **Table 2-5**. DRO was detected at 13,800 mg/kg in one sample, above the ADEC Method Two cleanup level of 10,250 mg/kg. Low DRO concentrations in the other five soil samples suggest that the DRO contamination is not widespread. DRO-contaminated soil will be excavated and disposed of with the PCB-contaminated soil previously identified at the Equipment Building. Therefore, since the USAF will not be leaving contamination in place exceeding cleanup levels, no institutional controls should be necessary for SS004.

Table 2-5
1997 Sump and Drain Soil Sample Summary

Analyte	Number of Samples	Number of Detections	Maximum Detection (mg/kg)	ADEC Method Two Cleanup Level (mg/kg)	Number Exceeding Cleanup Level
PCBs	6	1	0.067	1	0
Lead	6	1	1.65	400	0
Barium	6	6	1.33	20,300	0
DRO	6	6	13,800	10,250	1
Xylenes	6	2	0.216[(4)]	20,300	0

Notes:

1. ADEC Method Two Cleanup Level = 18 AAC 75.341 Table B1 cleanup level protective of residential use (PCBs and lead); protective of direct contact pathway (barium and xylenes); protective of ingestion (DRO).
2. DRO = diesel-range organics
3. Xylenes were the only volatile organic compounds (VOCs) detected.

2.5.7.3 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 or wind dispersal. This is unlikely at the Equipment Building since contaminated soils are buried under a soil and vegetation cap. As described in **Section 2.5.3,** groundwater has not been encountered in the vicinity of the site.

2.5.8 Conceptual Site Model

A conceptual site model (CSM) 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 2-5**, based upon current and reasonably likely future land uses and the potential beneficial use of groundwater and surface water at the Equipment Building.

Since future residential land use is considered unlikely, it is not included in **Figure 2-5**. However, residential land use has been considered in the human health risk assessment to determine whether the site would be suitable for unrestricted use or unlimited exposure and to establish requirements for land use controls (LUCs), as described within this ROD. In addition to land use, other resources may be impacted, such as groundwater.

2.6 Current and Potential Future Land Use and Resource Uses

2.6.1 Land Use

The USAF uses the former Bear Creek RRS for environmental restoration purposes only. The facility has been abandoned for many years and has no designated land use. Local residents have unrestricted access to the former Bear Creek RRS lands for subsistence and recreational purposes.

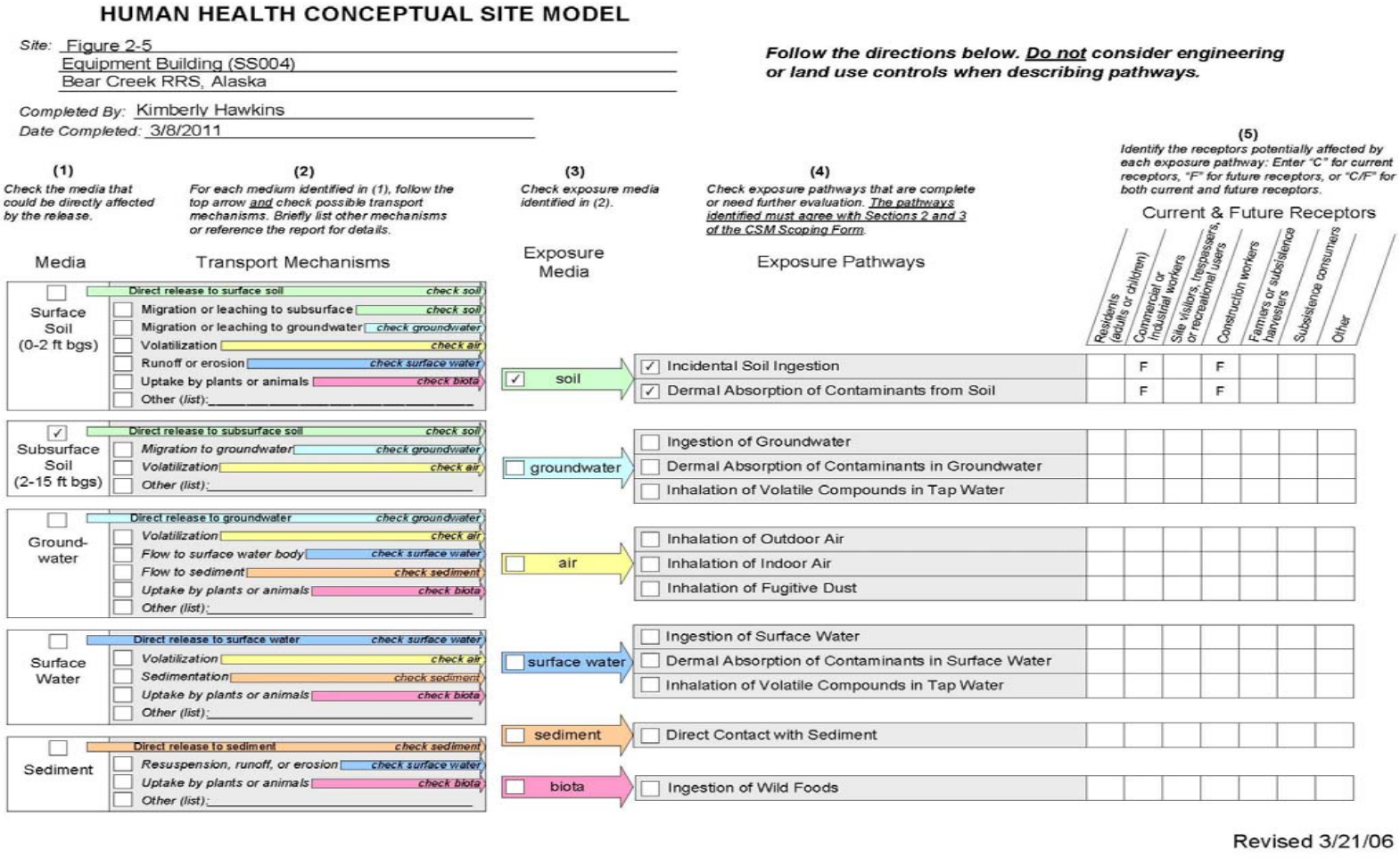
As the lead agency, the USAF has the authority to determine the future anticipated land use of Bear Creek RRS. After considering input from the ADEC, the USAF has determined that the most likely future land use of the Equipment Building over the next 30 years is recreational. The current land use of adjacent/surrounding land is recreation. The current use of adjacent/surrounding land is expected to remain the same over the foreseeable future.

2.6.2 Ground and Surface Water Beneficial Uses

As described in **Section 2.5.3**, groundwater has not been encountered at the site. Historically, soil borings as deep as 50 feet bgs did not encounter groundwater before encountering competent bedrock. Localized intervals of saturated soil encountered in some soil borings between bedrock fractures were characterized as pore water because they occur only intermittently (after precipitation events) and are not part of a larger or continuous groundwater zone.

As described in **Section 2.5.4**, the Yukon River is the significant surface water body in the area. Surface water runoff from precipitation and snowmelt likely occurs as seasonal overland flow to nearby creeks, including Mission Creek, NC Creek, and Bear Creek. The headwaters of the creeks are located downhill from the former installation and discharge directly into the Yukon River several miles downgradient of the site.

Figure 2-5:
Conceptual Exposure Model for the Equipment Building (SS004)



Note: Risk associated with future exposure to PCB-impacted soil by Commercial or Industrial Workers and/or Construction Workers during remedial action is addressed in **Table 2-16**.

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2.7 Summary of Site Risks

This section summarizes the human health and ecological risk assessments that have been performed at Bear Creek RRS. The COCs associated with unacceptable site risk are identified, as well as the potentially exposed populations and exposure pathways of primary concern. A summary of the findings of the ecological risk assessment (ERA) is also presented. Based on the presence of unacceptable risks to recreation and subsistence users if the existing soil and vegetative cap at the site is not maintained, remedial action is being recommended to reduce the risks.

Potential risk due to contamination at the Equipment Building was evaluated in the 1999 RI report and the risk evaluations were updated during preparation of the Proposed Plan to evaluate whether potential exposure pathways are complete and whether cumulative risks from multiple chemicals are above threshold levels. In accordance with ADEC regulations (18 Alaska Administrative Code [AAC] 75.325[g]) and Cumulative Risk Guidance (ADEC, 2008) the cumulative effects of exposure to all contaminants detected at a site must be evaluated to ensure the risk standards are not exceeded.

Individual detected chemical concentrations and total (cumulative) risk posed by all chemicals at the subject site were compared to published risk levels considered acceptable to ADEC. The published risk levels used for comparison with existing contamination levels are human health risk-based levels promulgated by the Sate of Alaska for soil based upon residential uses. The use of such promulgated standards for risk assessment is specifically allowed by NCP and EPA guidance (Office of Solid Waste and Emergency Response # 9355.0, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, April 1991).

2.7.1 Summary of Human Health Risk Assessment

The baseline risk assessment estimates what risks the site poses if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the ROD summarizes the approaches used and the results of the baseline risk assessment for this site. The human health risk assessment (HRA) is divided into the following sections: identification of COCs (hazard assessment), exposure assessment, toxicity assessment, and risk characterization. Potential risks for both current and future site occupants are discussed. Key assumptions and uncertainties associated with the HRA are also identified. The chemicals, exposure pathways, and populations associated with unacceptable risk are highlighted, as they serve as the primary basis for remedial action.

2.7.1.1 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. Although other chemicals were detected at the site, these COCs are the primary risk-driving chemicals. The data used in this risk assessment was deemed to be of sufficient quality and quantity for its intended use. The detection frequency (number of samples in which the chemical was detected divided by the total number of samples analyzed), range of detected concentrations (maximum and minimum concentrations detected),

the exposure point concentrations (the calculated or assumed concentration of the chemical at the assumed location of exposure), and the screening concentration (concentration above which the chemical is believed to possibly present a risk to human health or the environment and thus require further evaluation) for chemicals and media of concern are presented in **Table 2-6**.

Table 2-6
Summary of Chemicals of Concern and Medium-Specific Exposure Point Concentrations

Media	Chemical of Concern	Concentration Detected		Units	Frequency Of Detection	Exposure Point Concentration	Screening Concentration
		Min	Max				
Soil On-Site -Direct Contact	PCBs	<0.03	8.6	mg/kg	69/114	2.7 (99% UCL)	1
	DRO	4.79	13,800	mg/kg	6/6	13,800 (max concentration)	10,250

Key
PCBs = polychlorinated biphenyls
DRO = diesel range organics
mg/kg = milligrams per kilogram
UCL (upper confidence limit), calculated and recommended by ProUCL.
Data used to calculate UCL was obtained from the *Field and Analytical Report for 1997 Clean Sweep Activities at Bear Creek RRS Station, Tanana, Alaska (USAF 2007).*

To determine whether there are any COCs at the Equipment Building, chemicals of potential concern (COPCs) were identified in accordance with ADEC Cumulative Risk Guidance (ADEC, 2008c). Per the guidance, all analytes detected at concentrations greater than 1/10 of the ADEC Method Two soil cleanup levels (inhalation and ingestion/direct contact pathways) are considered COPCs and must be included in cumulative risk calculations. The sampling results from the Equipment Building were compared against screening criteria to determine whether there were COCs that require remedial action to protect human health and the environment. The primary soil screening criteria are derived from 18 AAC 75, specifically Method Two cleanup levels (under 40-inch 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). COPCs for the Equipment Building include PCBs and DRO in soil.

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 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.

Based on 1997 and 1998 soil sample results, PCBs are present in subsurface soils at levels up to 8.6 mg/kg, well above the 1 mg/kg ADEC Method Two cleanup level protective for residential land use. DRO is present in subsurface soils at 13,800 mg/kg, above the 10,250 mg/kg ADEC Method Two cleanup level protective for residential land use. Soils impacted with PCBs and

DRO are under a soil and vegetative cap, with DRO-impacted soil located an additional 18 inches under the building foundation.

2.7.1.2 Exposure Assessment

This section documents the populations and exposure pathways that were quantitatively evaluated in the risk assessment. A CSM was developed to aid in determining reasonable exposure scenarios and pathways of concern; this CSM is shown in **Figure 2-5**. As described in this section, both current and future populations have been evaluated based on current and reasonably anticipated future land use. The contaminated media to which people may be exposed is also discussed. Resources other than land may be involved.

The purpose of the CSM is to evaluate and depict potential relationships or exposure pathways between chemical sources and receptors (human or ecological). An exposure pathway describes the means by which a receptor can be exposed to contaminants in environmental media. Potentially complete current and future exposure pathways are summarized below and shown on **Figure 2-5**. The CSM indicates the only complete exposure pathways relate to "incidental soil ingestion" and "dermal absorption of contaminants from soil" for future use by Commercial or Industrial Workers and Construction Workers during remedial activities.

Current land use (recreational and subsistence): Exposure to subsurface PCB soil contamination through the ingestion of wild foods is unlikely due to the existing soil and vegetative cap. In addition, the area of PCB contamination is so small that exposure via the biota pathway is considered *de minimus*. Exposure to subsurface DRO contamination is unlikely since DRO concentrations above the Method Two cleanup levels are located approximately 18 inches under the concrete building foundation, which is further buried under approximately 24 inches of clean fill.

Potential future land use (recreation and subsistence): Exposure to subsurface PCB soil contamination through the ingestion of wild foods may be possible if the soil and vegetative cap was not maintained since the area is used for hunting and harvesting of wild foods and since PCBs have the potential to bioaccumulate. However, the area of PCB contamination is so small that exposure via the biota pathway is considered *de minimus*. Exposure to subsurface DRO contamination is unlikely since DRO concentrations above the Method Two cleanup levels are located approximately 18 inches under the concrete building foundation, which is further buried under approximately 24 inches of clean fill.

Potential future land use (residential): If future land use was modified to residential, exposure to subsurface soil contamination through incidental soil ingestion or dermal absorption of contaminants from soil may be possible due to accidental or intentional excavation activities if the existing soil and vegetative cap was not maintained.

2.7.1.3 Toxicity Assessment

This section describes the carcinogenic and non-carcinogenic toxicity criteria used to calculate the potential risk for each COC. Carcinogenic toxicity is the tendency of a chemical to cause cancer. Non-carcinogenic toxicity includes all other adverse health effects of a chemical. Toxicity data for carcinogens is presented in **Table 2-7**. When available, separate toxicity

criteria are listed for ingestion (oral intake, swallowing), inhalation (breathing into the lungs), and dermal (absorption through the skin) routes of exposure. For carcinogenic COCs, the toxicity criteria is the slope factor, which is a number, which when multiplied by the daily dose of the chemical, yields the expected incidence of cancer in a population. For example, a slope factor of 2 $(mg/kg\text{-}day)^{-1}$ multiplied by a daily dose of 0.001 mg/kg-day would yield a cancer incidence of 0.002 which would be 2000 cancers in a population of 1 million (See **Section 2.7.1.4** for more information). The weight of evidence/cancer guideline description is a descriptor, usually provided by the EPA classifying the degree of confidence that the chemical is a human carcinogen. Slope factors and weight of evidence/cancer guideline descriptions are listed in **Table 2-7** along with the source of each slope factor and date of its publication.

For non-carcinogenic chemicals the toxicity criteria is the reference dose (RfD). The RfD is the maximum daily dose of the chemical that is not expected to cause any adverse effect on human health. The RfD is calculated from actual dosing data (experimental animals or humans) by dividing the observed dose that produces no effects by "uncertainty" or "safety" factors that range from 3 to 3000, depending on the relevance and quality of the study used, to yield a daily dose that has a high certainty of being safe for humans because it is lower than the observed "safe" dose by a factor of 3 to 3,000.

PCBs cause cancer in animals and are believed to be carcinogenic in humans. The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies have also shown changes in blood and urine that may indicate liver damage. Evidence also suggests that PCBs might have adverse reproductive, developmental, and endocrine effects (ATSDR, 2001).

Table 2-7
Cancer Toxicity Data Summary

Pathway: Ingestion, Dermal						
Chemical of Concern	**Oral Cancer Slope Factor**	**Dermal Cancer Slope Factor**	**Slope Factor Units**	**Weight of Evidence/Cancer Guideline Description**	**Source**	**Date**
PCBs	2.0	2.22	mg/kg-d	B2 (Probably human carcinogen-based on sufficient evidence of carcinogenicity in animals)	ADEC Risk Assessment Procedures Manual	1 July 2010

Pathway: Inhalation							
Chemical of Concern	**Unit Risk**	**Units**	**Inhalation Cancer Slope Factor**	**Units**	**Weight of Evidence/Cancer Guideline Description**	**Source**	**Date**
PCB	1×10^{-4}	$\mu g/m^3$	2.0	mg/kg-d	B2 (Probably human carcinogen-based on sufficient evidence of carcinogenicity in animals)	ADEC Risk Assessment Procedures Manual,	1 July 2010

Key
PCB = polychlorinated biphenyls
mg/kg-d = milligrams per kilogram per day
$\mu g/m^3$ = micrograms per meter cubed

2.7.1.4 Risk Characterization

This section of the risk assessment combines the results of the exposure assessment with the toxicity criteria identified for the COCs and pathways. Carcinogenic risks and noncarcinogenic impacts for each COC are presented for all populations and media of interest, including both current and future land and other resource use settings. Cumulative risks, including all COCs and pathways, for all relevant pathways and populations are also described. These risk estimates are summarized in **Tables 2-8** and **2-9**. The results of the human health risk assessment 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 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 2008c).

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} (1 in 10,000 to 1 in 1,000,000).

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (e.g., life-time) with a 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 less than or equal to 1 indicates that a receptor's dose of a single contaminant is less than or equal to 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 and pathways 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 less than or equal to 1 indicates that adverse effects are unlikely from additive exposure to site chemicals. An HI greater than 1 indicates that site-related exposures may present a risk to human health.

Based on the exposure point concentration of PCBs (2.8 mg/kg) at SS004, the cumulative risk under a residential exposure scenario was 1×10^{-5}. The excess cancer risk equals the ADEC threshold risk of 1×10^{-5}. This cumulative risk value does not account for additional risk due to the potential for PCBs to bioaccumulate in the food chain. Based on the maximum concentration of DRO (13,800 mg/kg) at SS004, the cumulative HI under a residential exposure scenario was 2.1, which exceeds the ADEC threshold level of 1. However, a complete exposure pathway for DRO does not exist.

Table 2-8
Risk Characterization Summary

	Exposure Point Concentration (mg/kg)	Risk-based Concentration (mg/kg)	Exposure Pathway	HQ	Risk
PCB	2.7	2.8	Ingestion		9.6×10^{-6}
PCB	2.7	17	Inhalation		1.5×10^{-6}
DRO	13,800	10,139	Ingestion	1.4	
DRO	13,800	19,917	Inhalation	0.7	
Cumulative Risk (Threshold = $10^{-5)}$					1×10^{-5}
Cumulative HI (Threshold Level = 1)					2.1

2.7.2 Summary of Ecological Risk Assessment

This section summarizes the approaches and findings of the ERA that has been performed at SS004. An ERA estimates the likelihood that adverse ecological effects (e.g., mortality, reproductive failure) will occur as a result of a release of a hazardous substance at a Superfund site. The purpose for conducting the ERA is to 1) identify and characterize the current and

potential threats to the environment from hazardous substance release, 2) evaluate the ecological impacts of alternative remediation strategies, and 3) establish clean-up levels that will protect the natural resources at risk. It's a qualitative and/or quantitative appraisal of the actual or potential effects of site releases on plants and animals. The ERA did not find any unacceptable risks associated with chemicals present at SS004.

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 and pollutants or contaminants into the environment. Response action is warranted based on the presence of PCBs in subsurface soil between 1 and 10 mg/kg.

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 RAO for the Equipment Building is: Prevent human exposure to PCBs in soil exceeding the ADEC Method Two cleanup level of 1 mg/kg (**Table 2-9**).

Table 2-9
Maximum Soil Concentrations and ADEC Cleanup Levels

Contaminant	Maximum Concentration (mg/kg)	Location/Depth of Maximum Concentration	ADEC Cleanup Levels (mg/kg) by Pathway[1]		
			Direct Contact	Outdoor Inhalation	Migration to Groundwater
PCBs	8.6	47114978068 (1-3 inches bgs before capping)	1	NA	NA

Notes:
1. Cleanup Levels provided in Table B1 of the Alaska Contaminated Site Regulations (18 AAC 75.341) for the "Under 40-Inches of Precipitation" zone.
2. mg/kg = milligrams per kilogram
3. NA = No cleanup levels provided for these pathways.

This RAO was developed based on the currently and reasonably anticipated future land use of recreation/subsistence as described in **Section 2.6**.

The RAO addresses the risks identified in the risk assessment by: Protecting people from unknowingly contacting the residual contamination by excavating soil contaminated with PCBs above 1 mg/kg, backfilling the excavation with clean fill and a vegetative cover, and transporting PCB-contaminated soil to an permitted off-site facility in the continental United States for disposal.

2.9 Description of Alternatives

The remedial alternatives considered for the Equipment Building (SS004) were presented in the Draft Feasibility Study Report (HDR|e²M, 2010) and are summarized in **Table 2-10** below.

Table 2-10
Summary of Remedial Alternatives Evaluated for SS004

Alternative Designation	Alternative Description
1	No Action
2	ICs with Cap Maintenance and Periodic Reporting
3	Excavation

Each alternative evaluated is described in more detail including: remedy components, common elements and distinguishing features, and expected outcomes in the following sections.

2.9.1 Description of Remedy Components

A total of 3 alternatives were developed to address remediation at the Equipment Building. This section provides a summary overview of the components of those alternatives.

- Alternative 1: No Action
  - No response action needed
- Alternative 2: ICs with Cap Maintenance and Periodic Reporting
  - Land use restrictions maintained in the property records and proper signage at SS004
  - Periodic inspections performed to ensure the integrity of the existing soil and vegetative cap
  - Periodic reporting to document the continued protectiveness of the ICs and cap by the property owner
- Alternative 3: Excavation
  - Excavate soils contaminated with PCBs between 1 and 10 mg/kg and ship off-site to a disposal facility consistent with the Off-Site Rule (40 CFR 300.440). The soil would be shipped off-site to a landfill in the continental United States which is permitted to accept PCB remediation waste under 40 CFR 761.61.

2.9.2 Common Elements and Distinguishing Features of Each Alternative

Table 2.11 provides a summary of the elements common to each alternative and features that distinguish one alternative from another.

Table 2-11
Common Elements and Distinguishing Features of Alternative

	Alternative 1	Alternative 2	Alternative 3
Key ARARs associated with alternative	None	ADEC Method Two regulations (18 AAC 75.341)	ADEC Method Two regulations (18 AAC 75.341)
Long-term reliability of remedy	None	Moderate. PCB-contamainted soil is contained by maintaning the integrity of the soil and vegetative cap and restricting the use of the property through ICs.	High. PCB-containated soil would be removed to below the Method Two cleanup level.
Quantity of untreated waste and treatment residuals to be disposed off-site or managed on-site in a containment system and the degree of hazard remaining in such material	None	Approximatley 93 cubic yards of PCB-contaminated soil would be managed in place through ICs and cap maintenance.	Approximatley 93 cubic yards of PCB-contaminated soil would be excavated and disposed of off-site[1].
Estimated time for design and construction	Immediate	Short. Soil cap is already in place and vegetation is well established. Requires negotiations for deed restrictions.	Short. Requires work plan development and one field season for construction.
Estimated time to reach remediation goals	Indefinite	Indefinite. PCB-contaminated soils would remain beneath the soil and vegetative cap.	Short. PCB-contamianted soil is expected to be excavated and shipped off-site for disposal in one field season.
Estimated capital cost	$0	$51,719	$307,514
Estimated annual O&M cost	$0	$21,288	$0
Estimated total present worth	$0	$97,653	$307,514
Discount rate	7%	7%	7%
Number of years over which cost is projected	0	30	1
Use of presumptive remedies and/or innovative technologies	None	None	None

[1]Amount of soil to be excavated (93 cubic yards) is likely underestimated. The estimated volume of contaminated soil to be excavated will be determined during project planning for the field effort.

2.9.3 Expected Outcome of Each Alternative

Table 2-12 provides a summary of the outcomes of each alternative.

Table 2-12
Expected Outcome of Each Alternative

	Alternative 1	Alternative 2	Alternative 3
Available uses of land upon achieving cleanup levels		Land appropriate for recreation and subsistence use.	Land appropriate for unlimited use.
Time frame to achieve available land use	NA – Cleanup levels never achieved	Land already appropriate for recreation and subsistence use.	Land already appropriate for recreation and subsistence use. One field season for land to be appropriate for unlimited use.
Available uses of groundwater upon achieving cleanup levels	NA – Groundwater not present at site.	NA – Groundwater not present at site.	NA – Groundwater not present at site.
Time frame to achieve available groundwater use	NA – Groundwater not present at site.	NA – Groundwater not present at site.	NA – Groundwater not present at site.
Other impacts or benefits associated with alternative	NA – Cleanup levels never achieved.	Land already appropriate for recreation and subsistence use	Excavation of the existing vegetative cap would negatively afffect the heath of the vegetation.

2.10 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the alternatives for the Equipment Building (SS004) were evaluated using the nine criteria described in Section 121(a) & (b) of CERCLA and 40 CFR Section 300.430(e)(9)(i) as cited in 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, or an applicable waiver of 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 which may be considered to the extent that information is available during the FS, but can be fully considered only after public and regulator comments, 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 ICs.

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

Alternative 2 would prevent exposure to contaminated soils as long as the soil and vegetative cap was maintained. Alternative 3 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.

Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) and Alternative 3 (excavation) have common ARARs associated with soil cleanup standards for PCBs (18 AAC 75.341, Table B2, Under 40 inches). Alternative 2 has additional requirements associated with maintaining the cap over PCB-contamination in association with Note 9 of 18 AAC 75.341. Alternative 3 has additional requirements associated with disposal of PCB remediation waste (40 CFR 761) and the Off-Site Rule (40 CFR 400.340).

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 is expected to contain PCB-contaminated soil by maintaining the integrity of the soil and vegetative cap and restricting the use of the property through ICs. Cap maintenance and ICs are considered to be effective long-term, although long-term site care is required by this remedy. Alternative 3 removes the PCB-contaminated soil and prevents future exposure. Alternative 3 provides the greatest long-term effectiveness and permanence of all the options as the PCBs are removed from the site.

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.

Alternative 1 (No Action) does not contain any treatment as a component of the remedy. Therefore, this alternative would not reduce the toxicity, mobility, or volume of the contamination the site.

Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) maintains the vegetative cap over the PCB-contaminated soil, but does not provide any treatment of the soil.

Alternative 3 (Excavation) removes the PCB-contaminated soil from the site for disposal or treatment at a permitted offsite disposal facility.

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 risks from direct contact would exist through deterioration of the cap.

Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) requires long-term site care in the form of ICs and Cap Maintenance to provide protection from PCB-contaminated soils; however, there is no added risk to the community, workers, and the environment due to remedy construction. There is no exposure to soil contamination under this alternative.

Alternative 3 (Excavation) is anticipated to be completed in one field season; however, it involves risk to workers and the environment from potential exposure to contaminated soil during remedy construction. The risk can be mitigated by appropriate controls and worker health and safety procedures.

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.

There are no technical or administrative barriers to implement Alternative 1 (No Action). Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) would be relatively simple to implement; however, long-term monitoring is required, which may be difficult at a remote site. Alternative 3 (Excavation) requires relatively common excavation practices; however, the exact location of the PCB-contaminated soils is not known. In addition, PCB-contaminated soil would require extensive handling and transportation from Tanana to a disposal facility in the continental United States and established vegetation on the existing cap would have to be disturbed and re-established during Alternative 3.

2.10.7 Cost

There are no costs associated with Alternative 1 (No Action). The total estimated cost range for Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) is $48,827 to $195,307, which includes periodic inspections, cap repair (15% of cap surface) and reporting every 5 years. The

total estimated cost for Alternative 3 is $153,372 to $615,028, assuming excavation and offsite disposal of 93 cubic yards of PCB-contaminated soil. Cost summaries can be found in **Table 2-13**.

Table 2-13
Summary of Cost and Effectiveness Data for SS004

Remedial Alternatives at Equipment Building (SS004)		Cost	Potential Range	
			(-50%)	(+100%)
Alternative 1	No Action	$ -	$ -	$ -
Alternative 2	ICs, Cap Maintenance and Periodic Reporting	$ 97,653	$ 48,827	$ 195,307
Alternative 3	Excavation	$ 307,514	$ 153,757	$ 615,028

2.10.8 State/Support Agency Acceptance

The State has expressed its support for Alternatives 2 and 3. The State does not support Alternative 1 as the alternative does not provide protection of human health and the environment.

2.10.9 Community Acceptance

During the public comment period, the community expressed its support for Alternative 3 (Excavation). The community did not support Alternatives 1 (No Action) and 2 (ICs, Cap Maintenance, and Periodic Reporting) since both alternatives would leave PCB-contaminated soil at the site. Community members expressed concern about PCBs remaining in the soil as the site is used by many member of the community for subsistence.

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, surface water, 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 the Equipment Building (SS004) 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 the Equipment Building (SS004) and protecting human health and the environment. Performance measures are defined herein as the RAOs (see **Section 2.8**) 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 the Equipment Building.

The remedy for the Equipment Building, Alternative 3 – Excavation, was selected based upon its ability to protect human health and the environment, long-term effectiveness, and community acceptance. 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 (HDR|e²M, 2010). It is expected that this remedy will remain in effect and be protective of human health and the environment since PCB-contaminated soil is removed from the site and shipped to an offsite facility for treatment or disposal. It is expected this remedy will remain in effect and be protective of human health and the environment since PCB-contaminated soil is removed from the site and shipped to an off-site facility for disposal.

The USAF is responsible for implementing the remedial action identified herein for the duration of the remedy selected in this ROD. The USAF will exercise this responsibility in accordance with CERCLA and the NCP. Concurrence by ADEC is required for any modification of the remedy of this ROD.

2.12.1 Summary of the Rationale for the Selected Remedy

The selected remedial alternative for SS004 is Alternative 3 - Excavation. The USAF believes 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 selection criteria as defined by CERCLA § 121(b):

- Threshold criteria
  - Protection of human health and the environment
  - Compliance with ARARs
- Balancing criteria
  - Long-term effectiveness and permanence
  - Short-term effectiveness
- Modifying criteria
  - State agency acceptance
  - Community acceptance

A comparative analysis among alternatives for SS004 found Alternative 3 to be the preferred remedial action alternative for addressing the small volume of PCB-contaminated soil beneath the existing soil and vegetative cap.

Alternative 3 (excavation) protects human health and the environment, provides the greatest long-term effectiveness and permanence, and received overwhelming community acceptance to reduce the risk posed by PCBs. Excavation provides a balance of tradeoffs with respect to the balancing and modifying criteria.

Alternative 1 (No Action) does not meet threshold criteria of protection of human health and the environment and is therefore not a viable alternative for SS004. In addition, the no action alternative is rejected as not being in compliance with State of Alaska regulations.

Alternative 2 (ICs with Cap Maintenance and Periodic Reporting) was originally chosen as the preferred alternative in the FS (HDR, 2010) based on being the most cost-effective and readily implementable approach. However, community acceptance of Excavation led to Alternative 3 being chosen as the selected remedy.

2.12.2 Description of the Selected Remedy

As the result of excavation activities conducted at SS004, soils with PCB concentrations between 1 mg/kg and 10 mg/kg were left onsite and covered with a 2-foot soil cap in 1997. Additional soil was added to the cap and the area was re-vegetated in 2000.

Under the selected remedy, soil contaminated by PCBs above 1 mg/kg would be excavated and disposed of off-site in a permitted facility in the continental United States. Five localized areas are expected to be excavated around known areas of PCB contamination to an approximate depth of 10 inches below the existing cap. Confirmatory samples will be collected from the excavation area. Following removal of PCB-contaminated soils, the excavation will be backfilled and compacted with clean fill from a local borrow source.

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 ROD will be documented using a technical memorandum in the Administrative Record, an Explanation of Significant Differences (ESD), or ROD amendment.

2.12.3 Summary of Estimated Remedy Costs

A summary of estimated remedy costs is provided below in **Tables 2-14**.

Table 2-14
Cost Estimate Summary – Capital Costs for Remedy Component 1

	Description	*Quantity*	*Unit*	*Unit Cost*	*Cost*
Excavation					
1	Excavate Vadose Zone Soil	24	Hours	$300	$7,200
2	Load Soil into Shipping Containers	93	cy	$21	$1,953
3	Backfill Material	121	Ton	$45	$5,445
4	Excavation Oversight	24	Hours	$85	$2,040
5	PCB Field Screening – Excavation	75	Each	$35	$2,625
6	PCBs Laboratory Analysis – Confirmation Sampling	25	Each	$310	$7,750
7	PCBs Laboratory Analysis – Soil Characterization	3	Each	$200	$600
8	Container Rental	7	Each	$700	$4,900
9	Container Liners	7	Each	$30	$210
10	Soil Hauling from Tanana, AK to Fairbanks, AK	7	Container	$5,000	$35,000
11	Soil Hauling from Fairbanks, AK to TSD facility in Arlington, OR	7	Container	$12,000	$84,000
12	Disposal of PCB-Contaminated Soil	121	Ton	$20	$2,420
Subtotal					***$154,143***
Bid Contingency Allowances (15%)					$23,121
Scope Contingency Allowances (35%)					$53,950
Project Management and Support (8%)					$18,497
Remedial Design (15%)					$34,682
Construction Management (10%)					$23,121
				Total Capital Cost	***$307,514***

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

The selected remedy will allow for unlimited use at the site. There is no groundwater present at the site; therefore, no future uses for groundwater are expected.

The purpose of this response action is to remove soils exceeding the ADEC cleanup value of 1 mg/kg. After implementation of the remedy, the requirements of 18 AAC 75.341 will be met.

Table 2-15
Cleanup Levels for Chemicals of Concern at SS004

Media: Soil
Site Area: SS004
Available Use: Unlimited
Controls to Ensure Restricted Use (if applicable): None

Chemical of Concern	Cleanup Level	Basis for Cleanup Level	Risk at Cleanup Level
PCBs	1 mg/kg	18 AAC 75.341	Cancer Risk = 1×10^{-5}

Notes
1. PCBs = polychlorinated biphenyls
2. 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, periodic five-year reviews are required if, after the remedy, hazardous substances will remain in place above levels allowing for unlimited use and unrestricted exposure. CERCLA also 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 removing PCB-contaminated soils between 1 mg/kg and 10 mg/kg. Future risk due to ingestion of animals or plants that may bioaccumulate PCBs is also eliminated.

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 at agreed-upon points of compliance. 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 Resource Conservation and Recovery Act [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 2-16 summarizes the ARARs and TBCs for the selected remedy at SS004 and describes how the selected remedy addresses each one at agreed-upon points of compliance.

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 at agreed-upon points of compliance and is exempt from administrative requirements such as permitting and notifications.

Table 2-16
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 (40 CFR 761)	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 theses regulations through the proper storage of Toxic Substances Control Act regulated wastes.
Action-Specific	Federal Regulatory Requirement	Soil	General Industrial Standards for Workers (29 CFR 1910.210)	Applicable	Outlines required protection for workers.	The selected remedy will comply with these regulations through use of appropriate personal protective equipment and training for proper handling of hazardous materials or waste.
Action-Specific	Federal Regulatory Requirement	Soil	Hazardous Waste Operations and Emergency Response (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	Off-Site Rule (40 CFR 400.440)	Applicable	Requires that CERCLA wastes may only be placed in a facility operating in compliance with the RCRA or other applicable Federal or State requirements.	Soil contaminated with PCBs greater than 1 mg/kg will be shipped to a landfill permitted to accept PCB-containing waste.
Chemical-Specific	42 USC 9620(a)(4)	Soil	Alaska Soil Cleanup Rules 18 AAC 75.340-341	Applicable	For unrestricted land use, PCBs shall be cleaned up to 1 mg/kg or less.	The selected remedy will comply with the regulation through removal of soil containing more than 1 mg/kg PCBs.
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.

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 the Equipment Building was demonstrated in the comparative analysis of alternatives (**Section 2.10** – Summary of Comparative Analysis of Alternatives) and is summarized in **Table 2-17** below. The estimated present worth cost of the selected remedy (in 2010 dollars) is $307,514.

It is important to note that more than one cleanup alternative can be cost-effective, and the Superfund program does not mandate the selection of the most cost-effective cleanup alternative. In addition, the most cost-effective remedy is not necessarily the remedy that provides the best balance of tradeoffs with respect to the remedy selection criteria nor is it necessarily the least-costly alternative that is both protective of human health and the environment and ARAR-compliant. Rather, cost-effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options.

Table 2-17
Cost and Effectiveness Summary for SS004

Alternative	Present-Worth Cost	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, or volume.	No short-term risk to workers. Current risk due to direct contact could still exist.
2 – ICs, Cap Maintenance and Periodic Reporting	$97,653	N/A	Reduction in long-term risk as long as cap is maintained.	No reduction in toxicity, mobility, or volume.	No short term risk to workers, community and the environment.
3 – Excavation	$307,514	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.	Risk to workers and the environment from potential exposure to contaminated soil during remedy construction. Risk to workers and the environment can be mitigated by control measures.
Cost Effectiveness Summary • Alternative 1 is not considered to be cost effective. • While Alternatives 2 and 3 are 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 represents the maximum extent to which permanent solutions and treatment technologies can be used in a practicable manner at the site. Of those alternatives that are protective of human health and the environment and comply with ARARs, the USAF has determined that the selected remedy provides the best balance of trade-offs in terms of the five balancing criteria, while also considering the statutory preference for treatment as a principal element and bias against offsite treatment and disposal and considering state and community acceptance. Excavation is protective of human health and the environment and provides permanent removal of PCB-contaminated soils.

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 and the remedial process at this site were focused on removal of principal site threats. The selected remedy for the Equipment Building (SS004) does not satisfy the statutory preference for treatment as a principal element of the remedy because soils contaminated with PCBs will be shipped to a permitted facility off-site for disposal. Additional treatment is not expected due to the relatively low levels of PCBs in soil.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(5)(iii)(C), because the selected remedy, at completion, 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.

Pursuant to USAF policy, because the selected remedy, which at completion will attain onsite hazardous substance levels that allow for unlimited use and unrestricted exposure, will attain this result within 5 years of the remedy construction completion, a policy 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 SS004 was released for public comment on 12 April, 2010. The Proposed Plan identified Alternative 2 – ICs, Cap Maintenance, and Periodic Reporting as the Preferred Alternative for PCB-contaminated soil remediation. Alternative 3 – Excavation was also considered. The USAF reviewed all written and verbal comments submitted during the public comment period. Written and verbal comments overwhelmingly supported Alternative 3 – Excavation. Based on consideration of public comments, USAF decided to select Excavation as the Preferred Alternative.

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3.0 Responsiveness Summary

The Proposed Plan for the Equipment Building (SS004) was made available to the public 12 April 2010. The Proposed Plan can be found in the Administrative Record file and the information repository. Availability of the Proposed Plan was published in the Fairbanks Daily News-Miner on 4 April 2010, and revised notice of availability was published in this newspaper on 16 May 2010. At the time of the public review period, the USAF had selected Alternative 2 – ICs, Cap Maintenance, and Periodic Reporting as the preferred alternative for the site. The public comment period started on 12 April 2010 and was extended until 12 June 2010 because the public meeting in Tanana, originally scheduled for 14 April 2010, was postponed and conducted on 25 May 2010 instead. At this meeting, USAF and ADEC representatives answered questions from the public about the proposed plan. One written comment on the proposed plan was received from the City of Tanana. A list of the meeting attendees, and responses to the verbal and written comments received during the public comment period, are included in the Responsiveness Summary.

It should be noted that during the 25 May 2010 public meeting, the preferred alternative was Alternative 2, Institutional Controls, Cap Maintenance, and Periodic Reporting. Based on comments received during the 25 May 2010 public meeting, USAF changed the preferred alternative to Alternative 3, Excavation. Responses to comments provided below reflect the selection of Alternative 3, Excavation, as the preferred alternative.

3.1 Stakeholder Comments and Lead Agency Responses

3.1.1 May 25, 2010 Public Meeting Comments, Various Community Members

Verbal comments received during the May 25, 2010 Public Meeting and USAF responses are summarized below. Where the identity of individual community members could not be determined, comments are presented as from the general community.

USAF and ADEC participants in attendance:

- Steve Hunt, Remedial Project Manager, USAF 611 CES/CEAR
- Tommie Baker, Community Relations Coordinator, USAF 611 CES/CEAR
- Karlene Leeper, Cultural Resources Program Manager, USAF 611 CES/CEAR
- Kim Hawkins, HDR (contractor for USAF 61 CES/CEAR)
- Kim DeRuyter, ADEC
- Meghan Dooley, ADEC

Members of the Public:

- Chris Grant
- Cheryl Wright
- Ricky Folger

- Jeanette Walker
- Helen Peters
- James Roberts
- Faith Peters
- Pat Moore
- Bear Ketzler
- Donald Edwin
- Jeanette Scannell
- Julie Robert-Hyslop
- Donna Folger
- Gerald Nikolai
- Curtis Sommer
- Kathleen Peters-Zuray
- Lester Ehrardt

General Comment: Numerous core samples have been collected from the site. How deep were the samples collected? How far apart were the samples collected? Are they just random samples?

USAF Response: Soil samples at the Equipment Buildings were collected to depths of 12 inches below original grade during sampling and excavation activities. Sample locations were determined based on a sample grid laid out around the Equipment Building footprint. In addition, soil samples were collected from the Equipment Building sumps and drains at a depth of approximately 18 inches below the foundation.

General Comment: Who would be responsible to clean up the area if excavations were conducted at the site?

USAF Response: USAF would be responsible for cleanup of PCB-contaminated soils at concentrations above ADEC cleanup levels at the Equipment Building.

General Comment: Will the land ever be turned over to the Tozitna Corporation?

USAF Response: The main installation, including the Equipment Building, could be turned over to the Tozitna Corporation if the land was in a condition deemed suitable for return to the public domain. At that point, a native corporation could file for the land under the Accelerated Land Transfer Act. Removal of PCB-contaminated soil should allow for consideration of returning the site to the public domain.

General Comment: What about where berries and stuff are on land adjacent to the Equipment Building? Does this get affected by PCBs in the ground?

USAF Response: PCBs are not mobile in the soil; however, if they are close enough to the surface, they may be taken up by plants. Excavation and offsite disposal of PCB-contaminated soil above 1 mg/kg will reduce potential for uptake of residual PCBs by plants.

General Comment: One suggestion was to have a sign posted before you enter the site to say it is a former White Alice site so people know the past use of the property.

USAF Response: Signage informing visitors the area is a former White Alice Communication Site will be included in ICs.

General Comment: Can't we just clean it up and be done with it?

USAF Response: Yes, based on public comment, excavation and offsite disposal of PCB-contaminated soils has been chosen as the Selected Remedy at SS004. Soils contaminated with PCBs between 1 mg/kg and 10 mg/kg will be excavated and transported to an offsite disposal facility in the continental United States.

General Comment: There have been many years since the materials at the site have been buried and how many times has USAF come in and tried to remedy the situation. How can we be guaranteed that USAF will come back on a regular basis and do your jobs?

USAF Response: USAF is legally required by this ROD to implement the Selected Remedy, which is excavation and offsite disposal of soil contaminated with PCBs between 1 mg/kg and 10 mg/kg. Since hazardous materials will not be left at the site, additional monitoring and review of SS004 is not expected.

General Comment: If you don't clean up the land, we (the community) do not get use of it, right? The land is useless?

USAF Response: Unrestricted land use is expected at SS004 based on the Selected Remedy of excavation and offsite disposal of soil contaminated with PCBs between 1 mg/kg and 10 mg/kg.

General Comment: How much money is the USAF prepared to spend to clean up the site?

USAF Response: USAF will spend money as required to fulfill the requirements of the chosen alternative. Alternatives were evaluated against the nine evaluation criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i). The estimated cost for the Preferred Alternative (Excavation) is $307,514.

Bear Ketzler Comment: Is the PCB contaminated soil on site the result of existing PCBs, or are PCBs being released into the soil from another source?

USAF Response: PCB contamination at the site is the result of residual PCBs remaining in the soil following excavation at the site in 1997. In 1997, soil cleanup levels were 10 mg/kg. As a result, soils under the cleanup level were left in place.

Bear Ketzler Comment: If the site is cleaned up to ADEC levels (below 1 mg/kg), would the land be returned to the Tribe?

USAF Response: As described above, if the site was cleaned up to ADEC residential levels and was deemed suitable for return to public domain, the property could be returned to the Bureau of Land Management. At that time, a native corporation could file for the land under the Accelerated Land Transfer Act. Removal of PCB-contaminated soil should allow for consideration of returning the site to the public domain.

Bear Ketzler Comment: I understand the USAF is recommending Alternative 2, Cap Maintenance with Periodic Inspections and Reporting, to address contamination at the site.

However, if there is enough public support for excavation and offsite disposal of the PCB-contaminated soil, you'll take that into consideration?

USAF Response: Public comments were taken into consideration during preparation of this ROD and selection of the chosen remedy. The alternatives were evaluated with respect to each of the nine NCP criteria: overall protection of human health and the environment; compliance with regulations; long-term effectiveness and permanence; reduction of toxicity, mobility, and volume through treatment; short-term effectiveness; implementability; community acceptance; and state/regulatory agency acceptance. Based on public support of Excavation as the Preferred Alternative, the chosen remedy was changed from ICs, Cap Maintenance, and Periodic Reporting to excavation.

Bear Ketzler Comment: What are the estimated costs for each remedy?

USAF Response: The estimated cost for Alternative 2, Cap Maintenance and Periodic Inspections and Reporting is $97,653 with an estimated cost range of $48,827 to $195,307. The estimated cost for Alternative 3, Excavation, is $307,514 with an estimated cost range of $153,757 to $615,028.

Bear Ketzler Comment: So soil from the site has to be brought outside and processed there to clean it up?

USAF Response: There are a few permitted landfills in Alaska that can accept PCB-contaminated soil up to 10 mg/kg. However, regulations in Alaska are expected to change to prevent the disposal of PCB-contaminated soil between 1 mg/kg and 10 mg/kg. As a result, USAF prefers to ship PCB-contaminated soil to the continental U.S. for treatment and disposal.

Bear Ketzler Comment: How many cubic yards of soil are expected to be excavated and disposed of?

USAF Response: USAF anticipates approximately 93 cubic yards of soil would have to be excavated from the Equipment Building and disposed of off-site.

Bear Ketzler Comment: The $400,000 cost for excavation and offsite disposal seems affordable. The Tribe has spent and will be spending significant money to clean up PCB-contaminated soil within Tanana. I'd like to look at the alternatives from an economic side.

USAF Response: The three proposed alternatives were evaluated with respect to each of the nine NCP criteria (see above), which include cost. Based on public support of Excavation as the Preferred Alternative, the chosen remedy was changed from ICs, Cap Maintenance, and Periodic Reporting to Excavation.

Bear Ketzler Comment: Are there daily and/or weekly records of activities at Bear Creek RRS?

USAF Response: USAF was unable to locate any records, including daily or weekly records, concerning regular activities at the Bear Creek RRS.

Kathleen Peters-Zuray Comment: The cleanup level for PCBs is being changed to 1 mg/kg?

USAF Response: The ADEC cleanup level for residential soil was previously 10 mg/kg; however, the level has been changed to 1 mg/kg.

Kathleen Peters-Zuray Comment: We'd like to see the site cleaned up and contamination removed. The site is on a historic trail to Allakaket. There are on the other side towards the Tozi River and the site is being used for hunting and berry picking.

USAF Response: Unrestricted land use is expected at SS004 based on the Selected Remedy of excavation and offsite disposal of soil contaminated with PCBs between 1 mg/kg and 10 mg/kg.

Kathleen Peters-Zuray Comment: Is the $100,000 cost estimate per year?

USAF Response: The cost estimate of $97,653 is for all activities at the site for 30 years.

Curtis Sommer Comment: I this all the contamination should be dug up and removed and shipped out of here and clean soil put in its place. There are two drainages below the site, Bear Creek and Mission Creek. It should all be removed.

USAF Response: As described above, the chosen remedy at SS004 was changed from ICs, Cap Maintenance, and Periodic Reporting to Excavation based on public support for Excavation. Under all alternatives, soil containing under 1 mg/kg would be left in place. As far as removing all the PCB contamination at SS004, as you decrease the concentrations of PCBs, the volume of soil that falls into that category increases. This significantly increases the cost of disposal, as well as decreasing the benefit of removing soil. As more soil is removed, additional areas are disturbed and require increased restoration. Based on ADEC regulations, soils containing less than 1 mg/kg are not considered a hazard to human health and the environment.

Pat Moore Comment: Regarding berries, PCBs in the soil are not expected to move, right? They're where they are?

USAF Response: Yes, PCBs are generally not mobile. The selected remedy of Excavation will remove soil with PCB concentrations between 1 mg/kg and 10 mg/kg. Following removal of the PCB-contaminated soils, uptake by plants and animals is not expected.

Pat Moore Comment: Prior to capping the foundation, USAF ran a process to leach PCBs out of the concrete. Was there any follow up testing conducted to determine if the leaching process was successful?

USAF Response: Wipe samples were conducted on the concrete foundation to confirm residual PCBs had been removed from the foundation. PCBs were not detected above the target cleanup level (10 µg/100 cm^2) following the decontamination process.

City of Tanana Comment:

CITY OF TANANA
P.O. Box 249
Tanana, Alaska 99777
(907) 366-7159 • Fax (907) 366-7169

3rd of June 2010

Mr. Steve Hunt
611 CES/CEAR
10471 20th Street, Suite 348
Elmendorf AFB, Alaska 99506-2200

RE: Public comment submitted from the City of Tanana on Remedial Actions at Site LF001 Bear Creek RRS and Remedial Actions at Site SS004 Bear Creek RRS

Dear Mr. Hunt

Greetings from the Interior of Alaska. Thank you for holding the public meeting here in Tanana in late May 2010. The City Council of Tanana wishes publicly to express that our desires are that both Site LF001 and SS004 be totally cleaned up by excavation and offsite disposal of all PCB contaminated soil above 1 mg/Kg and debris currently underground. As the world grows smaller by the population growth and natural resources are developed, someday in the near future (maybe 25 to 50 years from now) that site will have to be looked at just by its very nature of the location, the water resource, air field, view, communication site, solid build able land and other unseen needs and uses.

The cost projection of totally cleaning up these 3 sites (SS004, LF001 & SS007) that you estimated seems to be the right time to get in there and do it right. The price tag isn't getting any cheaper and at this time the community has the ability to do most of the clean up effort. The Tribal Council of Tanana have a Environment Dept. devoted to coordinate such efforts and training dollars to develop a qualified work force and the City of Tanana has the tools and equipment to complete a task of this size with very little outside support. The community has a lot of experience in cleaning up of past environmental messes, be it the IHS hospital site, FAA site, Ft. Gibbons military site, BLM site, old buildings at the airport, old bulk fuel sites along the river front to name to few.

We are more than willing to assist the U. S. Air Force and your Air Group in developing a plan that could be a win – win for the U. S. Air Force and our Community with the peace of mind that the right thing was done and that nature was put back and cleaned up to almost to where it was originally found some 50 plus years ago.

At your service, respectfully submitted,

Bear Ketzler Jr.
City of Tanana

Cc: Tanana Tribal Council

"NUCHALAWOYYA" – Where the two rivers meet.

USAF Response: Thank you for your comment. As described above, the three proposed alternatives were evaluated with respect to each of the nine NCP criteria (see above), which include cost. Alternative 2 (ICs, Cap Maintenance, and Periodic Reporting) was initially the preferred alternative at SS004 based on similar effectiveness, better implementability, and lower costs than Alternative 3 (Excavation). Based on public support, Excavation has been chosen as the Selected Remedy at SS004.

3.2 Technical and Legal Issues

No technical or legal issues were identified during the public review period of the Proposed Plan.

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Appendix A
Proposed Plan for Final Remedial Actions, Site SS004, Bear Creek RRS

PROPOSED PLAN

FOR FINAL REMEDIAL ACTIONS
SITE SS004

BEAR CREEK RRS

COMMENT PERIOD: April 12, 2010 to June 12, 2010

U.S. Air Force 611th Air Support Group—611th Civil Engineer Squadron — Elmendorf AFB, Alaska

INTRODUCTION

This ***Proposed Plan***[1] discusses the final actions proposed for one *United States Air Force* (***USAF***) *Environmental Restoration Program* (***ERP***[2]) site at *Bear Creek Radio Relay Station* (***RRS***):

- Equipment Building (SS004)

Site investigation results show soil contamination by *polychlorinated biphenyls* (***PCBs***) above levels protective of unrestricted use under Alaska regulations at 18 AAC 75.341. The contamination has been covered with a vegetated soil cap to a depth of approximately 2 feet *below ground surface* (***bgs***), so it does not pose a risk to people or the environment. The USAF is proposing *Institutional Controls* (***ICs***) and cap maintenance with periodic reporting at SS004 to continue to protect human health and the environment and to comply with Alaska regulations, as required by the *Comprehensive Environmental Response, Compensation, and Liability Act* (***CERCLA***) Section 120(a)(4).

USAF provided an opportunity for the United States Environmental Protection Agency (***EPA***) to comment on this Proposed Plan; EPA declined to comment. The State of Alaska concurs with the actions proposed in this Plan; final acceptance will be evaluated following public comment.

[1] For convenience to the reader, the terms in ***bold italic*** are defined in the Glossary at the end of this publication.

[2] The ERP is the USAF's program modeled after the EPA's Superfund environmental cleanup program.

How You Can Participate

You are encouraged to comment on this Proposed Plan. The public comment period begins on April 12, 2010 and ends on June 12, 2010.

You are also encouraged to attend the public meeting that is scheduled to discuss the actions proposed in this Plan. The public meeting will be held on Tuesday, May 25 at 2 pm in the Elders Basement of the Tanana Tribal Council Compound.

A pre-addressed comment form is included at the end of the plan. You can mail or email your comments to the USAF Project Manager at the following address:

Mr. Steve Hunt
611 CES/CEAR
10471 20th Street, Suite 348
Elmendorf AFB, Alaska 99506-2200
1-907-552-4869
email: Steve.Hunt@elemendorf.af.mil

This Proposed Plan is also available electronically on request.

PURPOSE OF PROPOSED PLAN

As the lead agency, USAF has issued this Proposed Plan in accordance with CERCLA and *National Contingency Plan* (***NCP***) requirements. The Proposed Plan has the following purposes:

- Provide basic background information on the Site (detailed background information is provided in the 1999 Remedial Investigation report, which is available in the ***Administrative Record***, as described on page 16 of this Plan);
- Identify the preferred alternative for remedial action at Site SS004 (i.e., ICs with cap maintenance and periodic reporting) and explain the reasons for the preference;
- Solicit public review of and comment on all of the alternatives described; and

- Provide information on how the public can be involved in remedy selection.

The preferred alternative may be modified if public comments or additional data indicate that such a change would result in a more appropriate solution.

Following consideration of public comments received on this Plan, USAF will prepare a *Record of Decision* (***ROD)*** to document the final remedy selected for Site SS004. The ROD will contain a summary of responses to public comments received (***Responsiveness Summary).***

SUMMARY OF PREFERRED ALTERNATIVE

USAF has identified ICs with cap maintenance and periodic reporting as the preferred alternative for this site.

ICs will be used to inform the public about residual contamination at SS004 and protect people from unknowingly coming in contact with it. The location of the contamination will be documented in the ROD and at the District Recorder's office.

Periodic inspections and reporting will be performed to ensure the integrity of the soil and vegetation cap over the site.

The remedy will be reviewed no less often than once every five years to ensure that it remains protective.

Note that the preferred alternative for Site SS004 represents a change from the preferred alternative identified in a previous Proposed Plan. A July 2007 Proposed Plan for Final Action at Five Sites at Bear Creek RRS stated that no further action was necessary at Site SS004. After publication of the 2007 Proposed Plan, a remedial action report missing from the Administrative Record was found that documented areas of PCB-contaminated soil above levels protective of unrestricted use, requiring development of a more protective site remedy for SS004.

REGULATORY BASIS

THIS PLAN IS ISSUED IN ACCORDANCE WITH AND SATISFIES THE REQUIREMENTS OF THE COMPREHENSIVE ENVIRONMENTAL RESTORATION, COMPENSATION AND LIABILITY ACT (CERCLA, AT 42 USC §§ 9601 *ET. SEQ.*), AS FURTHER IMPLEMENTED BY THE NATIONAL CONTINGENCY PLAN (NCP, AT 40 CFR PART 300). THE ERP IS AUTHORIZED IN THE DEFENSE ENVIRONMENTAL RESTORATION PROGRAM (10 USC §§ 2701 *ET.SEQ.)* AS THE ENVIRONMENTAL RESTORATION PROGRAM THE AIR FORCE USES TO TAKE CERCLA RESPONSE ACTIONS AND SATISFY ITS CERCLA LEAD AGENCY FUNCTIONS AS DELEGATED BY EXECUTIVE ORDER 12580.

THE PLAN ALSO MEETS ALL REQUIREMENTS OF ALASKA STATE LAW AND REGULATIONS, INCLUDING BUT NOT LIMITED TO TITLE 46 OF THE ALASKA STATUTES AND REGULATIONS PROMULGATED THEREUNDER. PETROLEUM, INCLUDING CRUDE OIL OR ANY FRACTION THEREOF, IS SPECIFICALLY EXCLUDED FROM CERCLA. CONTAMINATION FROM PETROLEUM IS REGULATED UNDER ALASKA STATE LAW AND REGULATIONS.

BACKGROUND

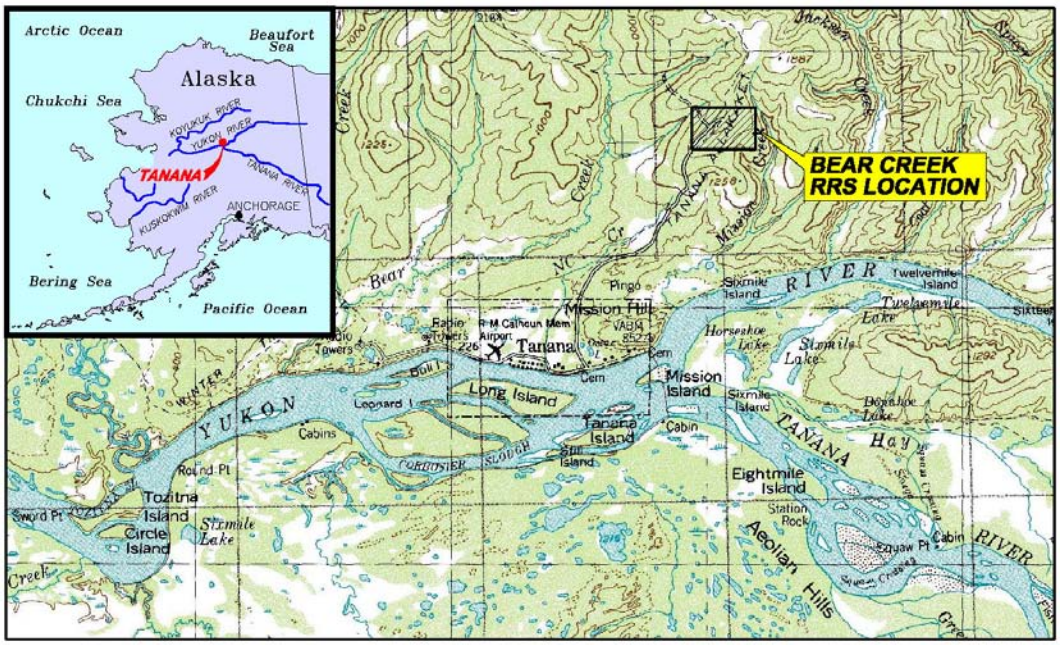
LOCATION AND HISTORY

The former Bear Creek RRS is located in central Alaska about 130 air miles west of Fairbanks near the community of Tanana (**Figure 1**). Tanana is located on the north bank of the Yukon River, approximately two miles west of the confluence of the Yukon and Tanana Rivers. Tanana is accessible by river and by air; there are no roads connecting Tanana to other regional communities. Bear Creek RRS is accessible by a gravel road from Tanana.

The Bear Creek RRS facilities were located on 16.21 acres of land withdrawn from public domain for military purposes. The 16.21 acres were divided into three parcels: the Bear Creek RRS installation was constructed on a 14.69-acre parcel, the water collection system was located on a separate 0.92-acre parcel north of the installation, and the POL Site at the Yukon River was located on a 0.6-acre parcel on the north shore of the Yukon River.

Bear Creek RRS was built in 1956 and 1957 and became active in January 1959. The station was part of the original *White Alice Communication*

Figure 1: Bear Creek Location Map



System (***WACS***). The purpose of the station was to relay radio information to and from Indian Mountain RRS, Kalakaket Creek RRS, and Pedro Dome RRS. With communication technology upgrades, the installation's mission was phased out in the late-1970s, and the installation was decommissioned in 1981.

While it was operational, the Bear Creek RRS included four White Alice scatter antennae, two smaller antennae, associated transmission framework, a water supply system, a solid waste disposal area, an equipment building and personnel dormitory, primary and temporary vehicle maintenance shops, a 40,000-gallon water aboveground storage tank, two *petroleum, oils, and lubricant* (***POL***) storage tank areas, an airstrip, and other support facilities (**Figure 2**). The Air Force removed all the remaining structures as part of the Clean Sweep effort in 1996, and the entire site has been graded and covered with fill.

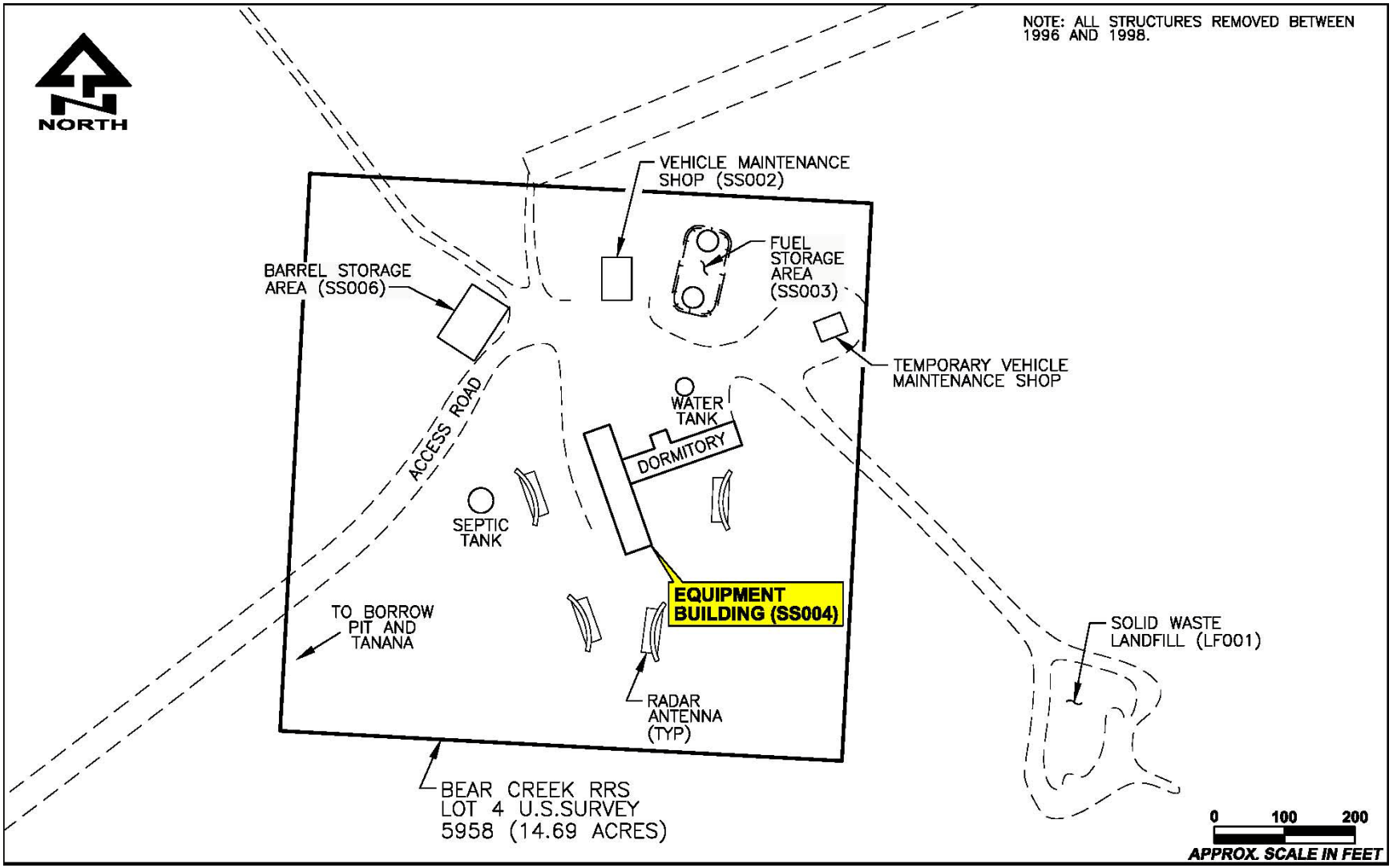
SS004 was an equipment building and dormitory complex located within the 14.69-acre parcel withdrawn from public domain during the time that the Bear Creek RRS was active. The equipment building was used to store electrical equipment and other materials. Most of the salvageable electrical equipment and packaged hazardous material from the equipment building was shipped to Elmendorf AFB in 1981 and 1982. The electrical equipment used oil that contained PCBs.

SITE INVESTIGATION HISTORY

Beginning with a 1981-1982 hazardous materials inspection and continuing through a 2005-2006 ***Remedial Investigation*** (***RI***), USAF has investigated the Bear Creek RRS area for environmental impacts from former installation operations. Site investigation and restoration events for the Equipment Building are summarized below. More details about remedial activities are provided in the following section.

- In 1981 and 1982, USAF inspected Bear Creek and other former White Alice installations. Hazardous and toxic materials and wastes and most moveable equipment were shipped off-site to Elmendorf AFB.
- In 1984, USAF performed a follow-up inspection and found several areas of soil containing PCBs. An unknown volume of PCB-contaminated soil was removed from the site and reportedly buried in a pit located approximately 0.25 miles east of the RRS.

Figure 2: Equipment Building (SS004) Site Location Map



- In summer 1985, 53 drums of PCB-contaminated soil and approximately 5 drums of PCB-contaminated debris were removed from the site and shipped to Elmendorf AFB for disposal.
- In 1996 and 1997, all remaining structures were removed under the Clean Sweep project, and the site was graded and covered with 18 inches of fill.
- In 1997, under Phase II of the Clean Sweep project, additional PCB assessment and removal activities were performed at the Equipment Building.

REMEDIAL ACTIONS TO-DATE

Between 1984 and 1997, a series of soil sample events and subsequent excavations were performed to delineate and remove PCB-contaminated soil from the vicinity of the former Equipment Building. The cleanup events are summarized below, but the soil sample results are not discussed in detail, because they were superseded by each successive sampling/ excavation event. The most recent sample events (i.e., post-excavation results from 1997 and comprehensive soil sample results from 1998) represent the current site conditions and are discussed in the following section.

- In 1984, several areas of PCB-contaminated soil were found outside the doors of the equipment building, and an unknown volume of PCB-contaminated soil was excavated, placed into drums, and transported off-site for disposal.
- In 1985, PCB-contaminated soil in Areas A, B, and D (**Figure 3**) was excavated, placed into 53 drums, and transported to Elmendorf AFB for disposal, along with other PCB-contaminated debris. After excavation, each area was backfilled with clean soil.
- In 1996, the equipment building was demolished. Prior to demolition, floor tiles were sampled for PCBs. Contaminated floor tiles were drummed and shipped to Elmendorf AFB for disposal. Debris that may have contained asbestos was segregated into regulated and non-regulated portions. Regulated material was removed and transported to Galena, Alaska, for disposal at the Campion asbestos landfill. Non-regulated asbestos containing material was buried with other demolition waste in a permitted landfill east of the installation. The concrete floor and foundation remain in place.
- In 1997, wipe sampling documented PCB contamination of the concrete floor, and a sequential solvent technology was used to clean the PCB contamination from the floor. PCB-contaminated floor tiles, decontamination solvent, and soil were transported off-site for disposal.
- In 1997, approximately 1,050 square feet of surface soils contaminated with PCBs above 10 *milligrams per kilogram* (***mg/Kg***) were excavated to an initial depth of 6-inches bgs (**Figure 4**). Excavation base and perimeter sampling verified that all soil containing PCBs greater than 10 mg/Kg had been removed. In several areas, the excavation depth was extended to 12 inches bgs.

  A total of 92.5 tons of PCB-contaminated soil was excavated and removed from the site in two hundred forty-five 55-gallon drums. The drums were shipped to Elmendorf AFB DRMO for disposal. After the excavation, clean fill material from a gravel pit along the Yukon River was used to cover remaining soils contaminated with PCBs between 1 mg/Kg and 10 mg/Kg.

Figure 3: Equipment Building (SS004) Site Plan and Sample Locations

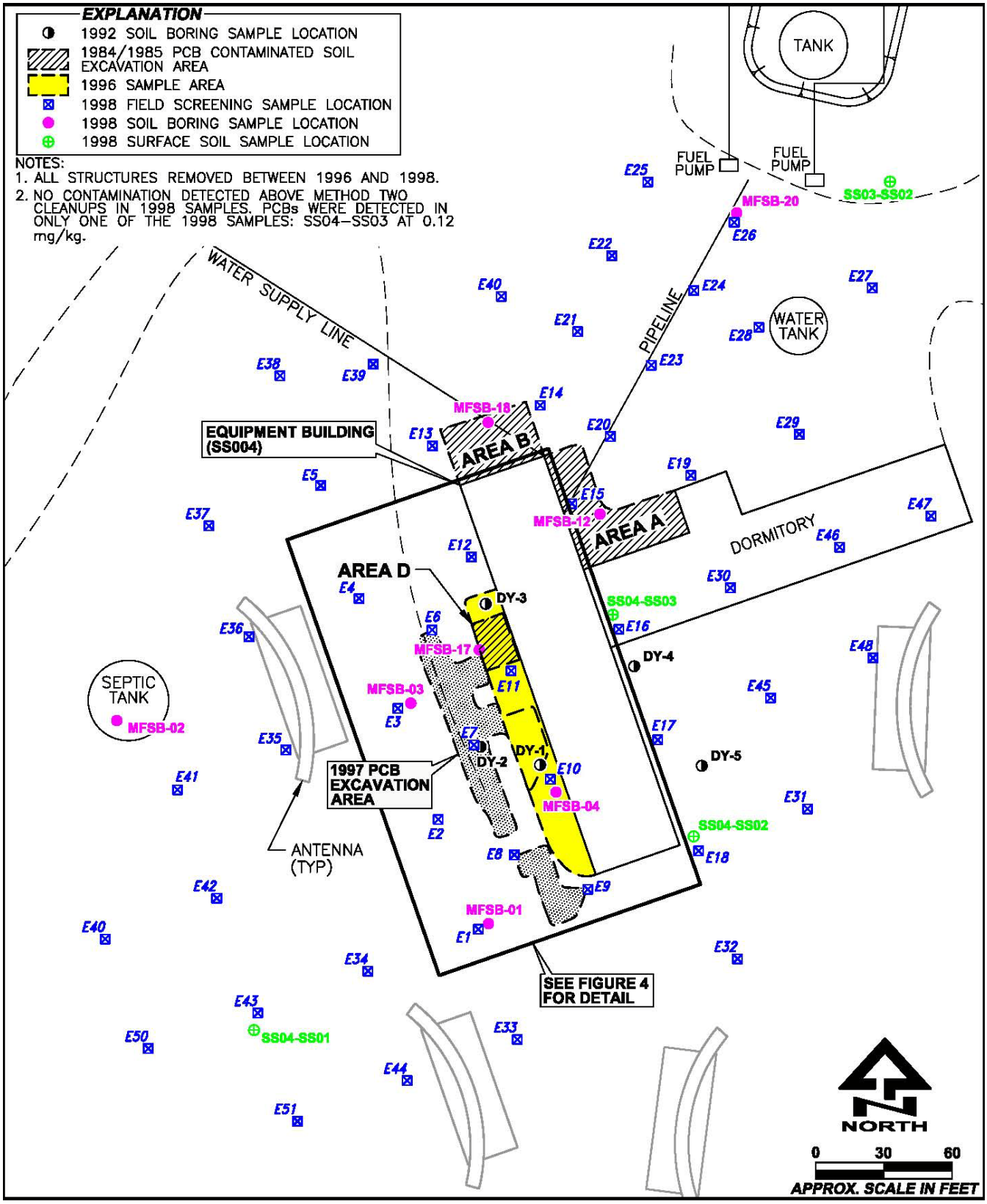
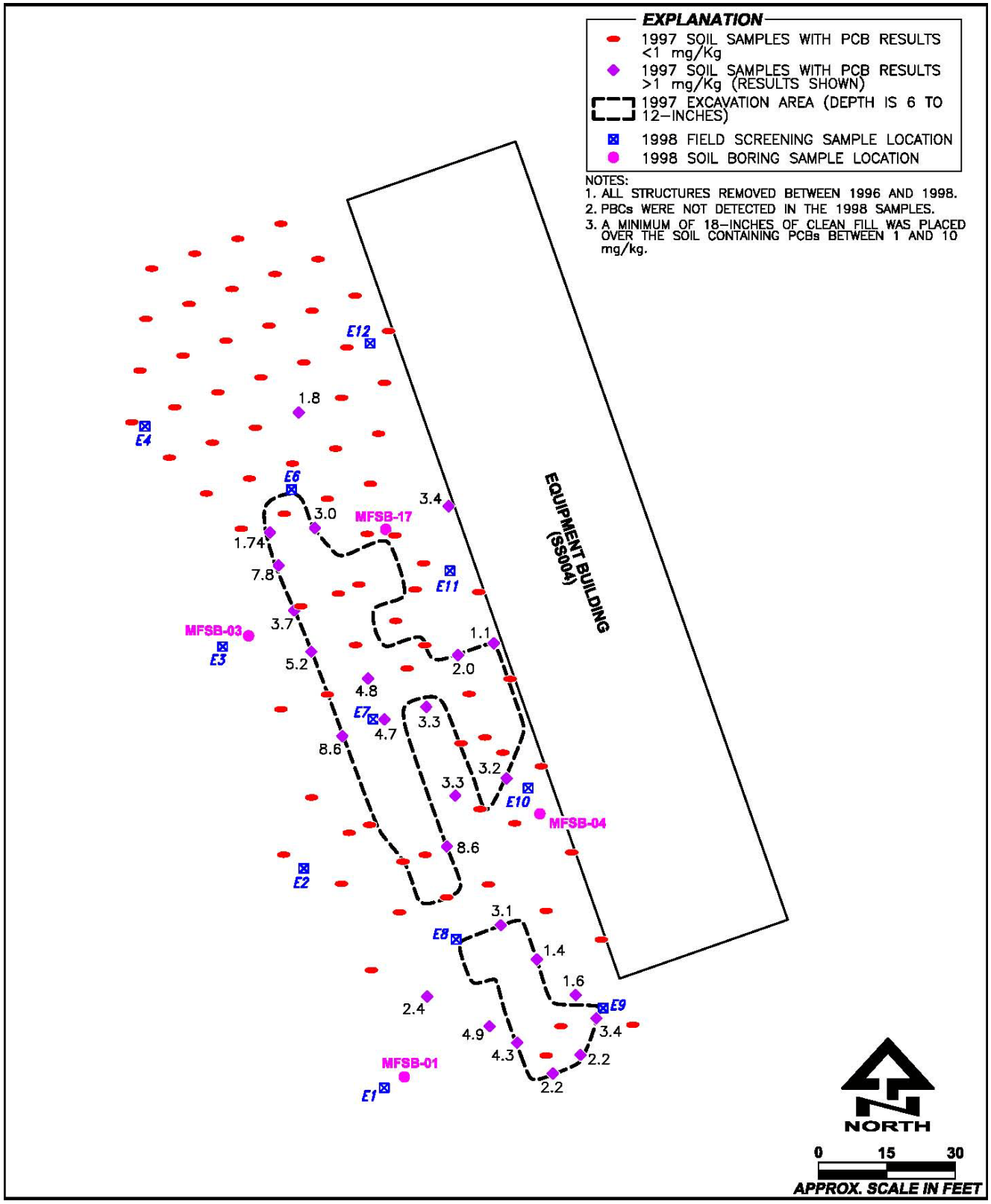


Figure 4: Equipment Building (SS004) 1997 -1998 Soil Sample Locations and Results



- In 2000, due to the poor success of previous reseeding efforts and erosion occurring at the site, erosion channels were repaired, and the equipment building foundation was covered with two feet of soil and reseeded. The rest of SS004 was covered with an additional six to twelve inches of soil and reseeded.

COMMUNITY RELATIONS ACTIVITIES

The 611 CES/CEAR has conducted extensive community relations activities in accordance with the CERCLA/NCP requirements to inform and involve the public in the environmental decision-making process. Major Bear Creek community relations activities are summarized below.

Community Relations Plan: A *community relations plan* (***CRP***) was initially prepared for Bear Creek RRS in December 1998, and then updated and revised in April 2002. A CRP is prepared to promote communication between the USAF and the general public during environmental restoration activities.

Administrative Record. An Administrative Record has been established for Bear Creek RRS as required by CERCLA. Administrative Record access information is provided on Page 16 of this Plan.

SITE CHARACTERISTICS

ENVIRONMENTAL SETTING

The former Bear Creek RRS lies within the continental climate zone, which is characterized by low precipitation and extreme seasonal temperatures.

The former Bear Creek RRS is located at an elevation of approximately 1,650 feet at the top of a ridge. The geology is characterized by 3 to 15 feet of soil overlying bedrock. The shallow bedrock is fractured with increasing competence with depth. The bedrock is primarily composed of schist, quartzite, and phyllite and is highly fractured.

There are no significant lakes or streams within the immediate area of the former RRS. Surface water runoff from precipitation and snowmelt likely flows into nearby creeks. The headwaters of several creeks (Mission Creek, NC Creek, and Bear Creek) are located approximately 3,500 feet to 10,000 feet downhill from the former installation and discharge directly into the Yukon River. These creeks have low seasonal flow rates and are not year-round fish habitat.

Groundwater has not been encountered in the main Bear Creek installation area where SS004 is located. During installation operations, drinking water was obtained from a surface water collection system north of the installation area. Historically, soil borings installed as deep as 50 feet bgs did not encounter groundwater[3] before encountering competent bedrock.

LAND USE

USAF decommissioned the Bear Creek RRS in 1981. Local residents have unrestricted access to the former Bear Creek RRS lands, including Site SS004, for subsistence and recreational purposes. Future land use is expected to remain recreational.

GROUNDWATER AND SURFACE WATER USE

As discussed above, there has been no groundwater or surface water detected at the former Bear Creek RRS.

NATURE AND EXTENT OF CONTAMINATION

Sample results were evaluated with respect to Alaska's Contaminated Site Regulations to determine the nature and extent of contamination at SS004.

Alaska's Contaminated Site Regulations:

The state of Alaska has promulgated ***cleanup levels*** in 18 AAC 75 (Oil and Hazardous

[3] Some soil borings encountered localized intervals of saturated soil between bedrock fractures. The saturated soil zones were characterized as pore water, because they occur only intermittently (after precipitation events) and are not part of a larger or continuous groundwater zone.

Substances Pollution Control Regulations, as amended through October 9, 2008). Tabulated soil cleanup levels are provided in 18 AAC 75.341 Method Two Table B1 and B2 (Under 40-inch zone)[4] for three exposure pathways: migration to groundwater, outdoor inhalation, and direct contact. The *Alaska Department of Environmental Conservation* (***ADEC***) Method Two soil cleanup levels may be applied at any contaminated site in Alaska and are considered protective of human health[5].

For PCBs, the Method Two cleanup level protective of residential land use is 1 mg/Kg. However, Note 9 of 18 AAC 75.341 Table B1 states that PCBs may be left in-place at concentrations up to 10 mg/Kg if the area is covered by a cap that protects people and the environment from exposure to the PCBs.

Current Site Conditions: Based on the 1997 and 1998 soil sample results, PCBs are present in subsurface soil at concentrations up to 10 mg/Kg.

Investigation Summary: Soil samples were collected from SS004 in 1984, 1985, 1992, 1996, 1997, and 1998. Soil sample results from locations that were subsequently excavated and removed from the site are not discussed below. Results from 1997 samples outside the excavation area and 1998 soil samples are representative of current site conditions and are summarized in this section. Locations of the 1994 through 1997 excavations and the 1998 soil samples are shown in **Figure 3**. The 1997 excavation sample details are shown on **Figure 4**.

In 1997, 88 pre-excavation soil samples were collected at depths of 1 to 3 inches bgs from the area immediately west of the equipment building (**Figure 4**) and analyzed for PCBs. Analytical results showed PCB concentrations up to 176 mg/Kg. As discussed previously, all soil identified as containing PCBs greater than 10 mg/Kg was excavated and removed from the site. 1997 excavation verification samples detected PCB concentrations below 10 mg/Kg around the excavation at the limits of the excavation, and around the excavation perimeter (shown on **Figure 4**).

All of the soil sample results from areas that were not excavated are summarized in **Table 1,** which includes results from pre-excavation samples that were below 10 mg/Kg and therefore not excavated, as well as the excavation verification samples from the bottom and sides of the excavation. A 99% *upper confidence limit* (***UCL***)[6] of the mean PCB concentration (2.7 mg/Kg) was calculated from the 1997 sample results.

In addition to the PCB sampling, six soil samples were collected from the soil below the equipment building sumps and drains and analyzed for barium, lead, diesel range organics (DRO), volatile organic compounds (VOCs), and PCBs. The samples were collected from a depth of approximately 18 inches below the building foundation below each sump. The results are summarized in **Table 2**.

There was one detection above ADEC Method Two cleanup levels: DRO at 13,800 mg/Kg (versus the 10,250 mg/Kg cleanup level). Low DRO concentrations in the other five soil samples suggest that the DRO contamination is not widespread. This detection is not interpreted to reflect a risk to people, because it is located 18 inches under a foundation that has also been buried under a 24-inch cap.

[4] Throughout this Plan, these cleanup levels are referred to as ADEC Method Two soil cleanup levels.

[5] Method Two soil cleanup levels are considered protective of human health; ecological protectiveness is evaluated on a site-by-site basis. The ecological risk evaluation (discussed on page 11 of this Plan) indicated that contamination from LF001 has not adversely affected the environment, nor would it be expected to do so in the future.

[6] The 99% UCL means that there is a 99 percent probability that the mean (average) PCB concentration does not exceed 2.7 mg/Kg at this site.

Table 1: 1997 PCB Result Summary (Unexcavated Soil)

Analyte	Number of Samples (Outside of Excavation)	Number of Detections	Number Detected Below 1 mg/Kg	Number Detected Above 1 mg/Kg*	Maximum Detection (mg/Kg)	UCL**
PCBs	114	69	41	28	8.6	2.7

*1 mg/Kg = 18 AAC 75.341 Table B1 cleanup level protective of residential use per Note 9, soil contaminated by PCBs at concentrations between 1 mg/Kg and 10 mg/Kg can be left in-place if the contaminated soil is covered by a protective cap.

**99% Chebychev UCL, calculated and recommended by ProUCL

PCB: polychlorinated biphenyl

UCL: upper confidence limit of the mean value of all 114 sample results

Table 2: 1997 Sump and Drain Soil Sample Summary

Analyte	Number of Samples	Number of Detections	Maximum Detection (mg/Kg)	ADEC Method Two Cleanup Level* (mg/Kg)	Number Exceeding Cleanup Level*
PCBs	6	1	0.067	1	0
Lead	6	1	1.65	400	0
Barium	6	6	1.33	20300	0
DRO	6	6	13800	10250	1

*ADEC Method Two Cleanup Level = 18 AAC 75.341 Table B1 cleanup level protective of residential use (PCBs and lead); protective of direct contact pathway (barium); Table B2 cleanup level protective of ingestion (DRO)

PCB: polychlorinated biphenyl

DRO: diesel-range organics

In 1998, a sample grid was established across Site SS004, and 50 soil screening samples were collected below the soil placed in 1997 and field-screened for total petroleum hydrocarbons (TPH), pesticides, and/or PCBs. Field-screening detected PCBs, TPH, or pesticides at several locations, and additional samples were collected for laboratory confirmation. Seven soil borings were drilled in the locations of field-screening detections, and fourteen soil samples were analyzed for fuels, metals, PCBs, VOCs, semi-volatile organic compounds (SVOCs), and pesticides. An additional three surface soil samples were collected and analyzed for the same parameters. PCBs were detected in one of the 17 soil samples, at an estimated concentration of 0.12 mg/Kg, well below the 1 mg/Kg ADEC Method Two cleanup level for residential use. No other analytes were detected at concentrations above 1/10 of the ADEC Method Two cleanup levels.

SCOPE AND ROLE OF RESPONSE ACTION

The USAF, with concurrence from ADEC, has organized the environmental restoration work at Bear Creek RRS into the seven sites listed in **Table 3** and shown on **Figure 2.**

The preferred remedial alternative identified in this Proposed Plan, ICs with cap maintenance and periodic reporting, is compatible with the USAF's overall cleanup plan for Bear Creek RRS (i.e., protect human health and the environment for recreational land use). ICs have been proposed as a remedy for other sites at Bear Creek RRS with contamination below levels protective of human health but above levels protective of unlimited access and unrestricted use.

Table 3: Bear Creek RRS ERP Sites

Site	Name	Environmental Concern	Status
LF001	Solid Waste Disposal Area	Former solid waste landfill for installation. No unacceptable risk if capped.	ICs with cap maintenance and periodic reporting.
SS002	Vehicle Maintenance Shop	No unacceptable risk	CERCLA - No action State of Alaska – No Action; Cleanup Complete
SS003	Fuel Storage Area	No unacceptable risk	CERCLA - No action State of Alaska – No Action; Cleanup Complete
SS004	**Equipment Building**	**No unacceptable risk if capped (PCBs < 10 mg/Kg)**	**Proposed Remedy: ICs with cap maintenance and periodic reporting.**
SS006	Barrel Storage Area	No unacceptable risk	CERCLA - No action State of Alaska – No Action; Cleanup Complete
SS008	POL site by the Yukon River	No unacceptable risk	CERCLA - No action State of Alaska – No Action; Cleanup Complete
SS007	Borrow Pit	Commingled Pesticide and Petroleum contamination in soil	Proposed Remedy: Excavation and off-site treatment

Note: subject site of this Proposed Plan shown in bold, blue font.

SUMMARY OF SITE RISKS

In order for contamination at a site to pose a risk or threat to people or animals, there must be a complete exposure pathway between the contamination and the receptors (i.e., people or animals). Potential risk is calculated by a several-step process.

1. *Chemicals of potential concern* (***COPCs***) are identified. In accordance with ADEC's Risk Assessment Procedures Manual, chemicals detected above 1/10 of the ADEC Method Two cleanup levels (inhalation and ingestion pathways for soil) are considered COPCs.
2. *Exposure point concentrations* (***EPCs***) are determined for each COPC. Generally, either the maximum detected concentration or the 95 percent *upper confidence limit* (**UCL**) of the mean concentration is used as the EPC.
3. In the exposure evaluation, potentially complete exposure pathways are identified for receptors (people or animals) to be affected by contamination. The amount of chemical a person or animal may be exposed to is based on their exposure.
4. The species-specific toxicity of the chemicals is considered in the toxicity evaluation.
5. Potential risk to the receptors is calculated.

HUMAN HEALTH RISK

Risk due to PCB contamination at SS004 was evaluated during preparation of this Proposed Plan in accordance with ADEC Cumulative Risk Guidance to meet the NCP's requirement for baseline risk assessment (40 CFR § 300.400 (d)) to characterize current and potential threats to human health and the environment.

Chemicals of Potential Concern (COPC)

PCBs and DRO in subsurface soil were identified as the COPCs.

Exposure Evaluation

As discussed previously, expected future land use is recreational. There are no complete exposure pathways to subsurface soil contamination in a recreational land use scenario[7].

PCBs: If the integrity of the cap over the PCB contamination were compromised, then there could potentially be a complete exposure pathway to the PCB contamination.

DRO: There is no reasonably complete exposure pathway to the DRO contamination. It is located approximately 18 inches under the building foundation which is buried under approximately 24 inches of clean fill.

Cancer and Noncancer Risk Summary

There is currently no complete exposure pathway to PCBs in subsurface soil and therefore no potentially unacceptable risk to human health. However, the integrity of the cap over the PCB contamination must be maintained.

It is the current judgment of the USAF that the Preferred Alternative identified in this Proposed Plan is necessary to prevent inadvertent human exposure to PCB-contaminated soil exceeding 1 mg/Kg.

ECOLOGICAL RISK

In the 1999 RI report, the 1998 sample results were screened against ecological screening criteria to evaluate the potential for adverse health effects at the sites. For SS004, only two analytes (manganese and cobalt) in one sample marginally exceeded the ecological risk-based criteria. There is no known source for manganese or cobalt at SS004, and because of the limited distribution and frequency of detections, the 1998-99 RI determined that the manganese and cobalt detections represent somewhat elevated naturally-occurring conditions. Furthermore, the limited distribution of elevated manganese and cobalt detections suggests that the metals are unlikely to represent actual risk to the environment.

During preparation of this Proposed Plan, ADEC's March 2009 *Ecoscoping* Guidance was used in an updated evaluation of ecological risk at the site. Although sample results exceed the conservative soil ecological screening criteria for PCBs provided in Appendix D of the *Ecoscoping Guidance* (0.5 mg/Kg), there is no complete exposure pathway to the PCB contamination buried a minimum of 1.5 feet bgs. Also, the lack of surface water or groundwater at the site limits the possible exposure to contamination.

Overall, the ecological risk evaluations concluded that SS004 does not pose unacceptable potential risk to the surrounding ecosystems.

REMEDIAL ACTION OBJECTIVES

Remedial action objectives (RAOs) are the specific goals that the remedial action is designed to achieve (USEPA, 1988).

The specific RAO for the Equipment Building (SS004) is: Prevent human exposure to PCBs in soil exceeding the cleanup level in 18 AAC 75.341(c) Table B1 (1 mg/Kg).

SUMMARY OF REMEDIAL ALTERNATIVES

The following three remedial alternatives were developed in a Feasibility Study (FS) to address subsurface soil contaminated by PCB concentrations less than 10 mg/Kg.

1. No Action;
2. ICs with Cap Maintenance and Periodic Reporting; and
3. Excavation.

Alternative 1: No Action

Evaluation of the No Action alternative is required by CERCLA as a baseline to reflect current conditions without remediation. This alternative

[7] Recreational land use assumes a lower level of exposure to contamination than residential land use, because people spend less time at a site they visit recreationally than where they live. Residential land use assumes that people are exposed to contamination at a site 270 days per year and that they could be exposed to buried contamination by activities such as gardening that do not happen with recreational land use.

does not include any treatment, containment, or monitoring.

Alternative 2: ICs with Cap Maintenance and Periodic Reporting

This alternative includes ICs with maintenance of the soil and vegetative cap and periodic reporting to address subsurface soil contaminated by PCBs above 1 mg/Kg. Cap maintenance and ICs would be established in accordance with ADEC requirements in 18 AAC 75.341 Table B1 (Note 9) for situations when PCBs are left in-place at concentrations between 1 and 10 mg/Kg. The ICs will document the presence of soil impact above levels allowing unrestricted use. Any excavation within SS004 would require screening of any excavated soils for possible contamination and a plan to manage any soil contamination found. Periodic inspections and associated reporting will be performed to ensure the integrity of the soil and vegetation over the site.

Alternative 3: Excavation

In this alternative, the soil contaminated by PCBs above 1 mg/Kg would be excavated. The excavated soil would be disposed off-site in accordance with applicable laws and regulations (i.e., disposal of contaminated soil in a permitted facility situated in the continental United States).

EVALUATION OF ALTERNATIVES

In accordance with the NCP, the remedial alternatives were evaluated against seven of the nine criteria described in Section 121(b) of CERCLA and the NCP §300.430(f)(5)(i); i.e., threshold criteria and balancing criteria, as described below. The final two criteria, modifying criteria, address public and state acceptance and are evaluated after completion of the FS during the public comment period for the Proposed Plan.

Threshold criteria are standards that an alternative must meet to be acceptable. The two threshold criteria are described below:

- **Overall protection of human health and the environment**: Will the alternative protect human health and plant and animal life?
- **Compliance with *Applicable or Relevant and Appropriate Requirements* (*ARARs*).** Does the alternative meet all pertinent federal, state, and local environmental statutes, regulations, and requirements?

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:** How reliable is the alternative for protection in the long-run? Does it permanently address risk?
- **Reduction of toxicity, mobility, and volume through treatment:** Does the alternative use treatment to reduce the amount and/or harmful effects of the contamination?
- **Short-term effectiveness:** How soon will risks be reduced? Are there short-term hazards that could occur during the cleanup?
- **Implementability:** Is the alternative technically and administratively feasible?
- **Cost:** How much does it cost to implement the alternative?

Modifying criteria evaluate public acceptance and can therefore only be fully considered after public comment is received on the Proposed Plan. In the final analysis, modifying criteria and balancing criteria are of equal importance. The final two criteria are considered modifying criteria:

- **Community acceptance:** Do residents of the community accept the alternative? What comments are offered during the comment period?
- **State acceptance:** Does ADEC agree with the alternative?

Table 4 presents the evaluation of the alternatives against the seven criteria.

Table 4: Comparison of Alternatives for SS004

Remedial Alternative	Threshold Criteria Scores		Effectiveness Scores			Implementability Score	Cost
	Protective of Human Health and the Environment	Compliance with ARARs	Long-term Effectiveness and Permanence	Reduction in Toxicity, Mobility, and Volume through Treatment	Short-term Effectiveness		Relative Estimated Cost
No Action	No	No	○	○	○	●	●
ICs and Cap Maintenance	Yes	Yes	◑	○	●	●	◑
Excavation and Offsite Disposal	Yes	Yes	●	○	◑	◑	○

Symbol Key

● Better

◑ Average

○ Worse

PREFERRED ALTERNATIVE

Alternative 2—ICs with Cap Maintenance and Periodic Reporting

Alternative 2 is the preferred alternative. It offers better protection of people and the environment than Alternative 1 (No Action), and it has similar effectiveness, better implementability, and lower cost than Alternative 3 (Excavation). A 2007 site inspection showed that the cap over SS004 is in good shape and is supporting healthy vegetation. Excavation into this cap would adversely affect the site revegetation that has occurred to date.

Alternative 2 will protect people from unknowingly contacting the residual contamination by documenting its presence, restricting the disposal of contaminated soil, and ensuring that the soil and vegetative cap over the site is preserved, enabling achievement of the RAO. Alternative 2 complies with Alaska regulations (required by CERCLA Section 120(a)(4)).

ADEC concurs with the preferred alternative. The preferred alternative can change in response to public comment or new information.

USAF will implement and maintain the IC identified below in accordance with Alaska's contaminated site regulations. The purpose of the IC is to help prevent people from unknowingly coming in contact with the residual contamination or handling contaminated soil inconsistent with State of Alaska's contaminated site regulations.

The proposed ICs will:

- Document the location of PCBs in soil above the cleanup level in 18 AAC 75.341(c) Table B1 (1 mg/Kg); and
- Require that excavations within SS004 include procedures to screen excavated soils for possible contamination. If contaminated soils are encountered, they must be handled in accordance with Alaska regulations.

USAF proposes to implement the ICs by taking the following actions.

- Delineate the boundaries of Site SS004 to obtain a property description suitable for recording purposes. The IC boundaries are expected to encompass the area shown on **Figure 4**.
- Document the IC at the District Recorder's office (including a map indicating ICs locations) and in the ROD for SS004 (which will be available in the Administrative Record).

Periodic inspections and reporting will be performed to ensure the integrity of the soil and vegetation cap over the site at a frequency to be determined. If there are any problems with the soil/vegetative cap over the site, a plan for remedial action would be prepared.

Because this alternative will result in hazardous substances remaining on-site above levels that allow for unrestricted use, it will be reviewed at a frequency of no less often than once every five years to ensure that it remains protective.

Based on information currently available, the USAF believes the Preferred Alternative meets the threshold criteria and provides the best balance of tradeoffs compared to the other alternatives with respect to the balancing and modifying criteria.

PUBLIC PARTICIPATION REQUEST

You are encouraged to review and comment on the recommendations in this Proposed Plan. Your comments can make a difference in the remedy selection. USAF will not select a final remedy until public comments received during the public comment period have been reviewed and considered.

USAF will publish the final decision in a ROD. All comments relevant to the Proposed Plan that are received by the USAF during the comment period will be summarized in the Responsiveness Summary within the ROD.

You may present your comments in writing or at the public meeting. A pre-addressed comment form is included at the end of this Proposed Plan and can be used to provide written comments. Comments must be received during the public comment period: April 12 to June 12, 2010.

For questions regarding this project, please contact:

Mr. Steve Hunt
Project Manager, 611 CES/CEAR
(907) 552-4869 or 1-800-222-4137
10471 20th Street, Suite 348
Elmendorf AFB, Alaska 99506
steve.hunt@elmendorf.af.mil

For questions regarding ADEC regulations, please contact:

Ms. Kim DeRuyter
Environmental Specialist, ADEC
(907) 451-2752
610 University Avenue
Fairbanks, Alaska 99709
kim.deruyter@alaska.gov

If you would like more information about this project:

Copies of the documents relied upon for the restoration of Bear Creek RRS are stored in the ***Administrative Record***, located at Elmendorf Air Force Base. The Administrative Record is available on the internet at **www.adminrec.com**, although the most recent documents may not yet be available on the internet. Alternatively, access to the Administrative Record is available by appointment (contact Tommie Baker, USAF Community Relations Coordinator, at (907) 552-4506 or 1-800-222-4137 to make an appointment).

A detailed description of site conditions can be found in the September 1999 RI report, entitled ***Remedial Investigation Report for the Bear Creek Radio Relay Station, Alaska*****.** The RI report is contained in the Administrative Record.

GLOSSARY OF TERMS

Administrative Record (AR) – A file that contains information used by the USAF to decide on the cleanup for an ERP site. This file is available for public review.

Alaska Department of Environmental Conservation (ADEC) – the lead regulatory agency for Bear Creek RSS.

Applicable or relevant and appropriate requirements (ARARs) – Laws and regulations that establish cleanup levels for sites with contamination. ARARs include cleanup standards, standards of control, and other environmental protection criteria as specified under federal and state statutes and regulations. ARARs must be met (or a waiver approved) to comply with CERCLA.

BLM – Bureau of Land Management

bgs – Below ground surface.

CERCLA – Comprehensive Environmental Restoration, Compensation and Liability Act

CES – Civil Engineer Squadron

Cleanup level – The concentration of a **hazardous substance** that may be present within a specified medium (i.e., soil, groundwater, or surface water) without posing an unacceptable risk to human health, safety, welfare, or the environment. ADEC provides tabulated cleanup levels in 18 AAC 75 that are applicable to contaminated soil and groundwater sites in Alaska.

COC – Chemical of concern

COPC – Chemical of potential concern

CRP – Community relations plan

DOI – Department of Interior

Diesel-range organics (DRO) – A mixture of organic compounds found in diesel fuel, jet fuel, and heating oil. Polynuclear aromatic hydrocarbons (PAHs), such as naphthalene, are included in this range.

DRMO – Defense Reutilization and Marketing Office

Environmental Restoration Program (ERP) – The USAF's CERCLA program.

EPA – United States Environmental Protection Agency.

EPC – Exposure point concentration

°F – Degrees Fahrenheit

Hazard index (HI) - A summation of the hazard quotients for all chemicals to which an individual is exposed. A hazard index value of 1.0 or less than 1.0 indicates that no adverse human health effects (noncancer) are expected to occur.

Hazard quotient (HQ) - A comparison of an estimated chemical intake (dose) with a reference dose level below which adverse health effects are unlikely. The hazard quotient is expressed as the ratio of the estimated intake to the reference dose. The value is used to evaluate the potential for noncancer health effects, such as organ damage, from chemical exposures.

Hazardous substance - A chemical that presents an imminent and substantial danger to the public health or welfare if it is released to the atmosphere, surface water, groundwater, or land surface. Regulatory definitions can be found in CERCLA § 101(14) and 102 and in the NCP40 CFR § 300.5, and in Alaska Statute (AS) 46.03.826 and AS 46.09.900. Petroleum hydrocarbons are specifically excluded from the CERCLA definition but included in the Alaska Statute definition.

Institutional Controls (ICs) –Any type of physical, legal, or administrative mechanism to restrict the use of, or limit access to, real property to prevent exposure to contaminants above permissible levels. The intent of the controls is to protect human health, the environment, and the integrity of an engineering remedy by limiting the activities that may occur at a particular site. Common examples of *ICs* include physical barriers to a site (e.g., fences and signs) and land use restrictions (e.g., restricting the installation of drinking water wells).

Milligram per kilogram (mg/Kg) – A solid concentration measurement. One milligram of a substance in 1 kilogram of soil, which is also equal to a concentration of 1 ***ppm*** for that substance in soil (see definition for parts per million).

National Contingency Plan (NCP) – The regulations that provide the structure and procedures for responding to discharges of oil and hazardous substances, as directed by CERCLA.

Parts per million (ppm) - A unit of measure used to express extremely low concentrations of chemicals in media such as soil or water. As an analogy, one ounce of a chemical in a million ounces of soil is 1

ppm and is also equivalent to 1 second of time in a period of 11 1/2 days. Equivalent units for 1 *ppm* can be expressed as 1 mg/Kg (soil).

Polynuclear (or Polycyclic) Aromatic Hydrocarbons (PAHs) – A class of very stable organic molecules made up of only carbon and hydrogen (benzene rings). They occur naturally in crude oil and refined products (such as diesel fuel) and also occur as products of incomplete combustion. Some PAHs are highly carcinogenic (e.g., benzo(a)pyrene).

Polychlorinated biphenyls (PCBs) – A group of toxic, persistent chemicals used in transformers and capacitors for insulating purposes and in gas pipeline systems as a lubricant.

Proposed Plan – A document required by section 117(a) of CERCLA that informs the public about alternatives that are considered for cleanup of a contaminated site and identifies a preferred cleanup alternative. The document encourages public comment on all alternatives.

Restoration Advisory Board (RAB) – An advisory body with diverse community representation designed to act as a focal point for the exchange of information between the USAF and interested stakeholders.

RAIS – Risk Assessment Information System (http://rais.ornl.gov/)

RAO – Remedial Action Objective

Record of Decision (ROD) – As required by CERCLA section 117(b), a document of the final cleanup decision under the site cleanup rules. The ROD documents the rationale for selection of the cleanup remedy and establishes performance goals for achieving cleanup. A ROD issued by or for ADEC is similar to a USAF Decision Document or an EPA ROD, but its format may differ. The format for an ADEC ROD is specified in the ADEC *Guidance on Decision Documentation Under the Site Cleanup Rules* (July 1999).

Responsiveness Summary – A summary of oral and/or written public comments received during a comment period and the responses to those comments. The responsiveness summary is part of the decision document or ROD.

Remedial Investigation (RI) –: An evaluation of site conditions (RI).

Risk-Based Cleanup Level (RBC) – Pathway-specific (e.g., inhalation or ingestion) soil levels corresponding to the concentration that would cause an adverse effect through the inhalation or ingestion routes of exposure. RBCs for method two soil inhalation and ingestion pathways are provided in Appendix B to the ADEC's Cumulative Risk Guidance (ADEC, November 7, 2002).

RRS – Radio Relay Station

SWDA – Solid waste disposal area

SVOC – Semi-volatile organic chemical

TPH – Total petroleum hydrocarbons. In Alaska, use of TPH as a bulk hydrocarbon measurement became obsolete when the Alaska Methods for measuring ***DRO*** (AK Method 102), ***GRO*** (AK Method 101), and ***RRO*** (AK Method 103) were developed, and Alaska cleanup levels were established for DRO, GRO, and RRO.

Upper Confidence Limit (UCL) – Because it is usually impossible to know the true mean contaminant concentration at a site, confidence intervals are generally used to account for the uncertainties by placing boundaries on the estimated (calculated) mean concentration. A 95% UCL of the mean concentration means that there is a 95% probability that the actual mean concentration does not exceed the 95% UCL concentration.

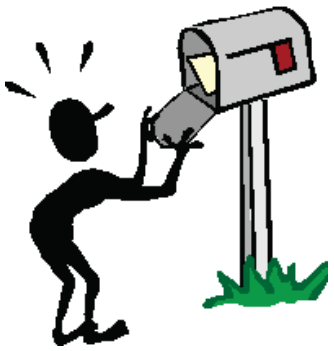
USAF – United States Air Force

VOC- Volatile organic compound

WACS (White Alice Communications System) – Communications systems built throughout rural Alaska in the 1950s for military and civilian use. White Alice communications systems sent very large signals skyward, and a small fraction of the signal would bounce off the earth's atmosphere to be received by another White Alice site beyond the horizon. The White Alice sites were self-contained outposts that were staffed 24 hours a day, 365 days a year and typically contained dormitories, large generators and associated fuel storage facilities, and airstrips, in addition to the communications equipment. The White Alice sites were gradually replaced by more efficient earth satellite systems; the last White Alice site was deactivated in 1985.

COMMENTS

(Use this sheet to write your comments)



Your input on the cleanup actions proposed in this Proposed Plan is important to USAF. Comments provided by the public are valuable in helping select a remedy. You may use the space below to prepare your comments. When you are finished, please fold and mail. Comments must be postmarked by June 12, 2010. If you have a question about the comment period, please contact Mr. Steve Hunt at (907) 552-4869 or via e-mail at steve.hunt@elmendorf.af.mil.

Optional Information	
Name:	Phone:
Address:	E-mail:
City/State/Zip:	**Thank you for your comments**

Proposed Plan for
Bear Creek
Radio Relay Station (Site SS004)
Alaska

U.S. Air Force 611th Air Support Group–611th Civil Engineer Squadron–Elmendorf AFB, Alaska

Steve Hunt
Project Manager, 611 CES/CEAR
10471 20th Street, Suite 348
Elmendorf AFB, AK 99506

Attachment 1
Notice of Availability

REVISED PUBLIC NOTICE

Bear Creek Radio Relay Station Alaska

The U.S. Air Force 611th Civil Engineer Squadron and Alaska Department of Environmental Conservation (ADEC) announce the extension of the public comment period for the following documents:

PROPOSED PLAN FOR FINAL REMEDIAL ACTIONS at SITE LF001 Bear Creek RRS, Alaska

PROPOSED PLAN FOR FINAL REMEDIAL ACTIONS at SITE SS004 Bear Creek RRS, Alaska

PROPOSED PLAN AVAILABILITY

Copies of the Proposed Plans have been sent to local residents on the Air Force's current mailing list. The Proposed Plans are also available on the internet at: ftp:\\pdcalaska.com. You can also contact the Air Force Project Manager (contact information below) for copies of these Proposed Plans or other Administrative Record documents. Current site conditions are described in the 1999 *Remedial Investigation* report, available in the Administrative Record.

PUBLIC COMMENT PERIOD EXTENSION– APRIL 12 TO JUNE 12, 2010

The public is encouraged to review and comment on the Proposed Plans during the public comment period (April 12 to June 12, 2010). The public comment period has been extended by 30 days to June 12, 2010, so that the re-scheduled public meeting occurs during the public comment period. The Air Force welcomes public comment on any of the alternatives discussed for these Sites; the Preferred Alternatives may be modified based on public comment or new information. The Air Force will choose the final remedy after considering public comments received during the public comment period.

PUBLIC MEETING RE-SCHEDULED

The Public Meeting has been re-scheduled to **2:00 pm on Tuesday, May 25, 2010**, in the **Elders Basement of the Tanana Tribal Council Compound, Tanana, Alaska**. The Air Force will give a brief presentation of the two plans, followed by open meeting discussions.

The Proposed Plan for Site SS007, a former borrow pit located outside of the main Bear Creek RRS facility will not be discussed at this meeting as previously planned. This Proposed Plan will be discussed at a future meeting. The Air Force will provide a brief progress report for Site SS007 during the May 25, 2010, meeting.

PUBLIC COMMENTS

You may provide your comments in person at the meeting, or toll free by telephone or in writing to the **Air Force Project Manager:**

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