US Army Corps of Engineers
Alaska District

Proposed Plan
Aircraft Control and Warning Station
UNALAKLEET AIR FORCE STATION
Formerly Used Defense Site

Unalakleet, Alaska
FUDS Project No. F10AK0036-05

January 2020

Sections:

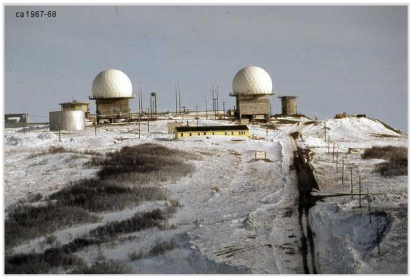

Photo 1: Photo of the AC&W Station in 1967

Photo 2: View of AC&W site from an adjacent hill, 2016

INTRODUCTION

The United States (U.S.) Army Corps of Engineers (USACE) requests your comments on this Proposed Plan for remedial action at Unalakleet Air Force Station (AFS) Formerly Used Defense Site (FUDS), Aircraft Control and Warning (AC&W) Station, located in Unalakleet, Alaska (Photos 1 and 2; Figure 1 and 2).

This Proposed Plan addresses contamination under CERCLA, which excludes petroleum hydrocarbon contamination, such as fuel releases. In addition to this, the Proposed Plan discusses alternatives addressing the petroleum, oil, and lubricants (POL)-contamination at the site. POL contamination at the site is not addressed under CERCLA but is being addressed under the authority of the Defense Environmental Restoration Program (DERP), United States Code, Title 10, Section 2701, et seq. The DERP provides authority to cleanup petroleum contamination if it poses an imminent and substantial endangerment to public health, welfare or the environment.

The Proposed Plan is a document that USACE is required to issue to fulfill the public participation requirements of Section 117(a) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund [42 U.S.C. § 9601 et al.]. The Proposed Plan was prepared in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and follows the requirements from Engineer Regulation 200-3-1, FUDS Program Policy (USACE 2004) and U.S. Environmental Protection Agency (EPA) guidance. The site described in this Proposed Plan is a CERCLA site; however, it is not listed on the National Priority List. USACE is issuing this Proposed Plan as part of its public participation responsibilities under CERCLA.

The Department of Defense (DoD) is authorized to carry out a program of environmental restoration at former military sites under the Defense Environmental Restoration Program, which includes clean-up efforts at FUDS. FUDS are properties that were under the jurisdiction of the DoD and owned by, leased to, or otherwise possessed by the United States that were transferred from DoD control prior to 17 October 1986. FUDS properties range from privately owned lands to state or Federal lands such as national parks as well as residential land, schools, and industrial areas.

The FUDS program includes former Army, Navy, Marine, Air Force, and other defense-used properties. Over 500 FUDS have been identified in Alaska.

Although this Proposed Plan recommends a preferred alternative for this site, USACE may modify or select another remedial alternative based on new information or public comment. Therefore, the public is encouraged to review and comment on all the alternatives presented in this Proposed Plan. After considering all public comments, USACE will prepare a Decision Document describing the selected remedy. The Decision Document will include responses to all significant comments in a section called the Responsiveness Summary. Changes to the proposed approach may be made through this comment review process and highlights the importance of community involvement. This Proposed Plan addresses contamination under CERCLA, which excludes petroleum hydrocarbon contamination, such as fuel releases.

This Proposed Plan presents a summary of the history, data, and actions conducted at the site. Detailed supporting documentation is available for review including the Remedial Investigation and Feasibility Study on file at the information repository at the Native Village of Unalakleet.

PURPOSE

The purpose of this Proposed Plan is to:

- Describe the environmental conditions and the risks posed by the site.
- Present the preferred remedial alternative for the site.
- Describe the potential remedial alternatives that were considered with a comparative evaluation.
- Describe the investigations, remedial actions, and removal actions previously conducted at the site.
- Describe the clean-up criteria for the site.
- Provide information on how the public can be involved in the final decision.
- Request public comment on the remedial alternatives.

SITE LOCATION AND HISTORY

The AC&W Station (Site) is located approximately 3.5 miles north-northeast of Unalakleet, Alaska. U.S. military interest in Unalakleet began during World War II when an aircraft runway was constructed to support aircraft transfer to the Soviet Union under the lend-lease agreement. After World War II, Unalakleet AFS was constructed as part of a defense network of aircraft warning and communication relay systems. The main portion of the AFS was acquired by Public Land Order (PLO) in December 1958. The AC&W site is located on a hill which was graded to develop building pads (Photo 3). The AC&W parcel was declared excess and retransferred to the Department of the Interior, Bureau of Land Management in 1970 (USACE 1999). The site is currently under the ownership of the Unalakleet Native Corporation (USACE 2013).

The AC&W site contained a variety of infrastructure, including a composite building, two radar buildings, two radar dome towers, a well pad, two water pump houses and water pipelines, two main underground storage tanks (USTs) adjacent to the composite building, a fuel filling station, two 323,400-gallon fuel aboveground storage tanks (ASTs) and fuel pipelines, a sewage system (building with outfall pipelines), a generator building, and several concrete structures (Photo 1).

Photo 3: Aerial view of the Site, 2016

Between 1993 and 1995, USACE demolished all buildings and associated infrastructure including storage tanks and collected soil samples from onsite areas of concern. Diesel range organics (DRO) contaminated soil was excavated and thermally treated on site. Construction debris was cut up and buried on site in the Martech Landfill. Additional excavation and onsite thermal treatment of fuel-contaminated soil continued in 1995.

NATURE AND EXTENT OF CONTAMINATION

CERCLA Contaminants of Concern

In 2005 and 2006, USACE conducted site characterization activities including test pit excavations with field screening and analytical sampling of soil at 10 areas of concern. Based on the site characterization data, further excavation and/or investigation was recommended for six areas of concern at the AC&W main complex.

Historical data for the site was compiled and evaluated in a Feasibility Study to assess remedial alternatives (USACE 2008). The trichloroethylene (TCE) impacted soil remaining at the AC&W main complex was estimated to be 5 cubic yards (CY).

In 2009, a Decision Document selected excavation and offsite treatment/disposal as the remedial action for soils at the AC&W site. Between 2010 and 2013, remedial activities were performed to reduce risk to human health and the environment. The extent and magnitude of soil contaminated with TCE was found to be larger than indicated by previous data, raising concern that this highly mobile contaminant could be migrating off site. In total, approximately 3,900 CY of contaminated soil was removed from the site (Photo 4), and it was apparent that even more contaminated soil was present. A follow-on remedial investigation was deemed necessary to address data gaps related to the 2005 and 2006 characterization work.

The 2016 Remedial Investigation (RI) was conducted to fill remaining data gaps after completion of the soil removals (USACE 2016). The investigation identified CERCLA contaminants of concern (COCs) TCE and polychlorinated biphenyls (PCBs) in soil (Figure 2).

TCE in soil above the cleanup level of 0.044 milligrams per kilogram (mg/kg) exists near the former radar buildings and composite building. Contamination is present in shallow soil extending to bedrock at most locations. The maximum concentration of TCE (1.65 mg/kg) was detected at a 2011 excavation bottom sample. PCBs exceeded the cleanup level of 1 mg/kg, with a maximum concentration of 1.3 mg/kg.

Groundwater was not found above bedrock in the excavations and test pits completed during previous investigations. Deep exploratory borings were advanced through bedrock to locate water-bearing fractures for collection of groundwater samples (Photo 5). Water was encountered in fractures ranging from as shallow as 32 feet deep (~20 feet into bedrock) along the northwestern perimeter of the Site to greater than 400 feet deep (~390 feet into bedrock) near the southern perimeter. No contaminants were detected.

Downgradient surface seeps and a culvert outfall beneath North River Road were also sampled as part of the groundwater investigation, and no contaminants of concern were detected.

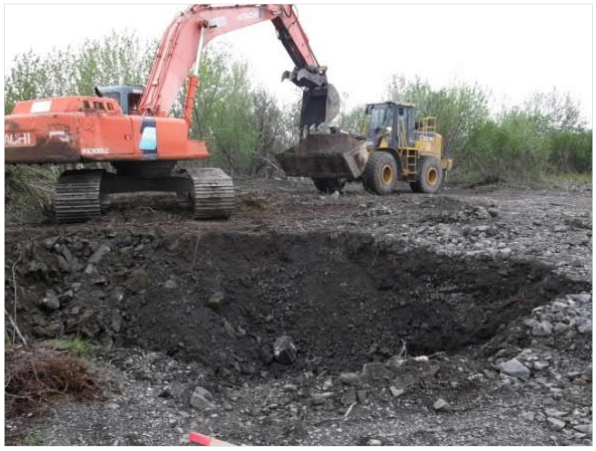

Photo 4: Initial Site excavation in 2012

Photo 5: Drilling monitoring wells at the Site

Petroleum-Oil-Lubricants (POL) Contamination under DERP authority:

Historical data for the site compiled in 2008 estimated the amount of DRO and polycyclic aromatic hydrocarbon (PAH) impacted soil above state cleanup levels at 625 CY.

Between 2010 and 2013, remedial activities were performed to remove POL-contaminated soils from the site. The extent of soil contaminated with PAHs was larger than indicated by previous data. A follow-on investigation was performed to address the identified data gaps. The 2016 Remedial Investigation identified the extent of remaining PAH and DRO contamination in soil (Figure 2).

PAH contamination occurs in surface soils across the Site. The most widespread PAH exceedance is from benzo(a)pyrene, with concentrations up to 80 mg/kg, above the cleanup level of 1.5 mg/kg. DRO in soil exists at three locations above the cleanup level of 3,800 mg/kg. Concentrations range from 4,890 mg/kg adjacent to a previous excavation near the western side of the former Composite Building to 7,450 mg/kg near the former fueling station.

SCOPE AND ROLE OF THE ACTION

This will be the final Remedial Action for the Site. The remedial action objectives (RAOs) are to prevent current and future exposure to contamination and/or contaminated media through treatment of soil at the site. RAOs are further discussed below. Through the use of treatment technologies, this response will permanently reduce the toxicity, mobility and volume of those source materials that create an unacceptable risk at the site.

SUMMARY OF SITE RISKS

HUMAN HEALTH RISK

A human health risk evaluation was conducted for contaminants regulated under CERCLA. Several sources and release mechanisms have resulted in impacts to soils at concentrations above the cleanup levels for TCE and PCBs. Contaminant pathways and potential receptors were evaluated through individual Conceptual Site Models (CSMs) for both human health and ecological receptors (USACE 2016). Current and future human receptors include site visitors, recreational users, farmers/ subsistence harvesters, subsistence consumers, and potential residents, commercial or industrial workers. The site is owned the Unalakleet Native Corporation, who indicates they intend to develop the site for commercial or residential use in the future.

Risk results show that the current cumulative non-cancer hazard index (HI) of 3 under a residential land use scenario for the child receptor is above the benchmark of 1. The non-cancer risk was driven by TCE in soil.

ECOLOGICAL RISK

The ecological CSM provided a general overview of the potential exposure pathways and ecological receptors to assess the risk to the environment on a site-wide basis. This small site lacks critical or aquatic habitat. Past disturbance has made the site poor quality habitat for wildlife in comparison to richer undisturbed upland habitat present nearby. Therefore, the ecoscoping process concluded that no further evaluation of risk to the ecological environment was warranted.

PETROLEUM-OIL-LUBRICANTS

The POL contamination at the site was investigated to determine whether it poses an imminent and substantial endangerment to human health or the environment under DERP. Petroleum related compounds have been determined to present an imminent and substantial endangerment to public health or welfare and the environment. Site concentrations of POL related compounds were compared to Alaska's Site Cleanup Rules (18 Alaska Administrative Code [AAC] 75 Article 3). DRO and multiple PAHs exceed the ADEC cleanup levels for residential use. DRO is present at a maximum concentration of 7,450 mg/kg which exceeds the cleanup level of 3,800 mg/kg. The most widespread PAH exceedance is from benzo(a)pyrene which is present at a maximum concentration of 80 mg/kg, which exceeds the cleanup level of 1.5 mg/kg.

REMEDIAL ACTION OBJECTIVES

The following were identified as RAOs to address soil contamination at the Site:

- Prevent unacceptable risk to human health and the environment from exposure to TCE and PCBs in the surface and subsurface soil;
- Achieve source control to address potential migration of TCE from soil to shallow fractured bedrock environment;

Estimated volumes of contaminated soil above cleanup levels are shown in Table 1.

Table 1: Estimated Volumes of Soil Above Cleanup Levels

Contaminant	Estimated Volume in cubic yards
PCBs	40
TCE	6,315

Note: the soil volumes in this document were revised from the FS to reflect the current ADEC cleanup levels.

The detailed evaluation of remedial alternatives includes an analysis of the extent to which the alternatives comply with applicable or relevant and appropriate requirements (ARARs). The potential chemical-specific and action-specific ARARs identified for the Site are presented in Table 2.

Table 2: Potential ARARs

Topic/ Alternative	Contaminants of concern	Regulation / Requirements Citation	Description
Chemical Specific			
Soil Excavation/ Alternatives 2, 4, 5	PCBs	18 AAC 75.341 (c), Table B1, Under 40-inch Zone	These state regulations provide soil cleanup levels for CERCLA constituents and provide the basis for the site cleanup levels. Cleanup level is 1 mg/kg.
	TCE	18 AAC 75.340 (a)(3), Method 3	ADEC Method Three Alternative Cleanup Level was calculated using the site-specific value for Total Organic Carbon (TOC) (0.0155 g/g), residential occupancy, under 40 inches of rainfall, migration to groundwater. Cleanup level is 0.044 mg/kg.
Action Specific			
Soil storage and disposal/ Alternatives 2, 4, 5	TCE/PCBs	18 AAC 75.370(a)(1),(3),(5) and (6)	For alternatives that include excavation of TCE and PCB-contaminated soils and potential onsite storage or soil stockpiles. For example, not mixing clean and dirty soils, storage of TCE or PCB contaminated soils on a liner and covering soil stockpiles.
Soil Capping/ Alternatives 3, 4	PCBs	40 CFR 761.61 (a)(4)(i)(A)	PCBs in soil that remain at concentrations >1 ppm and ≤10 ppm shall be covered with a cap. Cap materials consisting of compacted soil shall have a minimum thickness of 10 inches. A concrete or asphalt cap shall have a minimum thickness of 6 inches. A cap must be of sufficient strength to maintain its effectiveness and integrity during the use of the cap surface which is exposed to the environment.

AAC = Alaska Administrative Code CFR = Code of Federal Regulations

The ADEC requested consideration of multiple sections of Alaska regulations as ARARs including 18 AAC 60 and 18 AAC 75. USACE has determined that some of these state regulations are not ARARs. The proposed ARARs and USACE's rationale for not considering them ARARs are discussed below:

18 AAC 60.010(a)(3) and (4): require that solid waste not be stored in a manner that causes a health hazard and/or polluted runoff. This regulation is not applicable to any of the alternatives because waste covered by this regulation is not being stored on site. As such, it does not meet the definition of an ARAR.

18 AAC 60.015: requires that contaminated waste be covered during transport and any spills occurring during transport be promptly picked up. This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; remedial action; or remedial location. This regulation does not impact how the remediation would happen, and therefore is not an

ARAR. As a best management practice, USACE would cover loads during transportation.

18 AAC 75.340(k): provides direction on calculating cumulative risk under 18 AAC 75.325(g). A risk calculation is not a cleanup standard or a standard of control. Accordingly, this is not an ARAR.

18 AAC 75.355(b): requires that required sampling and analysis is conducted or supervised by a qualified environmental professional. This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; remedial action; or remedial location. This regulation does not impact how the remediation would happen, and therefore is not an ARAR. As a best management practice, USACE uses qualified environmental personnel to conduct sampling and analysis.

18 AAC 75.355(d): Deals with POL contamination. CERCLA Section 101(14) specifically excludes petroleum from the definitions of hazardous substance and pollutant or contaminant. Accordingly, this is not an ARAR.

18 AAC 75.355(e): requires use of a DEC-approved lab. This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; remedial action; or remedial location. This regulation does not impact how the remediation would happen, and therefore is not an ARAR. As a best management practice, USACE utilizes ADEC-approved labs.

18 AAC 75.360: requires that the site cleanup is conducted or supervised by a qualified environmental professional. This is not a cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; remedial action; or remedial location. This regulation does not impact how the remediation would happen, and therefore is not an ARAR. As a best management practice, USACE ensures that the cleanup is conducted or supervised by a qualified environmental professional.

Although not considered ARARs, the requirements of 18 AAC 60.015, 18 AAC 75.340(k), and 355(b)(d)(e) will be incorporated into future planning documents as applicable.

The extent of remaining contamination at the site was determined by comparing all available data to the cleanup levels. The remedial investigation determined that remaining contamination was limited to soil. Where groundwater was present, COCs were not detected at concentrations above cleanup levels. For these reasons, potential exposure to contaminants is limited to soil pathways, such as direct contact, ingestion, and inhalation. **Error! Reference source not found.**3 provides a summary of cleanup levels for petroleum hydrocarbon compounds in soil.

Table 3: Soil Cleanup Levels for Petroleum Hydrocarbon COCs

Contaminant of Concern	Maximum Concentration (mg/kg)	Cleanup level (mg/kg)	Source	Volume of Contaminated Soil (cubic yards)
DRO	7,450	3,800	18 AAC 75 Method 3 (MTG)	29
Benzo(a)anthracene	92	11	18 AAC 75 Method 3 (MTG)	2,524
Benzo(b)fluoranthene	80	15	18 AAC 75 Method 2 (Human Health)	
Benzo(a)pyrene	80	1.5	18 AAC 75 Method 2 (Human Health)	
Dibenzo(a,h)anthracene	12	1.5	18 AAC 75 Method 2 (Human Health)	
Indeno(1,2,3-c,d)pyrene	41	15	18 AAC 75 Method 2 (Human Health)	

Note: ADEC Method 3 Cleanup Levels were calculated using the site-specific value for Total Organic Carbon (TOC) (0.0155 g/g), residential occupancy, under 40 inches of rainfall, and migration to groundwater (MTG).

PROPOSED REMEDIAL ACTIONS

REMEDIAL ACTION ALTERNATIVES

The following five alternatives were evaluated to address the CERCLA soil contamination:

- No action
- Hot spot excavation and Phytoremediation
- Capping and Land Use Controls (LUCs)
- Limited Excavation and Capping/LUCs
- Excavation and offsite disposal.

Alternative 1 – No Action:

Evaluation of the No Action alternative is required by CERCLA as a baseline to reflect current conditions where no remediation would take place, and for comparison and evaluation of the other alternatives. Soil would be left in place without any response actions, such as monitoring, LUCs, removal, or treatment.

Alternative 2 – Hot Spot Excavation and Phytoremediation:

Hot spot excavation would be limited to the targeted removal of PCBs in shallow soil (40 CY) and a few locations where TCE contamination is present at eight feet or deeper below the surface (220 CY) (see Figures 3 and 4). COCs in deeper soils are not amenable to phytoremediation because of the limitation of the root system to extend beyond certain depths. Excavation would be performed using equipment such as hydraulic excavator(s), or backhoes, as applicable. Following soil removal, confirmation samples would be collected from the sidewalls and bottom of the excavated areas. Removed soils associated with hot-spot excavation would be replaced with clean fill obtained locally. Contaminated soils associated with hot-spot excavation would be shipped off Site via barge transport for disposal.

Phytoremediation will be used to address the remaining TCE contamination in shallow soils. The remedy would involve planting arctic willow and other suitable vegetation such as fescue grass at the Site and fertilizing till they take root. The plant roots would absorb and process the contaminants, removing them from the soil (Figure 3).

The estimated timeframe to achieve the cleanup levels is twenty years, therefore CERCLA five-year reviews would be conducted. Upon achieving the RAOs, the site would be available for unlimited use/unrestricted exposure.

Alternative 3 – Capping and LUCs:

This alternative would include installation of a low-permeability cap placed over the entire surface covering approximately 0.61 acres of TCE and PCB-contaminated soil. Capping would involve site preparation such as clearing and grubbing, compaction of subgrade and regrading prior to placement of a cap. Regrading would be performed to eliminate surface ponding and adjust slopes to route surface run-off and precipitation away from the contaminated soil. Depending on the site-specific reuse of the site, capping may consist of a soil barrier, or asphalt paving, or other low-permeable material meeting the performance objectives. The type of capping would be finalized in the design phase.

Five-year reviews would be conducted to evaluate the integrity of the cover, evaluate impacts from any changed site conditions, and assess the continued protectiveness of this remedial action.

LUCs may consist of:

- Maintenance of signs to inform site visitors of the presence of the soil cap;
- Periodic monitoring and maintenance of the cap;
- Providing the landowner with a Notice of Environmental Contamination (NEC) which summarizes the cap construction, surveyed location, maintenance and monitoring requirements. At this time, the landowner has not agreed to file the NEC.

Alternative 4 – Limited Excavation/Off-site Disposal, Capping and LUCs:

This alternative consists of limited excavation/off-site disposal pertaining to TCE-contaminated soil combined with capping to address remaining soil contamination. LUCs will be implemented to maintain the integrity of the cap.

Approximately 6,315 CY of TCE contaminated soil would be excavated from the site. This includes TCE contaminated soil from the eastern edge of former Composite Building and south of the North Radar Building. Excavation would be performed using equipment such hydraulic excavator, scrapers or backhoes, as applicable. Following soil removal, confirmation samples would be collected from the sidewalls and bottom of the excavated areas. The excavated areas would be backfilled with soil that may be obtained from nearby areas.

Approximately 0.02 acres of PCB contaminated soil surface area would be capped. Capping/LUCs would be performed as described for Alternative 3, excluding the limited excavation areas for TCE-contaminated soil.

Five-year reviews would be conducted to evaluate the integrity of the cover, evaluate impacts from any changed site conditions, and assess the continued protectiveness of this remedial action.

Alternative 5 – Excavation and Off-site Disposal:

This alternative consists of excavation and off-site disposal of the entire footprint of the TCE and PCB- contaminated soil. Alternative 5 would result in unrestricted use/unlimited exposure (UU/UE). The volume of excavated soil is estimated to be approximately 6,355 CY. Soil removed from the areas of contamination would be backfilled with clean fill.

REMEDIAL SELECTION PROCESS

The EPA has developed nine criteria to evaluate remedial alternatives and ensure all important considerations are factored into remedy selection decisions. The first step of remedy selection is to identify those alternatives that satisfy the threshold criteria, which are two statutory requirements that any alternative must meet in order for it to be eligible for selection. The second step is to examine the five primary balancing criteria, which are used to identify major trade-offs between remedial alternatives. After considering the balancing criteria, the third step is to evaluate the modifying criteria, which are based on input from the community and regulatory agency during the formal public comment period on the Proposed Plan. The balancing and modifying criteria are used to identify the preferred alternative and to select the final remedy.

Threshold Criteria:

The first threshold criterion is overall protection of human health and the environment, which addresses whether a remedy provides adequate protection and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, or LUCs. The second criterion is compliance with ARARs, which addresses whether a remedy will meet all the identified requirements or whether a waiver can be justified.

Primary Balancing Criteria:

The first primary balancing criteria is long-term effectiveness and performance, which refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup goals have been met. The second criteria is reduction of toxicity, mobility, or volume through treatment, which is the anticipated performance of the treatment technologies a remedy may employ.

The third criteria is short-term effectiveness, which addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until cleanup goals are achieved. The fourth criterion is implementability, which evaluates the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option. The fifth primary balancing criteria is cost, which includes estimated capital and operation and maintenance costs, and net present worth costs.

Modifying Criteria:

The first modifying criterion is State Acceptance, which considers the State's views on the alternatives evaluated. The second modifying criterion is community acceptance, which refers to the public's general response to the alternatives described in the Proposed Plan.

POL ALTERNATIVES UNDER DERP

Phytoremediation

Phytoremediation will be used to address the petroleum contamination in shallow soils that poses an imminent and substantial endangerment. The remedy would involve planting arctic willow and other suitable vegetation such as fescue grass at the Site and fertilizing till they take root. The plant roots would absorb and process the contaminants, removing them from the soil.

Capping and LUCs

This alternative would include installation of a low-permeability cap placed over the entire surface covering approximately 1.4 acres of DRO and PAH-contaminated soil that poses an imminent and substantial endangerment. Capping would involve site preparation such as clearing and grubbing, compaction of subgrade and regrading prior to placement of a cap. Regrading would be performed to eliminate surface ponding and adjust slopes to route surface run-off and precipitation away from the contaminated soil. Depending on the site-specific reuse of the site, capping may consist of a soil barrier, or asphalt paving, or other low-permeable material meeting the performance objectives. The type of capping would be finalized in the design phase.

Excavation and Off-site Disposal

This alternative consists of excavation and off-site disposal of the entire footprint of the DRO and PAH- contaminated soil. Petroleum-contaminated soil that poses an imminent and substantial endangerment would be excavated. The volume of excavated soil is estimated to be approximately 2,553 CY. Soil removed from the areas of contamination would be backfilled with clean fill.

COMPARATIVE ANALYSES OF ALTERNATIVES

The five alternatives were evaluated against the threshold and primary balancing criteria as part of the CERCLA process.

As shown in Table 4, Alternative 1 (No Action) did not meet the Threshold Criteria; however, it was retained for comparison purposes. All other alternatives meet the Threshold Criteria.

With Alternative 2 (Hot Spot Removal and Phytoremediation) COCs would be degraded and permanently removed from the Site over a period of time. It has minimal short-term risks due to a limited timeframe for hot spot excavations and planting of vegetation. RAOs are anticipated to be achieved in 20 years. It should be relatively easy to implement. The AC&W site is currently vegetated with diamond willow and is likely to support other locally sourced species of willows, which is a good indicator that phytoremediation would be successful. A field demonstration study would confirm its suitability for the Site. Several sites in Alaska have shown successful implementation of phytoremediation to treat petroleum and other compounds. It is a simple technology, with a minimal requirement of equipment and hardware, and relatively easy to implement. The cost would be $2.55 million.

Alternative 3 (Capping and LUCs) controls long-term exposure and contaminant migration, but it needs maintenance and effective LUCs to preserve the integrity of the cap. There is no reduction in toxicity and volume of COCs, but mobility would be reduced. There would be moderate short-term risks to the community and workers due to a longer construction timeline for capping activities. It is implementable but requires barge services for transportation of equipment not locally available. The land owner has not agreed to implement LUCs at this time. The cost could be $3.93 million.

Alternative 4 (Limited Excavation, Capping, and LUCs) would control long-term exposure and contaminant migration, but it would need maintenance and effective LUCs to preserve the integrity of the cap. The volume of TCE in soil would be reduced, and the mobility of other COCs would also be reduced. It has relatively high short-term risks during excavation, handling and transportation of TCE-contaminated soil, but moderate short-term risks associated with capping construction activities. It is implementable but requires barge services for transportation of equipment and excavated soil. Unknown if LUCs are acceptable to all stakeholders. The cost would be $8.08 million.

Alternative 5 (Excavation and Offsite Disposal) would have COCs permanently removed from the Site. This alternative has the greatest potential to impact Site visitors and workers during excavation, handling and transportation of contaminated soil from the Site. The alternative poses logistical constraints regarding excavation, handling and subsequent disposal of such a large volume of soil in a remote location. Barge landing area has limited space for temporary storage of contaminated soil and is utilized for other community needs. The cost would be $14.11 million.

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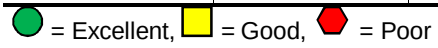
Table 4: Comparison of Alternatives

Criteria	Alternative 1 No Action	Alternative 2 Hot Spot Removal and Phytoremediation	Alternative 3 Capping and LUCs	Alternative 4 Limited Excavation, Capping, and LUCs	Alternative 5 Excavation and Offsite Disposal
Threshold Criteria					
Overall Protection of Human Health and Environment	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Compliance with ARARs	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Primary Balancing Criteria					
Long-term Effectiveness and Permanence					
Reduction in Toxicity, Mobility, or Volume Through Treatment					
Short-term Effectiveness					
Implementability					
Cost	**$0**	**$2.55 Million**	**$3.93 Million**	**$8.08 Million**	**$14.11 Million**
Modifying Criteria					
Regulatory Agency Acceptance	Regulatory acceptance of alternatives will be evaluated after the public comment period.				
Community Acceptance	Community acceptance of alternatives will be evaluated after the public comment period.				
Additional Information					
Estimated Construction Timeframe (yrs.)	None	1	1	1	1
Estimated time to reach RAOs (yrs.)	None	20	30	30	1

 = Excellent, = Good, = Poor

PREFERRED ALTERNATIVE

CERCLA Preferred Alternative

The preferred alternative for remediation of t the AC&W Station is Alternative 2, Hot Spot Excavation and Phytoremediation.

Relatively small amounts of PCB and TCE contamination would be excavated and removed from the site for off-site disposal outside of Alaska. The remaining, low concentrations of TCE–are highly susceptible to biodegradation, specifically, phytoremediation. Phytoremediation involves the use of plants to absorb and process contaminants (Figure 3 4). The plants would be arctic willow or fescue grass, harvested and replanted at the site. Over time these plants would remove the remaining contamination at the Site.

Alternative 2 provides overall protection of human health and the environment, compliance with ARARs, short-term and long-term effectiveness and permanence, very good implementability, and removes all contamination above UU/UE levels. Alternative 2 is lower in price than other

alternatives but is the only alternative that provides both excellent short-term and long-term solution for site clean-up.

The estimated timeframe to achieve the cleanup levels is twenty years, therefore CERCLA five-year reviews would be conducted. Upon achieving the RAOs, the site would be available for unlimited use/unrestricted exposure.

Other remedial alternatives such as capping do not provide long term solutions and would require leaving the contamination on site. Excavating all the soil is the least cost-effective.

For these reasons, the preferred alternative for clean-up of the site is hot spot excavation and phytoremediation.

POL Alternative under DERP

Phytoremediation is the alternative that best addresses the POL contaminants to remove the imminent and substantial endangerment.

COMMUNITY PARTICIPATION

The public is encouraged to provide comments on any of the alternatives presented in this Proposed Plan for the Unalakleet Air Force Station FUDS.

The NCP specifies the lead agency must provide a reasonable opportunity, not less than 30 calendar days, for submission of written and oral comments on the proposed plan and the supporting analysis and information located in the information repository.

The public comment period ends 22 January 2020.

Comments can be submitted to USACE by any of the following methods:

Mail a written comment:

AECOM Technical Services, Inc.
Unalakleet Air Force Station Proposed Plan
700 G St, Suite 500
Anchorage, Alaska 99501

Email a comment:

POA-FUDS@usace.army.mil

Attend the public meeting:

7:00 PM on 15 January 2020
Community Hall
Unalakleet, Alaska

A final decision for this site will be made only after public comments are considered.

USACE will provide a written response to all significant comments. A summary of the responses will accompany the Decision Document and will be made available in the Administrative Record and Information Repository.

Contact Information:

For additional information, please contact:

Andrea Elconin
USACE Project Manager
907-753-5680

Information Repository Location:

Additional detailed information that is not presented in this Proposed Plan (documents that detail previous investigations, remedial actions, and results) is available for your review in the Information Repository located at the Native Village of Unalakleet.

Electronic Copy:

An electronic copy of this Proposed Plan is available during the public comment period at:

https://www.poa.usace.army.mil/Library/Reports-and-Studies/

PUBLIC MEETING:
15 January 2020
Community Hall
Unalakleet, Alaska
7 PM

ACRONYMS

AAC	Alaska Administrative Code
AC&W	Aircraft Control & Warning
ADEC	Alaska Department of Environmental Conservation
AFS	Air Force Station
ARAR	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COC	contaminants of concern
CSM	Conceptual Site Model
DoD	Department of Defense
DRO	diesel range organics
EPA	United States Environmental Protection Agency
FUDS	Formerly Used Defense Site
HI	Hazard Index
LUC	land use control
mg/kg	milligrams per kilogram
N/A	Not applicable
NCP	National Contingency Plan
NPL	National Priorities List
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
ppm	parts per million
PRG	Preliminary Remedial Goal
RCRA	Resource Conservation and Recovery Act
RAO	Remedial Action Objectives
TCE	Trichloroethylene
TSCA	Toxic Substances Control Act (1976) (15 U.S.C. s/s 2601 et seq.)
U.S.	United States
USACE	U.S. Army Corps of Engineers
UU/UE	unlimited use and unrestricted exposure

REFERENCES

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FIGURES

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Figure 1: Site Overview

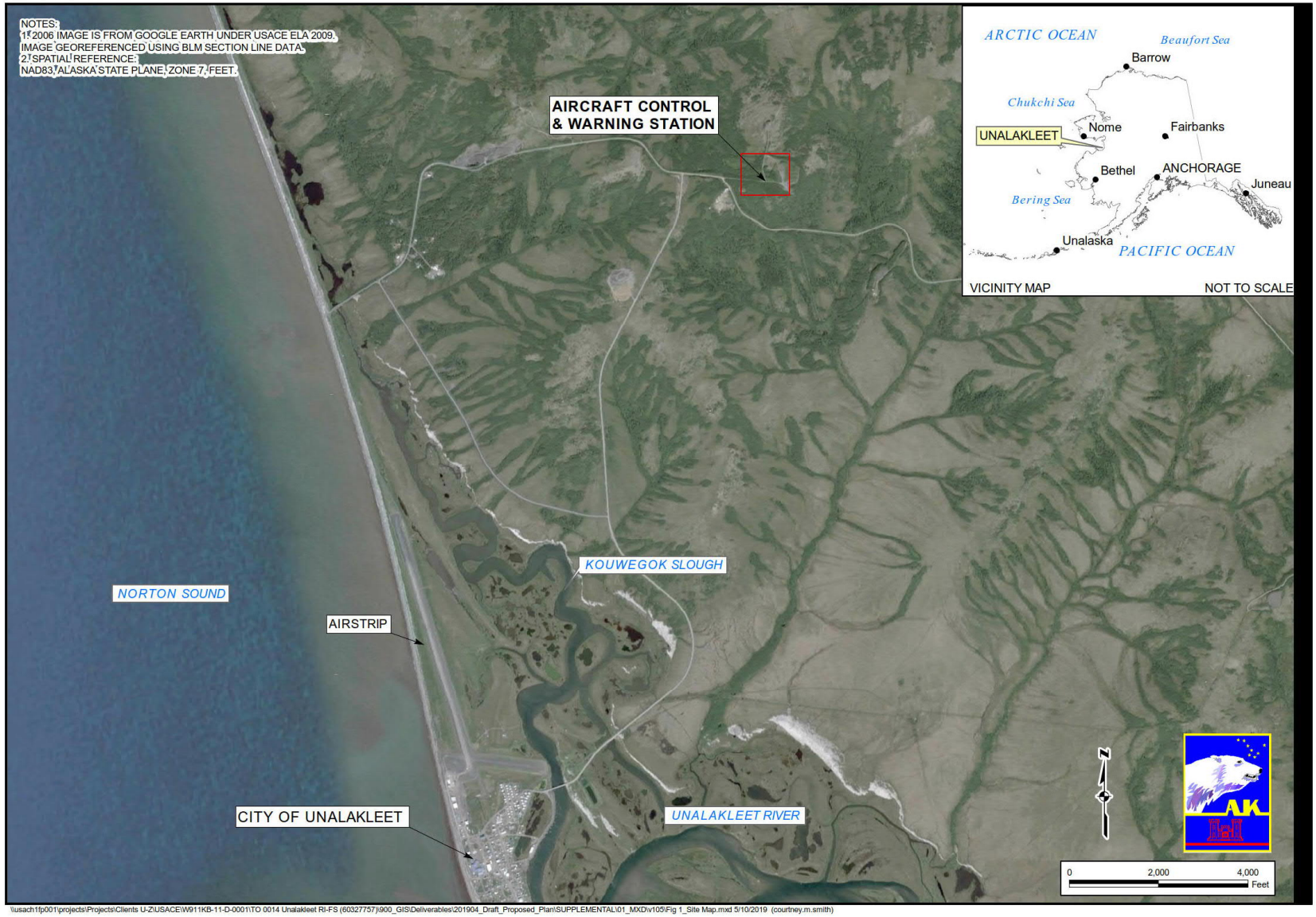


Figure 1
SITE OVERVIEW
DRAFT PROPOSED PLAN
AC&W Station (F10AK0036-05) Unalakleet, AK
U.S. Army Corps of Engineers Alaska District

Figure 2: Extent of Contamination above Cleanup Levels

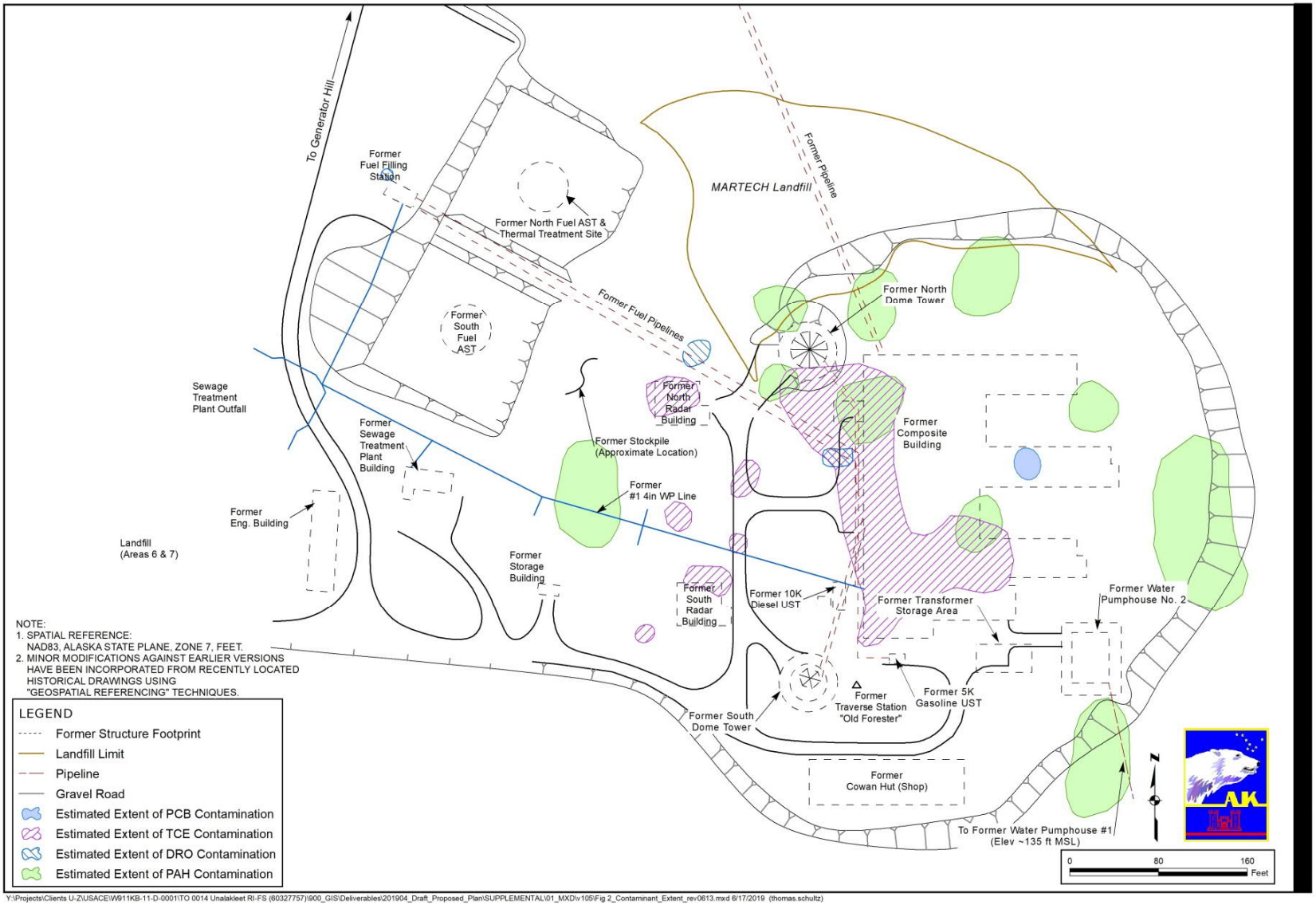


Figure 3: Alternative 2 Hot Spot Excavation and Phytoremediation Example

Hot spot excavation would be limited to a few locations Waste treatment or disposal would depend on waste characterization.

Planting of suitable vegetation to promote degradation. Arctic willow/fescue grass appear to be suitable.

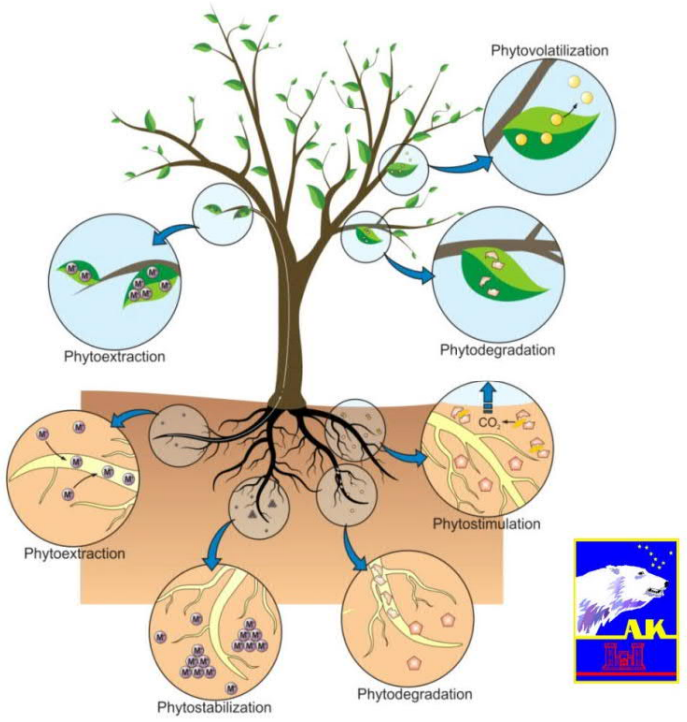
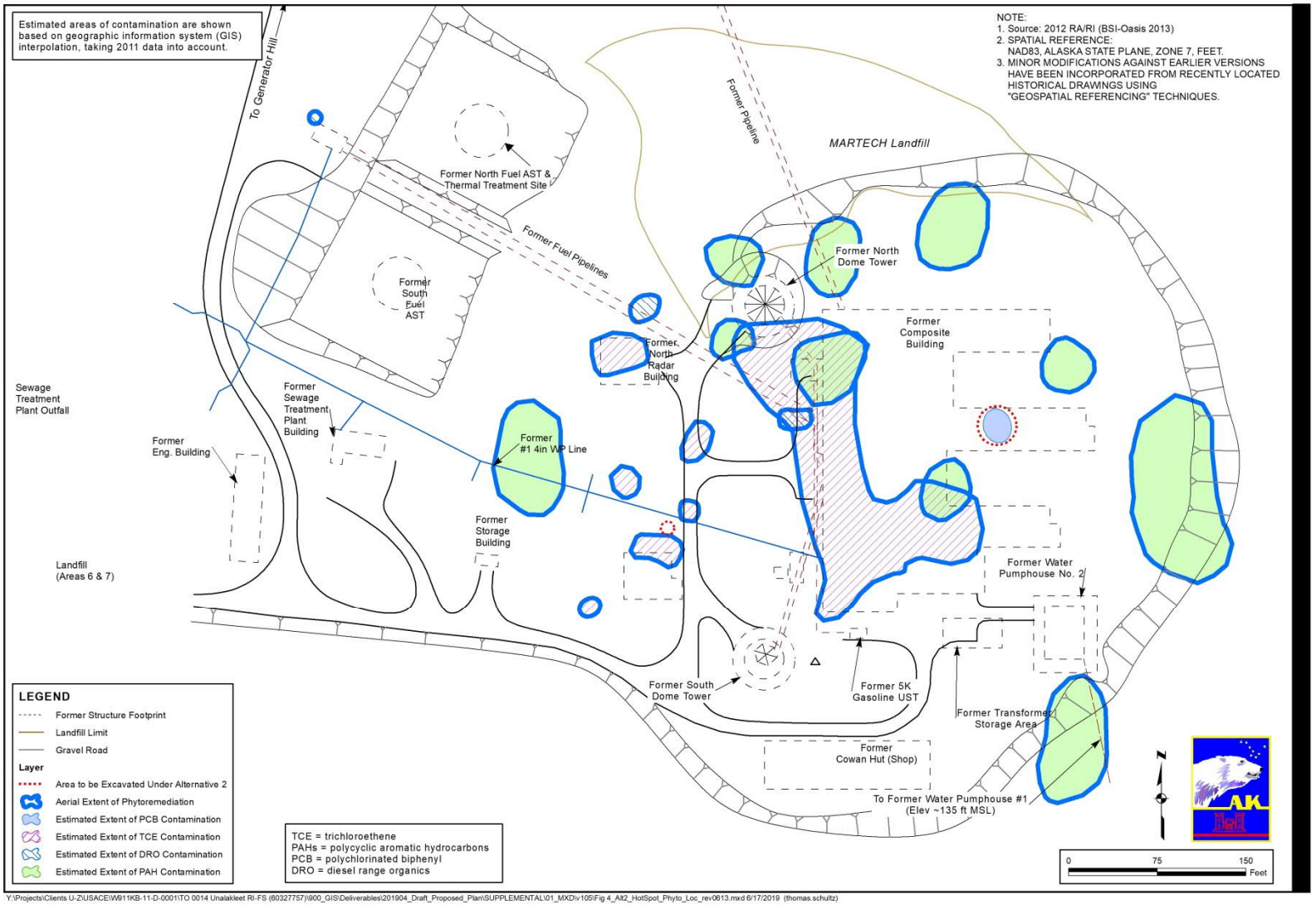


Figure 3
ALTERNATIVE 2 HOT SPOT EXCAVATION AND PHTOREMEDIATION
DRAFT PROPOSED PLAN
AC&W Station (F10AK0036-05) Unalakleet, AK
U.S. Army Corps of Engineers Alaska District

\\usach1fp001\projects\Projects\Clients U-Z\USACE\W911KB-11-D-0001\TO 0014 Unalakleet RI-FS (60327757)\900_GIS\Deliverables\201904_Draft_Proposed_Plan\SUPPLEMENTAL\01_MXD\v105\Fig 3_Alternative2Hotspot_rev0510.mxd 5/10/2019 (courtney.m.smith)

Figure 4: Alternative 2 Hot Spot Excavation and Phytoremediation



THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program

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December 13, 2019 File No: 630.38.003

Andrea Elconin
USACE
P.O. Box 6898
Elmendorf AFB, 99506-6898

Re: DEC Comments on the "Proposed Plan for Aircraft Control and Warning (AC&W) Station, Unalakleet Air Force Station (AFS) Formerly Used Defense Site (FUDS), Unalakleet, Alaska" dated July 2019.

Dear Ms. Elconin:

On August 30, 2019 the Alaska Department of Environmental Conservation (DEC) provided comments for the "Proposed Plan for Aircraft Control and Warning Station, Unalakleet Air Force Station, Formerly Used Defense Site, Unalakleet, Alaska" dated July 2019.

The United States Army Corps of Engineers (USACE) submitted response to comments (RTC) on October 02, 2019. However, there were some unresolved land use/ institutional control concerns for the proposed plan that required further discussions. The DEC and USACE met on December 10, 2019 to discuss the site and resolve the remaining issues. The remaining issues for land use controls were resolved during the meeting. The USACE provided an annotated RTC to capture the resolution of comments on December 12, 2019.

DEC is providing acceptance to the annotated version of the RTC (enclosed). Please do not hesitate to contact the DEC project manager at (907) 451-2180 or by email at dennis.shepard@alaska.gov if you have questions.

Sincerely,

Dennis Shepard
Environmental Program Specialist

cc via email: Melinda Brunner, DEC

Enclosure: Comment matrix/RTC

Aircraft Control and Warning (AC&W) Station,
Unalakleet Air Force Station (AFS) Formerly Used Defense Site (FUDS),
Unalakleet, Alaska

Proposed Plan
Dated July, 2017

Note: The Disposition and Response columns will be filled out by AECOM after addressing each Comment

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
				ADEC comments			
1	Global			DEC considers it inappropriate that USACE is not using EPA guidance for the establishment of ARARs by stating a USACE (not EPA) requirement that an ARAR is a "cleanup standard, standard of control, or requirement that specifically addresses a CERCLA hazardous substance, pollutant, or contaminant; remedial action; or remedial location.			Noted
2	5			18 AAC 60.010(a)(3) and (4): This is a substantive requirement under State law affecting the way in which contaminated media is stored and protects human health and the environment by not allowing transfer or spreading of contamination from one area to another. USACE has indicated that PCBs-contaminated soil will be placed in supersacks on-site prior to shipment for disposal. This regulation applies to the storage of contaminated soil, even if in supersacks. During the development of the feasibility study, in USACE's response to comments dated September 17, 2018, USACE concurred that these regulations would be added as action-specific ARARs.			USACE not able to include this and below regulations as ARARs because they do not meet the USACE definition of ARARs. Just as in the proposed plan, the decision document will also list the regulations ADEC identified as ARARs, but were not accepted by USACE. **DEC 10-09-2019 - Noted. The listed ARARs and USACE response will appear in the responsiveness section of the Final ROD.**
3	5	Table 2		18 AAC 60.015: This is a requirement of state law that is substantive and not procedural. It protects human health and the environment by ensuring solid waste, such as PCBs contaminated soil destined for disposal in a landfill, is contained during transport, and cleaned up if spilled. This regulation pertains to transport (e.g. moving from one location to another) within the site, as well as offsite transport. . This regulation			

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
				is in fact a standard of control of contamination and therefore it is an ARAR even under the USACE definition.			
4	5	Table 2		18 AAC 75.340(k): Cumulative risk regulatory requirements dictate how much contamination can remain at a site, and therefore may impact the implementation of the remedy by driving changes to the amount of contamination that must be removed. The DEC believes that it is a substantive requirement of state law, and is not procedural, and as such it is an ARAR under current EPA guidelines.			
5	*5*	Table 2		18 AAC 75.355(b): Individuals who do the work at a site must be minimally qualified in order to ensure that the work is performed correctly. DEC believes that this is a substantive requirement of State law. DEC believes that it is in fact a requirement that addresses a remedial action and it would have an impact on how the remediation would happen.			
6	5	Table 2		18 AAC 75.355(d): This regulation under State law requires that an analytical method used for hazardous substance analysis have a practical quantitation limit that is less that the applicable cleanup level. DEC's position is that this is a substantive requirement that applies to both hazardous substances and petroleum and that it is an ARAR. USACE's assertion that this regulation applies only to petroleum is incorrect.			
7	5	Table 2		18 AAC 75.355(e): The laboratory that performs the analysis of contaminated media must be minimally qualified in order to ensure that the analysis is accurate. DEC believes that this is a substantive requirement of State law. DEC believes that it is in fact a requirement that addresses a remedial action and it would have an impact on how the remediation would happen.			
8	5	Table 2		18 AAC 75.360: Individuals who do the work at a site must be minimally qualified in order to ensure that the work is performed correctly. DEC believes that this is a			

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
				substantive requirement of State law. DEC believes that it is in fact a requirement that addresses a remedial action and it would have an impact on how the remediation would happen.			
9	7			Alternative 2, Hot Spot Removal and Phytoremediation, does not provide institutional controls (ICs) for the landfill on site which contains an asbestos monofill. Does not provide interim ICs prior to unlimited use and unrestricted exposure. Interim ICs would be necessary to ensure that exposure of people to contaminant concentrations was controlled during in situ remediation.			According to the 2004 Monofill Post- Closure Care Report, a deed notice has already been recorded regarding the landfill. According to ADEC letter dated December 28, 2005, the requirements of post-closure care specified in Monofill Permit Number 9432-BA00 have been met, including recording of the Notice of Monofill Closure, and USACE's obligation for post-closure care at the site is copmplete. Additional ICs are not indicated for the landfill. At the phytoremediation area engineering controls in the form of signs will be provided to inform visitors of ongoing remediation and to warn against harvesting of the trees. In addition, regular soil testing and site monitoring will be specified in the Decision Document. ICs are not required during remediation, and they will not be needed after remediation because UU/UE will be achieved. **DEC Accept with comment:** site monitoring should include maintenance activities if required to address land use activity/disturbances during remediation that are inconsistent with the effectiveness of the remedy. **USACE response (12/11/19):** Agreed. Maintenance activities will be described in the decision document. **DEC Accept 12/13/2019**
10				The numerical screening criteria used in the feasibility study indicated that "Additional evaluation would be required to determine site-specific effectiveness" for Alternative 2, however, the numerical rating of "3" representing high effectiveness, high implementability and low cost was assigned. It is unclear how effectiveness was determined.			Alternative 2 was added to the FS at the specific request of ADEC, who assured the COE of its effectiveness, and provided case studies. It was not part of the original set of alternatives being considered. The effectiveness ratings were previously presented in the FS, which was reviewed and approved by ADEC. According to CERCLA, effectiveness is determined by evaluating (1) the potential effectiveness of process options in handling the estimated **areas or volumes of media** and meeting the remediation goals identified in the remedial action objectives; (2) the **potential impacts to human health and the environment during the construction and implementation** phase; and (3) **how proven and reliable the process is with respect to the contaminants and conditions at the site**. 1) The areas and volumes of media are limited in scope and scale. The COCs of concern are highly susceptible to bioremediation based on research studies conducted by ADEC. Concentrations in most cases barely exceed cleanup levels. 2) Impacts to human health and environment during implementation would be very limited. 3) The site is currently vegetated, and during public meetings, individuals have noted that arctic willow grows very well at this location already. The native name for this location was "the place of willows". Based on these factors, we felt it safe to rate the proposed solution as "highly effective." **DEC Accept with comment:** Please provide a reference to the document on "research studies conducted by ADEC".

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
							USACE response (12/11/19): Done. Reference provided by AECOM. **DEC Accept 12/13/2019**
11				It is unclear how it was estimated that the timeframe to achieve the cleanup levels is twenty years under Alternative 2.			Phytoremediation rates are difficult to determine, and are highly site specific. Twenty years was selected based on case studies of phytoremediation in Alaska, and is considered a best guess. Concentrations of contaminants at the site are relatively low, with many samples already near the cleanup level. It would appear that a relatively small amount of additional contaminant degradation would result in site closure. The consequences of longer remedial times would appear to be relatively small. The site is unoccupied, and monitoring and IC costs are relatively low. A description of the site monitoring plan will be included in the decision document. **DEC Accept 10- 09-2019**
12				It is unclear why the graphic representation of the comparatives in the proposed plan was changed to indicate colors for excellent, good, and poor while the feasibility study comparatives table used the terms: very high, high, medium, low, and low-medium.			The proposed plan is a simplified summary of the FS for the general public. It was determined that a color-coding system would be easier to follow for community members. **DEC Accept with comment:** However, it would have been more consistent with the FS to stay with five terms and use five colors.
13				It unclear how effectiveness was determined for Alternate 2.			See response to comment #10 above. **DEC Accept 10- 09-2019**
14				The feasibility study specified that, "Specific performance monitoring activities and frequency would be established in the Proposed Plan upon selection of the remedial alternative, and incorporated into the ROD upon further review." Annual performance monitoring events over a ten year period were included in the cost estimate, but specifics on monitoring the soil remedy are not included in the proposed plan.			The remedial alternative has not been formally selected, since we have not yet had a public meeting or recieved comment from all the relevent parties. The feasibility study should have left this to the decision document. Details of the monitoring, like many of the specific details on how the work will be done, are typcially not appropriate for a proposed plan. Performance monitoring activities would include collection of soil samples and analysis to evaluate phytoremediation progress relative to RAOs. Five year reviews would be conducted until RAOs are met, followed by Site-closeout. The cost estimate included $942k for site monitoring. We think this is more than sufficient. The time for completion of the remediaiton is estimated, but the purpose of the 5 year reviews to track progress toward the goal. Based on the results, the timeline can be adjusted, or addiitonal remdial measures implemented. **DEC Accept 10- 09-2019**
15				The proposed plan must address monitoring frequencies and the use of five-year reviews. The proposed plan should identify a timeframe for determining whether the remedy will achieve the remedial action objectives. The proposed plan should identify the numeric cleanup levels for each contaminant of concern as part of the remedial action objectives.			Monitoring frequencies will be provided in the decision document, as described in response above. The preferred alternative section of the PP does state that 5-yr reviews will be conducted. The remedy effectiveness will be evaluated during each 5-year review. Numeric cleanup levels for petroleum CoCs are provided in Table 3 of the Remedial Action Objectives section. Numeric cleanup levels for TCE and PCBs are provided in Table 2 of the Remedial Action Objectives section. The cleanup levels for TCE and PCBs will be more clearly identified in the decision document. **DEC Accept 10- 09-2019**

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
16				Fraction of organic carbon and alternate cleanup levels. The method three evaluation and development of alternate cleanup levels relied on collecting samples for total organic carbon. The dataset for the total organic carbon results indicate that RRO and DRO were detected in the samples. Although the dataset eliminated some high values with RRO concentrations up to 220 mg/kg, the dataset still contains questionable sample results.			This would seem to have been a comment more appropriate for a much earlier stage of the project, during the RI or FS. ADEC previously reviewed, and approved, both of those documents without mentioning this issue, and we have written this proposed plan under the assumption that those Toc results, and the cleanup levels derived from thoses results, were valid and approved by ADEC. "The dataset for the total organic carbon results indicate that RRO and DRO were detected in the samples." Natrually occuring organics commonly cause false detections of DRO and RRO, so the presence of these compunds in samples that have high Toc is not remarkable. 220 mg/kg for RRO is a background concentration that can be found in many of the soils in Alaska. The cleanup level for RRO in this area is 11,000 mg/kg, and much higher than background concentrations. **DEC Accept with comment:** The comment concerned the 2008 guidance document requirements: "TOC data sets must be evaluated for variability. If any result(s) differ by one order of magnitude or more, the mean of the more conservative (lower) TOC results of the same magnitude shall be used for the site and Method Three/Four determinations." All results used in the calculation were not of the same magnitude. **USACE response (12/11/19):** TOC results occur in three data clusters (see next RTC): 0.34 to 0.83% (4 samples) 1.03 to 1.20% (4 samples) 5.32 to 7.59% (3 samples) Only two of these samples were an order of magnitude apart - 0.34% and 7.59%. Both samples were discarded as part of our calculation. Averaging all TOC results = 2.37% Removing just the high and low TOC = 2.01% Removing high and low TOC and highest DRO+RRO = 1.55% (how we did it) Removing just the highest TOC result = 1.89% Removing the two highest TOC results = 1.41% Remove three highest TOC results = 0.92% We don't see much difference in these numbers and these changes should have little materiel effect on cleanup levels or risk. Given the highest concentrations of TOC (5.32 to 7.59%) represent 27% of the total samples collected, the high results can't be legitimately said to represent "outliers". Discarding the highest and lowest samples brings the remaining samples within an order of magnitude. **DEC Accept 12/13/2019**

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17				The reported average is 15 times the DEC default fraction of organic carbon which seems excessive considering the conceptual site model, site location and site conditions.			This issue was extesively discussed in the RI, which was previosuly reviewed and approved by ADEC. Background soil samples were collected to obtain site-specific TOC information that could be used to determine ACLs using the ADEC Method Three approach under 18 AAC 74.340(e) and (f) and in calculating soil-water partitioning to evaluate migration potential. Samples were collected following the ADEC guidelines for TOC sample collection (ADEC 2008b). Soil samples for the TOC evaluation were collected from five borings at locations within or adjacent to investigated areas, but outside the contaminant plumes and from depths with lithologies similar to those observed in contaminated areas. In addition to TOC, background soil was analyzedfor GRO, DRO, RRO, and DRO/RRO with silica gel cleanup to assure TOC values represent natural conditions and not interference from site-specific fuel contaminants (ADEC 2008b). In summary, the TOC samples were collected and submitted for analyses in accordance with ADECs guidance, and were all collected outside the plume. The minimum and maximum TOC numbers were removed from the final calculation. **Sample Information** / **Results [b] (mg/kg)** LOCID | Depth (ft bgs) | Soil Type [a] | DRO | RRO | DRO-SGC | RRO-SGC | TOC % | Notes [c] ACW-BG01 | 1-3 | GM | 4.4JB [3.6] | 16J [9.0] | 5.1JB [3.6] | 9.6J [9.0] | 0.68 [0.04] | — ACW-BG01 | 8-10 | GM | 20JB [4.4] | 190 [11] | 11JB [4.4] | 100J [11] | 5.76 [0.04] | Remove MaxFD ACW-BG01 | 8-10 | GM | 19JB [4.5] | 190 [12] | 11JB [4.5] | 96J [12] | 5.32 [0.04] | — ACW-BG02 | 2-4 | GP | 14JB [3.6] | 78J [8.9] | 13JB [3.6] | 62J [8.9] | 0.34B [0.04] | Remove Min ACW-BG02 | 8-10 | GM | 20JB [4.5] | 210 [12] | 9.7JB [4.5] | 110J [12] | 7.59 [0.04] | Remove Max ACW-BG03 | 2-4 | GP | 11JB [3.6] | 44J [9.0] | 7.4JB [3.6] | 21J [9.0] | 0.83 [0.04] | — ACW-BG03 | 6-8 | GP | 7.6JB [3.7] | 28J [9.4] | 6.8JB [3.7] | 21J [9.4] | 0.55 [0.04] | — ACW-BG04 | 1-3 | GP | 61 [3.6] | 130 [9.0] | 49 [3.6] | 83J [9.0] | 1.13 [0.04] | — ACW-BG04 | 4-6 | GM | 11JB [3.9] | 52J [9.8] | 8.7JB [3.9] | 28J [9.8] | 1.20 [0.04] | — ACW-BG05 | 4-5 | GM | 24JB [4.2] | 41JB [11] | 25JB [4.2] | 33JB [11] | 1.63 [0.04] | — ACW-BG05 | 5-7 | GP | 24B [3.5] | 24JB [8.8] | 21JB [3.5] | 19JB [8.8] | 1.03 [0.04] | — Average TOC: | 1.55% GRO was not detected in any of the samples. DRO and RRO were below cleanup levels in all samples. DRO results were predominately below the LOQ (J flagged) with all but one DRO sample showing the method blank above the LOD (B flagged). In addition, the low level detects for RRO with SGC are all J flagged. Another way to support that TOC is not due to interference from fuel contamination is to evaluate

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							the contribution of any DRO/RRO concentrations to the TOC results. Therefore, in conservatively assuming all DRO/RRO is carbon, converting the highest total concentrations (DRO+RRO [or 271 mg/kg)] to percent shows a max contribution to TOC of 0.027% (less than 2% of the average TOC used for the Method 3 calculation). Soil was a clayey silt with gravel, and may consist of fill brought in form another location. **DEC Accept 10- 09-2019**
18				The current DEC Technical Memorandum (Determining the Fraction of Organic Carbon (foc) for Methods Three and Four, March 6, 2017 (enclosed)) requires calculating a 95% lower confidence limit to be used as the site specific fraction of organic carbon.			The method outlined in the ADEC guidance does not include a provision for discarding the min and max results from the analyses, as was done in the RI. Using the full data set above, the 95% confidence interval is between 2.65% and 7.39%. Our 95% lower confidence limit would therefore be 2.65%. This is a higher and less conservative result than the 1.55% used in our Method 3 cleanup level calculations. Our relative standard deviation is 101%. This is only slightly higher than the 100% relative standard deviation ADEC uses to specify "high foc variability" for a site. Overall the approach used in the RI, which was published before ADEC's guidance on calculating foc, seems to be conservative and representative of the results at the site. 1) 11 samples were collected from 5 soil borings. 2) Incremental sampling methodology (ISM) was not used. 3) For soils with higher than normal heterogeneity, ADEC advises collecting more samples than the minimum. This was done. 4) Soil type(s) analyzed for foc must be representative of the soil type(s) that is (are) contaminated. This is true for this project. 5) Samples collected at this site were distributed around the perimeter of the spills. 6) If high soil type variability is observed, calculating soil-type specific foc may be necessary. This does not appear to be applicable for this site. Soils are relatively homogenous and consist of well to poorly graded coarse-grained sands, gravels, and cobbles within a variable matrix of finer grained materials, including silts estimated at between 5% and 12%. This materiel may have been brought in as fill to the site from another location, which may account for the high TOC concentrations observed. **DEC Accept 10- 09-2019**
19				It is unclear how an alternate migration to groundwater soil cleanup value based on changes in total organic carbon can be applied to fractured bedrock, as the fractured bedrock is not high in organic carbon. Additionally, it is unclear how phytoremediation would lead to cleanup of fractured bedrock. DEC does not believe USACE has adequately evaluated the potential effectiveness of the proposed phytoremediation, given the site specific characteristics, including presence of			The migration to groundwater value is based on the contamination that will remain in soils (the top 10-20 feet of materiel at the site), not the fractured bedrock. There is no representation that fractured bedrock at the site is a target for remediation. This issue was extensively discussed with ADEC prior to starting the RI at the site. GW wells installation and sampling, as well as the seep sampling, were intended to address this issue. Groundwater was not encountered within the numerous excavations and test pits across the Site during previous investigations. Several exploratory borings attempted to locate water-bearing fractures. Depth to water ranged from 20 to 340 feet bgs. No COCs were found in the water samples. No COCs were found in the seep samples collected from the base of the hill. None of the alternatives proposed will remediate fractured bedrock, and no such technology exists to our knowledge. There is only an inference that such contamination might be present, with no

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
				fractured bedrock.			actual evidence. **DEC Accept with comment:** There is also an inference that Vapor Intrusion concerns could remain an issue at the site due to contamination remaining in soil and fractured bedrock. **USACE response (12/11/19):** Per decision made at December 10, 2019 meeting between USACE and ADEC, the decision document will include a statement that prior to conclusion of the remedy the vapor intrusion pathway will be assessed to verify the UU/UE condition. **DEC Accept 12/13/2019**
20				An alternative cleanup level will only be approved for use within the soil horizons actually modeled by the field-measured parameters used to calculate said cleanup level.			There is no expectation or representation of anything different in the PP, FS or RI. The cleanup levels would apply only to the soil horizons, not the underlying bedrock. **DEC Accept 10- 09-2019**
21				Institutional Controls and Unified Environmental Covenants Act (UECA) The remedy will leave contaminants in place. The site conditions require institutional controls. The landfill, asbestos monofill, and residual contamination above cleanup levels on site require institutional controls. Landowner concurrence with institutional controls in accordance with 18 AAC 75.375 is required for the site. UECA (AS 46.04.300 et. seq.) requires an environmental covenant on land where the remedy leaves contamination in place. This is a substantive requirement that requires placement of information about the contamination remaining in the land records so that it is perpetual, or is there until the contamination is gone. The landowner must concur with the placement of a covenant on their property, for the covenant to be enacted. DEC will not concur that a remedy will be protective if it includes adoption of ICs, and USACE is unwilling or unable to secure the necessary ICs.			Disagree. The remedy will not leave contaminants in place. Engineering controls such as signs and boulders across the road to prevent vehicles from entering the site will be described in the decision document. In addition, five-year reviews will be conducted in accordance with CERCLA until UU/UE is achieved. **Clarification:** The remedy will leave contaminants in place above applicable cleanup levels during the period of treatment and degradation prior to UU/UE. 18 AAC 75.375 Institutional Controls section provides clarification that ICs are required to ensure 1) compliance with applicable cleanup levels; 2) protection of human health, safty or welfare or the environment; 3) the integrety of site cleanup activities or improvments. **18 AAC 75.375(c) is identified as an ARAR** in the Final Unalakleet Air Force Station AC&W Main Complex Feasibility Study. 18 AAC 75.375(c) The use of institutional controls must, to the maximum extent practicable, be (1) appurtenant to and run with the land so that the control is binding on each future owner of the site; and (2) maintained by each responsible person or owner of the site. Therefore DEC will require ICs to be implemented through an Environmental Covenant in accordance with the Unified Environmental Covenants Act (UECA) and remain until contaminant levels are demonstrated to be below applicable cleanup levels. Any construction on the site would have to consider vapor intrusion concerns and mitigate if needed. Any well drilled would be subject to sampling for site contaminants prior to use. Soil moved or transported from the site would require DEC approval. **USACE response (12/11/19):** Per decision made at December 10, 2019 meeting between USACE and ADEC, institutional controls or an environmental covenant is not required during phyto remediation process. UU/UE is the remedial action objective of the proposed remedy. **DEC Accept 12/13/2019**

Number	Page # or Global	Section	Paragraph	Comment	Commenter Initials	Disposition A/M/O	Response & Responder's Initials
							The landfill also does not require ICs. For one thing, there are not contaminants being left in place at the landfill. Secondly, a deed notice has already been recorded regarding the landfill. Please see response to comment 9 above. **DEC Accept 10- 09-2019**
END Comments							