

**NORTH RIVER RADIO
RELAY STATION**

**RECORD OF DECISION
AMENDMENT**



UNALAKLEET, ALASKA

FINAL

2019

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**Prepared for:
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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
611 CES	611th Civil Engineer Squadron
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARAR	applicable or relevant and appropriate requirement
ATV	all-terrain vehicle
bgs	below ground surface
BSNC	Bering Straits Native Corporation
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	code of federal regulations
COC	chemical of concern
CSM	conceptual site model
cy	cubic yards
DERA	Defense Environmental Restoration Account
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
FS	feasibility study
IC	institutional control
Jacobs	Jacobs Engineering Group Inc.
JBER	Joint Base Elmendorf-Richardson
LUC	land-use control
mg/kg	milligrams per kilogram
NCP	National Contingency Plan
O&M	operations and maintenance
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricants
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RRO	residual-range organics
RRS	Radio Relay Station
TCB	trichlorobenzene
TCRA	time-critical removal action

ACRONYMS AND ABBREVIATIONS (Continued)

TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
UNC	Unalakleet Native Corporation
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	U.S. Code
UU/UE	unlimited use and unrestricted exposure
VMF	vehicle maintenance facility
VOC	volatile organic compound
WACS	White Alice Communications System
WGS84	World Geodetic System 1984

PART 1: DECLARATION

1.1 NAME AND LOCATION

<i>Facility Name:</i>	North River Radio Relay Station (North River RRS), Unalakleet, Alaska
<i>Site Location:</i>	North River, Unalakleet, Alaska (Figure A-1)
<i>Latitude and Longitude:</i>	63°53'10.257"N 160°31'27.881"W (horizontal datum WGS84)
<i>CERCLIS ID Number:</i>	AK3570028685 (AF North River White Alice Communications Site)
<i>ADEC Contaminated Sites File ID Number:</i>	630.38.001
<i>ADEC Contaminated Sites Hazard ID Number(s):</i>	4365 and 4367
<i>Operable Unit/Site:</i>	SS001 and SS003 (Figure A-2)
<i>Point of Contact:</i>	Mr. Robert Johnston – Remedial Project Manager AFCEC/CZOP 10471 20th Street, Suite 343 JBER, AK 99506 907-552-7193 robert.johnston.17@us.af.mil

The North River Radio Relay Station (RRS) includes three source areas managed under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (Figure A-2). Site IDs in parentheses correlate to site numbers used in the North River feasibility study (FS) and Record of Decision (ROD) (U.S. Air Force [USAF] 2009, 2010b), which addressed contamination at the following sites:

- Site OT001: White Alice Communications System (WACS) Polychlorinated Biphenyls (PCBs); the remedy is complete and was implemented as planned.
- Site SS001 (Area C): Drum Storage Yard and PCB Trail; the remedy is being revised as part of this amended ROD.
- Site SS003 (Area A): Drums and Stained Soil; the remedy is being revised as part of this amended ROD.

The following two source areas were discussed in a separate decision document (USAF 2010c) because fuel contamination is covered by State of Alaska, not CERCLA, regulations:

- Site SO001: Former Vehicle Maintenance Facility (VMF); remediation is ongoing.
- Site SS004 (Area B): Drums and Stained Soil; the remedy is complete and was implemented as planned.

1.2 STATEMENT OF BASIS AND PURPOSE

This ROD Amendment documents a change to the remedy selected for two of the three sites addressed in the 2010 ROD that was signed on 13 September 2010 for Sites OT001 (WACS), SS001 (Area C), and SS003 (Area A) (USAF 2010b). The selected remedy, Offsite Disposal of Contaminated Soil, was implemented at the three sites from 2011 through 2015 (U.S. Army Corps of Engineers [USACE] 2013, 2014, 2015a, 2016a,b). A Cleanup Complete determination was issued for Site OT001 (WACS) on 5 June 2015 (Alaska Department of Environmental Conservation [ADEC] 2015). Site conditions limited accessibility to subsurface contamination at Sites SS001 (Area C) and SS003 (Area A); as such, excavation activities were not able to remove all the contaminants above cleanup levels (USACE 2016b). Additional remedial alternatives were chosen for consideration and further evaluated in the revised Proposed Plan (USACE 2018).

This ROD amendment presents the new selected remedy for Sites SS001 (Area C) and SS003 (Area A) at the North River RRS. This remedy was chosen in accordance with CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, with the National Contingency Plan (NCP) (Title 40 of the Code of Federal Regulations [CFR], Part 300 et seq. [40 CFR 300 et seq.]). This ROD amendment will become part of the Administrative Record [NCP 300.825(a)(2)] for North River RRS, which can be accessed at the following website: <http://afcec.publicadmin-record.us.af.mil/Search.aspx>. As the lead agency, the USAF has selected a new remedy, Offsite Disposal of Contaminated Soil, Capping, and Land-Use Controls (LUCs), for Sites SS001 (Area C) and SS003 (Area A).

For the North River RRS, the U.S. Environmental Protection Agency (EPA) has delegated its CERCLA regulatory agency authority to ADEC. ADEC is the regulatory agency for this

project. ADEC concurs that, if properly implemented, the new selected remedy for Sites SS001 (Area C) and SS003 (Area A) will comply with State of Alaska regulatory requirements.

1.3 ASSESSMENT OF SITE

Past activities at the North River RRS, such as use of transformers, drum storage, and communications systems, introduced substances into the environment during facility operation. The chemicals of concern (COCs) are PCBs and fuel components (identified in the original ROD), as well as the 1,2,4-trichlorobenzene (TCB) discovered during original remedy implementation at Site SS001 (Area C), that have caused soil contamination above the State of Alaska cleanup levels as defined in Title 18 of the Alaska Administrative Code 75.341 (18 AAC 75.341), Tables B1 and B2 (ADEC 2018). Field and analytical results indicated the following:

- PCBs exceeded the ADEC soil cleanup level (1 milligram per kilogram [mg/kg]) at both Sites SS001 (Area C) and SS003 (Area A). The majority of PCB contamination has been removed in both locations.
- Although not listed as a COC in the original ROD, 1,2,4-TCB exceeded its ADEC soil cleanup level (0.082 mg/kg) in a sample collected during PCB excavation at Site SS001 (Area C) in 2013, which was collected based on field observations. Due to the exceedance, 1,2,4-TCB was added to the analytical suite for confirmation samples.
- Residual-range organics (RRO) also exceeded its ADEC soil cleanup level (10,000 mg/kg) at Site SS003 (Area A).

The response actions selected in this ROD amendment are necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The USAF is committed to implementing, monitoring, maintaining, and enforcing all components of the selected remedy to ensure that it remains protective of human health and the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

This ROD amendment modifies the previously selected remedy for Sites SS001 (Area C) and SS003 (Area A) at North River RRS. The main components of the original 2010 remedy are:

- Excavation of contaminated soil containing PCBs in excess of 1.0 mg/kg

- Excavation of contaminated soil containing petroleum, oil, and lubricants (POL) in excess of ADEC cleanup levels
- Segregation of soil into Toxic Substances Control Act (TSCA) hazardous (PCBs greater than or equal to 50 mg/kg) and TSCA nonhazardous (PCBs between 1 and 50 mg/kg)
- Transportation of TSCA hazardous soil to a permitted Subtitle C landfill
- Transportation of TSCA nonhazardous and fuel-contaminated soil to a permitted Subtitle D landfill
- Collection and analysis of confirmation samples

The revised remedy (Alternative 7) adds the following components:

- Residual contamination present in the fractured bedrock will remain on site: PCBs in concentrations greater than 1 mg/kg, 1,2,4-TCB in concentrations greater than 0.082 mg/kg, and RRO in concentrations greater than 10,000 mg/kg.
- Excavations will be lined and covered with clean backfill, creating soil caps. This component was completed in 2015.
- LUCs will be used to restrict land use and exposure pathways, as well as to prevent the removal and transportation of contaminated soil.

1.5 STATUTORY DETERMINATIONS

The revised remedy is protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to the remedial action, is cost-effective, and uses permanent solutions and alternative treatment technologies to the maximum extent practicable. The revised remedy for Sites SS001 (Area C) and SS003 (Area A) satisfies the statutory requirements of CERCLA and the NCP. The NCP establishes the expectation that treatment will be used to address the contaminants posed by a site whenever practicable, as specified in 40 CFR 300.430(f)(5)(ii)(F). The revised remedy for Sites SS001 (Area C) and SS003 (Area A) does not satisfy the statutory preference for treatment because it will not permanently or significantly reduce the toxicity, mobility, or volume of COCs.

The revised remedy for Sites SS001 (Area C) and SS003 (Area A) was chosen because the selected remedy described in the original 2010 ROD did not account for the volume and extent of contamination that has been identified at the North River RRS, nor did it anticipate the

presence of fractured bedrock, and therefore requires a revision to appropriately address the site conditions as they are currently understood. The remoteness of the location makes the implementation of treatment technologies costly and impractical due to the unlikely exposure of human and ecological receptors.

Because this revised remedy will result in hazardous substances, pollutants, or contaminants remaining on site above ADEC regulatory cleanup levels that allow for unlimited use and unrestricted exposure (UU/UE), periodic LUC inspections and CERCLA five-year reviews will be required.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included in the Decision Summary located in Part 2.0 of this ROD Amendment:

- The COCs and their respective concentrations (Sections 2.5.7, 2.5.8, Table 2-1)
- Baseline human health and ecological risk evaluation represented by the COC (Section 2.7)
- Cleanup level established for the COC and the basis for the selection (Section 2.8, Table 2-6)
- How source materials constituting principal threat wastes are addressed (Section 2.11)
- Current and reasonably anticipated future land-use assumptions and current and potential future beneficial uses of groundwater used in the baseline risk assessment and ROD (Section 2.6)
- Potential land and surface water use that will be available at the site as a result of the selected remedy (Sections 2.6.1, 2.6.2, and 2.12.5)
- Estimated capital, operations and maintenance (O&M), total costs, and the number of years over which the remedy cost estimates are projected (Sections 2.10.7 and 2.12.4; Tables 2-4, 2-5, and 2-7)
- Key factors that led to selecting the remedy, including a description of how the selected remedy provides the best balance of tradeoffs with respect to the balancing and modifying criteria, highlighting criteria key to the decision (Sections 2.10, 2.12, and 2.13)

Additional information can be found in the Administrative Record file for this site.

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1.7 AUTHORIZING SIGNATURES

This signature sheet documents the U.S. Air Force approval of the remedy selected in this Record of Decision Amendment for Sites SS001 (Area C) and SS003 (Area A) at the North River RRS, Alaska.

By signing this declaration, the Alaska Department of Environmental Conservation concurs that proper implementation of the selected remedy for Sites SS001 (Area C) and SS003 (Area A) will comply with state environmental laws. These decisions will be reviewed and may be 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.



JASON S. CAMPBELL, Colonel, USAF, P.E.
Deputy Director, Environmental Management
Air Force Civil Engineer Center

10 JAN 20

Date



MELINDA BRUNNER, DSMOA Section Manager
Federal Facilities Section, Contaminated Sites Program
Alaska Department of Environmental Conservation

13 JAN 20

Date

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PART 2: DECISION SUMMARY

The Decision Summary provides a summary of previous investigations that support remedy selection, identifies the selected remedy, and explains how the remedy fulfills statutory and regulatory requirements. The USAF is issuing this ROD amendment under its authority as the CERCLA lead agency. This amendment is issued in accordance with and satisfies requirements of Defense Environmental Restoration Program (DERP) (10 U.S. Code [USC] 2701 et seq.); CERCLA (42 USC 9601 et seq.); and Executive Order 12580. Site remediation will be funded under the Defense Environmental Restoration Account (DERA).

As the regulatory support agency, ADEC provides primary oversight of the environmental restoration actions in accordance with State of Alaska contaminated sites regulations (*Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances* [Title 18, Chapter 75, Article 3]) (ADEC 2018).

The implementation of the revised remedy for Sites SS001 (Area C) and SS003 (Area A) will be funded by DERA, a funding source approved by Congress to clean up contaminated sites on Department of Defense installations.

2.1 SITE DESCRIPTION

The North River RRS is located on 26 acres of land atop a bluff approximately 8 miles east of the city of Unalakleet, Alaska and north of the Unalakleet River (Figure A-1). Unalakleet, population 750, is located on the Norton Sound at the mouth of the Unalakleet River 148 miles southeast of Nome and 395 miles northwest of Anchorage. Gravel roads connect Unalakleet with the North River RRS.

The land encompassing the North River RRS is owned and managed by the USAF with the exception of Site SS003 (Area A). In accordance with the Alaska Native Claims Settlement Act, village corporations have the right to surface estate (land) and regional corporations assume claim to subsurface estate (mineral and other resources). At Site SS003 (Area A),

Unalakleet Native Corporation (UNC) owns the surface estate, while the Bering Straits Native Corporation (BSNC) owns the subsurface estate.

2.1.1 Site SS001 (Area C) Description

Site SS001 (Area C), Drum Storage Yard and PCB Trail, is located directly west-southwest of the former VMF and consists of an all-terrain vehicle (ATV) trail that is used to gain access to a small recreational cabin (Figure A-2). The trail extends from the road south approximately 0.75 miles. A temporary drum storage area, located on the eastern side of Site SS001 (Area C), was included with this site, based on its proximity, although the drum storage area was most likely used in conjunction with the operation of adjacent Site SO001 (VMF). Site SS001 (Area C) includes the PCB excavation area located east of the intersection of the Site Access Road and the Water Pump House Road. Contamination has been removed from this site to the extent practicable (Figures A-3 and A-4), but residual PCBs and 1,2,4-TCB remain within fractured bedrock at the subsurface. The excavation was lined and backfilled with clean soil in 2015. A landfarm containing soil from an excavation at neighboring Site SO001 (VMF) currently occupies the surface of Site SS001 (Area C). Site restoration of Site SS001 (Area C) will occur once the landfarm is decommissioned and treated soil is used to backfill the Site SO001 (VMF) excavation.

2.1.2 Site SS003 (Area A) Description

Site SS003 (Area A) Drums and Stained Soil is located on the west side of the access road approximately 0.75 miles southwest of Site OT001 (WACS) (Figure A-2). The contaminant source is drums. In 2002, drums were identified along with areas of POL soil contamination (USAF 2004c). In 2003, USAF 611th Civil Engineer Squadron (611 CES) personnel found nine 55-gallon drums, three of which contained product resembling used motor oil. Soil in the vicinity appeared to be contaminated with POL. The nine drums were removed along with obviously contaminated soil (USAF 2004b). Leaks or spills to surface soil may have percolated down to the subsurface soil. Analytical results from soil samples collected from Site SS003 (Area A) indicated elevated levels of diesel-range organics (DRO), RRO, and PCBs. Contamination has been removed from this site to the extent practicable (Figures A-5 and A-6);

residual PCBs remain within the fractured bedrock at the subsurface and RRO that was detected above the ADEC cleanup level in one confirmation sample from a shallower excavation wall remains on site. The excavation was lined and backfilled; it was then graded to match the contour of the area and seeded for the completion of site restoration.

2.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

The North River RRS was constructed in 1957 and was one of the original 31 WACS facilities in Alaska used for defense and civilian communications. The North River RRS relayed radio information between similar stations at Granite Mountain, Anvil Mountain, and Kotzebue. Through these connections, Aircraft Control and Warning system sites could link with the Distant Early Warning system relaying critical information to Elmendorf and Eielson Air Force Bases. Four dish antennas were situated on the hilltop of Site OT001 (WACS), approximately 8 miles east of the Village of Unalakleet. Support facilities surrounding the hilltop antennas consisted of a composite building, barracks, petroleum storage and distribution facilities, equipment maintenance building, water tower, and temporary garage. North River RRS was operated by the Radio Corporation of America/Alascom from 1957 until its abandonment in 1978.

There have been no enforcement activities at the North River RRS site to date; however, LUCs that include institutional controls (ICs) were established at Site SS001 (Area C) in 2003. LUCs were established after the excavation and removal of 250 cubic yards (cy) of PCB-contaminated soil failed to decrease onsite PCB concentrations to acceptable levels below the ADEC Method Two cleanup level (ADEC 2018). Further excavation work took place in 2005, 2012, 2013, and 2014. Between efforts, the excavation cavity was left open. To restrict access by people and large animals to a known contaminated area, a chain-link fence was installed around Site SS001 (Area C). Signs warning of the dangers of PCB exposure were clearly posted on the fence. The excavation was lined and backfilled in 2015 and the fencing and signs were removed. The ground surface in this area has since been used as a landfarm to treat POL-contaminated soil from ongoing excavation activities at Site SO001 (VMF). LUCs were updated to include both Sites SS001 (Area C) and SS003 (Area A) in the 2017 LUC Management Plan (USAF 2017).

There are no notices of violation. One unresolved lawsuit is pertinent to the North River RRS. In *Nanouk v. United States*, the plaintiff alleges that undisputed contamination due to the North River RRS land use extends into her Native Allotment causing harm.

Site closure has been achieved at the OT001 (WACS) and SS004 (Area B) sites; ADEC issued Cleanup Complete determinations on 5 June 2015 and 5 March 2013, respectively.

2.3 COMMUNITY PARTICIPATION

NCP §300.430(f)(3) requires the lead agency to conduct a number of public participation activities following preparation of the Proposed Plan and review by the regulatory agency. In accordance with NCP requirements, USAF distributed the Revised Proposed Plan (USACE 2018) on 22 May 2018 for public review and to solicit public input. A public meeting was held on 22 May 2018. No written comments were submitted by the community on the Proposed Plan. Verbal comments were received at the public meeting.

The FS (USAF 2009), original Proposed Plan (USAF 2010a), original ROD (USAF 2010b), revised Proposed Plan (USACE 2018), and all newsletters, fact sheets, and community relations documents relating to the Environmental Restoration Program (ERP) (formerly the Installation Restoration Program) sites at the North River RRS are located in an Administrative Record and a public information repository at Joint Base Elmendorf-Richardson (JBER) in Anchorage, Alaska.

Historically, at a public meeting held in Unalakleet on 6 May 2014, the community expressed concerns with the USAF leaving any PCB contamination above the ADEC cleanup level at the sites. Although ADEC understands the concerns of the community, the agency believes that the USAF has done everything feasible within CERCLA requirements.

On 12 May 2014, project members from USACE, USAF, ADEC, and Jacobs Engineering Group Inc. (Jacobs) met to discuss the path forward for the North River RRS sites after receiving input from the community of Unalakleet during the 6 May public meeting. All parties present at this meeting agreed that it was prudent to move forward with the limited excavation

activities planned at Sites SS001 (Area C) and SS003 (Area A) in 2014, and then to backfill the excavations as soon as possible to alleviate safety concerns. This has since been accomplished and the areas have been re-graded and seeded consistent with the surrounding landscape.

The following actions were also recommended by ADEC to address community concerns:

- Collect additional samples to include vegetation sampling around Sites SS001 (Area C), SS003 (Area A), and the ATV trail. This was accomplished in 2014. Vegetation was sampled and analyzed for PCBs. No cleanup level for vegetation exists, and none of the vegetation sample results exceeded the ADEC direct contact soil cleanup level of 1 mg/kg (USACE 2015a).
- Advance a soil boring downgradient of the Site SS003 (Area A) excavation to determine contaminant migration, if any. If groundwater is encountered, it will be sampled. This was accomplished in 2015. Two soil borings were advanced downgradient of the excavation at Site SS003 (Area A). Soil samples were collected and analyzed for DRO, RRO, and PCBs. None of the samples contained concentrations of contaminants that exceeded the ADEC soil cleanup levels (USACE 2016b). No groundwater was encountered.
- Install monitoring wells and collect groundwater samples at Site SS001 (Area C). In 2015, five monitoring wells and/or test wells were advanced. Groundwater samples were analyzed for PCBs and 1,2,4-TCB. All groundwater results were less than ADEC cleanup levels. Four wells remain at Site SS001 (Area C) (USACE 2016b). Groundwater was also sampled in 2016 and results were again below ADEC cleanup levels.
- Search for additional barrels/drums around the cabin and over the bluff, as the community mentioned that there may be more present. Two crushed drum pieces were removed from Site SO001 (VMF) as part of ongoing soil remediation. Only one off-site drum has been located; it appeared to have been empty and previously used as a burn barrel.
- Request help and input from local individuals when conducting sampling or investigative activities as an opportunity to educate and engage. Regular public meetings provide the public with an opportunity to provide input. The content of these meetings is discussed below.
- Develop educational materials about the fate and transport of PCBs and the related health concerns, and distribute this information within the community. The requested educational material about PCBs and POL and their potential exposure pathways was provided to Unalakleet community members at a later public meeting on 12 August 2014.

At another public meeting held on 5 November 2014, ADEC highly recommended that excavation activities cease based on the very low probability of exposure to community members because of the depth of the excavations (USAF 2015). At that meeting, Jacobs discussed the probability of lining the excavations at Sites SS001 (Area C) and SS003 (Area A)

and backfilling the sites to existing grade concurrent with the placement of ICs on the properties, and Unalakleet residents indicated that they would like additional confirmation that remaining contamination at Sites SS001 (Area C) and SS003 (Area A) is not migrating offsite. This concern was reiterated on a subsequent meeting held in Unalakleet on 15 May 2015. To address these concerns, additional borings and groundwater monitoring wells were installed at the sites (USACE 2015b). Additional public meetings to provide updates and discuss results were held on 29 October 2015 and 20 September 2016 to relay information about site activities.

The most recent public meeting was held on 22 May 2018 to relay information about upcoming site activities, as well as to introduce the revised Proposed Plan (Appendix D) and open a 30-day public comment review period. The community expressed concerns for leaving contaminants on site; however, they did not disagree with pursuing Alternative 7. The community was concerned with the potential for additional contamination at other surrounding areas.

2.4 SCOPE AND ROLE OF OPERABLE UNIT OR RESPONSE ACTION

PCB-, 1,2,4-TCB-, and RRO-contaminated soil remains at one or more North River RRS sites, of which, PCBs and 1,2,4-TCB constitute hazardous substances under CERCLA and RRO is regulated under State of Alaska law. Ingestion, inhalation, and dermal contact with hazardous substances in soil may pose a current and potential future risk to human health. Restoration at the North River RRS has been initiated under the authority of CERCLA, and associated cleanup activities were conducted in accordance with State of Alaska regulations 18 AAC 75.

Implementing the original remedy did not remove all contamination above acceptable levels, requiring a revised remedy to protect human health and the environment by preventing contact with contaminated soil. Measures that have already been accomplished in pursuit of this goal include:

- Placement of a subsurface liner
- Backfilling/grading the excavation
- Interim LUCs to prevent invasive activities

Measures that have yet to be implemented once this ROD has been approved include:

- Instituting permanent LUCs to inform the public of a potential threat and prevent exposure
- Conducting regular LUC inspections
- Scheduling five-year reviews to assess remedy protectiveness in perpetuity

2.5 SITE CHARACTERISTICS

Natural site features and characteristics are explained below, followed by a brief site history of investigative and remedial actions and descriptions of the remaining contamination.

2.5.1 Topography

The North River RRS is located on 26 acres of land on a plateau approximately 500 feet above sea level near the Unalakleet River. Surrounding areas have relatively flat topography.

2.5.2 Climate

The Village of Unalakleet and its surrounding area have a subarctic climate influenced by the Norton Sound when it is ice-free, typically between May and October. Winters are cold and dry. Average temperatures range from -4 to 11 degrees Fahrenheit (°F) in winter and from 47 to 62°F in summer. Annual precipitation averages 14 inches, and the area receives an annual average of 41 inches of snow (USACE 2007).

2.5.3 Geology

Cenozoic gravel, silts, and basalt underlie this coastal area of the Lower Yukon subregion. The surrounding Nulato Hills consist of folded Cretaceous graywacke and slate with Mesozoic and Paleozoic volcanic intrusions at the east and south ends. At higher elevations, soil borings indicate mostly sand and gravel as overlying sediment. At lower elevations, soil borings indicate thick peaty organics, sandy clay, sandy gravel, and poorly graded gravel (USAF 2008). Sedimentary and metasedimentary bedrock is encountered at shallow depths ranging from 3 feet to 15 feet below ground surface (bgs). Discontinuous permafrost exists in this area and has been encountered during previous drilling activities.

The Kaltag Fault, a major structural feature that trends north-northwest between Unalakleet and Kaltag, transects the subregion. Most of the rocks are intensely folded and faulted. North River is in Seismic Zone 3 and subject to earthquakes of magnitude 6.0 or greater (USAF 2008).

2.5.4 Surface and Subsurface Hydrology

The North River RRS is located on a plateau approximately 500 feet above sea level near the Unalakleet River. Surface water runoff to the north and west of the site drains into the Little North River, and runoff to the south and east drains into the Unalakleet River. Rivers in the area meander over relatively flat topography.

In 2016, groundwater was encountered between 2.3 and 7.5 feet bgs at Site SO001 (VMF) and between 3.6 and 7.8 feet bgs at Site SS001 (Area C). No other seeps or surface water have been observed on site; thus, site contamination is not likely to migrate to streams, rivers, or water bodies located outside of the North River RRS site boundaries.

2.5.5 Ecology

Flora at the North River RRS primarily consists of sparse forests of spruce, paper birch, balsam poplar, aspen, willow, and alder. Other plant life includes shrubs, sedges, flowers, berries, mushrooms, lichens, and mosses. Dry soil is covered with tall grasses. Muskeg and bogs occur in low-lying areas (USAF 2008).

At its closest point, the Unalakleet River is half a mile from the North River RRS. The Unalakleet River experiences excellent runs of king and silver salmon, as well as resident populations of arctic grayling and Dolly Varden. The river and other fresh water bodies also provide habitat for chum and pink salmon, whitefish, burbot, stickleback, arctic char, and Alaska blackfish (USAF 2008).

Large mammals, such as gray wolf, moose, caribou, musk oxen, brown bear, and black bear inhabit the Unalakleet and North River RRS area. Small mammals include red fox, lynx, muskrat, beaver, land otter, marten, porcupine, ground squirrel, tree squirrel, wolverine, weasel,

hare, and several species of small rodents. Waterfowl and shorebirds migrate through the area or reside there seasonally (USAF 2008).

2.5.6 Previous Site Characterization Activities

Several investigations occurred at the North River RRS between 1985 and 2005. These activities included building demolition, debris removal, and soil cleanup activities. Site investigations and sampling events were first performed in 1985 by Woodward-Clyde Consultants, then in 1989 by J.M. Montgomery Consulting Engineers Inc. (USAF 2008). The majority of the demolition activities were conducted in 1995 (USAF 2008). Permitted landfill cells were created on site to hold demolition waste. Site-specific investigations and removal actions are presented below.

Previous activities at SS001 (Area C) and neighboring Site SO001 (VMF) include the following:

- In 2002, while on site to investigate drums located at the North River RRS landfill, an area of exceptionally high PCB contamination (designated the Hot Spot) was found on the road to a cabin. This area was identified as Area C (USAF 2004c).
- In 2003, excavation activities were conducted as part of a time-critical removal action (TCRA). The area within the site exhibiting the highest PCB concentrations was excavated. However, additional PCB contamination remained, most likely due to vehicle traffic (USAF 2004c).
- In 2004, tissue samples were collected from key animal species (i.e., ptarmigan, grouse, and hare) used for subsistence by the Native Village of Unalakleet and analyzed for total PCBs to determine if subsistence hunting near the Site SS001 (Area C) Hot Spot is an exposure pathway of concern. No PCBs were detected in any of the sample tissues (USAF 2004a).
- In 2004, excavation activities continued with another TCRA in an effort to remove additional PCB-contaminated soil from the area exhibiting the highest PCB concentrations and throughout the site. The highest PCB concentration was along the road, at 18.6 mg/kg. DRO concentrations were present at levels up to 6,780 mg/kg (USAF 2008).
- In 2004, during a site investigation at neighboring Site SO001 (VMF), one test pit was excavated within the drum storage area. Three primary soil samples were collected from 0.5 and 4.0 feet bgs. Samples were evaluated for DRO, gasoline-range organics, RRO, volatile organic compounds (VOCs), semivolatile organic compounds, PCBs, pesticides, and Resource Conservation and Recovery Act (RCRA) metals. One of the four samples had DRO concentrations exceeding the ADEC Method Two cleanup level, with a maximum concentration of 4,650 mg/kg. This sample was collected at 0.5 feet bgs (USAF 2005).

- In 2005, excavation activities during another TCRA focused on the area with the highest PCB concentration. Confirmation samples were collected from the bottom of the excavation, at depths ranging from 3 to 6 feet bgs. Although the deepest point of the excavation was approximately 6 feet bgs, the greatest concentration of PCBs (840 mg/kg) was sampled from an area of the excavation that reached a depth of 3 to 3.5 feet bgs. The excavation was left open with a fence surrounding the excavated area (USAF 2008).
- In 2007, during a site characterization and remedial investigation effort, borings were advanced to a maximum of 15 feet in an effort to collect groundwater grab samples; however, refusal was encountered in all borings prior to encountering groundwater (USAF 2008). Soil samples were analyzed for fuel compounds and PCBs. Fuel compounds were detected below the ADEC Method Two ingestion cleanup levels. PCBs were detected in soil samples, with a maximum concentration of 1.6 mg/kg (USAF 2008).
- In 2012, PCB-contaminated soil excavation was initiated at the existing 2005 excavation (main excavation) and from a 2007 site investigation sample location (grid cell N13). Excavation activities removed approximately 300 tons of PCB-contaminated soil from Site SS001 (Area C), but PCB contamination is still prevalent, and soil sample results indicate nearly half is at TSCA hazardous waste levels (USACE 2013).
- In 2013, excavation of PCB-contaminated soil was continued from the existing 2005 excavation (main excavation) and from a 2007 site investigation sample location (grid cell N13). During activities at the main excavation, an odor was noted that led to further sampling and a review of site history, resulting in the discovery of 1,2,4-TCB at concentrations above the ADEC site cleanup level. Soil excavation was completed at the 2007 site investigation (grid cell N13) excavation. All confirmation results were less than 1 mg/kg PCBs and the excavation area was backfilled and graded to match site contours. Excavation activities removed 1,252 cy of PCB-contaminated soil from the Site SS001 (Area C), but PCB contamination and 1,2,4-TCB is still present at the main excavation (USACE 2014).
- In 2013, additional work at this site included the collection of PCB samples from soil along the ATV trail and nearby cabin to confirm the effectiveness of previous remedial actions. The wipe sample results from the cabin were nondetect for PCBs. The soil samples from the trail were all less than the cleanup level. In addition, a drum was discovered near the cabin at the end of the trail. Field screening and analytical samples were collected from the area of the drum and analyzed for fuel constituents. The drum was emptied, removed, decontaminated, and disposed of in the local landfill. The drum contents were containerized and disposed of offsite.
- In 2014, vegetation samples were collected from the roots, leaves, and fruits of various plants at SS001 (Area C) and analyzed for PCBs. No cleanup level for vegetation exists, and none of the vegetation sample results exceeded the ADEC direct contact soil cleanup level of 1 mg/kg (USACE 2015a). Two samples were collected from berries, both of which were nondetect for PCBs.
- In 2015, activities at Site SS001 (Area C) consisted of lining and backfilling the existing excavation, drilling, and site restoration. Five soil borings were advanced. Soil samples

were collected from each boring and analyzed for PCBs and 1,2,4-TCB, and monitoring wells and/or test wells were installed to determine if site contamination had migrated to groundwater. Groundwater samples were analyzed for PCBs and 1,2,4-TCB. All groundwater results were less than ADEC cleanup levels. Four wells remain at SS001 (Area C) (USACE 2016b).

- In 2016, a stockpile cell for POL-contaminated soil excavated from neighboring Site SO001 (VMF) was constructed at Site SS001 (Area C). Five pre-construction soil samples were collected from the footprint of the long-term stockpile and analyzed for the COCs identified in the Decision Document (USAF 2010c) for Site SO001 (VMF). All preconstruction sample results were less than ADEC cleanup levels for site COCs. In addition, groundwater samples were collected from four monitoring wells at this site following completion of the 2016 excavation activities; analytical results did not exceed the ADEC groundwater cleanup levels. Two consecutive annual groundwater sampling events at Site SS001 (Area C) have indicated that contaminants are not present in site groundwater above the ADEC groundwater cleanup levels; therefore, groundwater monitoring should be discontinued at Site SS001 (Area C) (USACE 2017).
- In 2017, a test pit investigation at Site SO001 (VMF) was conducted to investigate the extent of the remaining POL contamination. Analytical results from test pit activities indicate that POL contamination remains at Site SO001 (VMF). The long-term stockpile located at Site SS001 (Area C) was also inspected during the field effort and rips to the reinforced liner were repaired.
- In 2018, the stockpile cell at Site SS001 (Area C) was decommissioned and the contaminated soil was transported to the landfarm constructed at Site OT001 (WACS). Excavation at Site SO001 (VMF) continued until the landfarm at Site OT001 (WACS) was full. Contaminated soil remained at Site SO001 (VMF) and a landfarm was constructed at Site SS001 (Area C) to hold the remaining POL-contaminated soil. Additional pre-construction soil samples were collected within the footprint of the landfarm area and analyzed for COCs identified for Site SO001 (VMF). To date, nutrient samples have been collected from the Site SS001 (Area C) landfarm and tilling commenced in July.

Previous activities at SS003 (Area A) include the following:

- In 2002, while on site to remove drums located at the westernmost toe of slope of the North River RRS landfill, additional drums were found along with areas of POL soil contamination at Site SS003 (Area A) (USAF 2004c).
- In 2003, USAF 611 CES personnel found nine 55-gallon drums, three of which contained product resembling used motor oil. Soil in the vicinity appeared to be contaminated with POL. The nine drums were removed along with obviously contaminated soil. Confirmation soil samples collected after drum removal indicated concentrations of DRO up to 38,400 mg/kg, RRO up to 209,000 mg/kg, and PCBs up to 3.77 mg/kg remained on site. Additional samples collected for PCB analysis from a 'landfill site,' the location of which could not be verified as figures were unavailable, contained PCBs up to 122 mg/kg (USAF 2004b).

- In 2004, brush was cut and a chain-link fence and signage were put up at the site. No removal activities occurred (USAF 2004c).
- In 2007, during a site characterization and remedial investigation effort, borings were advanced in an effort to collect groundwater grab samples; however, refusal was encountered in all borings prior to encountering groundwater (USAF 2008). Soil samples were analyzed for fuel compounds and PCBs. DRO, RRO, and PCBs were detected in soil samples above ADEC cleanup levels, with maximum concentrations of 21,000, 130,000, and 200 mg/kg, respectively (USAF 2008).
- In 2011, in preparation for the removal and offsite disposal stipulated in the 2010 ROD, soil boring locations from 2007 activities at Site SS003 (Area A) were relocated and a 15-foot by 15-foot excavation and sampling grid was established over the anticipated excavation. Thirty-four surface soil samples (0 to 12 inches bgs) were collected from the site to further characterize the PCB contamination and to refine the boundary. These samples were analyzed for PCBs in the mobile laboratory (USACE 2013).
- In 2012, excavation of comingled PCB- and POL-contaminated soil was initiated at Site SS003 (Area A). Soil at this site contained many large rocks, which made containerization of the material difficult and inefficient. Sampling of oversize materials (rocks) was conducted to determine if oversize material could be segregated and left on site. One sample from the 5-inch diameter grouping had a detection of 2.81 mg/kg PCBs; therefore, it was determined that oversize material of an 8-inch diameter or larger could be left on site and material of less than an 8-inch diameter would be disposed of with the contaminated soil. Approximately 1,260 tons of comingled PCB- and POL-contaminated soil was excavated, containerized, and disposed of offsite from Site SS003 (Area A). PCB contamination is still present in 13 grid cell excavation floors (USACE 2013).
- In 2013, excavation of contaminated soil continued. Approximately 578 cy of PCB- and POL-contaminated soil were removed from Site SS003 (Area A), which included approximately 84 cy of soil contaminated only with POL. Although PCB contamination remained at the floor of the excavation at Site SS003 (Area A), it was recommended that no further excavation of PCB- or POL-contaminated soil take place within this excavation due to the depth of the excavation and the presence of bedrock (USACE 2014).
- In 2014, vegetation was sampled at SS003 (Area A) and analyzed for PCBs. No cleanup level for vegetation exists; none of the vegetation sample results exceeded the ADEC direct contact soil cleanup level of 1 mg/kg (USACE 2015a).
- In 2015, activities at Site SS003 (Area A) consisted of lining and backfilling the excavation, drilling, and site restoration. At the request of the community of Unalakleet, two soil borings were advanced downgradient of the excavation at Site SS003 (Area A) to assess the potential migration of contaminants from the excavation where contamination remains. The soil borings were advanced until refusal was met at 8 to 8.5 feet bgs. Soil samples were collected and analyzed for DRO, RRO, and PCBs. None of the samples contained concentrations of contaminants that exceeded the ADEC soil cleanup levels (USACE 2016b).

2.5.7 Nature and Extent of Contamination at SS001 (Area C)

At Site SS001 (Area C), PCB- and 1,2,4-TCB-contaminated soil was removed to the extent practical. Further excavation was not feasible due to groundwater and fractured bedrock encountered during excavation activities. The maximum contaminant concentrations remaining on site are PCBs at 119.05 mg/kg (mobile laboratory screening result) and 1,2,4-TCB at 9.4 mg/kg (analytical laboratory result). Figures A-3 and A-4 show the approximate extent remaining on site.

The Site SS001 (Area C) excavation was backfilled in 2015 with large riprap and geotextile fabric was placed on top as a marker fabric. Approximately 1,000 cy of backfill material was hauled to the site and placed over the geotextile fabric, and the backfilled excavation was graded to match the contour of the area. Additional soil was mounded at the excavation to accommodate future settling at the site. Four monitoring wells were installed at Site SS001 (Area C) (USACE 2016b).

Known or Suspected Sources of Contamination

Potential contaminant sources for Site SS001 (Area C) include historical spills and discharges associated with PCB-contaminated transformer oil, storage of waste oil, and drum storage. It is believed that the demolition of the RRS, which included excavation and re-grading activities, most likely resulted in the distribution of contaminants away from the original release locations. Fuel contaminants were likely released from a temporary drum storage area, located on the eastern side of Site SS001 (Area C); however, the drum storage area was most likely used in conjunction with the operation of adjacent Site SO001 (VMF).

Types of Contamination and the Affected Media

The COCs at Site SS001 (Area C) are PCBs and 1,2,4-TCB. Comingled PCB and 1,2,4-TCB-contaminated soil remains at the site beneath a protective liner and 1,000 cy of clean backfill, effectively creating a 10- to 13-foot cap. Groundwater samples were collected during two consecutive annual groundwater sampling events and analyzed for PCBs and 1,2,4-TCB. All groundwater sample results from 2015 were nondetect. In 2016, the maximum detected

concentrations of PCBs and 1,2,4-TCB were 0.000024 mg/L and 0.00037 mg/L (J-flagged), respectively, both well below the ADEC groundwater cleanup levels (0.00044 and 0.004 mg/L, respectively). Table 2-1 presents the maximum concentrations of the COCs remaining in soil on site.

Known or Potential Routes of Migration

All surface soil contamination has been removed from Site SS001 (Area C); subsurface soil contamination remains in soil and fractured bedrock beneath 10 to 13 feet of fill. The soil caps effectively protect human health and the environment from remaining subsurface contamination. No soil contamination has migrated to groundwater, as evidenced by groundwater sample results below cleanup levels; therefore, offsite migration via groundwater is unlikely to occur.

2.5.8 Nature and Extent of Contamination at SS003 (Area A)

At Site SS003 (Area A), PCB- and POL-contaminated soil was removed to the extent practical. Further excavation was not feasible due to the depth of the excavation and the amount of fractured bedrock encountered during excavation activities. The maximum contaminant concentrations remaining are PCBs at 320.3 mg/kg (mobile laboratory screening result) and RRO at 41,000 mg/kg (analytical laboratory result). Figures A-5 and A-6 show the approximate extent remaining on site.

The Site SS003 (Area A) excavation was backfilled in 2015 with 1,670 cy of backfill material and geotextile fabric as a marker fabric. The excavation was backfilled to 1 to 2 feet above the original grade, and seeded for the completion of site restoration. Two soil borings were advanced and sampled downgradient of the excavation and indicated no soil contamination was migrating offsite (USACE 2016b).

Known or Suspected Sources of Contamination

The potential contaminant source at Site SS003 (Area A) is drums. Leaks or spills to surface soil may have percolated down to the subsurface soil. In 2002, numerous drums were removed.

Types of Contamination and the Affected Media

The COCs at Site SS003 (Area A) are PCBs and RRO in the subsurface. PCBs at SS003 (Area A) are present beneath a protective liner and 1,670 cy of clean backfill, effectively creating an 8- to 16-foot cap. The RRO exceedance is covered by a 2- to 3-foot cap, as surplus clean fill material was placed on top of the backfilled excavation to create a cap. Groundwater is not present at Site SS003 (Area A). Table 2-1 presents the maximum concentrations of the COCs remaining on site. No groundwater is present at SS003 (Area A).

Known or Potential Routes of Migration

All surface soil contamination has been removed from Site SS003 (Area A); subsurface soil contamination remains in soil and fractured bedrock beneath 8 to 16 feet (PCBs) or 2 to 3 feet (RRO) of fill. The soil caps effectively protect human health and the environment from remaining subsurface contamination. Groundwater is not present at Site SS003 (Area A). Therefore, offsite migration via groundwater is not possible.

**Table 2-1
Maximum Concentrations of Remaining Contaminants in Soil**

Site	PCB (mg/kg)	RRO (mg/kg)	1,2,4-TCB ¹ (mg/kg)
ADEC Cleanup Level	1.0	10,000	0.082 (SS001) ² 45 (SS003) ³
SS001 (Area C)	119.05	NS	9.4
SS003 (Area A)	320.3	41,000	2.4

Notes:

¹ 1,2,4-TCB was not included as a COC in the 2010 ROD (USAF 2010b); a sample was collected during remedy implementation based on field team observations.

² Groundwater is present at Site SS001; therefore, ADEC migration to groundwater cleanup levels are applicable.

³ Groundwater is not present at Site SS003; therefore, ADEC under 40-inch zone human health cleanup levels are applicable.

Bold = Exceedance of cleanup level

NS = not sampled

For definitions, refer to the Acronyms and Abbreviations section.

2.6 CONCEPTUAL SITE MODEL

Conceptual site models (CSMs) were developed for Sites SS001 (Area C) and SS003 (Area A) 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. Those pathways are based upon current and reasonably likely future land uses. Receptors considered for the North River RRS include commercial/industrial workers, construction workers, subsistence harvesters and consumers, site visitors, trespassers, and recreational users.

Subsurface soil is affected by contamination at Sites SS001 (Area C) and SS003 (Area A). Potential human exposure pathways include the following: dermal absorption of soil, incidental soil ingestion, ingestion of groundwater (at Site SS001 [Area C] only), and inhalation of outdoor air. Although contamination is present in soil/bedrock, it is currently beneath soil caps, which prevents exposure to humans and wildlife. Although ingestion of groundwater is a complete pathway at Site SS001 (Area C), exposure is considered insignificant because COC concentrations are below one-tenth the ADEC Table C cleanup level.

ADEC CSM graphic, scoping, and ecoscoping forms for Sites SS001 (Area C) and SS003 (Area A) are presented in Appendix C and are based upon current and reasonably likely future land uses and the potential beneficial use of groundwater at Sites SS001 (Area C) only.

2.6.1 Current and Potential Future Land and Water Uses

The current land use of North River RRS is subsistence harvesting and some recreational ATV use. As the lead agency, the USAF has the authority to determine the future anticipated land use of North River RRS. After considering input from community residents, support agencies, and public meetings, the USAF has determined that the most likely future land use of North River RRS over the foreseeable future will continue to be subsistence harvesting and recreational use. This determination was based on the current trends of land use and consultation with the local community.

2.6.2 Current and Potential Future Groundwater and Surface Water Uses

Groundwater is not commonly used as a drinking water supply in the area of the North River RRS. The drinking water well that supplied the former RRS located near a tributary of the Unalakleet River has been decommissioned. Surface water resources for Unalakleet originate

outside the Unalakleet River Basin and are unlikely to be affected by any contamination stemming from the former North River RRS (USAF 2001); no surface water is present in the vicinity of Sites SS001 (Area C) or SS003 (Area A). Several cabins located within the Unalakleet River Basin may rely on other sources of potable water.

2.7 SUMMARY OF SITE RISKS

Risk characterization is the process of quantifying cancer risk due to potential exposures to carcinogenic toxicants and of quantifying the hazard posed by potential exposures to non-carcinogenic toxicants. A 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. Cancer risk is assumed to be additive for all carcinogens. Non-cancer risk is assumed to be additive for chemicals with similar sites of toxicological action. In the event that any combination of these chemicals results in synergistic effects, risk might be underestimated. Conversely, the assumption of additivity would overestimate risk if a combination of these chemicals acted antagonistically or had no combined toxic effect at all. The methods are designed to be health-protective and tend to overestimate rather than underestimate risk. Risk characterization is limited to those source area-related chemicals selected as chemicals of potential concern selected during a screening process.

Neither a formal baseline quantitative human health nor ecological risk assessment were conducted for the North River RRS. Maximum detected concentrations of residual COCs were input into the ADEC cumulative risk calculator to support risk determination for potential future residents, under 40-inch precipitation scenario. Although contamination is present in soil/bedrock, it is currently beneath soil caps, which prevents exposure to humans and wildlife, and below the root zone (4 feet bgs). Groundwater is present at Site SS001 (Area C); however, groundwater sample results were all below cleanup levels and minor detections are not expected to contribute significantly to risk. Since the groundwater sample results were less than one-tenth ADEC cleanup levels, groundwater was not evaluated for risk to human health. No soil contamination has migrated to groundwater, as evidenced by groundwater sample results below

cleanup levels; given the historical nature of the release, offsite migration via groundwater is unlikely to occur. No drinking water wells are present at North River RRS.

In 2003, concerns regarding the possible exposure to PCBs among Unalakleet-area residents prompted the State of Alaska Section of Epidemiology to conduct an exposure investigation. Epidemiology staff collected blood samples from 26 volunteer participants, ranging in age from 18 to 81 years old, considered to have the greatest potential for exposure to PCB contamination near the North River RRS. The samples were sent to the Centers for Disease Control and Prevention (CDC) analytical laboratory for analysis. PCB levels detected in Unalakleet participants were determined to be below any levels that would be expected to cause ill health effects and were similar to those of people in other parts of Alaska and other parts of the United States (ADEC 2003).

Biological animal sampling was conducted by the USAF at the North River RRS in January 2004. Tissue samples were collected from key animal species (i.e., ptarmigan, grouse, and hare) used for subsistence by the Native Village of Unalakleet and analyzed for total PCBs to determine if subsistence hunting near the Site SS001 (Area C) Hot Spot is an exposure pathway of concern. No PCBs were detected in any of the sample tissues (USAF 2004a).

2.7.1 Carcinogenic Risk

PCBs are classified B2, indicating that they are a probable human carcinogen. PCBs are bioaccumulative, which means an organism can absorb a toxic substance at a rate greater than at which the substance is lost. In 2014, due to recreational land use of the area and community concern, 111 vegetation samples (root, leaf, and berry) were collected from Sites SS001 (Area C) and SS003 (Area A) and analyzed for PCBs. Most plants do not bioaccumulate PCBs from contaminated soil due to the presence of a waxy layer, or cuticle, in leaves and young shoots which binds the PCBs and prevents them from being absorbed into the plant; however, studies have demonstrated that lighter, more volatile PCBs released into the atmosphere may be taken up by the leaves and transported into edible portions of a plant (EPA 2014). Most PCB contamination associated with vegetation is found on the surfaces of fruits or vegetables, often

as part of the soil deposited by wind or splashed by rainwater clinging to the plant (EPA 2014). All PCB concentrations were below the soil cleanup level of 1 mg/kg, and 88 samples (79 percent) had no detected PCBs. Two samples were collected from berries, both of which were nondetect for PCBs. Although ingestion of wild foods is a potential human exposure pathway, it is considered insignificant. Carcinogenic risk to potential future residents was evaluated for Sites SS001 (Area C) and SS003 (Area A) using the ADEC cumulative risk calculator. The upper bound limit for cancer risk established by ADEC (1×10^{-5} [1 in 100,000]) and acceptable EPA risk management range (between 1×10^{-4} and 1×10^{-6}) are used for comparison. Results are presented in Table 2-2.

2.7.2 Toxicity Assessment

1,2,4-TCB is classified D, indicating that it is not classifiable as a human carcinogen (note that this COC is still evaluated quantitatively for its contribution to overall cumulative cancer risk, but cancer risk is secondary to noncancer risk in the development of cleanup levels). Noncancer risk to potential future residents was evaluated for Sites SS001 (Area C) using the ADEC cumulative risk calculator. The acceptable ADEC and EPA noncancer hazard index of 1 is used for comparison. Results are presented in Table 2-2.

2.7.3 Petroleum Risk

Of the three COCs, only PCBs and 1,2,4-TCB are defined as hazardous substances under CERCLA. RRO also has the potential to be harmful to human health and the environment and is regulated by ADEC under 18 AAC 75.341(d). Residual RRO exceeds the ADEC maximum allowable concentration at Site SS003 (Area A), but is not included in cumulative risk calculations.

**Table 2-2
Future Human Health Risk Summary – Soil**

COC	Site SS003 (Area A)		Site SS001 (Area C)	
	Hazard Index (Child)	Carcinogenic Risk	Hazard Index (Child)	Carcinogenic Risk
PCBs	-	1.16×10⁻³	-	4.31×10⁻⁴
1,2,4-TCB	N/A	N/A	0.21	3.02×10 ⁻⁷
Total HI/Risk¹	0	1.16×10⁻³	0.21	4.31×10⁻⁴
ADEC Risk Threshold	1	1.00×10 ⁻⁵	1	1.00×10 ⁻⁵

Notes:

¹ The risk presented used post-excavation data from the soil that is currently underneath soil caps. This does not represent current risk, as the remaining contaminated soil is not accessible to humans.

Bold results exceed the ADEC risk threshold.

-- = no output value from online calculator

Results for the child receptor are presented, as they are likely to represent the most susceptible population.

For definitions, refer to the Acronyms and Abbreviations section.

2.7.4 Health Effects

Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage (Agency for Toxic Substances and Disease Registry [ATSDR] 2014b).

There is virtually no information regarding health effects of TCBs in humans. Studies in animals indicate that oral administration of TCBs for short or long periods produces mainly alterations in the liver and kidneys. The EPA has stated that 1,2,4-TCB is not classifiable as to human carcinogenicity. However, this was based on studies conducted prior to 1990; newer information has not been evaluated (ATSDR 2014a).

RRO is classified as a petroleum hydrocarbon (C25-C36). Very little is known about the toxicity of many total petroleum hydrocarbon compounds, and different fractions affect the body in different way (ATSDR 2015). RRO is not evaluated for carcinogenic risk, and is not regulated under CERCLA, following the CERCLA Petroleum Exclusion. However, remedies to address PCBs and 1,2,4-TCB will also address the potential risks posed by RRO contamination.

2.7.5 Ecological Risks

Contaminants remaining on site are well below the depth that would expose animals that are burrowing or grubbing for food. They are also well below the depth where terrestrial plant roots would come into contact; therefore, no uptake will occur.

2.7.6 Basis for Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. If achieved, the remedial action objectives (RAOs) (Section 2.8) developed for Sites SS001 (Area C) and SS003 (Area A) will adequately and effectively mitigate human health risks the potential for ecological exposure.

2.8 REMEDIAL ACTION OBJECTIVES

RAOs provide a general description of what the CERCLA response action will accomplish. These goals typically serve as the design basis for the remedial alternatives, which were originally evaluated in the 2009 FS (USAF 2009) and presented in the original and revised Proposed Plans (USAF 2010a, USACE 2018). These alternatives are discussed in Section 2.9.

The cleanup levels selected for Sites SS001 (Area C) and SS003 (Area A) are chemical-specific applicable or relevant and appropriate requirements (ARARs) set at the concentrations established under ADEC Method Two [18 AAC 75.341(c) and 75.341(d)] (ADEC 2018) are as follows:

- ADEC Method Two soil cleanup level for PCBs (1 mg/kg for human health)
- ADEC Method Two soil cleanup level for 1,2,4-TCB (0.082 mg/kg for migration to groundwater)
- ADEC Method Two soil cleanup level for RRO (10,000 mg/kg for ingestion)

Appendix B contains a complete list of ARARs pertaining to the North River RRS.

The RAOs for Site SS001 (Area C) that are necessary to be protective of human health and the environment are as follows:

- Prevent human exposure to soil containing PCBs in excess of the ADEC Method Two human health cleanup level (1 mg/kg).
- Prevent exposure to soil containing 1,2,4-TCB in excess of the ADEC Method Two migration to groundwater cleanup level (0.082 mg/kg).
- Minimize or eliminate direct ecological exposure to PCBs and 1,2,4-TCB above the established ADEC Method Two cleanup levels.
- Reduce the potential for COCs to migrate from Site SS001 (Area C) soil.

The RAOs for Site SS003 (Area A) are as follows:

- Prevent human exposure to soil containing PCBs in excess of the ADEC Method Two human health cleanup level (1 mg/kg).
- Prevent human exposure to soil containing RRO in excess of the ADEC Method Two cleanup level for ingestion (10,000 mg/kg).
- Minimize or eliminate direct ecological exposure to PCBs and RRO above the established ADEC Method Two cleanup levels.
- Reduce the potential for COCs to migrate from Site SS003 (Area A) soil.

2.9 DESCRIPTION OF ALTERNATIVES

The No Action Alternative and the original selected remedy presented in the 2010 Proposed Plan (USAF 2010a) to address remediation at the North River RRS are described in their current context within Sections 2.9.1 and 2.9.2. Alternative 2: Offsite Disposal of Contaminated Soil, was the original selected remedy for both Sites SS001 (Area C) and SS003 (Area A). VOCs were encountered during original remedy implementation in 2013; therefore, VOCs were not accounted for in the original FS alternative development. The alternative developed for this ROD amendment and presented in the revised Proposed Plan (USACE 2018) is described in Section 2.9.3.

2.9.1 Alternative 1: No Action

In this alternative, no additional response action is taken to remediate contaminated soil at the North River RRS. No monitoring would be performed at the facility to assess site conditions over time. The No Action Alternative is required to be evaluated under the NCP as a baseline condition.

2.9.2 Alternative 2: Offsite Disposal of Contaminated Soil (SS001 and SS003)

This alternative consists of excavating, staging, manifesting, and transporting soil contaminated with POL and/or PCBs above the RAOs for off-site disposal.

Soil would be excavated and staged on site prior to offsite transport. Samples would be collected from the staged soil for waste profiling purposes and segregated into TSCA hazardous (PCBs greater than or equal to 50 mg/kg) and TSCA non-hazardous (PCBs greater than the RAO of 1 mg/kg but less than the TSCA threshold of 50 mg/kg) waste streams prior to transport. TSCA hazardous soil containing PCBs greater than or equal to 50 mg/kg would be shipped to a permitted Subtitle C landfill in the contiguous United States. TSCA non-hazardous/low-level PCB- and POL-contaminated soil containing TSCA non-hazardous concentrations of PCBs would be shipped to a permitted, approved Subtitle D landfill in the contiguous United States.

Confirmation sampling would be required post-removal to ensure contaminants were no longer present above RAOs. Once confirmation is received that all contaminated soil has been removed, the excavation would be backfilled with locally available clean fill.

2.9.3 2018 ROD Amendment Alternative 7: Offsite Disposal of Contaminated Soil, Capping, and LUCs (SS001 and SS003)

This alternative consists of excavating, staging, manifesting, and transporting soil contaminated with PCBs, VOCs, and/or POL above cleanup levels, to the extent practicable, for offsite disposal. Contaminated soil/bedrock remaining on site has been capped with approximately 10 feet of material. Updated LUCs would be implemented to restrict land use and prevent the removal and transportation of contaminated soil. Signage would be installed to notify the public

of potential risks. The USAF dig permitting system would be utilized. No unauthorized transport or disposal of soil or unauthorized digging/excavation would occur without ADEC notification and approval. Updates to the LUCs at Sites SS001 (Area C) and SS003 (Area A) would be incorporated into the USAF LUC Management Plan. The LUC boundary for Site SS001 (Area C) proposed in this ROD amendment has been updated to include the capped area of Site SS001 (Area C) and excludes the former PCB trail and cabin. The former PCB trail has achieved UU/UE and is closed out under this ROD amendment. Regular site inspections and CERCLA five-year reviews would be required to evaluate the long-term protectiveness of the remedy indefinitely.

2.10 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

In accordance with the NCP, the alternatives were evaluated using the nine criteria described in CERCLA §121(a) and (b) 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. Two of the nine criteria are considered threshold criteria:

- Overall protection of human health and the environment
- Compliance with, or an applicable waiver of 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 balancing 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 indicate whether technical and administrative issues have been met by the alternative and address the public concerns in the decision-making process. Two of the nine criteria are considered modifying criteria:

- Community acceptance
- State/support agency acceptance

This section summarizes how well each alternative satisfies each evaluation criterion and indicates how each alternative compares to the other alternatives under consideration. Table 2-3 provides a summary of the alternatives comparison for the remedy selected in the 2010 ROD (Alternative 2) and the revised remedy for Sites SS001 (Area C) and SS003 (Area A) (Alternative 7).

**Table 2-3
Screening of Alternatives for Fuel- and Polychlorinated Biphenyl-Contaminated Soil**

Alternative	Threshold Criteria		Primary Balancing Criteria					Modifying Criteria	
	Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (millions)	State Acceptance	Community Acceptance
Alternative 1: No Action	○	○	0	0	2	2	\$0	No	No
Alternative 2: Offsite Disposal	●	●	5	0	3	4	\$7.01 ¹	Yes	Yes
ROD Amendment Alternative 7: Offsite Disposal, Cap, and LUCs	●	●	4	0	3	5	\$5.87 ²	Yes	Yes

Notes:

- or 5 = fully meets criterion
- ◐ or 1 to 4 = somewhat meets criterion
- or 0 = does not meet criterion

¹ The cost presented for Alternative 2 is based on actual costs accrued during completion of the remedy plus estimated remediation and disposal costs for remaining soil contamination. The original remedy cost as projected in the 2010 ROD was \$2.49 M (USAF 2010b).

² The cost for the revised remedy, Alternative 7, is based on actual costs accrued during completion of the remedy plus estimated O&M costs for the next 30 years. For definitions, refer to the Acronyms and Abbreviations section.

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 and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or LUCs.

Alternatives 2 and 7 are both protective of human health and the environment. The No Action alternative does not include provisions for environmental monitoring, controlling the migration of contaminants, reducing contaminant concentrations, or preventing human or ecological exposure.

2.10.2 Compliance with Applicable or Relevant and Appropriate Requirements

Under CERCLA §121(d) and NCP §300.430(f)(1)(ii)(B), remedial actions at CERCLA sites are required to legally satisfy ARARs on federal and state levels unless waived under CERCLA §121(d)(4). ARARs are divided into three categories. Chemical-specific ARARs are used to set cleanup levels that are protective of both human health and ecological receptors (i.e., 18 AAC 75) during site work. Location-specific ARARs require that potential wildlife habitat, migration patterns, and negative effects on the ecosystem be considered as part of project design. Action-specific ARARs are included to highlight proper waste management procedures and provide pollution control and notification procedures in the event of a spill. ARARs, once identified, are then further classified as applicable, relevant, and appropriate, or to be considered. The ARARs for Sites SS001 (Area C) and SS003 (Area A) are presented in Appendix B.

Applicable requirements refer to the 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 the 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 ARARs of other federal and state environmental statutes or provides a basis for invoking a waiver. No waiver for Sites SS001 (Area C) and SS003 (Area A) is necessary; Alternative 7 (Offsite Disposal of Contaminated Soil, Capping, and LUCs) meets the provisions of the ARARs as shown in Appendix B, so long as it is implemented as designed and in accordance with applicable federal and state regulations. TSCA-regulated concentrations exceeding State of Alaska cleanup levels for PCBs would remain at Sites SS001 (Area C) and SS003 (Area A); however, this has been accepted by the State because the site is capped and LUCs would be put in place to prevent human exposures.

Because the No Action alternative would result in contaminated soil remaining on site in an uncontrolled manner, this would not be protective of human health or the environment under any exposure scenario and therefore would not comply with ARARs. Alternative 2 does comply with ARARs, but this alternative is not able to be fully implemented. Alternative 7 does comply with ARARs, but PCBs would remain capped on site indefinitely. Therefore, additional LUC measures are required under Alternative 7 to protect human health and the environment. The USAF has obtained permission from UNC and BSNC to leave the contaminated soil on site beneath soil caps.

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 RAOs have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls. Alternative 2 and Alternative 7 both permanently reduce or remove contaminants from the North River RRS site; however, both remedies pose a residual risk that the contaminants would still remain at the offsite disposal location.

Alternative 2 would render Sites SS001 (Area C) and SS003 (Area A) immediately available for UU/UE, if complete removal were possible, but this remedy has been implemented to the extent practicable. Alternative 7 relies on the adequate implementation and regular maintenance of the caps and LUCs to remain effective over the long-term.

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. Both Alternative 2 and Alternative 7 would only reduce the mobility but not the volume or toxicity of contaminants. Reduction of contamination would not be achieved through treatment under either alternative.

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, or the environment during construction, and operation of the remedy until cleanup levels are achieved.

The offsite disposal components of both remedies (Alternatives 2 and 7) involve soil excavation and containerization/stockpiling, which has exposed workers to contaminants as well as to hazards associated with working in and around excavations. Continued excavation into

fractured bedrock as required to fully implement Alternative 2 would constitute a lengthened period of exposure and therefore increased risk to site workers for minimal long-term gain, as complete removal has proven difficult if not impossible at depth. Soil transport as required for both options and possesses its own unique risks, which have been mitigated. This is due, in part, to the dangers associated with the condition of the road between Unalakleet and the North River RRS, which underwent regular maintenance during site activities and was impassable during high rainfall events, delaying remediation work. Implementation of a proper health and safety plan (HSP) and engineering controls reduced short-term risk to workers and the public.

Under Alternative 7, LUCs would provide short-term effectiveness by eliminating exposure to potential hazards, which would remain in the subsurface indefinitely. As the soil contamination is already covered with the soil caps, there is no possibility of short-term exposure risk to workers associated with cap maintenance as part of Alternative 7.

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.

Due to the relative remoteness of the North River RRS, all personnel, power equipment, and supplies would have to be barged or flown to Unalakleet and then transported by truck to the site. Equipment and personnel required for these alternatives are readily available in Unalakleet; however, mobilization of this equipment to the site would require transporting equipment along an unmaintained road. Mobilization and demobilization of some personnel and waste transportation would also be required. Alternative 2 was previously considered feasible, but did not account for the volume and extent of contamination that has since been identified at the North River RRS, nor did it anticipate the presence of fractured bedrock.

Alternative 7 would not require any additional removal actions and would be more implementable than Alternative 2, which would require digging up the remaining contamination at the sites.

2.10.7 Relative Cost

Due to the remoteness of the North River RRS, the primary cost factor for any remedial action is the quantity of material that needs to be capped or the waste that needs to be transported. Table 2-4 provides the cost summary for Alternatives 1 and 2 from the 2010 ROD (USAF 2010b) and Alternative 7 from the revised Proposed Plan (USACE 2018). These estimates include labor, equipment, waste transport and disposal, laboratory analysis, sampling, and five-year monitoring where applicable for a period of 30 years.

**Table 2-4
SS001 (Area C) and SS003 (Area A) Alternatives Cost Summary**

Alternative	Capital (millions)	Present Worth O&M ¹ (millions)	Total Present Worth Cost ² (millions)
Alternative 1: No Action	\$0	\$0	\$0
Alternative 2: Removal and Offsite Disposal	\$7.01	\$0	\$7.01
Alternative 7: Removal and Offsite Disposal, Capping, and LUCs	\$5.67	\$0.20	\$5.87

Notes:

¹O&M costs include tasks such as site inspections, cap inspections, cap maintenance, and five-year reviews using 5 percent rate of return over 30 years for Alternatives 2 and 7.

² Costs estimated with +50% / -30% accuracy based on subcontractor quotes, construction drawings, and engineering estimates. Values include total capital costs, total annual costs, and present worth of annual costs (5 percent rate of return). The cost presented for Alternative 2 is based on actual costs accrued during completion of the remedy plus estimated remediation and disposal costs for remaining soil contamination. The original remedy cost as projected in the 2010 ROD was \$2.49 M (USAF 2010b).

For definitions, refer to the Acronyms and Abbreviations section.

2.10.8 State/Support Agency Acceptance

At the public meeting held in Unalakleet on 5 November 2014, ADEC recommended that excavation activities cease based on the very low probability of exposure to community members because of the depth of the excavations. At that meeting, Jacobs, on behalf of the USAF, discussed the possibility of lining the excavations at Sites SS001 (Area C) and SS003

(Area A) and backfilling the sites to existing grade with the placement of LUCs on the properties.

After a subsequent public meeting held in Unalakleet on 22 May 2018, and the release of the revised Proposed Plan, the State agreed that the Alternative 7 remedy, if properly implemented, would comply with State of Alaska law and that no technical impracticability waiver will be needed.

2.10.9 Community Acceptance

During the public comment period for the original ROD, the community expressed its support for Alternative 2. The community did not support the remaining alternatives (Alternatives 1, 3, 4, 5, and 6). During the public comment period for the revised Proposed Plan (USACE 2018), the community expressed concerns for leaving contaminants on site; however, they did not disagree with pursuing Alternative 7. The community was more concerned with the potential for additional contamination at other surrounding areas.

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 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.

Contamination has been identified that exceeds the concentration at which PCBs are considered a principal threat waste (100 mg/kg for residential sites) at Sites SS001 (Area C) and SS003 (Area A). However, PCBs are not volatile and do not readily migrate through soil; this type of contamination can be reliably controlled in place.

2.12 SELECTED REMEDY

The remedy selected in this ROD Amendment is Alternative 7, which includes removal and offsite disposal, capping, and LUCs. This remedy satisfies overall protectiveness, complies with ARAR criteria to the extent practicable, and achieves state and community acceptance. Contaminated soil has already been lined and capped. Remaining tasks include placing LUCs to prevent human exposure and implementing inspection and review cycles to ensure long-term protectiveness. The selected remedy meets the RAOs for Sites SS001 (Area C) and SS003 (Area A) as presented in Section 2.8 of this ROD Amendment.

The primary indicator of remedial action performance will be satisfying the RAOs for Sites SS001 (Area C) and SS003 (Area A) (see Section 2.8) and protecting human health and the environment. Performance measures are defined herein as the required actions to achieve RAOs. It is anticipated that successful implementation, O&M, and completion of the performance measures will achieve a protective and legally compliant revised remedy for Sites SS001 (Area C) and SS003 (Area A).

This remedy provides the best balance of tradeoffs with respect the balancing criteria, implementability in particular, and long-term effectiveness and permanence. The selected remedy is protective of human health and the environment because exposure to residual PCBs, VOCs, and POL will be controlled through LUCs, inspections, and prompt maintenance of any protective cap deficiencies. Five-year reviews will be conducted at Sites SS001 (Area C) and SS003 (Area A) indefinitely or until the site has been approved for UU/UE; USAF will maintain responsibility for these sites in perpetuity or until such a time that contaminants no longer pose a threat to human health and the environment.

As the lead agency, USAF is responsible for implementing, maintaining, and monitoring the response 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.

2.12.1 Remedy Implementation

The revised remedy under Alternative 7 has been partially implemented in order to prevent exposure to soil containing PCBs in excess of 1 mg/kg, 1,2,4-TCB in excess of 0.082 mg/kg, and RRO in excess of 10,000 mg/kg. The following activities were conducted at Sites SS001 (Area C) and SS003 (Area A):

- Segregating excavated soil into TSCA hazardous and TSCA nonhazardous waste streams
- Collecting and analyzing confirmation samples to ensure the cleanup levels were met, to the extent practicable
- Loading PCB-, VOC-, and POL-contaminated soil into Super Sacks for transport from the North River RRS to the barge landing
- Staging Super Sacks in containers at the barge landing for transport to the treatment, storage, and disposal facility (TSDF)
- Barging containers to in the contiguous United States for proper disposal at an approved RCRA Subtitle C or Subtitle D TSDF
- Lining and backfilling the excavations
- Restoring the sites to the natural grade

The remaining portions of the revised remedy to be implemented include establishing LUCs at Sites SS001 (Area C) and SS003 (Area A) and conducting regular inspections and five-year reviews.

2.12.2 Summary of the Rationale for the Selected Remedy

The revised remedy for Sites SS001 (Area C) and SS003 (Area A) is Alternative 7. USAF and ADEC believe that the revised remedy meets the threshold criteria and provides the best balance of tradeoffs among the other alternatives with respect to the balancing and modifying criteria. A comparative analysis among alternatives for Sites SS001 (Area C) and SS003 (Area A) (refer to Table 2-2) found Alternative 7 to be the best response action alternative for addressing the risks associated with the site characteristics, land use, and type of contamination currently present at Sites SS001 (Area C) and SS003 (Area A).

Removing all PCB-contaminated soil to the extent practicable and capping all remaining contaminated soil eliminates the potential for human/ecological exposure and future contaminant migration from Sites SS001 (Area C) and SS003 (Area A). Transportation and disposal costs are high and logistics are difficult in a remote site. Alternative 7 allows the majority of PCBs to be safely disposed of offsite and for the remaining contamination at bedrock to be inaccessible provided that the protective cap is maintained and LUCs are implemented and enforced. This alternative will achieve substantial risk reduction by both treating the source materials constituting principal threats at the sites and providing safe management of remaining material. This combination reduces risk sooner and costs less than the other alternatives.

2.12.3 Description of the Selected Remedy

Remedial alternatives for Sites SS001 (Area C) and SS003 (Area A) were originally developed and evaluated in the FS (USAF 2009). USAF selected Alternative 2 – Offsite Disposal of Contaminated Soil – in the 2010 ROD. This remedy was conducted to the extent practicable during remedial actions performed from 2011 through 2015. Due to the presence of PCB- and POL-contaminated soil remaining in the fractured bedrock of these sites, the USAF has selected a revised remedy to address the remaining contamination. The major components of the revised remedy include:

- All PCB-, VOC-, and POL-contaminated soil above the ADEC cleanup levels at Sites SS001 (Area C) and SS003 (Area A) will be excavated and removed, to the extent practicable, for disposal in the contiguous United States. This has been accomplished through the partial implementation of Alternative 2.
- PCB concentrations above 10 mg/kg and below 50 mg/kg will be disposed of as nonhazardous waste; PCB concentrations 50 mg/kg and above will be disposed of as hazardous waste in a RCRA Subtitle C facility. This has been accomplished through the partial implementation of Alternative 2.
- Soil that reaches or exceeds 50 mg/kg PCBs will be handled, transported, and disposed of in accordance with TSCA. TSCA-regulated soil is subject to more stringent storage, transportation, and disposal requirements and will be segregated from other waste soil for that reason. This has been accomplished through the partial implementation of Alternative 2. TSCA-regulated soil remains in the subsurface within fractured bedrock that precludes further excavation.

- Confirmation soil samples will be collected from the excavations to show that remaining PCB, 1,2,4-TCB, and RRO concentrations are below their respective RAOs, where possible. This has been accomplished to the extent practicable through the partial implementation of Alternative 2.
- PCB- and POL-contaminated soil remaining on site in the fractured bedrock will be covered with a permeable geofabric liner prior to capping. The cap will be designed and constructed to withstand environmental conditions, and will prevent exposure of humans and the environment to residual contaminants. This has been accomplished as part of newly developed Alternative 7.
- Cap extents will be surveyed and mapped. LUCs will be applied to the site and cap inspections and maintenance as needed will be performed to ensure the long-term integrity of the caps; inspection results and photographs will be communicated in a letter report to ADEC and promptly (within one year) addressed by USAF. Preferential drainage pathways, evidence of erosion, and any instances where the geofabric liner is apparent or has been compromised will be documented and addressed. These remedy components will be implemented once this ROD amendment has been approved.
- LUCs such as signage and dig restrictions will be implemented to notify the public of potential risks and limit human exposure to PCBs and POL. These remedy components will be implemented once this ROD amendment has been approved. The LUC boundary for Site SS001 (Area C) proposed in this ROD amendment has been updated to include the capped area of Site SS001 (Area C) and excludes the former PCB trail and cabin. The former PCB trail and cabin have achieved UU/UE and are closed out under this ROD amendment. Long-term LUC management is described below:
 - Current site use is recreational and expected to remain recreational. The Air Force shall restrict any future site use that has the potential to affect the protectiveness of the selected remedy including residential development and disposition and use of any soil excavated from the site, in the LUC management plan (USAF 2017).
 - LUC boundaries will be surveyed and mapped for inclusion into the LUC management plan and used during LUC and cap inspections.
 - LUCs are anticipated to be permanent at Sites SS001 (Area C) and SS003 (Area A), as PCB concentrations are unlikely to degrade naturally.
 - The Air Force shall file a notice with the USAF real property office and in State of Alaska Department of Natural Resources land records that describes the nature and location of the pollutants or contaminants and the types and locations of LUCs.
 - The Air Force shall include signage around Sites SS001 (Area C) and SS003 (Area A) to prevent unauthorized access. The signage will be implemented and maintained by 611 CES.
 - The Air Force will utilize the base dig permit system, which will prevent activities that could breach the caps. The base dig permit system is implemented by 611 CES.

- The Air Force will utilize the base construction review process, which will prevent ground-disturbing construction activities or ensure safe soil management procedures in areas with residual contamination. The base construction review process is implemented by 611 CES.
- All ROD use limitations and exposure restriction shall be entered in the base master plan and the Geographical Information System by 611 CES within 30 days after ROD signature.
- The Air Force will file a notice of activity and use limitation (Site SS001 [Area C]) and an environmental covenant (Site SS003 [Area A]) that describe the nature and location of residual contamination, and the types and locations of LUCs.
- The Air Force is responsible for implementing, maintaining, monitoring, reporting, and enforcing LUCs.
- The Air Force shall inform, monitor, enforce, and bind, where appropriate, authorized lessees, tenants, contractors, and local community members regarding the LUCs affecting Sites SS001 (Area C) and SS003 (Area A).
- Although the Air Force may later transfer these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Air Force shall retain ultimate responsibility for remedy implementation and protectiveness.
- The Air Force will notify ADEC as soon as practicable, but no longer than 10 days after discovery, of any activity that is inconsistent with the LUC objectives or use restrictions, or any other action that may interfere with the effectiveness of the LUCs. The Air Force will take prompt measures to correct the violation or deficiency and prevent its recurrence. In this notification, the Air Force will identify any corrective measures it has taken or any corrective measures it plans to take and the estimated time frame for completing them. For corrective measures taken after the notification, the Air Force shall notify ADEC when the measures are complete.
- The Air Force must provide notice to ADEC at least six months prior to any transfer or sale of property containing LUCs so that ADEC can be involved in discussions to ensure that appropriate provisions are included in the transfer or conveyance documents to maintain effective LUCs. If it is not possible for the facility to notify ADEC at least six months prior to any transfer or sale, then the facility will notify the state as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to LUCs. The Air Force agrees to provide ADEC with such notice, within the same time frames, for federal-to-federal transfer of property accountability. The Air Force shall provide either access to or a copy of the executed notice and covenant or transfer assembly to ADEC.
- The Air Force shall not modify or terminate LUCs, modify land uses that might impact the effectiveness of the LUCs, take any anticipated action that might disrupt the effectiveness of the LUCs, or take any action that might alter or negate the need for LUCs without 45 days prior to the change seeking and obtaining approval from ADEC of any required ROD modification.

- The Air Force will monitor and inspect all site areas subject to LUCs as PCB-contaminated soil will remain on site indefinitely. LUC and cap inspections will be conducted and reported annually for the first five years, then every five years thereafter.
- The Air Force will report no less often than once every five years to ADEC on the frequency, scope, and nature of LUC monitoring activities, the results of such monitoring, any changes to the LUCs, and any corrective measures resulting from monitoring during the time period.
- If the road at the North River RRS, or access to the area, is ever not needed, alternatives to remove the remaining contamination may be reevaluated.

The selected remedy, Alternative 7: Offsite Disposal of Contaminated Soil, Capping, and LUCs (SS001 and SS003), will require five-year reviews under CERCLA. PCB-, VOC-, and POL-contaminated soil, although contained under protective caps, will remain above cleanup levels at Sites SS001 (Area C) and SS003 (Area A). Five-year reviews evaluate the overall effectiveness of the revised remedy and ensure that it remains protective over the long-term, to include the integrity of the caps and the frequency, scope, and nature of LUC monitoring activities, the results of such monitoring, any changes to land use or the LUCs, and any corrective measures resulting from monitoring during the time period. Documentation from inspections and any subsequent maintenance performed as a result of deficiencies will be compiled in the five-year review reports.

Commingled PCB- and POL-contaminated soil will be treated as PCB-contaminated soil and either removed or capped. PCBs are considered more toxic than 1,2,4-TCB and RRO and therefore drive risk at Sites SS001 (Area C) and SS003 (Area A).

Any changes to the selected remedy as described in this ROD amendment, if they occur, will be documented in a technical memorandum that will be made available in the Administrative Record, an Explanation of Significant Differences document, and/or an additional ROD amendment.

2.12.4 Summary of Estimated Remedy Costs

The information in the cost estimate is based on the available information regarding the scope of the revised remedy. Actual costs accrued during implementation of the remedial actions at

Sites SS001 (Area C) and SS003 (Area A) (i.e., labor, subcontracts, equipment, travel, rentals, etc.) are included in the cost estimate. Table 2-5 presents an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

**Table 2-5
Capital and O&M Cost Estimates for the Selected Remedy**

Remedy	Description	Cost
Offsite Disposal of Contaminated Soil, Capping, and LUCs	Capital cost	\$5,669,271 ¹
	Estimated present worth annual overhead and maintenance over 30 years	\$196,745 ²
	Estimated present worth costs	\$5,866,116

Notes:

¹ This cost is based on actual costs accrued during completion of the remedy to date plus \$29,732 estimated LUC capital costs.

² This is the estimated cost for O&M yet to be conducted.

Costs estimated with +50% / -30% accuracy based on subcontractor quotes, construction drawings, and engineering estimates. Cost estimates for the alternative are based on site-specific conceptual designs and are expressed in 2018 dollars.

Time to achieve the RAOs – 0 Days

For definitions, refer to the Acronyms and Abbreviations section.

2.12.5 Expected Outcomes of Selected Remedy

Under this revised remedy, PCB and POL contamination will remain in the fractured bedrock at Sites SS001 (Area C) and SS003 (Area A) under protective caps. Because contamination will remain on site above acceptable levels, Sites SS001 (Area C) and SS003 (Area A) will not be suitable for UU/UE, and CERCLA five-year reviews would be required indefinitely. LUC and cap inspections will occur once a year for the first five years, then every five years thereafter. All necessary maintenance would occur promptly to ensure that the remedy remains protective over the long-term.

Land use at the North River RRS is not anticipated to change. Removal of contaminated soil to the extent practicable will mitigate the potential for exposure to potentially harmful contamination, and the implementation of a minimum 8-foot cap over remaining PCB, POL, and VOC contamination and LUCs to include signage, a notice of activity and use limitation (Site SS001 [Area C]), an environmental covenant (Site SS003 [Area A]), and dig restrictions, if properly implemented, are an effective and legally compliant way to prevent both human and ecological exposure. No current or future risk for anyone traversing overland to access

hunting/gathering areas or driving along the site road; this is the extent of anticipated future use. Final cleanup levels are presented in Table 2-6.

**Table 2-6
Cleanup Levels for COCs in Soil**

COC	Cleanup Level (mg/kg)	Basis for Cleanup Level
PCBs	1.0	Compliance with State ARAR (18 AAC 75)
RRO	10,000	
1,2,4-TCB ¹	0.082 ²	

Notes:

¹ 1,2,4-TCB was not included as a COC in the 2010 ROD (USAF 2010b).

² Groundwater is present at Site SS001; therefore, ADEC migration to groundwater cleanup levels are applicable. For definitions, refer to the Acronyms and Abbreviations section.

2.13 STATUTORY DETERMINATIONS

Under CERCLA §121 as required by NCP §300.430(f)(5)(ii), the lead agency must select a remedy that is protective of human health and the environment, complies with ARARs, is cost-effective, and uses permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, CERCLA includes (1) a statutory preference for remedies that employ a treatment that 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 revised remedy for Sites SS001 (Area C) and SS003 (Area A) does not comply with the statutory preference for treatment as a principal element. No reduction of toxicity, mobility, or volume of waste through treatment would occur under Alternative 7 as effective treatment technologies for PCBs would be very difficult and costly to implement at this remote site due in part to difficulty mobilizing the necessary equipment and supplies, the lack of an onsite energy source to power equipment, increased exposure risk to onsite personnel, and the inaccessibility of residual contamination. Alternative 7 instead eliminates the potential risks to human health and the environment by capping remaining contaminated soil/bedrock and by implementing LUCs to restrict land use and prevent the removal and transportation of contaminated soil.

2.13.1 Protection of Human Health and the Environment

The revised remedy, Alternative 7, will protect human health and the environment by permanently eliminating exposure risks to PCBs, 1,2,4-TCB, and RRO contamination above RAOs. RAOs will be achieved upon remedy implementation and additional short-term risks to site workers or visitors would be minimized as additional invasive activities have been discontinued. Long-term risks depend on the adequate implementation of LUCs, cap maintenance, and review cycle assessments.

2.13.2 Compliance with Applicable or Relevant and Appropriate Requirements

The revised remedy, Alternative 7, complies with all chemical-specific, location-specific, and action-specific ARARs. Although PCB-contaminated soil would remain on site above TSCA allowable limits, this condition has been accepted because contamination is capped and LUCs would be put in place to prevent human exposure. No waivers are required for the SS001 (Area C) and SS003 (Area A) project sites.

2.13.3 Cost Effectiveness

In USAF's judgment, the revised remedy is cost-effective and represents a reasonable value for the money that is to be spent. In making this determination, the following definition from 40 CFR 300.430(f)(1)(ii)(D) was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness." This determination was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfy the threshold criteria, meaning that they are protective of human health and the environment and comply with the ARARs identified for Sites SS001 (Area C) and SS003 (Area A). The overall effectiveness of the revised remedy for Sites SS001 (Area C) and SS003 (Area A) was demonstrated in the comparative analysis of alternatives (Section 2.10) and is summarized in Table 2-7. The estimated present worth cost of the revised remedy is \$5.87 million (in 2018 U.S. dollars).

2.13.4 Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

While the North River RRS is unlikely to become available for UU/UE under the new Alternative 7, exposure risks will have been minimized upon remedy implementation through the removal of PCBs, VOCs, and POL to the extent practicable and mitigated through the implementation of protective caps designed to withstand site conditions. Five-year reviews and LUC and cap inspections, if properly implemented, remain effective in preventing exposure to the subsurface.

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 based on 40 CFR 300.430(a)(1)(iii)(A). The selected remedy for Sites SS001 (Area C) and SS003 (Area A) does not satisfy the statutory preference for treatment of all waste streams as a principal element of remediation. PCBs, VOCs, and POLs in soil were partially removed and sent to a TSDF and the rest capped, but no contamination was treated because the costs and short-term risks would be substantially higher without a significant reduction in long-term risk at this remote site.

2.13.6 Five-Year Review Requirements

Pursuant to CERCLA §121(c) and NCP §300.430(f)(4)(ii), because the selected remedy will result in hazardous substances, pollutants, or contaminants remaining above levels that allow for UU/UE at Sites SS001 (Area C) and SS003 (Area A), a statutory review will be required five years after initiation of the response action to verify that the remedy is, or will be, protective of human health and the environment. The five-year review is separate from but inclusive of the LUC and cap inspections that are a primary remedy component.

**Table 2-7
Cost and Effectiveness Summary**

Remedy	Present Worth Cost (millions)	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume Through Treatment	Short-Term Effectiveness
Removal and Offsite Disposal, Capping, and LUCs	\$5.87	Eliminates exposure to PCBs, 1,2,4-TCB, and RRO through removal and disposal; prevents exposure to residual PCBs, 1,2,4-TCB, and RRO through capping, cap maintenance, and LUCs.	No reduction in toxicity, mobility, or volume through treatment will occur under this alternative. Treatment technologies would be difficult to identify and costly to implement at this remote site. PCBs are stable compounds that are not likely to reduce in concentration or volume naturally. Capping effectively limits mobility and both exposure and migration potential.	<p>During site work, exposure risks were minimized with proper training beforehand and the use of appropriate personal protective equipment.</p> <p>Capping rapidly prevented exposure to residual contamination at the subsurface.</p> <p>LUCs will be implemented to ensure that this revised remedy remains protective to human health and the environment.</p>

Note:
For definitions, refer to the Acronyms and Abbreviations section.

2.14 DOCUMENTATION OF SIGNIFICANT CHANGES

The revised Proposed Plan for Sites SS001 (Area C) and SS003 (Area A) was released for public comment on 22 May 2018. The revised Proposed Plan identified Alternative 7, Offsite Disposal of Contaminated Soil, Capping, and LUCs, as the Preferred Alternative for soil remediation. No written comments were received during the public comment period and ADEC was present at the 22 May 2018 public meeting and heard all verbal comments. It was determined that no significant changes to the remedy, as originally identified in the revised Proposed Plan, were necessary or appropriate.

PART 3: RESPONSIVENESS SUMMARY

This section provides a summary of the public comments regarding the *Revised Proposed Plan for Sites SS001 and SS003 North River Radio Relay Station* (USACE 2018). At the time of the public review period, USAF proposed the new Alternative 7, Removal and Offsite Disposal, Capping, and LUCs, to address remaining PCB- and POL-contaminated soil at Sites SS001 (Area C) and SS003 (Area A).

The state regulatory agency, ADEC, was invited to comment on the draft of the revised Proposed Plan prior to the public comment period. All regulator comments on the Proposed Plan were resolved and integrated into the final version, as applicable. All regulator comments received on this draft ROD amendment will also be addressed and integrated into the final version.

NCP 300.430(f)(3) establishes a number of public participation activities that the lead agency must conduct as part of the CERCLA process; these are discussed in detail in Section 2.3. The revised Proposed Plan (USACE 2018) was made available to the public for review during a 30-day public comment period that began on 22 May 2018 and lasted through 20 June 2018. A notice regarding updates at the North River RRS and announcing the 22 May 2018 public meeting was published in the Spring 2018 edition of the BSNC newsletter, *The Agluktuk*, that is sent to all BSNC shareholders (Appendix D). A radio announcement was also made about the public meeting as well as the revised Proposed Plan public comment period on the local radio station (KNSA, 930 AM) on 22 May 2018 (Appendix D). Notices regarding the availability of the Revised Proposed Plan were published on the BSNC and Native Village of Unalakleet Facebook pages on 22 May 2018 (Appendix D). Copies of the revised Proposed Plan were distributed for public review and comment to several local agencies in Unalakleet, Alaska. The oral comments summarized in Section 3.1.1 were recorded during the 22 May 2018 public meeting held in Unalakleet, Alaska. No written comments were received.

3.1 ORAL AND WRITTEN COMMENTS AND RESPONSES

As described above and in Section 2.3, a public meeting was held in Unalakleet, Alaska, on 22 May 2018. A complete transcript of the public meeting is available in Appendix D. Only substantive questions are included in the discussion below, and they have been summarized and merged/consolidated where pertinent. The responses initially given at the meeting were further researched and have been elaborated upon to provide the most complete and accurate information available.

3.1.1 Public Meeting Comments/Questions

In referring to tests, do you sample at surface or do you go down?

When sampling in the excavation, we sample different zones of the excavation wall, not just at the surface; we sample at different depths. With field screening techniques, samples will be collected from the highest reading. We also look for staining and would be sure to test those areas.

Is the test site known as the White Alice Site? Are you also including the Air Force site?

This is the Air Force site. These sites that I am speaking about are the known spill areas that are on record.

Do you have results for the wells up there? You have four wells up there.

There are three wells at Site SO001 (VMF). Site SS001 (Area C) also has additional three or four wells around it as well. Groundwater was sampled at these wells in 2015 and 2016; all results were below cleanup levels.

It sounds as though you are terminating this project maybe this year? Is that what I was reading?

Well, we will be completed with the Site SO001 (VMF) excavation and we are hoping that all of that will be removed this summer and we will be completed with that. The alternative remedy of leaving contamination at Sites SS001 (Area C) and SS003 (Area A) is up for review and

needs to be adopted by the state and the local community. These sites will get LUCs and we will come out and monitor every year.

I didn't mention before but some of the problems that we were encountering while we were digging in these areas is that there is fractured bedrock. So, every time we dig in these areas, the soil falls into the bedrock and we dig more and it opens up the bedrock and the soil falls into it again. So we keep digging and as we are digging we are breaking open this fractured bedrock and the soil keeps going into it. And we are creating this pathway for the soil to keep going deeper and deeper. It has become very difficult to keep digging. We have dug to 18 feet at one of the sites. This was part of the decision-making process of why a new remedy was proposed is because we keep hitting the bedrock.

Do you know how a person can get cancer from PCBs? What's one of the ways?

They have to ingest it.

It has to go inside the body then. If there is PCBs known and recorded and they get tundra tea and he picks up one of those and puts it in his tea and drinks it. That's what he said he did, he told me. And, this is close to where Area C is located. There is a cabin to the right. It was even pushed back. It was really close to that Area C though. It can spread very easily from what it sounds like. I mean you can stomp on it and move it to another place.

If it is on the surface, it does. PCBs like to be in soil, but are not mobile in water. So, it is pretty stable. Once it finds its place in the soil unless it is being tracked by humans or something like that it is not migrating or spreading like a fuel might migrate. So, it is stable and likes to be in place with the soil.

PCBs adhere to soil particles, so wind dispersion is a transport mechanism although it is more prevalent in sandy soil than the cobbles and rocks present at the North River RRS. If PCBs are detected in water, it is likely due to suspended sediment or particulates in the water column. PCBs are not water-soluble and have not exceeded the cleanup level in two prior sampling events; in 2016, the most recent groundwater sampling event at Area C reported a maximum concentration of 0.024 µg/L (the ADEC cleanup level for PCBs in groundwater is 0.5 µg/L).

Due to recreational land use of the area, and community concern, vegetation samples (root, leaf, and berry) were collected in 2014 and analyzed for PCBs. In 79 percent (88 out of 111 samples from Sites SS001 [Area C] and SS003 [Area A]) of all plant samples PCBs were nondetect. All PCB concentrations were below the soil cleanup level of 1 mg/kg.

3.1.2 Written Comments

No written comments were received during the 30-day public comment period.

3.2 TECHNICAL / LEGAL ISSUES

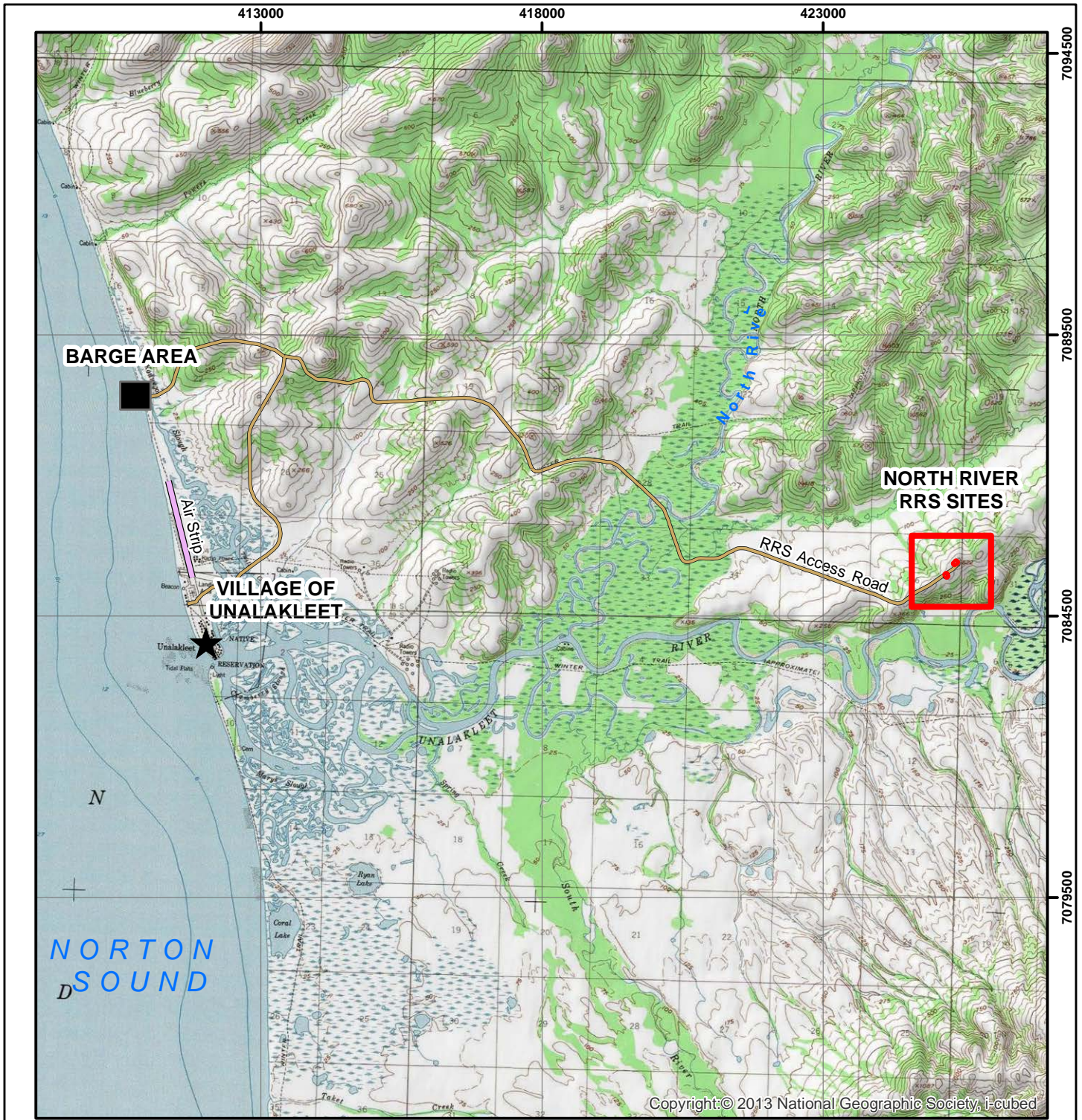
The USAF, in consultation with ADEC, discussed its authority to determine whether a technical impracticability waiver was necessary for leaving PCBs on site above TSCA limits. It was agreed that the Alternative 7 remedy, if properly implemented, would comply with State of Alaska law because residual risks could be adequately controlled through means other than removal (i.e., capped and LUCs), and therefore, no technical impracticability waiver would be needed.

PART 4: REFERENCES

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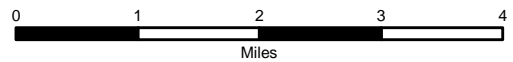
APPENDIX A
Figures



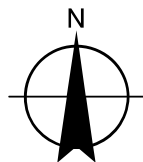
P:\NorthRiver\MXD\2018_ROD\Fig1_2018ROD_Loc\loc.mxd beatvcj



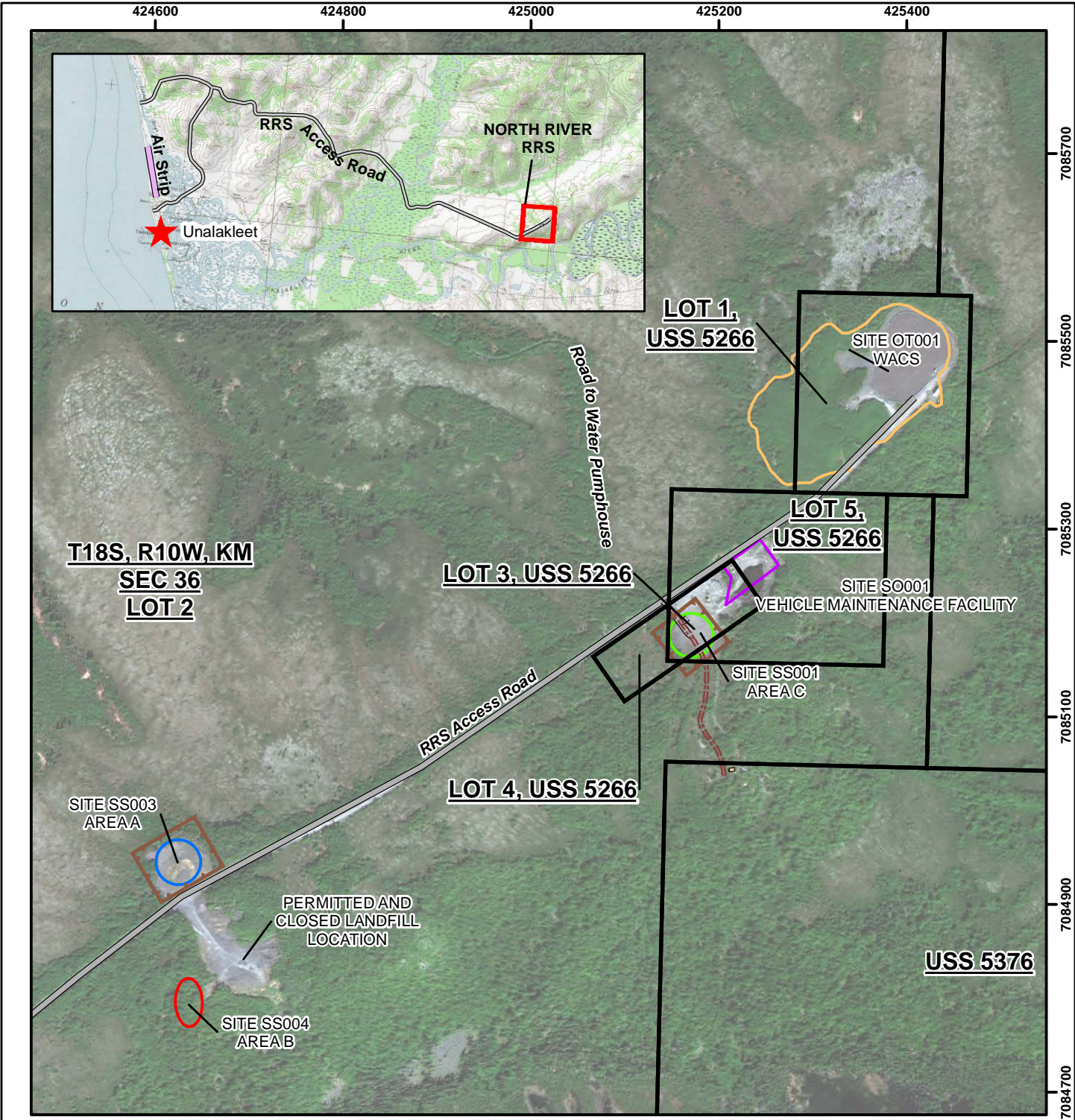
- Project Areas
- Air Strip
- RRS Access Road



WGS 1984 UTM Zone 4N



<p>NORTH RIVER RADIO RELAY STATION (RRS) PROJECT LOCATION AND VICINITY MAP</p> <p>UNALAKLEET, ALASKA</p>	
<p>DATE: 09 APR 2019</p>	<p>FIGURE NO: A-1</p>



T18S, R10W, KM
SEC 36
LOT 2

LOT 3, USS 5266

LOT 1, USS 5266

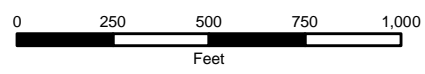
LOT 5, USS 5266

LOT 4, USS 5266

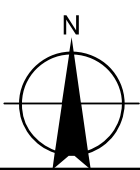
USS 5376

- ATV Trail
- RRS Access Road
- Proposed LUC Boundaries
- Site OT001 (White Alice Communications)
- Site SO001 (Vehicle Maintenance Facility)
- Site SS001 (Area C)
- Site SS003 (Area A)
- Site SS004 (Area B)
- Cabin
- Bureau of Land Management (BLM) - Public Land Survey System Intersected (Map Service)

Note:
 Plat T18S, R10W, KM, Sec 36, Lot 2 subsurface estate is owned by BSNC and surface estate is owned by UNC. Lot 1, 3, 4, and 5, USS 5266 is owned by USAF.



WGS 1984 UTM Zone 4N
 1 inch = 500 feet



NORTH RIVER RADIO RELAY STATION (RRS) SITE MAP	
UNALAKLEET, ALASKA	
DATE: 09 APR 2019	FIGURE NO: A-2

424580

424600

424620

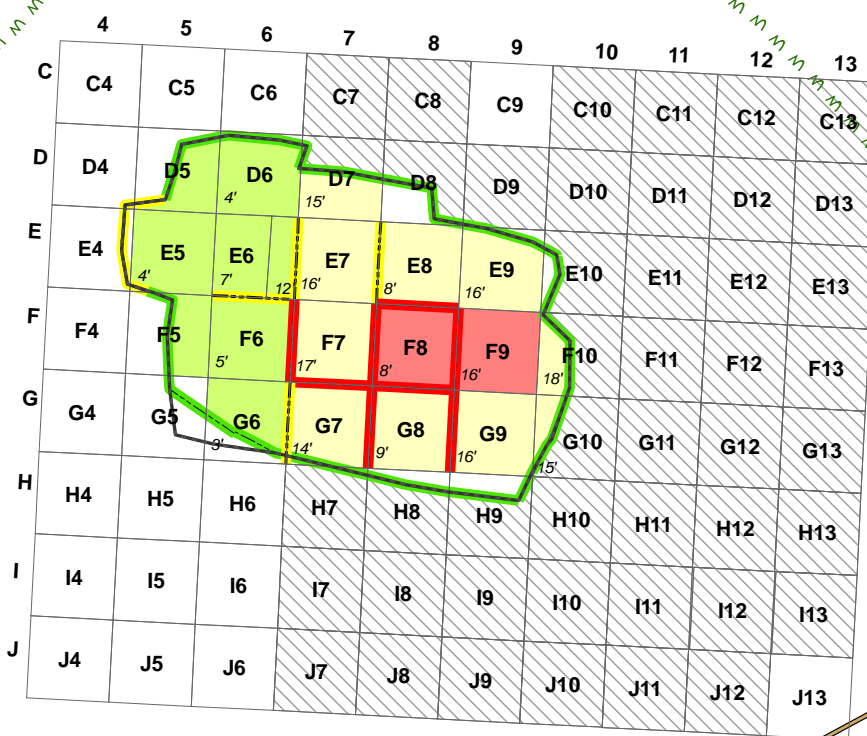
424640

424660

PCB Sample Results Exceeding 1 mg/kg Remaining Onsite			
Sample ID	Location ID	Result (mg/kg) ¹	Depth (ft)
13NR-A-D7F-15 **	A-D7F	4.13	15
13NR-A-E5N-1 †	A-E5N	1.1	5
13NR-A-E5W-0.5 †	A-E5W	12	5
13NR-A-E6S-7 **	A-E6S	4.07	7
13NR-A-E6S-9 **	A-E6S	8.44	9
13NR-A-E7E-10 **	A-E7E	18.52	10
13NR-A-E7F-16 **	A-E7F	1.34	16
12NR-A-E8F-8 *	A-E8F	12.04	8
12NR-A-E9F-16 *	A-E9F	7.38	16
13NR-A-F7E-10 **	A-F7E	235.09	10
13NR-A-F7F-16 **	A-F7F	40.52	16
13NR-A-F7S-10 **	A-F7S	65.65	10
13NR-A-F7W-10 **	A-F7W	72.57	10
13NR-A-F8E-8 **	A-F8E	180.09	8
13NR-A-F8F-8 **	A-F8F	189.64	8
13NR-A-F8N-8 **	A-F8N	81.46	8
13NR-A-F8S-8 **	A-F8S	161.58	8
12NR-A-F9F-16 *	A-F9F	320.3	16
12NR-A-F10F-18 *	A-F10F	5.24	18
12NR-A-G10F-19 *	A-G10F	3.03	19
13NR-A-G7E-9 **	A-G7E	190.20	9
13NR-A-G7F-14 **	A-G7F	38.57	14
13NR-A-G7W-9 **	A-G7W	1.24	9
12NR-A-G8E-7 *	A-G8E	77.76	7
13NR-A-G8F-9 †	A-G8F	1.1	9
12NR-A-G9F-16 *	A-G9F	47.46	16

Notes:
Grids are labeled with excavation depth in the bottom left corner. Depths are based on original ground level and do not account for excavation benching.

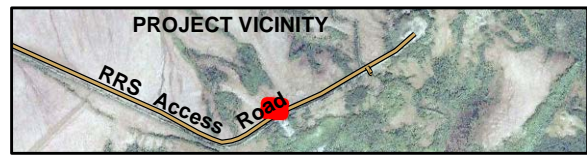
Notes:
¹ All results are Aroclor 1260
 * 2012 Mobile laboratory result
 ** 2013 Mobile laboratory result
 † 2013 ALS laboratory result
 mg/kg = milligrams per kilogram
 Project Action Level is ADEC Method Tw o under 40-inch zone cleanup level (18 AAC 75, 7 November 2017)
 Location ID nomenclature: Area, grid cell, location
 (i.e. A-E6F = Area A, grid E6, floor)
 A - Area A
 E - east wall
 N - north wall
 S - south wall
 W - west wall
 F - floor



STAGING AREA

TEMPORARY ACCESS

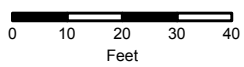
RRS MAIN ROAD TO WACS



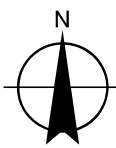
2013 Excavation - PCB SIDEWALL RESULTS
 Red: PCB > 50 mg/kg
 Yellow: PCB > 1 mg/kg and < 50 mg/kg
 Green: PCB < 1 mg/kg

2013 Excavation - PCB FLOOR RESULT
 Light Green: PCB < 1 mg/kg
 Yellow: PCB > 1 mg/kg and < 50 mg/kg
 Red: PCB > 50 mg/kg

White box: Non-Detect for PCB; Field Screened with PID for POL
 Grey box: 2013 Excavation Extent
 Green line: Edge of Clearing
 Brown line: Transportation Route



WGS 1984 UTM Zone 4N
1 inch = 35 feet



NORTH RIVER RRS
2013 SITE SS003 (AREA A)
PCB EXCAVATION
UNALAKLEET, ALASKA

DATE: 09 APR 2019

FIGURE NO: A-5

P:\NorthRiver\MKD\2019_RR\RRS\AreaA_PCBExcavation.mxd beatyjcj

424580

424600

424620

424640

424660

RRO Sample Result Exceeding 10,000 mg/kg Remaining Onsite

Sample ID	Location ID	Result (mg/kg) ¹	Depth (ft)
13NR-A-E5W-0.5	A-E5W	41,000	0.5

Notes:

¹ Sample analyzed by offsite analytical laboratory, ALS.

RRO is the only analyte remaining onsite that exceeds cleanup criteria.

mg/kg = milligrams per kilogram

Project Action Level is ADEC Method Two most stringent under 40-inch zone cleanup level (18 AAC 75, 7 November 2017)

Location ID nomenclature: Area, grid cell, location

(i.e. A-E6F = Area A, grid E6, floor)

A - Area A

E - east wall

N - north wall

S - south wall

W - west wall

2013 SAMPLE

DISCRETE FLOOR RESULT (mg/kg)

▲ RRO < 10,000

● TCB < 45

SIWALL RESULT (mg/kg)

▬ RRO < 10,000; DRO < 10,250; TCB < 45

▬ RRO > 10,000; DRO < 10,250; TCB < 45

▬ Excavated for RRO exceedance; DRO < 10,250; TCB < 45

▬ Sidewall Not Sampled for POL/TCB

▬ PID < 20 ppm

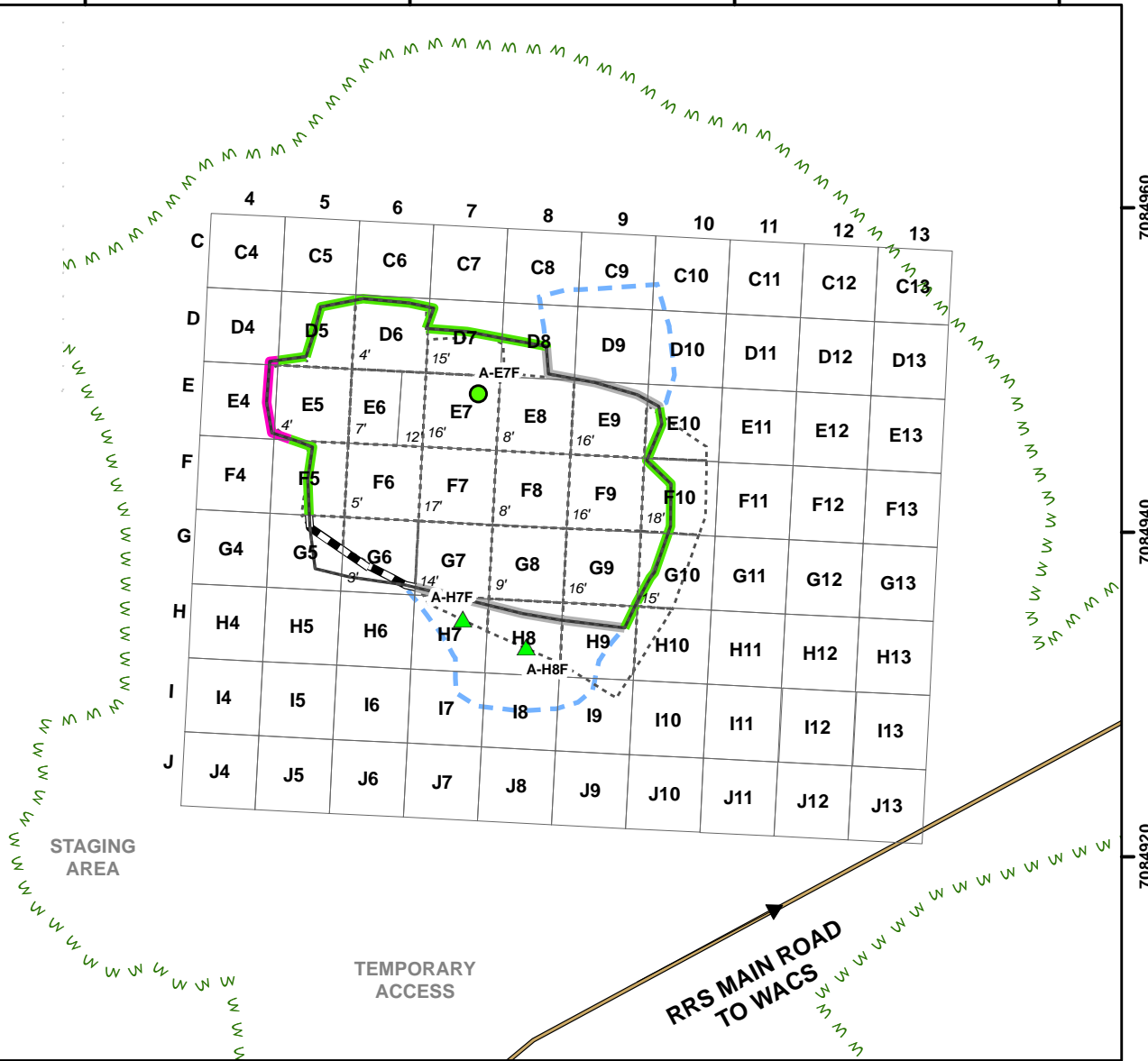
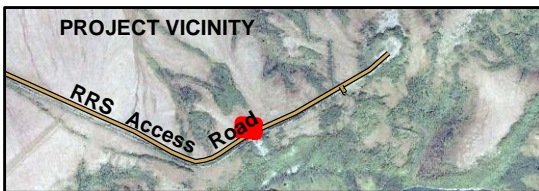
SITE FEATURES

▬ 2012 Excavation Extent

▬ 2013 Excavation Extent

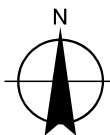
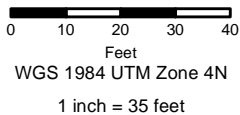
⌞ Edge of Clearing

▬ Transportation Route



P:\NorthRiver\NDR\2019 ROD\Fig6_2019 ROD_AreaA_TCB_POL_Excavation.mxd bealyj

Notes:
ADEC Method 2, under 40 inch zone.
Grids are labeled with excavation depth in the bottom left corner. Depths are based on original ground level and do not account for excavation benching.



NORTH RIVER RRS
2013 SITE SS003 (AREA A)
TCB/POL EXCAVATION
UNALAKLEET, ALASKA

DATE:
09 APR 2019

FIGURE NO:
A-6

APPENDIX B
Applicable or Relevant and Appropriate Requirements

**APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
SITES SS001 (AREA C) AND SS003 (AREA A), NORTH RIVER RRS, ALASKA**

This appendix reviews potential applicable or relevant and appropriate requirements (ARARs) for Sites SS001 (Area C) and SS003 (Area A) at the North River Radio Relay Station (RRS), Alaska. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), three types of ARARs are considered:

- Chemical-specific
- Location-specific
- Action-specific

Each ARAR has been assessed based on its applicability to the site, and categorized as applicable or relevant and appropriate. In addition, U.S. Environmental Protection Agency guidance documents identify items to be considered (TBCs). TBCs are not considered legally enforceable but are evaluated along with ARARs as part of the risk assessment to set protective cleanup level targets.

Table B-1 presents chemical-specific ARARs. These standards have been used to select cleanup levels appropriate to the site. Table B-2 presents location-specific ARARs and Table B-3 presents action-specific ARARs.

CHEMICAL-SPECIFIC ARARS

Chemical-specific ARARs provide numerical cleanup values that establish acceptable contaminant concentrations that may remain following a remedial response (Table B-1). The Alaska Administrative Code (AAC), Title 18, Chapter 75, Article 3, *Oil and Hazardous Substances Pollution Control Regulations – Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*, Method Two soil cleanup criteria [18 AAC 75.341(c) and (d)] – Tables B1 and B2) establish the applicable chemical-specific soil cleanup values (ADEC 2017). The regulation tabulates soil cleanup levels for polychlorinated biphenyls (PCBs), 1,2,4-trichlorobenzene (TCB), and residual-range organics (RRO). The standards applicable at the North River RRS are for sites located in a non-arctic zone with annual precipitation of less than or equal to 40 inches.

Human exposure can occur directly (by ingestion or inhalation) or indirectly (via migration from contaminated soil to groundwater). Different cleanup criteria are presented for each of three exposure routes: direct contact or ingestion, inhalation, and migration to groundwater. Groundwater is known to exist at Site SS001 (Area C); therefore, migration to groundwater may act as a transport mechanism for site contaminants. The migration to groundwater cleanup levels have been used at Site SS001 (Area C) for cleanup; however, groundwater has been sampled at the site and no contaminants have been found exceeding the ADEC Table C groundwater cleanup levels. At Site SS003 (Area A), the more stringent of the standards for the human health (PCBs) or ingestion and inhalation (RRO) exposure pathways are applicable for cleanup.

**Table B-1
Chemical-Specific Applicable or Relevant and Appropriate Requirements**

Regulation	Description	A or RA	Rationale
RCRA of 1976 as amended by the hazardous and solid waste amendments of 1984, Subtitles C and D, other than corrective action requirements (U.S. Code, Title 42, Section 6901 [42 USC 6901])	Establishes protections and protocols for the creation and recycling of waste including cradle to grave manifesting.	A	Excavated materials designated as waste (e.g., contaminated soils) are subject to the requirements of RCRA.
Toxic Substances Control Act (40 CFR 761)	Regulates storage and disposal requirements, including onsite storage limitations for PCB wastes. Specifies notification and recordkeeping requirements for PCB disposal.	A	Concentrations of PCBs greater than 50 mg/kg are present at the site.
Alaska Oil and Other Hazardous Substance Pollution Control regulations (18 AAC 75)	Governs discharge of oil and hazardous substances and state cleanup requirements.	A	The site is known to be affected by a release of PCBs, 1,2,4-TCB, and POL constituents. Alternative soil cleanup levels may be applied.

Notes:

A = Applicable

RA = Relevant and Appropriate

For additional definitions, refer to the Acronyms and Abbreviations section in the ROD amendment.

LOCATION-SPECIFIC ARARS

Location-specific ARARs are restrictions developed on the conduct of activities at specific locations (Table B-2). These ARARs may restrict or preclude certain remedial actions, or they may apply only to certain portions of an installation. Location-specific factors that may require the identification of ARARs include sensitive habitats, floodplains, wetlands, endangered species habitat, fault locations, and historic or archeological resources.

**Table B-2
Location-Specific Applicable or Relevant and Appropriate Requirements**

Regulation	Description	A or RA	Rationale
Bald and Golden Eagle Protection Act (16 USC 668-668c)	Protects bald and golden eagles/habitat in the area and provides for permitted activities.	A	Bald or golden eagles have not been identified in the project area, but the possibility for their presence exists.
Migratory Bird Treaty Act (37 Stat. 878, Ch. 45; 16 USC 703-712 (§709 has been omitted); 50 CFR Parts 10, 20, 21)	Prohibits taking or possession of any migratory bird listed, including parts, nests, or products.	A	Considered for possible impacts to birds at North River RRS.
Wetlands/Waters of the U.S. Protection Regulations (Navigable Water Pollution, Prevention, and Control Act; Clean Water Act; 40 CFR 10, 401, 402, 404; 18 AAC 70 – Alaska Water Quality Standards)	Regulates activities in waters of the United States.	RA	Considered for impacts to wetlands in sites which are adjacent to or inclusive of wetlands.
National Historic Preservation Act (16 USC 470 et seq.; 36 CFR 65)	Provides for the protection of cultural sites; requires coordination with State Historic Preservation Officer and National Park Service.	A	The site was developed in the 1950s. Remaining artifacts may be of historical value.

Notes:

A = Applicable

RA = Relevant and Appropriate

For additional definitions, refer to the Acronyms and Abbreviations section in the ROD amendment.

ACTION-SPECIFIC ARARS

Action-specific ARARs are requirements that apply to specific investigative or remedial actions (Table B-3). Action-specific requirements do not in themselves determine remedial alternatives; they indicate how a selected alternative must be achieved. Action-specific ARARs are refined during remedial design as specific information becomes available.

**Table B-3
Action-Specific Applicable or Relevant and Appropriate Requirements**

Regulation	Description	A or RA	Rationale
Alaska Spill Reporting and Notification (18 AAC 75)	<p>Specifies sampling and analysis of soil, surface water, and groundwater resulting from the discharge of oil or a hazardous substance.</p> <p>Specifies soil, surface water, and groundwater cleanup levels resulting from the discharge of oil or a hazardous substance.</p> <p>Specifies institutional controls for residual soil, surface water, and groundwater left in excess of cleanup levels resulting from a discharge of oil or a hazardous substance.</p>	A	<p>18 AAC 75.355 lists requirements for sampling and analysis.</p> <p>18 AAC 75.360 lists requirements for cleanup work plans.</p> <p>18 AAC 75.375 lists requirements for institutional controls.</p> <p>18 AAC 75.380 lists requirements for reporting.</p>
Alaska Air Quality Control Regulations (18 AAC 50, 15) and CAA (40 CFR 230, 33 CFR 320-330)	Regulations governing identification, prevention, abatement, and control of air pollution	A	Cleanup methods will require the use of heavy machinery and trucks for transporting soil.
U.S. Department of Transportation Regulations (49 CFR 170-199; 40 CFR 263)	Governs the packaging, marking, labeling, recordkeeping, transportation, and transporters of hazardous materials.	A	Monitoring samples are transported from the project area.
Alaska Hazardous Waste Regulations (18 AAC 62)			
Toxic Substances Control Act (40 CFR 761)	Regulates storage and disposal requirements, including onsite storage limitations for PCB wastes. Specifies notification and recordkeeping requirements for PCB disposal.	A	PCBs greater than 50 mg/kg are present at the site.
Solid Waste Management Regulations (40 CFR 257, 40 CFR 264, 49 CFR 265, 40 CFR 266, 40 CFR 268, 40 CFR 270, 40 CFR 261, 40 CFR 262)	Governs the management of solid wastes generated during remedial activity. Specifies restrictions on land disposal of specific types of hazardous waste based on levels achievable by current technology.	A	Excavated soils and monitoring samples may be generated from the project area. Remedial alternatives may create contaminated media to be removed from the site.
Alaska Solid Waste Management Regulations (18 AAC 60)			

Table B-3 (Continued)
Action-Specific Applicable or Relevant and Appropriate Requirements

Regulation	Description	A or RA	Rationale
Uniform Environmental Covenants Act (AS 46.04.300-390)	<p>Requires an environmental covenant if the ADEC makes a remedial decision as part of an environmental response project and that environmental response project results in residual contamination remaining in the environment in concentrations that are safe for some, but not all, uses; or an engineered feature or structure that requires monitoring, maintenance, or operation, or that will not function as intended if disturbed.</p> <p>Ensures that LUCs are preserved and enforceable over the long-term against successive owners by applying traditional real estate law.</p> <p>Replaces the use of deed notices as ICs.</p>	A	Residual contamination will remain on site. LUCs are proposed for Site SS003 (Area A).
Uniform Environmental Covenants Act (AS 46.04.340)	Requires the owner of real property to record a notice of activity and use limitation into the appropriate public land records where a legal impediment prevents creation of an environmental covenant, such as on U.S. Department of Defense lands.	A	Residual contamination will remain on site. LUCs are proposed for Site SS001 (Area C).

Notes:

A = Applicable

RA = Relevant and Appropriate

For additional definitions, refer to the Acronyms and Abbreviations section in the ROD amendment.

APPENDIX C
Conceptual Site Models

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name:

File Number:

Completed by:

Introduction

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

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

1. General Information:

Sources (*check potential sources at the site*)

- | | |
|--|--|
| <input type="checkbox"/> USTs | <input checked="" type="checkbox"/> Vehicles |
| <input type="checkbox"/> ASTs | <input type="checkbox"/> Landfills |
| <input type="checkbox"/> Dispensers/fuel loading racks | <input checked="" type="checkbox"/> Transformers |
| <input checked="" type="checkbox"/> Drums | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|--|--|
| <input checked="" type="checkbox"/> Spills | <input checked="" type="checkbox"/> Direct discharge |
| <input checked="" type="checkbox"/> Leaks | <input type="checkbox"/> Burning |
| | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|---|--|
| <input type="checkbox"/> Surface soil (0-2 feet bgs*) | <input checked="" type="checkbox"/> Groundwater |
| <input checked="" type="checkbox"/> Subsurface soil (>2 feet bgs) | <input type="checkbox"/> Surface water |
| <input checked="" type="checkbox"/> Air | <input checked="" type="checkbox"/> Biota |
| <input type="checkbox"/> Sediment | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|---|---|
| <input checked="" type="checkbox"/> Residents (adult or child) | <input checked="" type="checkbox"/> Site visitor |
| <input checked="" type="checkbox"/> Commercial or industrial worker | <input checked="" type="checkbox"/> Trespasser |
| <input checked="" type="checkbox"/> Construction worker | <input checked="" type="checkbox"/> Recreational user |
| <input checked="" type="checkbox"/> Subsistence harvester (i.e. gathers wild foods) | <input type="checkbox"/> Farmer |
| <input checked="" type="checkbox"/> Subsistence consumer (i.e. eats wild foods) | <input type="checkbox"/> Other: <input type="text"/> |

* bgs - below ground surface

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

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.)

If the box is checked, label this pathway complete:

Complete

Comments:

PCBs are present from 10-13 feet below the original ground surface and 1,2,4-trichlorobenzene (TCB) is present at 7-8 feet below the original ground surface. The contaminants have been capped with 10-13 feet of fill material.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)?

If both boxes are checked, label this pathway complete:

Complete

Comments:

PCBs are present from 10-13 feet below the original ground surface. The contaminants have been capped with 10-13 feet of fill material.

b) Ingestion -

1. Ingestion of Groundwater

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

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

If both boxes are checked, label this pathway complete:

Complete

Comments:

Groundwater is present at SS001 (Area C) and was sampled in 2015 and 2016. Samples analyzed for PCBs and 1,2,4-TCB had results that were either nondetect or less than 1/10 the ADEC cleanup levels. This pathway is considered insignificant.

2. Ingestion of Surface Water

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

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

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

3. Ingestion of Wild and Farmed Foods

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

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)?

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.)

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

Complete

Comments:

Vegetation samples (root, leaf, and berry) were collected in 2014 and analyzed for PCBs. 79% (88 out of 111 samples from Sites SS001 and SS003) of all plant samples were nondetect for PCBs. All PCB concentrations were below the soil cleanup level of 1 mg/kg. The highest PCB result was 0.44 mg/kg.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Are the contaminants in soil volatile (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Complete

Comments:

PCBs are present in soil at 10-13 feet below the original ground surface and 1,2,4-TCB is present in the soil at 7-8 feet below the original ground surface. The contaminants have been capped with 10-13 feet of fill material.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminated soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures)

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

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

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

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

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

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

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

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

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM₁₀). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

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

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

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

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

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

Comments:

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

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: SS001 (Area C) Drum Storage Yard and PCB Trail
North River RRS

Completed By: Jacobs Engineering
 Date Completed: 24 May 2018

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

(1) Media	(2) Transport Mechanisms
<input type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input type="checkbox"/> Migration to subsurface <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Runoff or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Ground-water	<input type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Surface Water	<input type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Sedimentation <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Sediment	<input type="checkbox"/> Direct release to sediment <i>check sediment</i> <input type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

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

Exposure Media

soil

groundwater

air

surface water

sediment

biota

(4)
Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.

Exposure Pathway/Route	Residents (adults or children)	Commercial or Industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
<input checked="" type="checkbox"/> Incidental Soil Ingestion	F	F	C/F	F	C/F	C/F	
<input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil	F	F	C/F	F	C/F	C/F	
<input type="checkbox"/> Inhalation of Fugitive Dust							
<input checked="" type="checkbox"/> Ingestion of Groundwater							
<input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater							
<input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water							
<input checked="" type="checkbox"/> Inhalation of Outdoor Air	F	F	C/F	F	C/F	C/F	
<input type="checkbox"/> Inhalation of Indoor Air							
<input type="checkbox"/> Inhalation of Fugitive Dust							
<input type="checkbox"/> Ingestion of Surface Water							
<input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water							
<input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water							
<input type="checkbox"/> Direct Contact with Sediment							
<input checked="" type="checkbox"/> Ingestion of Wild or Farmed Foods							

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

Current & Future Receptors

Appendix B: Ecoscoping Form

Site Name: SS001 (Area C) Drum Storage Yard and PCB Trail, North River RRS

Completed by: Jacobs Engineering

Date: 12/20/2017

Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? *Check the appropriate box.*

- Yes – *Describe observations below and evaluate all of the remaining sections without taking any off-ramps.*
- No – *Go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

Terrestrial Exposure Routes

- Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water.
- Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or waterbody).
- Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface).
- Particulates deposited on plants directly or from rain splash.
- Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom.
- Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities.
- Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the *Policy Guidance on Developing Conceptual Site Models*).

Other site-specific exposure pathways.

Aquatic Exposure Routes

- Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow.
- Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at “seep” locations along banks or directly to surface water.
- Deposition into sediments from upwelling of contaminated groundwater.
- Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.
- Aquatic plants rooted in contaminated sediments.
- Bioaccumulatives (see the *Policy Guidance on Developing Conceptual Site Models*) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms.
- Other site-specific exposure pathways.

If any of the above boxes are checked, go on to the next section. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Although PCBs are bioaccumulatives, they are present in subsurface soil/fractured bedrock at 10-13 feet below the original ground surface. The contaminants have been capped with 10-13 feet of fill material. Vegetation samples (root, leaf, and berry) were collected in 2014 and analyzed for PCBs. 79% (88 out of 111 samples from Sites SS001 and SS003) of all plant samples were nondetect for PCBs. All PCB concentrations were below the soil cleanup level of 1 mg/kg. The highest PCB result was 0.44 mg/kg.

3. Habitat

Check all that may apply. See Ecoscoping Guidance for additional help.

- Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity).
- Critical habitat or anadromous stream in an area that could be affected by the contamination.
- Habitat that is important to the region that could be affected by the contamination.
- Contamination is in a park, preserve, or wildlife refuge.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

- Endangered or threatened species are present.
- The aquatic environment is or could be affected.
- Non-petroleum contaminants may be present, or the total area of petroleum contaminated surface soil exceeds one-half acre.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

5. Toxicity Determination

Check all that apply.

- Bioaccumulative chemicals are present (see *Policy Guidance on Developing Conceptual Site Models*).
- Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php).

If either box is checked, complete a detailed Ecological Conceptual Site Model (see DEC's Policy Guidance on Developing Conceptual Site Models) and submit it with the form to your DEC project manager.

If neither box is checked, check the box below and submit this form to your DEC project manager.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Source: This form was excerpted from the State of Alaska Department of Environmental Conservation division of Spill Prevention and Response Contaminated Sites Program *Ecoscoping Guidance A Tool of Developing an Ecological Conceptual Site Model* March 2014.

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name:

File Number:

Completed by:

Introduction

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

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

1. General Information:

Sources (*check potential sources at the site*)

- | | |
|--|--|
| <input type="checkbox"/> USTs | <input type="checkbox"/> Vehicles |
| <input type="checkbox"/> ASTs | <input type="checkbox"/> Landfills |
| <input type="checkbox"/> Dispensers/fuel loading racks | <input type="checkbox"/> Transformers |
| <input checked="" type="checkbox"/> Drums | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|--|--|
| <input checked="" type="checkbox"/> Spills | <input checked="" type="checkbox"/> Direct discharge |
| <input checked="" type="checkbox"/> Leaks | <input type="checkbox"/> Burning |
| | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|---|--|
| <input type="checkbox"/> Surface soil (0-2 feet bgs*) | <input type="checkbox"/> Groundwater |
| <input checked="" type="checkbox"/> Subsurface soil (>2 feet bgs) | <input type="checkbox"/> Surface water |
| <input checked="" type="checkbox"/> Air | <input checked="" type="checkbox"/> Biota |
| <input type="checkbox"/> Sediment | <input type="checkbox"/> Other: <input type="text"/> |

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

- | | |
|---|---|
| <input checked="" type="checkbox"/> Residents (adult or child) | <input checked="" type="checkbox"/> Site visitor |
| <input checked="" type="checkbox"/> Commercial or industrial worker | <input checked="" type="checkbox"/> Trespasser |
| <input checked="" type="checkbox"/> Construction worker | <input checked="" type="checkbox"/> Recreational user |
| <input checked="" type="checkbox"/> Subsistence harvester (i.e. gathers wild foods) | <input type="checkbox"/> Farmer |
| <input checked="" type="checkbox"/> Subsistence consumer (i.e. eats wild foods) | <input type="checkbox"/> Other: <input type="text"/> |

* bgs - below ground surface

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

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.)

If the box is checked, label this pathway complete:

Complete

Comments:

PCBs are present from 5-19 feet below the original ground surface and RRO is present at 16 feet below the original ground surface. The contaminants have been capped with 8-16 feet of fill material.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)?

If both boxes are checked, label this pathway complete:

Complete

Comments:

PCBs are present from 5-19 feet below the original ground surface. The contaminants have been capped with 8-16 feet of fill material.

b) Ingestion -

1. Ingestion of Groundwater

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

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

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

Groundwater is not present at SS003 (Area A).

2. Ingestion of Surface Water

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

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

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

3. Ingestion of Wild and Farmed Foods

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

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)?

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.)

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

Complete

Comments:

Vegetation samples (root, leaf, and berry) were collected in 2014 and analyzed for PCBs. 79% (88 out of 111 samples from Sites SS001 and SS003) of all plant samples were nondetect for PCBs. All PCB concentrations were below the soil cleanup level of 1 mg/kg. The highest PCB result was 0.44 mg/kg.

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.)

Are the contaminants in soil volatile (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Complete

Comments:

PCBs are present from 5-19 feet below the original ground surface. The contaminants have been capped with 8-16 feet of fill material.

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminated soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures)

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)?

If both boxes are checked, label this pathway complete:

Incomplete

Comments:

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

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are deemed protective of this pathway because dermal absorption is incorporated into the groundwater exposure equation for residential uses.

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

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

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

DEC groundwater cleanup levels in 18 AAC 75, Table C are protective of this pathway because the inhalation of vapors during normal household activities is incorporated into the groundwater exposure equation.

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

Comments:

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM₁₀). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.

DEC human health soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because the inhalation of particulates is incorporated into the soil exposure equation.

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

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

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

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

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

Comments:

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

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: SS003 (Area A) Drums and Stained Soil
North River RRS

Completed By: Jacobs Engineering
 Date Completed: 24 May 2018

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

(1) Check the media that could be directly affected by the release.	(2) For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.
Media	Transport Mechanisms
<input type="checkbox"/> Surface Soil (0-2 ft bgs)	<input checked="" type="checkbox"/> Direct release to surface soil <i>check soil</i> <input type="checkbox"/> Migration to subsurface <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Runoff or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input checked="" type="checkbox"/> Subsurface Soil (2-15 ft bgs)	<input checked="" type="checkbox"/> Direct release to subsurface soil <i>check soil</i> <input type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input checked="" type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Ground-water	<input type="checkbox"/> Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Surface Water	<input type="checkbox"/> Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Sedimentation <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____
<input type="checkbox"/> Sediment	<input type="checkbox"/> Direct release to sediment <i>check sediment</i> <input type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list): _____

(3) Check all exposure media identified in (2).	(4) Check all pathways that could be complete. The pathways identified in this column must agree with Sections 2 and 3 of the Human Health CSM Scoping Form.	(5) Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.																								
Exposure Media	Exposure Pathway/Route	Current & Future Receptors																								
		Residents (adults or children) Commercial or Industrial workers Site visitors, trespassers, or recreational users Construction workers Farmers or subsistence harvesters Subsistence consumers Other																								
<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil <input type="checkbox"/> Inhalation of Fugitive Dust	<table border="1"> <tr> <td>F</td><td>F</td><td>C/F</td><td>F</td><td>C/F</td><td>C/F</td><td></td><td></td> </tr> <tr> <td>F</td><td>F</td><td>C/F</td><td>F</td><td>C/F</td><td>C/F</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	F	F	C/F	F	C/F	C/F			F	F	C/F	F	C/F	C/F										
F	F	C/F	F	C/F	C/F																					
F	F	C/F	F	C/F	C/F																					
<input type="checkbox"/> groundwater	<input type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																								
<input checked="" type="checkbox"/> air	<input checked="" type="checkbox"/> Inhalation of Outdoor Air <input type="checkbox"/> Inhalation of Indoor Air <input type="checkbox"/> Inhalation of Fugitive Dust	<table border="1"> <tr> <td>F</td><td>F</td><td>C/F</td><td>F</td><td>C/F</td><td>C/F</td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>	F	F	C/F	F	C/F	C/F																		
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<input type="checkbox"/> surface water	<input type="checkbox"/> Ingestion of Surface Water <input type="checkbox"/> Dermal Absorption of Contaminants in Surface Water <input type="checkbox"/> Inhalation of Volatile Compounds in Tap Water	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																								
<input type="checkbox"/> sediment	<input type="checkbox"/> Direct Contact with Sediment	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																								
<input checked="" type="checkbox"/> biota	<input type="checkbox"/> Ingestion of Wild or Farmed Foods	<table border="1"> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </table>																								

Appendix E: Ecoscoping Form

Site Name: SS003 (Area A) Drums and Stained Soil, North River RRS

Completed by: Jacobs Engineering

Date: 12/20/2017

Instructions: Follow the italicized instructions in each section below. "Off-ramps," where the evaluation ends before completing all of the sections, can be taken when indicated by the instructions. Comment boxes should be used to help support your answers.

1. Direct Visual Impacts and Acute Toxicity

Are direct impacts that may result from the site contaminants evident, or is acute toxicity from high contaminant concentrations suspected? *Check the appropriate box.*

- Yes – *Describe observations below and evaluate all of the remaining sections without taking any off-ramps.*
- No – *Go to next section.*

Comments:

2. Terrestrial and Aquatic Exposure Routes

Check each terrestrial and aquatic route that could occur at the site.

Terrestrial Exposure Routes

- Exposure to water-borne contaminants as a result of wading or swimming in contaminated waters or ingesting contaminated water.
- Contaminant uptake in terrestrial plants whose roots are in contact with contaminated surface water.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at upland "seep" locations (not associated with a wetland or waterbody).
- Contaminant uptake by terrestrial plants whose roots are in contact with soil moisture or groundwater present within the root zone (generally no more than 4 feet below ground surface).
- Particulates deposited on plants directly or from rain splash.
- Incidental ingestion and/or exposure while animals grub for food, burrow (up to 2 feet for small animals or 6 feet for large animals), or groom.
- Inhalation of fugitive dust or vapors disturbed by foraging or burrowing activities.
- Bioaccumulatives (other than PAHs, which bioaccumulate more readily in aquatic environments) taken up by soil invertebrates, which are in turn eaten by higher food chain organisms (see the *Policy Guidance on Developing Conceptual Site Models*).

Other site-specific exposure pathways.

Aquatic Exposure Routes

- Contaminated surface runoff migration to water bodies through swales, drainage ditches, or overland flow.
- Aquatic receptors exposed through osmotic exchange, respiration, or ventilation of surface waters.
- Contaminant migration via saturated or unsaturated groundwater zones and discharge at “seep” locations along banks or directly to surface water.
- Deposition into sediments from upwelling of contaminated groundwater.
- Aquatic receptors may be exposed directly to contaminated sediments through foraging or burrowing, or indirectly exposed due to osmotic exchange, respiration, or ventilation of sediment pore water.
- Aquatic plants rooted in contaminated sediments.
- Bioaccumulatives (see the *Policy Guidance on Developing Conceptual Site Models*) taken up by sediment invertebrates, which are in turn eaten by higher food chain organisms.
- Other site-specific exposure pathways.

If any of the above boxes are checked, go on to the next section. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Although PCBs are bioaccumulatives, they are present in subsurface soil/fractured bedrock at 5-19 feet below the original ground surface. The contaminants have been capped with 8-16 feet of fill material. Vegetation samples (root, leaf, and berry) were collected in 2014 and analyzed for PCBs. 79% (88 out of 111 samples from Sites SS001 and SS003) of all plant samples were nondetect for PCBs. All PCB concentrations were below the soil cleanup level of 1 mg/kg. The highest PCB result was 0.44 mg/kg.

3. Habitat

Check all that may apply. See Ecoscoping Guidance for additional help.

- Habitat that could be affected by the contamination supports valued species (i.e., species that are regulated, used for subsistence, have ceremonial importance, have commercial value, or provide recreational opportunity).
- Critical habitat or anadromous stream in an area that could be affected by the contamination.
- Habitat that is important to the region that could be affected by the contamination.
- Contamination is in a park, preserve, or wildlife refuge.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

4. Contaminant Quantity

Check all that may apply. See Ecoscoping Guidance for additional help.

- Endangered or threatened species are present.
- The aquatic environment is or could be affected.
- Non-petroleum contaminants may be present, or the total area of petroleum contaminated surface soil exceeds one-half acre.

If any of the above boxes are checked, go on to the next scoping factor. If none are checked, end the evaluation and check the box below.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

5. Toxicity Determination

Check all that apply.

- Bioaccumulative chemicals are present (see *Policy Guidance on Developing Conceptual Site Models*).
- Contaminants exceed benchmark levels (see the Ecological Benchmark Tool in RAIS, available at: http://rais.ornl.gov/tools/eco_search.php).

If either box is checked, complete a detailed Ecological Conceptual Site Model (see DEC's Policy Guidance on Developing Conceptual Site Models) and submit it with the form to your DEC project manager.

If neither box is checked, check the box below and submit this form to your DEC project manager.

- OFF-RAMP: NO FURTHER ECOLOGICAL EVALUATION NECESSARY

Comments:

Source: This form was excerpted from the State of Alaska Department of Environmental Conservation division of Spill Prevention and Response Contaminated Sites Program *Ecoscoping Guidance A Tool of Developing an Ecological Conceptual Site Model* March 2014.

APPENDIX D
Community Participation

North River Radio Relay Station

May 22, 2018



Robert Johnston - AFCEC

*Melinda Brunner- Alaska Department of
Environmental Conservation*

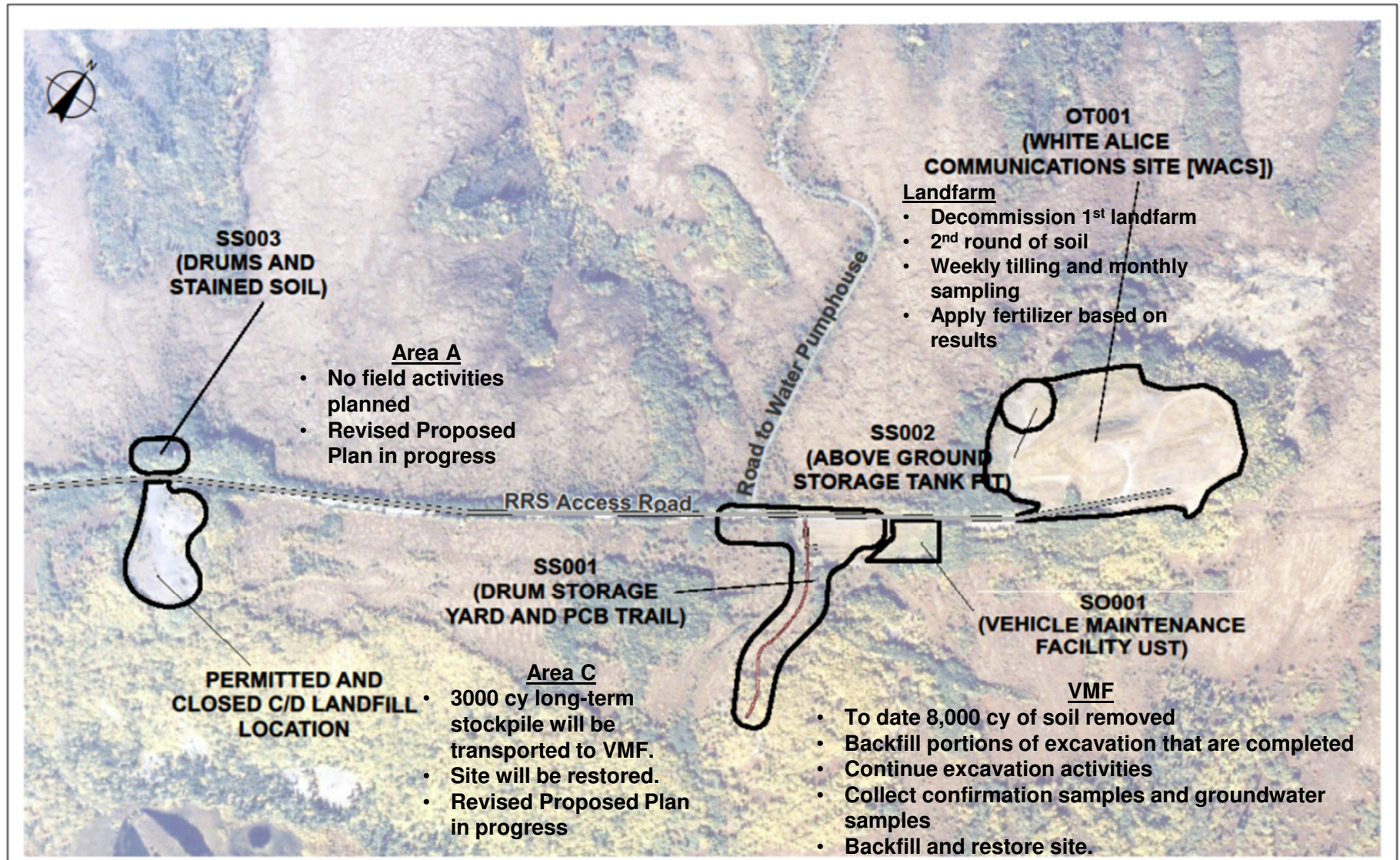
*Dan Graham & Claire Costello
Eagle Eye Electric (Eagle Eye)*

Angela DiBerardino

Jacobs Engineering Group Inc. (Jacobs)



Overview of Site Features



- Remediation Progress to Date - SO001 (VMF)
- 2018 Planned Activities
- Revised Proposed Plan - SS001 (Area C) and SS003 (Area A)



Remediation Progress to Date

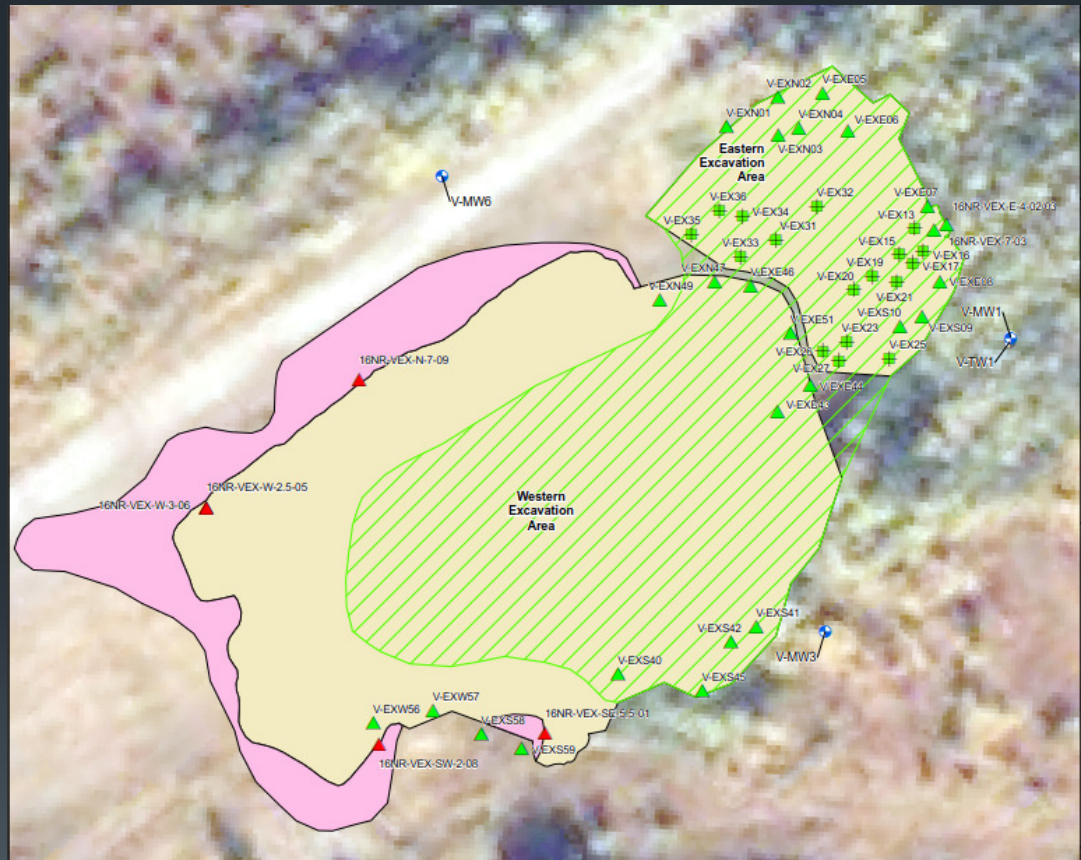
SO001 (VMF)

- Implementing remedy selected through the CERCLA/State process.
- Approximately 8,000 cy of fuel-contaminated soil has been excavated from the VMF to date.
- A long-term stockpile was constructed in 2016 at Area C for remaining soil after the WACS landfarm had reached capacity.
- Test pits were excavated in 2017 to determine the extent of remaining contamination.
- Samples were collected at the landfarm confirming soil is below the cleanup level and ready to be used as backfill.



Planned 2018 VMF Backfill & Excavation Activities

- Backfill sections of the excavation that are confirmed below project cleanup levels using treated soil from the landfarm.
- Excavate remaining 800 to 1,800 cy of fuel contaminated soil.
- Road may need to be re-routed.
- Soil will be screened to remove large rocks
- Transport excavated soil to the landfarm for treatment.
- Collect field screening and confirmation samples from the excavation boundary.



Planned Activities for Area C Long-Term Stockpile

- Approximately 3,000 cy of VMF excavated soil stored in the Area C long-term stockpile will be transported to the WACS landfarm for treatment.
- Post Construction samples will be collected from beneath the stockpile to ensure there is no surface contamination.
- Seed the surface at Area C once activities are completed.



2018 Landfarm Activities

- Transport existing soil from the landfarm to the VMF for backfill.
- Prepare landfarm to receive second round of POL contaminated soil.
- Begin second round of landfarm treatment to address soils currently stockpiled and those excavated in 2018.
- Perform weekly tilling and monthly nutrient sampling until the ground freezes and add nutrients as necessary.



Groundwater Sampling

- All three monitoring wells at the VMF will be sampled at the end of excavation activities to ensure contaminants are not migrating to groundwater.
- VMF: DRO only
 - MW-1
 - MW-3
 - MW-6



Post-Construction Sampling Activities

- Soil samples will be collected from 5 locations along the site access road between Area C and WACS to verify contamination was not spread during 2018 field activities.
- Samples will be analyzed for contaminants of concern.



Look Ahead

- Monitor groundwater at the VMF to ensure that contaminants did not migrate to groundwater.
- Continue treatment of soil at the landfarm and conduct periodic nutrient sampling and tilling until contaminant concentrations fall below project cleanup levels.
- Once levels are below project cleanup levels transport soil to the VMF





Remedy for Site Remediation at SS001 (Area C) and SS003 (Area A)

Record of Decision, 2010

- The selected remedy stated all soil with PCB and fuel concentrations above cleanup level would be excavated and shipped off the installation.

Revised Proposed Plan, 2018

- The new remedy states soil contaminated with PCBs and fuels can remain onsite in the fractured bedrock, covered with permeable liner and minimum of 8 feet of clean fill to prevent exposure and migration.

History of Site Remediation at SS001 (Area C)


- 2010: Record of decision signed
- 2012/2013: Excavated 1,252 cy of PCB-contaminated soil and reached horizontal extents of PCB contamination.
- Excavation encountered groundwater at a depth of 10-12 feet below ground surface.
- Identified soil with solvent contamination (1,2,4-Trichlorobenzene [TCB]).
- 2014: Vegetation sampling for PCB analysis
- 2015: Lined and backfilled excavation. Installed and sampled groundwater monitoring wells.
- 2016: long-term stockpile was constructed. Sampled monitoring wells.



History of Site Remediation at SS003 (Area A)

- 2012/2013 field seasons: approximately 2,500 cy of PCB- and fuel-contaminated soil were excavated and packaged.
- Excavation continued into fractured bedrock up to 18 feet below ground surface. PCB contamination (TSCA and non-TSCA) still present.
- 2014: Vegetation sampling for PCB analysis
- 2015: Advanced one soil boring downgradient of the excavation. Results were less than ADEC criteria
- 2015 field season: lined, backfilled, and restored site.





Acknowledgements
Thank you BSNC
and WCC

Questions or Comments?

Robert Johnston

USAF Project Manager

1-800-222-4137

Robert.Johnston.17@us.af.mil

Sign In

<u>Name</u>	<u>email</u>	<u>phone</u>
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Public Meeting Transcript
Question and Answer Session
Area A (SS003) and Area C (SS001)
Revised Proposed Plan
Unalakleet, Alaska – 22 May 2018

[Meeting was given on 5/22/2018 at 7:15 pm. The meeting was a two part series (2018 site activities and revised proposed plan). Questions were received after each part.]

[2018 Site Activities Presentation Slides]

[Questions received after the 2018 Site Activities presentation slides]

[COMMUNITY] In referring to tests, do you sample at surface or do you go down

[EE/JE]: When sampling in the excavation sample different zones of the excavation wall, not just at the surface we sample at different depths. With field screening techniques samples will be collected from the highest reading. And, we also look for staining and would be sure to test those areas.

[COMMUNITY]: Is the test sites known as the White Alice Site. Are you also including the Air Force site.

[EE/JE]: This is the Air Force site. These sites that I am speaking about are the known spill areas that are on record.

[COMMUNITY] I was wondering if you made contact with those people who used to be up there because when I talked with Fred Mathas (Sargent at the Air Force) married a local and they live in Michigan. What he was telling me is that he knows where and you wouldn't believe what kind of contamination, what kind of spills, and where they dumped some things. Wondering if you have made contact with people that are currently living. Because I heard this gentleman talk about safety and making sure everybody got home without injuries. We have a fairly high incident rate of cancer and I would suspect the problems with what you are searching for and what you are pulling out would affect the health of quite a few of our people.

[EE/JE]: I am not sure if the AF has directly contacted specific people.

[COMMUNITY]: I am wondering if you have.

[EE/JE]: No, I personally have not.

[COMMUNITY]: so, you do not have a complete survey, study particularly from those people that were here. These people would certainly know and remember where contaminants were placed. They were using DDT to eliminate mosquitos, that is a fairly extensive contaminant that was used by the AF and not to mention the White Alice.

[EE/JE]: We haven't had DDT and is not one of our contaminants of concern at these sites that we know of or have been excavating for. We have used historical documentation and a lot of investigations from past companies to determine where a lot of the spills are.

[COMMUNITY]: it would be a highly recommendation from our people and the government that you look a little deeper and ask them. Because they would recognize the sites on your photos. I think they would have good information, particularly if they say this is where we dumped the PCBs. He did mention they are not looking in the right places.

[COMMUNITY]: I have been working with these people and they are very thorough and they are very open and if someone says there is drum in such a place they are on it. And if you know of somebody with intimate knowledge, all they need is some direction of where this place is and

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Question and Answer Session
Area A (SS003) and Area C (SS001)
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Unalakleet, Alaska – 22 May 2018

they are in there. And once they are there you wouldn't believe how thorough they are. We are trying to get work done up there.

[EE/JE]: Do you have the ability to pass on the information to us maybe after the meeting

[COMMUNITY] I would think your google and your computer would be able to locate some of these people and I really think you need to dig a little bit further and this gentleman that brought it to me said "boy they are looking in the wrong spots." And he was part of that dump crew. So, it would be a high recommendation so that we do not eliminate spots that might be highly contaminated. And I appreciate your comments today but I think you intend to be well but I like your opening statement today about the safety and health of our people and this should be a high priority and if you did some research about the type of things that are going on in our community (the health) you would look at others that what are the cause for all of that.

[EE/JE]: I appreciate your comment.

[AF]: Do you know where we could get the list of names

[COMMUNITY] You can google Air Force and find what years they were here. There has to be some people still around. I know that Fred Mathas is still around, he is in Michigan. He is one guy to start with.

[COMMUNITY]: If you can put these people that are in the know.

[AF]: If you can get any kind of information like an email address.

[COMMUNITY] Well I do not have. If you can stretch your moneys a little bit to get people that know about this and hire them. That could be an option and a positive thing to do.

[COMMUNITY] You asked for questions and suggestions. We are interested in getting it clean as we get our water from there. The contaminants will eventually go to a stream of some sort that might be used by some of us.

[EE/JE]: I will talk a little bit about that when I discuss the revised proposed plan next.

[COMMUNITY]: One of the things we had talked about at a city meeting was road maintenance. I have seen how the trucks can damage the roads. Do you have a plan for cleaning it up afterwards, the main roads that we drive on? Do you have a plan for fixing that afterwards?

[EE/JE]: We can discuss. Most of our work will be done between Area C and the WACS. So we will make sure that we repair that. We won't be doing any type of hauling like we have done in the past to the beach. So there will not be any of that type of traffic happening with the exception of our daily route from town to the site with vehicles and I assume some of the bigger trucks will make that daily travel once. But we won't be doing the big hauls like we have in years past between WACS and the beach. We are getting to do a first run up there soon so we will get a good look at the road. They may need some maintenance just for our own travel for getting up there.

[COMMUNITY] Do you have results for the wells up there? You have 4 wells up there.

[EE/JE]: Let me go back to one of the slides. There are 3 wells at the VMF. Area C also has additional 3 or 4 wells around it as well.

[COMMUNITY] This is the air force?

[EE/JE]: yes this is the air force.

Public Meeting Transcript
Question and Answer Session
Area A (SS003) and Area C (SS001)
Revised Proposed Plan
Unalakleet, Alaska – 22 May 2018

[COMMUNITY] I thought I was speaking with you last summer about getting some water samples from the well.

[EE/JE]: I am not familiar with this.

[COMMUNITY] It had to be somebody else then. They said they didn't have them yet.

[AF]: That was probably Corp of Engineers

[EE/JE]: These are monitoring wells that are out at the White Alice station. Nothing that is closer to town.

[COMMUNITY] Oh I see.

[EE/JE]: This pertains to the site that is 14 miles outside of town. I do not have any information about the Air Force site that is closer to town.

[AF]: We do not have any.

[EE/JE]: That must be the FUDS site, corp. of engineers.

[AF]: The corp. of engineers is handling.

[COMMUNITY] There are some wells that are on top of Air Force hill and they went down over 400 ft.

[AF]: That is the corp. of engineers. They did that about 3 years ago.

[EE/JE]: We do have any information about this. Sorry.

[Revised Proposed Plan presentation slides]

[Questions received after the Revised Proposed Plan presentation slides]

[COMMUNITY] I have a recommendation not a question. I was approached by a local moose hunter last fall and she saw and we call it little North River which is closer to the White Alice site and there was a fairly good size plot of land that the vegetation had started but just had turned really nasty. She was wondering what was causing that. My immediate response to her was probably the contaminants from the White Alice because that is where they were getting there water source from. It might be useful looking at that particular crick for contaminants also and probably a recommendation. It sounds as though you are terminating this project maybe this year? Is that what I was reading?

[EE/JE]: Well we will be completed with the VMF excavation and we are hoping that all of that will be removed this summer and we will be finished completed with that. The alternative remedy of leaving contamination is up for review and needs to be adopted by the state and the local community.

[AF]: But it doesn't, it goes into LUCs and we will come out and monitor every year for 30 years (2048).

[EE/JE]: I didn't mention before but some of the problems that we were encountering while we were digging in these areas is that (I probably should have explained) is there is fractured bedrock. So, every time we dig in these areas the soil falls into the bedrock and we dig more and it opens up the bedrock and the soil falls into it again. So we keep digging and as we are digging we are breaking open this fractured bedrock and the soil keeps going into it. And we are creating this pathway for the soil to keep going deeper and deeper. It has become very difficult to keep

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digging. We have dug to 18 feet at one of the sites. This was part of the decision making process of why this remedy was selected is because we keep hitting the bedrock.

[COMMUNITY] Do you know the how affective PCB and how a person can get cancer from PCBs? What's one of the ways?

[EE/JE]: They have to ingest it.

[COMMUNITY] It has to go inside the body then. If there is PCBs known and recorded and they get tundra tea and he picks up one of those and puts it in his tea and drinks it. That's what he said he did, he told me. And, this is close to where Area C is located. There is a cabin to the right.

[COMMUNITY] It was even pushed back. It was really close to that Area C though.

[COMMUNITY] It can spread very easily from what it sounds like. I mean you can stomp on it and move it to another place.

[EE/JE]: If it is on the surface, it does. PCBs likes to be in soil, it does not like to be mobile in water. So, it is pretty stable. Once it finds its place in the soil unless it is being track by humans or something like that it is not migrating or spreading like a fuel might migrate. So, it is stable and likes to be in place with the soil.

[COMMUNITY] His 4-wheeler trail cut right through Area C where we were digging. That is right where his trail was at.

[COMMUNITY] He died kind of young. He should have had 30 more years on his life. But that didn't happen. I think the concern though is pretty obvious within our community. Is that the higher number of cancer related sickness and illnesses seems like it is too high. I am hoping that people look into that and ingest some of that. I am hoping that you are willing to listen and stay open and if there is need for more excavation. I don't know if that area was tackled or not. The one in little North River which is close to where the water source of White Alice was coming from.

[COMMUNITY] I think they might have collected a couple of samples from there. It was getting pretty late in the fall and all of us guys said we are not going because it was getting close to bear season.

[EE/JE]: I am not sure of that area, sorry.

[COMMUNITY] Are you familiar with the road going too little North River? You go down the road and go to the right before the crick itself.

[COMMUNITY] It is where they got the water for the people that lived at the White Alice Site.

[EE/JE]: So as you are going to site it is a road off to the right hand side.

[COMMUNITY] As you are going up it would be to the left. The road should be identifiable.

[COMMUNITY] She works at the city office. She would love to tell you where it is located. If you are interested in looking and following up. These are people that actually know. It would be nice if you can at least get a sample from there. I did see it.

[EE/JE]: The signs of stressed vegetation off that road?

[COMMUNITY] Yes. I am glad you are doing this. I want you to know that I am not here to try and go against. The intent is to make sure we live in a healthier environment. And we support you quit a bit. And we probably don't say some of the nicest things to support that but it always good to have people here to remove and excavate things that do not belong.

[EE/JE]: The Air Force has been doing a lot to clean up their sites up there and restore it back for the community.

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Unalakleet, Alaska – 22 May 2018

[COMMUNITY] I think we are lucky because there are some places where they are not doing anything.

[COMMUNITY] How long is the work going to take place for this summer?

[EE/JE]: We are estimating about 8 weeks. Starting June 4th we will be starting the decommissioning effort bringing the soil that is at the WACS to the VMF. Then after that is done we will begin excavating more dirt and starting the second round of landfarm. Then the groundwater monitoring. This portion will take about 8 weeks. Once all the dirt is up there tilling and other activities will be happening throughout the rest of the summer until it freezes.

[EE/JE]: June and July you can expect to see us out here.

[COMMUNITY] So sometime during this work it would be nice to look at a couple of places that I know where there are some drums. There is one located near the KNCS radio road and it has the air force placard. It appears to be either diesel or gas. The green drum with a yellow stamp on it. There is also another one up on old army hill. We have looked at it before but have never gone to pick it up because it was not in the scope of work.

[EE/JE]: Was that Air Force also?

[COMMUNITY] The Old army hill one is. One of the corp. guys was with us. We looked at it but was not in the scope of work to pick it up so it was left.

There is another drum up at White Alice. There are three that I know of.

[EE/JE]: So, why don't we collect data Quinn and document it and then we would obviously have to go through our contractual channels.

[EE/JE]: I think we can do that. We will have our GPS system. So, we can take GPS and photographs. Is what we can do this summer. We wouldn't be under scope to do a removal.

[COMMUNITY]: It is good to hear that the samples are clean

[EE/JE]: It is exciting to how that process works...with the tilling, and adding nutrients, and the microbes. Yes this is great.

[EE/JE]: And how long was it?

[EE/JE]: I think it took 1.5 seasons, is that right Dave? We were late in getting it finished in 2015.

[COMMUNITY]: Not quite 2 years

[EE/JE]: Almost two. That is pretty quick to be clean.

[COMMUNITY]: It worked well. It worked as good or better than we thought it would. I want to add this was all done with local labor. If not totally native people, almost all native people. And members of Bering Straits and Unalakleet Native Corporation. It has been good to let the local people do the work and they have been doing a good job. It is kind of a win-win situation.

[EE/JE]: It has been a great team.

[EE/JE]: Is there anything else?

[EE/JE]: We appreciate everyone for coming.

[END / Approximately 44 minutes]

BSNC INTRODUCES DESCENDANT REGISTRY

Receive news and information about descendant benefits



Bering Straits Native Corporation invites descendants to register their information to receive important news and information about descendant benefits. Submitted information will be kept confidential and will only be used for BSNC and Bering Straits Foundation purposes.

WHO?

The BSNC descendant registry is for a lineal descendant (e.g. child, grandchild, great-grandchild) or adoptee of a BSNC shareholder. Descendants who are already BSNC shareholders do not need to register.

DESCENDANT BENEFITS

- Scholarships from the Bering Straits Foundation
- Hiring and employment preference
- Summer Internship Program
- Recreational and subsistence land use
- Bereavement benefits

HOW TO REGISTER

To register, descendants must submit a completed registration form, which can be found at beringstraits.com/descendants, and a copy of the state-issued birth certificate establishing the relationship to a BSNC shareholder. If the descendant's name differs from the name on the birth certificate, or if the shareholder's name on the descendant's birth certificate is different from the name BSNC has on file, copies of the legal document(s) substantiating the name change are also required (e.g. a marriage certificate, divorce decree, adoption decree or other legal document). In some cases, it may be necessary to provide additional documents to demonstrate lineal descent.

Descendants may review, update or remove their personal information by emailing descendants@beringstraits.com. For more information, go to www.beringstraits.com/descendants.

NOTICE OF ANNUAL MEETING OF SHAREHOLDERS

SATURDAY, OCT. 6, 2018 AT 10 A.M.
TO BE HELD IN ANCHORAGE, ALASKA
THE CENTER
4855 ARCTIC BLVD. ANCHORAGE, AK 99503

Voting shareholders who are at least 18 years of age and wish to run for the Board of Directors must file a letter of intent, resume and proxy questionnaire with BSNC by June 14, 2018 at 5 p.m. Shareholders may request a Nominating Packet by mail or email from:

Nominating Committee
Bering Straits Native Corporation
P.O. Box 1008
Nome, Alaska 99762
Email: phoogendorn@beringstraits.com

IMPORTANT: All original letters of intent, resumes and questionnaires must be received by BSNC by June 14, 2018 at 5 p.m.

BSNC SHAREHOLDER PRESENTS PROCLAMATION HONORING SAMI REINDEER HERDERS



Inga Kemi Turi, the youngest granddaughter of Sami reindeer herder Samuel Kemi, and BSNC shareholder Pearl Johnson, hold the Alaska Legislature's honorary proclamation. Kemi was the first Sami reindeer herder to contract with Sheldon Jackson, arriving in Alaska in 1894.

On March 16, 2016, the Alaska State Legislature recognized the 122nd anniversary of the arrival of the Sami reindeer herders and their families from Scandinavia with an honorary proclamation for their humanitarian endeavors.

In 1894 and 1898, Sami were recruited by the U.S. Government with assistance from Sheldon Jackson reindeer herders to teach reindeer

Sami Reindeer Herders continued on page 7...

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A MESSAGE FROM THE PRESIDENT & CEO



I am excited to share with you news about an opportunity that the new tax law created for BSNC and other Alaska Native Corporations (ANCs) to enhance the benefits we provide to our shareholders and descendants. ANCs have been authorized to create "Settlement Trusts" since the 1980s, and several regional corporations have already created these trusts. Under the law, a Settlement Trust is authorized to promote the health, education, and welfare of its beneficiaries, and to preserve the heritage and culture of Alaska Natives.

At its February 2018 meeting, the BSNC Board authorized the creation of the BSNC Beringia Settlement Trust. This trust will be a separate legal entity from BSNC, and its board will be appointed by BSNC. In order to create a BSNC Settlement Trust, shareholders must approve its creation by a vote of the majority of shares present (in person or by proxy) at a meeting for which a quorum is established. We are asking that you vote YES to authorize the creation of the BSNC Beringia Settlement Trust at the 2018 Annual Meeting.

You may wonder why BSNC wants to create a Settlement Trust right away. The answer is that the new tax law created financial incentives for BSNC to save money on taxes by making contributions to the Trust for the benefit of our shareholders and descendants. The Trust could be used to fund dividends, elder distributions, and bereavement assistance payments. The Trust may also be used for scholarships and funds for cultural

preservation and promotion programs. Finally, contributions received by the Trust from BSNC would be taxed just one time at the low flat rate of 10%, and dividends and other distributions from the Trust to shareholders and descendants are expected to be tax free.

Once BSNC contributes cash or other assets to the Settlement Trust, they can only be used for the generation and distribution of benefits to the shareholders and/or beneficiaries of the Trust. BSNC cannot take any money out of the Trust for its own uses once contributions are made.

The BSNC Beringia Settlement Trust will serve to provide a dividend distributions, elder benefits, bereavement assistance, scholarships and support cultural preservation and promotion programs. Additional information will be included on the BSNC website and Facebook page, and in the Annual Report and proxy you will receive prior to the 2018 Annual Meeting.

Again, we ask that you vote YES to allow BSNC to create the BSNC Beringia Settlement Trust. Quyaana to you our shareholders for your ongoing support and involvement in BSNC.

Gail R. Schubert

BSNC BOARD OF DIRECTORS

Henry Ivanoff Sr.
Chairman

Lee Ryan
Vice Chairman

Gail R. Schubert
President & CEO

Roy Ashenfelter
Secretary

Tim Towarak
Treasurer

Eugene Asicksik
Assistant Secretary

Ella Anagick
Assistant Treasurer

Deborah Atuk
Director

Jason Evans
Director

Robert (Bobby) Evans
Director

Charles W. Fagerstrom
Director

Neal W. Foster
Director

Louie Green Jr.
Director

Homer E. Hoogendorn
Director

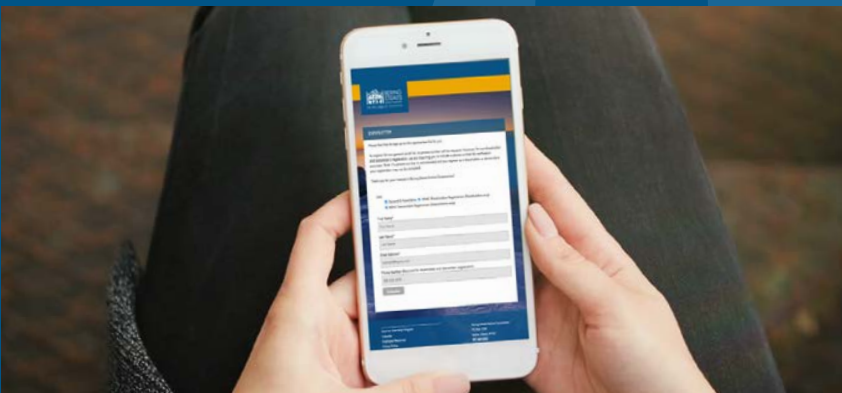
Steve Ivanoff
Director

SIGN UP TO RECEIVE THE BSNC E-NEWSLETTER!

BSNC invites shareholders to help reduce paper usage by signing up to receive the Agluktuk newsletter electronically. The e-Newsletter, which is sent via email, respects our environment and is received in a more timely fashion than the mailed newsletter.

Shareholders who receive the e-Newsletters may also request to receive paper copies of editions that are meaningful to them, and full copies of the paper newsletter will continue to be posted to the BSNC website in a PDF format.

Visit www.beringstraits.com/enewsletter to sign up.



BSNC SEEKS YOUNG PROVIDERS NOMINATIONS

The Young Providers Award honors young people from the BSNC region who contribute on a daily basis to the health and well-being of their families, communities and culture. Nomination Criteria:

- He/she cares for family through subsistence activities, Elder care, or mentoring of young people in traditional activities and values or education.
- He/she is involved in activities that benefit the community such as suicide prevention programs, youth sports, and community well-being and health.

The deadline for nominations is July 17, 2018.

1. Download the nomination form at beringstraits.com/youngproviders or request one by phone (907) 443-5252.
2. Complete form and submit by:
 - **Mail:** BSNC Nome Headquarters
P.O.Box 1008, 110 Front Street, Suite 300
Nome, Alaska 99762
 - **Fax:** (907) 443-2985
 - **Email:** kgooden@beringstraits.com

SHAREHOLDER ADDRESSES NEEDED

ADAM COYLE REDDAWAY	COLTEN L. LOWE	HEIDI A. MCCONNELL	JOHN BARNARD JOHNSON	LUCY JEAN MOGG	RACHELLE BRITTANY TURNER	STEVEN DAVID ANOWLIC
ADAM S. GARMAN	CRISTA LYNN ARNOLD	HELEN D. KARMUN	JOHN DANIEL JAMES BAILEY	LYDIA ANN HANCOCK	RANDALL JOSEPH SPENCER	STEVEN GILBERT AGIBINIK
ADRIENNE DEANNA LOCKWOOD	CRYSTAL OYOUMICK	HELEN MAGDELENE A HALE	JOHNATHAN K. KASGNOC	MABEL BROWN	REBECCA E. TOKEINNA	THEODORE A. PECK
ALAN T. DAVIS	CURTIS JAMES IYAPANA	HENRY WAYNE LUKE	JON PAYENNA GERTON	MARGARET M. KILLARZOAC	RICHARD WAYNE LOCKWOOD	THERESA ESCHOLT YOOL
ALICE MAE KAVAIRLOOK	CYNTHIA MIXSOOKE	HENRY A. MORGAN	JONATHAN SHADOE MUNN	MARGARET C. PATRICK SEGURA	RICHARD RAYMOND OMELAK	THERESA KAY ANDERSON
ALLEN N. A. PEARSON	DAEVIN BARNES	HENRY NORMAN	JOSEPH NORBERT	MARGARET WALLACE	ROBERT C. WRIGHT	THOMAS LEE HUFFMAN
ALMA MULLINS	DEGEE A. DOBSON	HERBERT LANE KIYUTELLUK	JOSEPH M. E. SAAD	MARIE ANN MILLER	ROBERT THUNDER BEAR CALEB KEECH	THOMAS B. JAMES
AMOS FRANK OXEREOK	DENISE ASHENFELTER	HERBERT JOHN ALUSKA	JOSHUA R. L. FIREY	MARRIE LUPSON	ROBERT NORMAN COLE	THOMAS BELL
ANNOKAZOOKA LAZYNA SANCHEZ	DEREK PETER ANARUK	HERMAN LESTENKOF	JOYLYN LEONARD	MARTHA MARIE WASHINGTON	ROBERT EARL REYNOLDS	TIMOTHY DAVID JAMES
ANTHONY PITOOKNUK MAZONNA	DIANE LEE DAL BELLO	HUNTER L.T. ANGASAN	JULIA C. JOHNSON	MARVIN L. MORGAN	ROMALD K. KATEXAC	TINA M. MILLER
ANTHONY LANE FRY	DOMINIC JACOB STETTINGER	ISAAC AHKVALUK	JULIA MAY PICKUS	MARY JILL YOUNG	RONNIE H. KEITH LUPSON	TONY JOHN DESARRO
ANTONIA MARIE DENMARK	DONALD M. OTTON	IZAAK Q. LAMBERT	JUSTINA PETE	MARY BUCK	ROSEANN E. WARD	TONYA MICHELLE COTMAN
ASHLEY HYDER	EBBA ESTHER KAYOUKLUK	JACK SPOTTED CROW KEECH	KATELYNN ROSE GRAY	MATHILDA LICK	ROY EDWARD BEN BROWN	VANESSA MURPHY
BERNICE ADA ADAMS	ELGEN R. SHELDON	JACQUALYN GUILLEY	KELLEY JOE HAMMOND	MAXINE O. HOFFMAN	RUEBEN ARCHIE OLANNA	VANESSA HOLDER
BILLY ONEAL	ELIZABETH JANE LARSEN	JAHOMEIT PARKER	KELLY DAWN ROBERTS	MELISSA ADOLPH	RYAN W. OKLEASIK	VAUGHN K. MUNN
BOBBY COLLINS	ELSIE ROSE OKITKON	JAKOB W. GONANGNAN-MELGREEN	KEVIN RAY GARRIS	MICHAEL LEONARD	RYAN COOPER	VERA ANN GREGORY
BRENDA LEE RAYMOND	ENGENIA TERESA BENTLEY	JAMES E. CAROON	KIMBERLY LORETTA KRATSAS	MICHAEL P. MILLER	SARA AMAKTOOLIK	VERNON KEELICK KUGZRUK
BRENT WILLIAM HUFFER	ERIC CHRISTIAN VELTRANO	JAMES MELVIN WALSER	KRISTIE EMMA CAROON	MICHAEL JOHN CLARK	SASCHA SIXKILLER	VICKI MARLENE OLIVER
CANDICE FILKINS	EVELYN HENDRICKSON	JAMIE LEE FIELDS	KRISTINA MARYROSE MOONEY	MICHAEL EDGAR SMALL	SCOTT DIXON	VIOLA VERA JOSEPH
CARLA JUNE EVANS	FRANCIS KIRK	JANET FERRIS	KRISTY ANN PUSHUK	MICHELLE MAMIE AUKON	SHAWNTE' TONI HAUGAN	VIRGINIA KNISELEY
CARMEN MARIE FISHER	FREDERICK EARL ERNAK	JEANETTE GAIL YUMAN	LANGFORD ADAMS	MYLES GONANGNAN	SHELLEY R. DUDLEY	WALTER LEE SOOKIAYAK
CHANDRE MARIE SZAFFRAN	GAIL LEWIS	JEDIDIAH D. T. KOWCHEE	LAURA ANN GIFFIN	NANCY P. PEREZ	SHERRY MILLIGROCK	WANDA JACQUELINE CARLSON
CHARLES VANN	GEORGE ANASOGAK	JEFFERY EUGENE GRANT	LAURA FRANCES C PEREZ	NEIL ALAN LAGSTROM	SHIRLEE ANN KAKARUK	WARREN ELACHIK
CHARLES L. ROBERTS	GEORGE AHKINGA	JENNIE LEE PILCHER	LEROY LITTLE OBNEY	PARKER S. SOREM	SIDNEY J. HERMAN	WAYNE JOHN TOBUK
CHARLES DAVID RAYMOND SR.	GILBERT JAMES OLANNA	JENNIFER KINNEY	LEVI ALFRED SILAS	PATRICK D. OCTUCK	STACEY D. M. TOKEINNA	WILFRED J. KOZEVNIKOFF
CHARLES NEPHEW	GLADYS MARIE DULEY	JERILYNN BEAUNA QINUGANNA WELLERT	LOANNE JOYCE MARTIN	PAUL T. YOUNG	STACY K. S. L. KOWCHEE	WILLIAM JOSEPH GREENE
CHELSEA ROSE BORKOWSKI	GLEN D. WHITTAKER	JESSIE MARIE PHILLIPS	LORRAINE LUPSON	PAULINE S. IMMINGAN	STARLA RAE SMITH	WILLIAM LEE WALLUK
CHRISTINE ISHNOOK	GORDON ENGEEDLOOK NAGOZRUK	JOCELYN TESTA	LORRAINE OZENNA	PETER ANASOGAK	STEPHANIE IRENE KUSHNICK	WILLIAM OMYRUK IYAPANA
CLARK KOWCHEE	HARLEY JOHNSTON	JOHN IYAPANA	LORRI LUPSON	PETULA ANN KUNNEMANN	STEPHANIE HAZEL EVANS	WILLIAM A. KNISELEY
	HAZEL NANCY JACK	JOHN HENRY MONEYMAKER	LOUCILLE CATHERINE MURPHY MCBRIDE	PRESTON WASHINGTON	STEVEN LEE HANSEN	WILLIAM JAMES WOFFORD
					STEVEN SOLLICH	WILLIAM LAURENCE SMITH

Are you receiving important mailings from BSNC, including newsletters and dividends? It is important that shareholders keep their mailing address up-to-date. Visit http://beringstraits.com/shareholders/forms/address_name_change.pdf to update your address today or use the form below.

SHAREHOLDER NAME AND ADDRESS CHANGE FORM

BSNC shareholders should update the Shareholder Records Department directly in writing anytime their mailing address or name changes. Address changes for shareholders under the age of 18 must be signed by the minor's custodian. Mail in this form or send a signed letter to BSNC with your social security number, date of birth and new address to:

Print name: _____

New mailing address: _____

City: _____ State: _____ ZIP: _____

Social security number: _____ Date of birth: _____

Contact phone number: _____

Email address: _____

(If applicable)

I am also a custodian for: _____

Signature: _____

Date: _____



MAIL COMPLETED FORM TO:
Bering Straits Native Corporation
P.O. Box 1008
Nome, Alaska 99762

You may also call our Nome or Anchorage offices at (907) 443-5252 or (907) 563-3788 or email us at shareholders@beringstraits.com.

For name changes, BSNC requires that you attach a legal document with your new name, such as a copy of a court record, valid government ID, marriage certificate or divorce decree.

New name: _____

Former name: _____

Social security number: _____

Date of birth: _____

Signature: _____

Date: _____



BERING STRAITS NATIVE CORPORATION ALASKA STATUTE 13.16.705(b) WILL ALASKA NATIVE CLAIMS SETTLEMENT ACT OF 1971

MAIL COMPLETED FORM TO:
Bering Straits Native Corporation
P.O. Box 1008
Nome, Alaska 99762

I, _____, having attained the age of eighteen (18) years and being of sound mind, and solely for the purposes of AS 13.16.705(b) and ANCSA of 1971, Sec. 7(h)(2), freely and voluntarily execute this will and hereby devise and bequeath my shares of stock in Bering Straits Native Corporation and _____ village corporation to:

Name of village

Name	Current Address	% of Shares

This Will revokes any bequest of the stock, described above, in any previously existing will or codicil. If I now own more shares than I have bequeathed above, I direct that the remaining shares shall be split pro rata among the persons named above. BSNC recommends that all existing fractional shares of stock be given to one person, and that existing whole shares be given as whole shares and not split into fractional shares.

This instrument shall be governed by and construed in accordance with the laws of the State of Alaska.

Dated at _____, _____,
this _____ day of _____, 20____. City State

State of: _____
County of: _____ (or _____ Judicial District)

Signature of Testator _____

Subscribed, sworn to and acknowledged before me by _____

I, being first sworn, declare that the testator signs and executes this instrument as his/her last will and that he/she signs it willingly, and I sign this will as witness of the testator's signing, and that to the best of my knowledge the testator is 18 years or older, of sound mind, and under no constraint or undue influence.

the testator, this _____ day of _____, 20____

Notary Public or Postmaster _____
In and for the State of _____

SHAREHOLDER NEWS



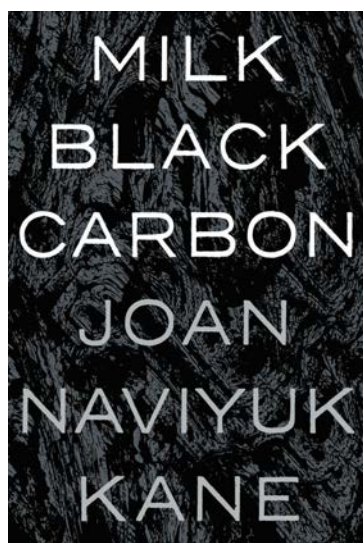
CONGRATULATIONS!

BSNC congratulates shareholder **Jennine Jordan** on being selected as an awardee of the Alaska Journal of Commerce's Top Forty Under 40 class of 2018!

Jennine Jordan is the daughter of BSNC shareholder and director Ella Anagick.

SHAREHOLDER KANE PUBLISHES FOURTH BOOK

BSNC shareholder Joan Naviyuk Kane has published a fourth poetry book titled "Milk Black Carbon." Milk Black Carbon works against the narratives of dispossession and survival that mark the contemporary experience of many indigenous people, and Inuit in particular. In this collection, autobiographical details – motherhood, marriage, extended family and its geographical context in the rapidly changing arctic – negotiate arbitrary landscapes of our perplexing frontiers through fragmentation and interpretation of conventional lyric expectations.



Kane is the author of *The Cormorant Hunter's Wife*, *Hyperboreal* and *The Straits*. She has earned numerous awards for her writing including the Whiting Writer's Award, the Donald Hall Prize in Poetry, the American Book Award, the Alaska Literary Award, and fellowships from the Rasmuson Foundation, the Native Arts and Cultures Foundation and the School for Advanced Research. Kane, who holds a Bachelor of Arts degree from Harvard University and a Master of Fine Arts (MFA) degree from Columbia University, is a faculty mentor in the MFA program at the Institute of American Indian Arts in Santa Fe, New Mexico. She is Inupiaq with family from King Island and Mary's Igloo and lives in Anchorage, Alaska.

BSNC SHAREHOLDER PROMOTED TO BENEFITS ADMINISTRATOR



Annabelle Ryan

BSNC is pleased to announce that shareholder Annabelle Ryan has been promoted from Benefits Technician to Benefits Administrator. Ryan will have a significant role in managing and administering employee benefit programs for BSNC, multiple subsidiaries and joint ventures that are conducting business in approximately 30 different states and foreign locations. Ryan began working for BSNC in the Accounting Department in 2009 and in 2013, was recruited to the Human Resources Department. Ryan is the daughter of Karen Bradley and the late Fred Ryan Jr. of Unalakleet.

AIH RECRUITING SHAREHOLDERS, DESCENDANTS AND SPOUSES

BSNC subsidiary Alaska Industrial Hardware (AIH) is continually accepting applications from BSNC shareholders, BSNC descendants and spouses of BSNC shareholders. AIH seeks:



1. Requisition #2121 – Counter Sales
2. Requisition #2122 – Warehouse Worker I

These are core positions for AIH. Please note that a position may not be immediately available and the submission of your application does not guarantee employment. This solicitation is intended to create a pool of qualified BSNC shareholder/descendant/spouse applicants who will be interviewed for openings as they occur. If you are qualified for the position, please apply and you will be contacted when a position opens. Time frames vary. Apply at beringstraits.com/careers.

HISTORICAL SPOTLIGHT: ARCTIC ARC PEACE PROJECT

The Arctic Arc Peace Project (1986-1991) was composed of two landmark sculptures by shareholder artist Joe Senungetuk from Kinjigin (Wales) and David Barr of Michigan. The "hand," located in Kinjigin, symbolizes a peaceful handshake between the Alaska and Chukotka Inuit amidst a history of international tension dating back to the Cold War. The hand and the bird it holds face west for a reason: a large metal umiaq sculpture is located approximately 60 miles directly across the Bering Strait in Naukan, Russia. The umiaq is positioned as if to sail across to Kinjigin.

For many years, Inuit have traveled back and forth across the Bering Strait by umiaq to visit and trade with friends and family. These landmarks stand as symbols for the relationship between Alaskan and Chukotkan Inuit. The ties between our peoples and families go back thousands of years.

Read more about the Arctic Arc in a Village Life Stories entry by shareholder Vernae Angnaboogok at beringstraits.com/villagelife.



Photo by BSNC shareholder Vernae Angnaboogok

The "hand" in Kinjigin stands tall along the base of the mountain with open wooden hands joined at the wrist with a metal bird positioned as if in flight directly across to Naukan, Russia.

SHAREHOLDER SPOTLIGHT: PATRICIA LONGLEY COCHRAN

BSNC shareholder Patricia Longley Cochran has served as Executive Director of the Alaska Native Science Commission (ANSC) since its inception in 1994. ANSC was established to bring together research and science in partnership with the Alaska Native community.



Patricia Longley Cochran

Cochran has worked on numerous research projects throughout the Arctic and has shared her extensive knowledge of key issues impacting Arctic communities at forums worldwide. Her works include numerous articles and publications that have appeared internationally on programs reporting on climate change and indigenous issues. Cochran and ANSC are currently working on climate change and black carbon projects in the Bering Strait region.

Cochran has also shared her love of science and learning with many youth through internships at ANSC and by developing science curricula for K-12th grade students based on Alaska Native science and traditional knowledge. Cochran is extremely grateful to work directly with Alaska Native communities, especially Elders, who have shared their knowledge, wisdom and guidance.

Cochran was born and raised in Nome, Alaska and has family ancestry in Nome, King Island and Wales. Her mother is the late Frances Longley, and her late brother Gary Longley was the former Executive Director of BSNC. Cochran currently resides in Anchorage, Alaska. Learn more about Cochran at www.nativescience.org/about/cochran.htm.

VILLAGE LIFE STORIES PROJECT



Help share the Bering Strait region's rich cultural history!

BSNC's Village Life Stories Project seeks to share the Bering Strait region's rich cultural history. BSNC shareholders and descendants are invited to submit short stories of personal experiences about growing up and life in the village to media@beringstraits.com. Photos are not required but encouraged. Story entries must be accompanied by the author's name, hometown and a story title. Selected stories will be shared on BSNC's Facebook page and website at www.beringstraits.com/villagelife.

BSNC SHAREHOLDER BECOMES CERTIFIED JOURNEYMAN ELECTRICIAN



BSNC would like to congratulate shareholder Richard Eggart of Nome on becoming an Alaska Certified Journeyman Electrician. Eggart has worked with BSNC subsidiary Bering Straits Development Company (BSDC) since 2012 where he started as a laborer before entering the Electrical Apprenticeship Program. Eggart is the third shareholder to complete the program and become an Alaska Certified Journeyman Electrician under BSDC. Congratulations, Richard!

MONTHLY STOCK WILL DRAWING WINNERS

MAIL IN YOUR UPDATED STOCK WILL TODAY AND
BE ENTERED INTO A DRAWING TO WIN \$200!

NOVEMBER	Tyler Timothy Daniel Takak
DECEMBER	Norma V. Andrews
JANUARY	Helen Iyapana
FEBRUARY	Shawn P. Pushruk
MARCH	Selma Rock

Mail in your updated stock will today and be entered into a drawing to win \$200. Having a Stock Will on file with BSNC lets you decide who will inherit your stock after your death. If you pass away without a Stock Will, your stock will be distributed according to state law, and may be distributed to individuals you do not intend to benefit. Please visit beringstraits.com/shareholders/forms/ or call (907) 443-5252 to update your stock will today.

BSNC SUBSIDIARY GAT WORKS ALONGSIDE GHANA POLICE SERVICE



A GAT IPPOS instructor explains and demonstrates to Ghanaian police the use and care of gas masks as part of their training prior to deploying to South Sudan for peacekeeping purposes.

A team of Global Asset Technologies, LLC (GAT) trainers from the Bureau of International Narcotics and Law Enforcement Affairs' (INL) International Police Peacekeeping Operations and Support (IPPOS) Program is currently working alongside the Ghana Police Service to prepare a unit for a deployment to the United Nations Mission in South Sudan. INL's trainers work to ensure that police officers have the essential skills needed to safely conduct their mission while deployed. With the instability in the region and the growing hunger crisis, it is important to equip officers with the expertise to patrol neighborhoods and refugee camps, protect buildings, or quickly and appropriately respond to an emergency. On their return, they will be able to apply these same skills within their home country.

The IPPOS program helps build the skills and capacity of partner country police forces to face the austere environments and meet the growing demand for police in United Nations Peacekeeping. The Ghana Police have been a partner for several years, continuing to take on more of the training responsibility.

Ghana has contributed 384 police officers to peacekeeping missions. GAT has been training these officers as well as implementing a Training of Trainers program since 2015.

GROW YOUR CAREER

With more than 1,500 employees working on projects across the U.S. and globe, BSNC employees play an important role in helping BSNC fulfill its mission to improve the quality of life of our people through economic development while protecting our land and preserving our culture and heritage.

Learn more about exciting job opportunities at beringstraits.com/careers



AIH AWARDED ASSOCIATE OF THE YEAR AWARD FROM AGC



James Bienvenu and Timothy Larson with AIH accept the 2017 Associate of the Year Award from AGC's Thea Scalise.

BSNC subsidiary Alaska Industrial Hardware received the 2017 Associate of the Year Award from the Associated General Contractors (AGC) of Alaska on Dec. 12. AGC of Alaska is a nonprofit construction trade association consisting of general contractors, subcontractors and industry professionals dedicated to improving the professional standards of the construction industry. AGC has been a significant part of the construction industry in Alaska since its establishment in 1948.

GPS EMPLOYEES RECEIVE COMMENDATION AWARDS



BSNC President and CEO Gail Schubert congratulates Captain William Tidwell for his exemplary service.

On Nov. 17, BSNC subsidiary Global Precision Systems, LLC (GPS) employee Captain William Tidwell and his staff received Commendation Awards for exemplary service and performance of duties during the Civil Rights and Civil Liberties (CRCL) Inspection at the El Paso Processing Center. Under the direction of Captain Tidwell, his staff met and exceeded all CRCL standards. The Office for Civil Rights and Civil Liberties supports the U.S. Department of Homeland Security's mission to secure the nation while preserving individual liberty, fairness and equality under the law.

GPS operates the El Paso Processing Center in Texas for the U.S. Immigration and Customs Enforcement. Duties at the site include employing detention officers, transportation officers and food service staff to operate the center.

RICHARDS APPOINTED TO PFD BOARD

Governor Bill Walker announced that he has appointed BSNC Vice President and General Counsel Craig Richards to the Alaska Permanent Fund Corporation Board of Trustees. Richards provides general legal counsel to BSNC and its affiliated companies and oversees legal compliance and risk management.



Craig Richards

Richards has more than 16 years of legal experience, including as the Attorney General of the State of Alaska from 2014 to 2016. While serving as Attorney General, he played a key role in developing the concepts that underpin the Permanent Fund Protection Act, a proposal now being considered by the Legislature that would ensure the longevity of the dividend program while leveraging the state's wealth to help pay for government services. Prior to serving as Attorney General, Richards was in private practice where he specialized in tax, finance and oil and gas law. He holds a Master of Business Administration from Duke University's Fuqua School of Business and a Juris Doctor from Washington & Lee University. He earned a Bachelor of Science in Finance from the University of Virginia.

"Craig is an asset to the Board because of his extensive knowledge of public finance and Permanent Fund policy," Governor Walker said.

PARAGON AWARDED SPILL RESPONSE CONTRACT



1,350 gallons of jet fuel from a truck rollover accident were excavated in Fort Wainwright, Alaska.

Last fall, BSNC subsidiary Paragon Professional Services, LLC (Paragon) was awarded a two-year contract with the U.S. Army Corps of Engineers to perform spill response activities in Fort Wainwright, Alaska. Tasks include providing response to prevent, contain, control, clean up, remove and dispose of hazardous waste and material. Paragon has responded to two releases that occurred mid-October. The first response consisted of a 20-gallon release of jet fuel, while the second response consisted of a 1,350-gallon release from a rollover accident involving a truck. The contaminated material is stockpiled in Fairbanks, Alaska awaiting treatment.

Paragon offers a wide-range of environmental remediation services to both private- and public-sector clients throughout the United States. Its experienced staff is dedicated to producing high-quality documentation and providing safe field execution to support its clients' environmental planning and assessment, investigation, remediation, restoration and construction projects in line with local, state and federal guidelines and regulations.

continued from page 1...

BSNC SHAREHOLDER PRESENTS PROCLAMATION HONORING SAMI REINDEER HERDERS

husbandry to Alaska Native apprentices from western Alaska. Despite language difficulties, this large-scale teaching and hands-on training program transformed the lives and culture of many Alaskans by providing a marketable, locally available protein source. In addition, tanning hides made fur available for outerwear and by-products through present day. The Sami's heroic efforts included traveling with reindeer from Haines to Circle City to save miners stuck in snow without provisions. They also herded reindeer from Teller Mission to Barrow to save the crew of a ship trapped in ice.

On Aug. 19, 2017, BSNC shareholder and Sami Cultural Center of North America Board Member and consultant Pearl Johnson traveled to Jokkmokk, Sweden, to participate in the 6th World Reindeer Herders Congress. Every four years the Association of World Reindeer Herders brings reindeer herders from across the circumpolar North to network, share experiences and traditional knowledge, hear from scientific experts, learn of cultural practices and celebrate. While attending, Johnson presented the proclamation to the descendants of the original Alaska Sami herders.

NORTH RIVER RADIO RELAY STATION SITE UPDATE



BSNC descendant Quinn Ivanoff of Unalakleet operates the auger for the soil sample collection at the landfarm.

Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station (RRS) site, 12 miles east of Unalakleet, Alaska. During fall 2017, the U.S. Air Force received permission from the Alaska Department of Environmental Conservation to move 5,000 cubic yards of successfully treated soil from the land farm, located at the former White Alice Communications site at the North River RRS, to a fenced-off excavation site. Another 3,000 cubic yards of stockpiled soil will be moved to the land farm for treatment beginning summer of 2018. Additionally, an estimated 800-1,800 cubic yards of remaining contaminated soil is expected to be excavated and treated.

Planning is ongoing and a public meeting is scheduled to be held on Tuesday, May 22 at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall. Work is expected to begin in late May after breakup has occurred. As in past years, Eagle Eye plans to use a local labor force to support the field effort. If you have any questions, please contact Environmental Project Manager Claire Costello at ccostello@beringstraits.com.

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Peggy Hoogendorn, Ana Swanson
LAYOUT: Yuit Communications
DESIGN: Roland Adams

THE AGLUKTUK

Spring 2018

BERING STRAITS FOUNDATION NEWS

BSF LAUNCHES FUNDRAISING CAMPAIGN

Since 1991, the Bering Straits Foundation (BSF) has helped Bering Straits Native Corporation shareholders and descendants achieve their educational and vocational goals by offering scholarship and fellowship opportunities. BSF has provided more than \$2.6 million in educational funding to help empower Our People who are gaining knowledge and skills needed to make positive impact in our communities.

On behalf of BSF, I am excited to announce a new campaign that will be critical to fulfilling BSF's core mission to support the educational and vocational goals of Our People, strengthening sustainable communities and enriching Native cultural heritage and traditional values.

► **Our goal is to raise \$50,000 in 2018!**

Your support helps positively impact the lives of BSF recipients such as Isabel Yamat, a BSF recipient who participated in the Bering Straits Native Corporation summer internship program and was promoted to Assistant Facilities Security Officer:

"I am grateful for the support Bering Straits Foundation gave me while I pursued my degree. I was a first generation college student, and with their support I was able to obtain my degree. The support and assistance they dedicate to Bering Straits shareholders and descendants is truly admirable and uplifting." - Isabel Yamat

Your investment is more than a commitment to the Bering Straits Foundation. It is an affirmation of your connection with the next generation



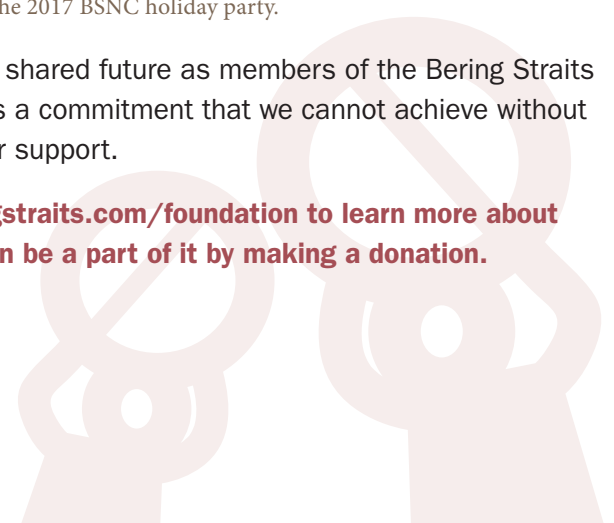
BSNC CEO Gail Schubert thanks shareholder Cindy (Towarak) Massie and her husband Thomas for their generous \$20,000 donation to the Bering Straits Foundation. Cindy and Thomas presented their check at the 2017 BSNC holiday party.

of student leaders and our shared future as members of the Bering Straits Foundation community. It is a commitment that we cannot achieve without your help and we need your support.

Visit our website at beringstraits.com/foundation to learn more about this effort and how you can be a part of it by making a donation.

Sincerely,

Tabetha Toloff
BSF Board President



McDonald, Erika

From: Ana Swanson <aswanson@beringstraits.com>
Sent: Tuesday, May 22, 2018 10:21 AM
To: Henry Email (knsa@gci.net)
Subject: Unalakleet Public Meeting
Attachments: 18BSNC045 Unalakleet Public Meeting Flyer_v4.pdf

Good morning Henry, the Air Force remediation project meeting will take place tonight at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall.

Can this be announced on KNSA? Here is the info:

Unalakleet residents are invited to attend a public meeting regarding the cleanup of contaminated soil at the North River Radio Relay Station site on Tuesday, May 22 at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall.

Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after breakup has occurred. As in past years, Eagle Eye plans to use a local labor force to support the field effort.

The Air Force will accept written, emailed and voicemail comments during the public comment period (May 22 – June, 20 2018). Voicemail comments can be provided by calling and leaving a message at 1(800) 222-4137 or by contacting Robert Johnston at (907) 552-7193.

Please let me know if you have any questions.

Thank you,
Ana

Ana Swanson
Communications Specialist
Bering Straits Native Corporation
3301 C Street, Suite 400 | Anchorage, AK 99503
Phone 907.563.3788 | Fax 907.563.2742
Direct 907.334.8377 | Mobile 907.406.0021
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AIR FORCE REMEDIATION PROJECT

MEETING

Tuesday, May 22, 2018 at 7 p.m.
Myles Gonongan/Aaron
Paneok Memorial Hall



Unalakleet residents are invited to attend a public meeting regarding the cleanup of contaminated soil at the North River Radio Relay Station site and to discuss revisions to the proposed plan.



Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after breakup has occurred. As in past years, Eagle Eye plans to use a local labor force to support the field effort. The Air Force will also accept written, emailed and voicemail comments during the public comment period (May 22 – June, 20 2018). Voicemail comments can be provided by calling and leaving a message at 1 (800) 222-4137 or by contacting Robert Johnston.

FOR MORE INFORMATION CONTACT:

Robert Johnston, Project Manager

EMAIL robert.johnston.17@us.af.mil

TOLL-FREE 1.800.222.4137

TEL. 907.552.7193



berlingstraits.com

Facebook interface showing a post from Bering Straits Native Corporation. The post includes a flyer for an "AIR FORCE REMEDIATION PROJECT MEETING" on Tuesday, May 22, 2018, at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall. The flyer text reads: "Unalakleet residents are invited to attend a public meeting regarding the cleanup of contaminated soil at the North River Radio Relay Station site on Tuesday, May 22 at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall." Below the flyer, there is a photo of a construction site with an excavator and a person. The text continues: "Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after break-up has occurred. As in past years, Eagle Eye plans to use a local labor force to support the field effort. The Air Force will also accept written, emailed and in-person comments during the public comment period (May 22 - June 20 2018). Verbal comments can be provided by calling and leaving a message at 1-800-222-4137 or by contacting Robert Johnston. FOR MORE INFORMATION CONTACT: Robert Johnston, Project Manager; EMAIL: robert.johnston.17@bus.af.mil; TOLL FREE: 1-800-222-4137; TEL: 907-552-7193." The post has "Like", "Comment", and "Share" buttons.

RECENT ACTIVITY

Bering Straits Native Corporation 4 hrs

Unalakleet residents are invited to attend a public meeting regarding the cleanup of contaminated soil at the North River Radio Relay Station site on Tuesday, May 22 at 7 p.m. at the Myles Gonongan/Aaron Paneok Memorial Hall.

AIR FORCE REMEDIATION PROJECT MEETING
Tuesday, May 22, 2018 at 7 p.m.
Myles Gonongan/Aaron Paneok Memorial Hall

Unalakleet residents are invited to attend a public meeting regarding the cleanup of contaminated soil at the North River Radio Relay Station site and to discuss revisions to the proposed plan.

Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after break-up has occurred. As in past years, Eagle Eye plans to use a local labor force to support the field effort. The Air Force will also accept written, emailed and in-person comments during the public comment period (May 22 - June 20 2018). Verbal comments can be provided by calling and leaving a message at 1-800-222-4137 or by contacting Robert Johnston.

FOR MORE INFORMATION CONTACT:
Robert Johnston, Project Manager
EMAIL: robert.johnston.17@bus.af.mil
TOLL FREE: 1-800-222-4137
TEL: 907-552-7193

Like Comment Share

Suggested Events: Alaska Run for Women, One Year Birthday, 4th Annual Rainbow Run, The 37th Annual Alaska Scott..., NAS | LIVE at Moose's Tooth, Elderberry Essentials Grand ...

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Windows taskbar: 2:23 PM 5/22/2018

Facebook interface showing the event page for "Air Force Remediation Project Meeting". The event is scheduled for May 22 at 7 PM - 8:30 PM in Unalakleet, Alaska. It is hosted by Bering Straits Native Corporation. The page shows 1 Going and 4 Interested. The event details include: "Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after breakup has occurred. As in past years, Eagle Eye plans to use local labor force to support the field effort." The page has "Share" and "Share in Messenger" buttons.

Events

Air Force Remediation Project Meeting

Public · Hosted by Bering Straits Native Corporation

★ Interested ✓ Going Share

Today at 7 PM - 8:30 PM
Starts in about 5 hours

Unalakleet, Alaska

About Discussion

1 Going · 4 Interested
Share this event with your friends Share

Details

Remediation work by BSNC subsidiary Eagle Eye Electric, LLC (Eagle Eye) will continue this summer at the North River Radio Relay Station site, 12 miles east of Unalakleet, Alaska. Work is expected to begin in late May after breakup has occurred. As in past years, Eagle Eye plans to use local labor force to support the field effort.

Share in Messenger

Suggested Events: Alaska Run for Women, One Year Birthday, The 37th Annual Alaska Scott..., 4th Annual Rainbow Run, NAS | LIVE at Moose's Tooth, 6th Annual Beer and Bacon F...

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Windows taskbar: 2:27 PM 5/22/2018

APPENDIX E
Responses to Comments

**REVIEW
COMMENTS**

**DOCUMENT: North River Radio Relay Station Record of Decision Amendment,
Draft, November 2018**

**LOCATION: UNALAKLEET,
AK**

ADEC	DATE: 5 February 2019 SUBMITTED BY: Melinda Brunner PHONE: 907-451-2192	RESPONSES BY: Jacobs Engineering Group Inc. FOR: USACE DATE: 6 February 2019
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Item No.	Section, page, paragraph, line (classification)	COMMENT	RESPONSE	REVIEWER ACCEPTANCE (A-Agree) (D-Disagree)
1.	Section 1.1, page 1-1	List datum associated with latitude and longitude coordinates.	Accept. The text will be changed to read: 63°53'10.257" N 160°31'27.881" W (horizontal datum WGS84)	A
2.	Section 1.5, page 1-5	The text states, "The revised remedy for Sites SS001 (Area C) and SS003 (Area A) was chosen because the remoteness of the location makes the implementation of treatment technologies costly and impractical, and due to the unlikely exposure of human and ecological receptors." According to the proposed plan, "Previously, the Air Force decided that all soil with PCB concentrations above the cleanup level (1 milligram per kilogram [mg/kg] PCBs) and fuels above their respective cleanup levels would be excavated and shipped off the installation for disposal in a landfill located in the contiguous United States. This has been done to the extent practicable at both Sites SS001 (Area C) and SS003 (Area A); however, the selected remedy described in the 2010 Record of Decision did not account for the volume and extent of contamination that has been identified at the North River RRS, nor did it anticipate the presence of fractured bedrock, and therefore requires an amendment to appropriately address the site conditions as they are currently understood." The quoted text in the draft ROD does not match the reasoning given in the proposed plan. Please reconcile.	Accept. The second paragraph of Section 1.5 will be changed to read: "The revised remedy for Sites SS001 (Area C) and SS003 (Area A) was chosen because the selected remedy described in the original 2010 ROD did not account for the volume and extent of contamination that has been identified at the North River RRS, nor did it anticipate the presence of fractured bedrock, and therefore requires a revision to appropriately address the site conditions as they are currently understood."	A
3.	Part 2, page 2-1	The second paragraph references 18 AAC 75.300, but instead should reference the entirety of Title 18, Chapter 75, Article 3.	Accept. The second paragraph will be changed to read: "As the regulatory support agency, ADEC provides primary oversight of the environmental restoration actions in accordance with State of Alaska contaminated sites regulations (<i>Discharge Reporting Cleanup and Disposal of Oil and Other Hazardous Substances</i> [Title 18, Chapter 75, Article 3]) (ADEC 2018)."	A
4.	Section 2.1, page 2-2	The text states the Unalakleet Native Corporation owns the surface soil rights and the Bering Straight Native Corporation owns the subsurface soil rights. Please provide documentation of coordination and concurrence from landowners regarding the proposed land use controls (LUCs).	The USAF will hold a government to government consultation with UNC and BSNC, which is planned for May 2019. This ROD Amendment will not be signed until this is concluded, and the landowners agree to leaving contamination onsite with LUCs.	A

Item No.	Section, page, paragraph, line (classification)	COMMENT	RESPONSE	REVIEWER ACCEPTANCE (A-Agree) (D-Disagree)
5.	Section 2.3, page 2-5	The text references minutes from a 5 November 2014 public meeting. Please provide a copy of the referenced minutes.	These meeting minutes are documented in the Administrative Record (AR # 474615). A reference for the minutes is included in the References section.	A
6.	Section 2.4, page 2-6	The text states, "...RRO is regulated under State of Alaska." Please add the word "law" after Alaska.	Accept. The end of the first sentence will be changed to read: "... RRO is regulated under State of Alaska <u>law</u> ."	A
7.	Section 2.3, 2-6	The text states, "The community was more concerned with the potential for additional contamination at other surrounding areas." Recommend deleting the word "more" as this is a subjective evaluation of the feedback received.	Accept. The sentence will be changed to read: "The community was more concerned with the potential for additional contamination at other surrounding areas."	A
8.	Section 2.5, pages 2-7, 2-8	The information in the Section 2.5.1 "Topography" and Section 2.5.4 "Surface and Subsurface Hydrology" sections contain the exact same wording. Recommend a changed and more detailed description within "Topography," since "Surface and Subsurface Hydrology" is suitable as is. Additionally, EPA guidance states that the size of the site (acres) should be listed within the Site Characteristics section; please add.	Accept. The text in Section 2.5.1 will be changed to read: "The North River RRS is located on 26 acres of land on a plateau approximately 500 feet above sea level near the Unalakleet River. Surrounding areas have relatively flat topography."	A
9.	Section 2.5, page 2-8	Request adding paragraph in Section 2.5.5 "Ecology" regarding fish resources in the nearby Unalakleet River. A paragraph of this nature was included in the original record of decision, but is not present in this record of decision amendment, yet should still be applicable to this site.	Accept. The following text will be added after the first paragraph: "At its closest point, the Unalakleet River is half a mile from the North River RRS. The Unalakleet River experiences excellent runs of king and silver salmon, as well as resident populations of arctic grayling and Dolly Varden. The river and other fresh water bodies also provide habitat for chum and pink salmon, whitefish, burbot, stickleback, arctic char, and Alaska blackfish (USAF 2008)."	A
10.	Section 2.5.8, page 2-14	The text states, "Further excavation was not feasible due to the depth of excavation and the amount of fractured bedrock encountered during excavation activities." Please see Comment 2, and reconcile the ROD amendment with the proposed plan.	Clarification. The revised proposed plan has the following text, "Subsurface soil at the North River RRS source areas is contaminated with PCBs and POLs at Sites SS001 (Area C) and SS003 (Area A) because prior excavation efforts were unable to remove contaminated soil that had settled deep within local fractured bedrock inaccessible to the heavy equipment used for removal." The text within the comment is thought to be consistent with the revised proposed plan text.	A
11.	Section 2.10, Table 2-3, page 2-26;	The table and text indicates that Alternative 7 is "somewhat" compliant with ARARs. Please explain. As Section 2.13.2 states, the exposure pathways have been eliminated, so why aren't TSCA ARARs being met?	Accept. The first note in Table 2-3 will be deleted and the half-moon circle will be changed to a full circle. The text in Section 2.13.2 will be updated to read:	A

Item No.	Section, page, paragraph, line (classification)	COMMENT	RESPONSE	REVIEWER ACCEPTANCE (A-Agree) (D-Disagree)
	Section 2.13.2, page 2-41		“The revised remedy, Alternative 7, complies with all chemical-specific, location-specific, and action-specific ARARs. Although PCB-contaminated soil would remain onsite above TSCA allowable limits, this condition has been accepted because contamination is capped and LUCs would be put in place to prevent human exposure. No waivers are required for the SS001 (Area C) and SS003 (Area A) project sites.”	
12.	Section 2.12.3, page 2-37	The text states, “The Air Force will file a deed notice that describes the nature and location of residual contamination, and the types and locations of LUCs.” The Air Force needs to coordinate/negotiate with landowners to ensure a covenant placed on the land in accordance with the Uniform Environmental Covenants Act (AS 46.04.300-390).	Noted. The USAF will coordinate the environmental covenant during the government to government consultation. The USAF will also file a notice of activity and use limitation.	A
13.	Section 3.2, page 3-4	DEC agrees that Alternative 7 will meet the requirements of state law if properly implemented. DEC does not have the authority to determine if a technical impracticability (TI) waiver would be needed under CERCLA, and cannot grant a TI waiver under CERCLA. Please revise the text.	Accept. The text will be adjusted to read: “The USAF, <u>in consultation with ADEC, discussed its authority to determine whether</u> a technical impracticability waiver <u>was necessary</u> for leaving PCBs onsite above TSCA limits. It was agreed that the Alternative 7 remedy, if properly implemented, would comply with State of Alaska law because residual risks could be adequately controlled through means other than removal (i.e., capped and LUCs), and therefore, no technical impracticability waiver would be needed.”	A
14.	Appendix B, Table B-3, page B-5	Add the Uniform Environmental Covenants Act (AS 46.04.300-390) as an ARAR.	Accept. The following text will be added to the Action-Specific ARARs:	A

Item No.	Section, page, paragraph, line (classification)	COMMENT	RESPONSE				REVIEWER ACCEPTANCE (A-Agree) (D-Disagree)
			Regulation	Description	A or RA	Rationale	
			Uniform Environmental Covenants Act (AS 46.04.300-390)	<p>Requires an environmental covenant if the ADEC makes a remedial decision as part of an environmental response project and that environmental response project results in residual contamination remaining in the environment in concentrations that are safe for some, but not all, uses; or an engineered feature or structure that requires monitoring, maintenance, or operation, or that will not function as intended if disturbed.</p> <p>Ensures that LUCs are preserved and enforceable over the long-term against successive owners by applying traditional real estate law.</p> <p>Replaces the use of deed notices as ICs.</p>	A	Residual contamination will remain onsite. LUCs are proposed for Site SS003 (Area A).	
			Uniform Environmental Covenants Act (AS 46.04.340)	Requires the owner of real property to record a notice of activity and use limitation into the appropriate public land records where a legal impediment prevents creation of an environmental covenant, such as on U.S. Department of Defense lands.	A	Residual contamination will remain onsite. LUCs are proposed for Site SS001 (Area C).	