Proposed Plan for Cleanup Action at the Former Facility Area

PORT HEIDEN RRS

Port Heiden, Alaska
October 2008

You are invited to comment on the information and proposed cleanup alternatives discussed in this **Proposed Plan.** Your comments will help in choosing the cleanup alternative for the Former Facility Area at the Port Heiden Radio Relay Station (RRS). The "How You Can Participate" box below and on Page 16 gives more information on how you may comment on this Proposed Plan. All public comments will be reviewed and considered before making final decisions. The United States Air Force (Air Force) and **Alaska Department of Environmental Conservation** (ADEC) may change the preferred cleanup alternative based on public comment.

Following the public comment period, a **Record of Decision** (ROD) will be issued that lists the final cleanup alternatives. The ROD will include all public comments and the responses to those comments.

As you review this document, note that some key words are bolded. These bolded words are defined in the blue boxes on the right side of the page.

Proposed Plan: *a document informing Alaska Tribes, community leaders, and the public about contaminated sites, options that were considered for cleaning up the sites, and which options were identified as the preferred cleanup options.*

Alaska Department of Environmental Conservation (ADEC): *the state agency responsible for protecting public health and the environment from adverse effects of environmental contamination.*

Record of Decision (ROD): *an agreement between the State and Air Force to clean up a site. RODs list contaminants found at a given site, outline clean up methods, and provide a target cleanup date.*

How You Can Participate

We invite you to comment on the proposed cleanup option discussed in this Proposed Plan. All public comments will be considered by ADEC and the Air Force before making a final decision for cleanup at the site. Depending upon public comments, the actual cleanup option selected for the site may be the preferred option, a modification to the preferred option, or a combination of options.

The public comment period begins October 10, 2008 and ends on November 10, 2008. You may also meet with an Air Force representative at the public meeting, to be held on October 23, 2008 at 12:00 PM (noon) at Ray's Place in Port Heiden. During the public comment period, you can mail or e-mail your comments to the Air Force Community Relations Coordinator at the following address:

Air Force Community Relations Coordinator
611 CES/CEVR
10471 20th Street, Suite 340
Elmendorf AFB, Alaska 99506-2200
907-552-4506 or 1-800-222-4137
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INTRODUCTION

This Proposed Plan presents the cleanup alternatives proposed by the Air Force and reviewed by the ADEC for an **Environmental Restoration Program** (ERP, formerly Installation Restoration Program) site known as the Former Facility Area. Figure 1 shows the location of the Former Facility Area (RRS Facility Source Areas) within the RRS. While there are other sites at the Port Heiden RRS that the Air Force has studied, this Proposed Plan looks at cleanup alternatives for only this site. Cleanup plans for other sites at Port Heiden RRS will be prepared in the future.

Environmental Restoration Program (ERP): *the federal program initiated in the early 1980s to investigate and clean up military facilities.*

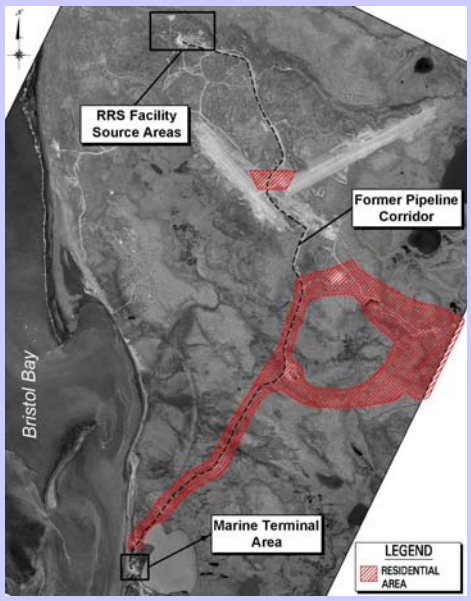

Figure 1-Port Heiden RRS Site Location Map

This Proposed Plan discusses the following topics: 1) history and background of Port Heiden RRS, 2) site characteristics, 3) site risks, 4) remedial action objectives, 5) cleanup options, 6) alternative evaluation criteria, 7) alternatives evaluated, and 8) preferred cleanup alternative. Although this Proposed Plan identifies cleanup alternatives that the Air Force prefers and ADEC and EPA have approved, final cleanup decisions will not be made until all public comments are reviewed and considered.

As part of the ERP**,** the Air Force conducted several studies at Port Heiden RRS to find problems from past waste disposal practices. Information in this Proposed Plan is from the 2006 Final Remedial Investigation/Feasibility Study (RI/FS) for Port Heiden Radio Relay Station (US Air Force, 2006). Reports from various studies can be found online at the US Air Force's Administrative Record website: http://www.adminrec.com/PACAF.asp?Location=Alaska. Additionally, for easy public access, the Air Force maintains the Port Heiden RRS documents in the Administrative Record at Elmendorf Air Force Base and in the Council Environmental Office at Port Heiden.

ADEC is the lead regulatory agency and the Air Force is the lead cleanup agency for Port Heiden RRS. This Proposed Plan is prepared according to the **Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)** "Superfund" Program, under Section 117(a), and the National Contingency Plan (NCP), Section 300.430(f)(2). These federal laws regulate the cleanup of old hazardous waste sites that contain substances covered under CERCLA. The Air Force cleanup program follows CERCLA guidance; however, the investigations of the sites described in this Proposed Plan were also conducted under ADEC's Contaminated Sites regulations (Title 18 Alaska Administrative Code [AAC], Section 75, Article 3 "Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances"). Petroleum products such as crude oil or refined fuel are not considered hazardous substances under CERCLA. The term "hazardous substance," as defined in CERCLA, excludes "petroleum, including crude oil or any fraction thereof," unless specifically listed or designated under CERCLA (Sections 101(14) and 102(a)).

CERCLA: *This Plan is issued in accordance with and satisfies the requirements of the* ***Comprehensive Environmental Restoration, Compensation and Liability Act*** *(CERCLA, at 42 USC §§ 9601 et. Seq.), as further implemented by the National Contingency Plan (NCP, at 40 CFR Part 300). The ERP is authorized in the Defense Environmental Restoration Program (10 USC §§ 2701 et.seq.) as the environmental restoration program the military is to use to take CERCLA response actions and satisfy its CERCLA lead agency functions as delegated by Executive Order 12580. The plan also meets all requirements of Alaska State law and regulations, including but not limited to Title 46 of the Alaska Statutes and regulations promulgated there under.*

This Proposed Plan only discusses cleanup alternatives for non-fuel contamination because the Plan is being prepared under the authority of CERCLA, which does not consider fuel a hazardous substance. However, the fuel contamination at the Port Heiden RRS will be addressed in the future by the Air Force under Alaska State law and environmental regulations. As required by CERCLA, the Air Force will hold a public meeting on the cleanup alternatives presented in this Proposed Plan to receive your verbal comments and talk about the Proposed Plan.

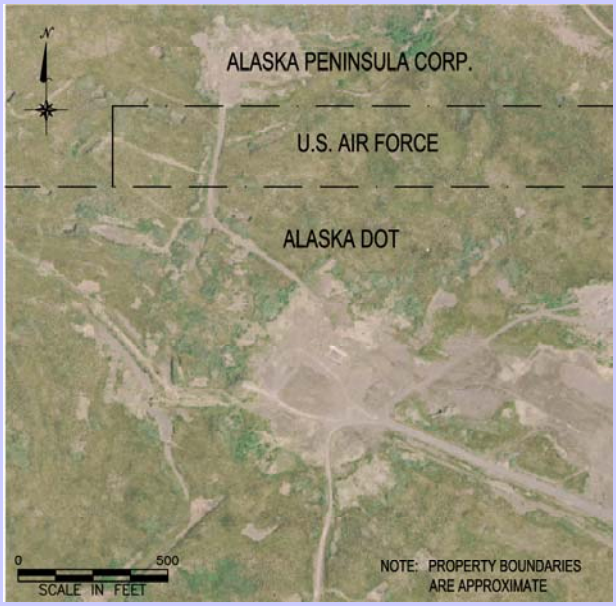

Figure 2 – Land Ownership in the Former Facility Area

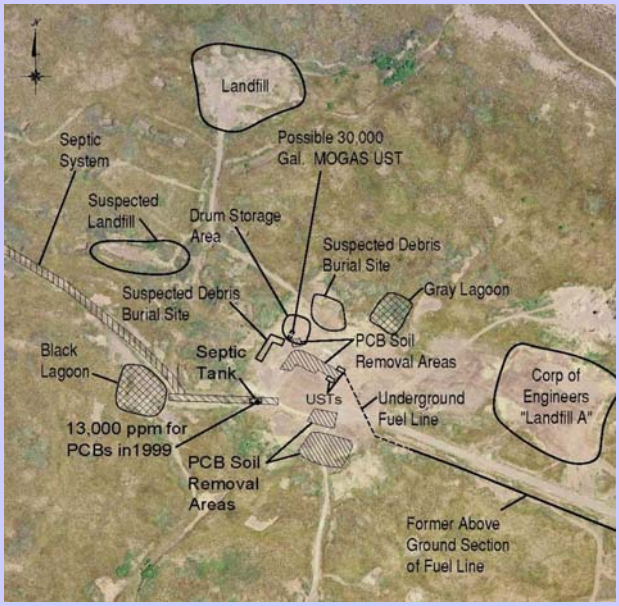

Figure 3 – Former Facility Area Investigation Areas

Port Heiden is located along the northern coastal plain of the Alaska Peninsula along Bristol Bay, approximately 400 air miles southwest of Anchorage. The Port Heiden RRS was constructed during 1955-1960 as a Distant Early Warning (DEW) line radar station. The site was active until 1981, when the DEW line sites were replaced by satellite communications. The facility was constructed over a small part of the former US Army Fort Morrow, which consisted of several hundred buildings with a footprint covering several square miles. The Port Heiden RRS is comprised of three main areas: the Former Facility Area, the Marine Terminal Area (located on the coast near the old town site of Meshik), and the Former Pipeline Corridor (which connected the Former Facility Area with the Marine Terminal Area). The Former Facility Area is the focus of this Proposed Plan.

Landowners within the Former Facility Area include the Alaska Peninsula Corporation, the State of Alaska Department of Transportation, and the US Air Force (refer to Figure 2). The Former Facility Area is located about 6 miles north of the village of Port Heiden. Besides buildings, it contained a drum storage area, a landfill, underground storage tanks, lagoons (where contaminants were disposed), a septic system, and debris burial areas (refer to Figure 3). From 1990 through 1992, the US Army Corps of Engineers demolished all buildings and structures at the facility and buried them in a landfill just east of the former Port Heiden RRS gravel pad.

Fuels: *groups of petroleum-based chemicals that are burned to make energy. Spilled fuels are measured as total petroleum hydrocarbons, gasoline-range organics (GRO), diesel-range organics (DRO), or residual-range organics (RRO). GRO naturally degrades faster than DRO, which degrades faster than RRO.*

Fuel chemicals: *different chemicals commonly found making up parts of fuel products, such as benzene, toluene, ethylbenzene, and xylene.*

Solvents: *chemicals commonly found in paint or used as degreasers in the maintenance of machinery, such as tetrachloroethene; trichloroethene (TCE); and 1,1,2-trichloroethane. These chemicals usually have a strong, distinct smell and tend to evaporate very quickly.*

Polychlorinated biphenyls (PCBs): *a chemical that was commonly used in certain electrical equipment such as transformers.*

Activities such as contaminant storage, water purification, building and mechanical equipment maintenance, power generation, use of transformers, landfill disposal, sewage disposal, application of herbicides and pesticides, fire protection, and use of heat recovery and circulation systems may have caused contamination in this area. Contamination-causing compounds that may have been used at the Port Heiden RRS include **fuels** (and **fuel chemicals**), antifreeze, **solvents** (i.e., trichloroethene [TCE]), batteries, **polychlorinated biphenyls (PCBs)**, paints and paint thinners, herbicides, pesticides, and asbestos. Under normal conditions, these substances are controlled and pose no threat to human life and the environment. However, when they enter the environment through an accidental release, they can contaminate the land, water, and/or air and need to be addressed.

SITE CHARACTERISTICS

The Port Heiden RRS site slopes gently to the west and southwest. The land in the area is used mostly for recreation and subsistence. Groundwater beneath the site is about 50 feet deep and generally flows to the west and northwest away from the village of Port Heiden. No major rivers or creeks flow through the Former Facility Area but the smaller Reindeer Creek (locally known as North River) is located approximately 1 mile north of this area. A portion of the Former Facility Area is located within wetlands, and small, shallow surface water ponds are located east and southeast of this area. These ponds extend south toward Abbott Creek. The residents of Port Heiden obtain drinking water from wells near the village; surface water is not used for drinking. The closest housing development is located approximately 2.5 miles from the site and the groundwater from the contaminated area flows away from this housing development.

Surface Soil: *the first 8 feet of soil.*

Subsurface Soil: *soil found below 8 feet and the groundwater table.*

Polyaromatic Hydrocarbons (PAHs): *chemicals formed during combustion of wood and gasoline. These chemicals are also found in wood-treating products like creosote. Some (e.g., benzo(a)pyrene) – but not all – PAHs are carcinogenic.*

mg/Kg*: milligram per kilogram. The weight of the impurity compared to the weight of the total.*

The Air Force has conducted investigative studies regarding the type and extent of contamination throughout the Port Heiden RRS. Contamination at the Port Heiden RRS is believed to be at least 25 years old. The most recent study at the Port Heiden RRS took place in 2004 (presented in the 2006 Final RI), which involved studying the site geology and collecting soil and water samples across the site to identify the types, amounts, and locations of contamination (US Air Force, 2006). There have also been several small scale cleanup activities.

The Air Force developed and evaluated cleanup alternatives for the three main areas of the installation, which are described in the Final RI/FS (US Air Force, 2006). However, this Proposed Plan summarizes only the findings from the investigations and the cleanup alternatives at the Former Facility Area.

Groundwater, **surface soil**, and **subsurface soil** samples collected during the 2004 investigation were analyzed for fuels, solvents, fuel chemicals, PCBs, **polyaromatic hydrocarbons (PAHs)**, pesticides, herbicides, and metals to determine if there was any hazardous contamination at the Former Facility Area. Due to the limited surface water in the area and the relatively low level of contamination that was detected, surface water was not addressed in the 2004 study. This Proposed Plan summarizes all non-fuel contaminants that were found at unacceptable levels at the Former Facility Area. Therefore, subsurface soil that was contaminated only with fuels is not discussed.

Levels of contaminants were compared to "cleanup levels" which are based on State (ADEC) and EPA risk and cleanup levels. Final cleanup levels for surface soil and groundwater at the Former Facility Area at the Port Heiden RRS have been determined and established by environmental statutes/regulations. The cleanup levels used are ADEC Method 2 cleanup levels (18 AAC 75.341 Table B and 18 AAC 75.345 Table C), which are protective of human health and the environment and allows unrestricted land use and access. These cleanup levels, all non-fuel contaminants found above cleanup levels at the Former Facility Area, and the maximum concentration found are provided in Table 1 on the following page.

The Former Facility Area contains fuels combined with CERCLA hazardous substances. Surface soils at the Former Facility Area contain PCBs (Aroclor 1260), pesticides (dieldrin and heptachlor expoxide), and PAHs (benzo(a)pyrene, benzo(a)anthracene, and dibenzo(a,h)anthracene) in concentrations above cleanup levels. Figure 4 shows the five main areas within the Former Facility Area along with tables that list the contaminants found in surface soil samples, maximum concentration levels, cleanup levels, and number of samples that were above cleanup levels. The most common contaminant found was PCBs, which were discovered in a number of surface soil samples at concentrations above the cleanup level of 1 milligram per kilogram (mg/Kg). The maximum level of PCBs found in surface soil was 930 mg/Kg. The study determined that thousands of cubic yards of soil at the Former Facility Area contained contaminants in excess of cleanup levels.

Table 1. Summary of Contaminants of Concern and Cleanup Levels .for the Former Facility Area

Contaminant of Concern		Cleanup Level (mg/Kg)	Maximum Concentration Found (mg/Kg)
Surface Soil			
PAHs	Benzo(a)pyrene	1	7.8 MA
	Benzo(a)anthracene	6	7.2 MA
	Dibenzo(a,h)anthracene	1	1.6 MA
PCBs	Aroclor 1260	1[A]	930 J
Pesticides	Dieldrin	0.015	5 J
	Heptachlor epoxide	0.2	1 J
Contaminant of Concern		**Proposed Cleanup Level (mg/L)**	**Maximum Concentration Found (mg/L)**
Groundwater			
Benzene		0.005	0.0059
TCE		0.005	0.69 J

Notes:
A: or as modified pursuant to 18 AAC 75.341 Table B1, note 9.
mg/Kg – milligrams per kilogram
mg/L – milligrams per liter
J – analyte positively identified; quantitation is an estimate
MA - matrix effect was present

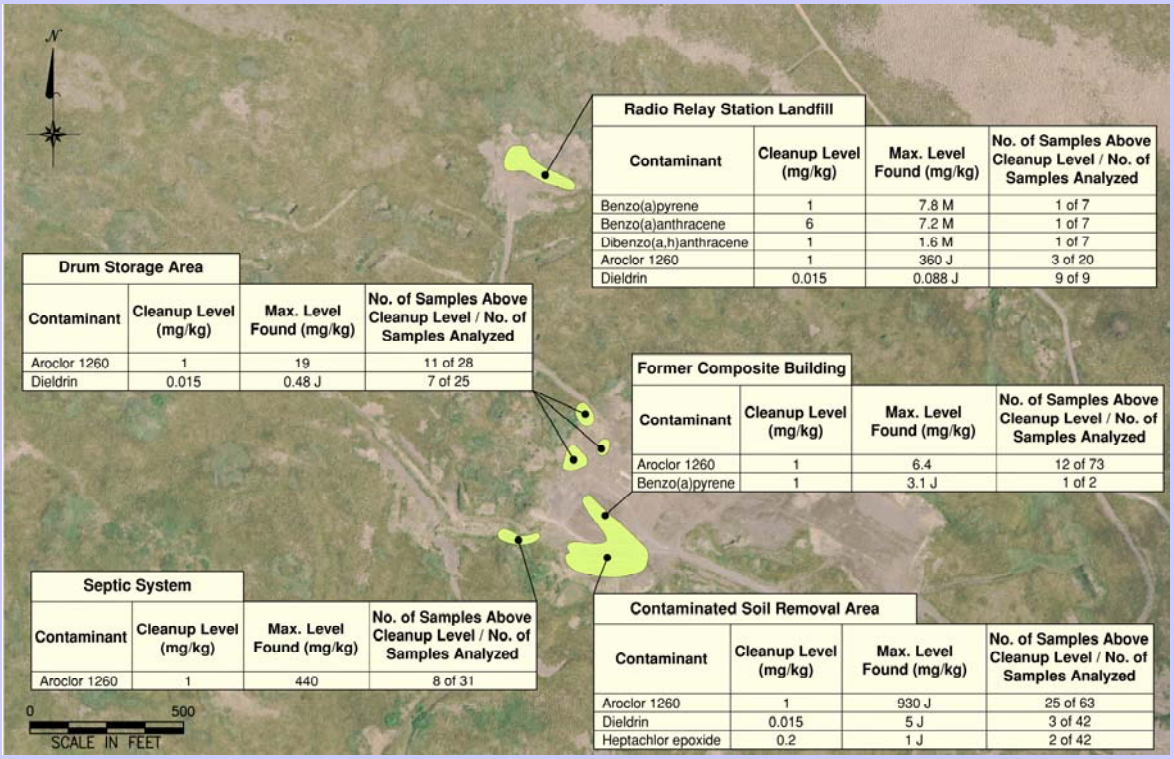

Figure 4 - Surface Soil Contamination Port Heiden RRS Former Facility Area

SITE CHARACTERISTICS (CONTINUED)

Two **plumes** of groundwater contamination found at the Former Facility Area are discussed in this Proposed Plan. Figure 5 shows these plumes along with tables that list the contaminants, maximum concentration levels, cleanup levels, and number of samples above cleanup levels. The Former Facility Area Plume contains TCE, underlies the Former Facility Area pad, and is approximately 700 feet long and 400 feet wide (depth about 50 feet below ground surface). The Black Lagoon Outfall Plume contains **benzene** and TCE and is approximately 100 feet long and 100 feet wide (depth about 50-60 feet below ground surface). The most common contaminant found in these two plumes was TCE, with a maximum level of 0.690 milligrams per liter (mg/L). Groundwater at the Former Facility Area flows to the northwest away from Port Heiden so drinking water currently used by village residents is not in danger of contamination by these plumes. A third plume, the Underground Storage Plume, is intermingled with the Former Facility Area Plume and contains fuel constituents. Therefore, it is not discussed in this Proposed Plan.

SITE RISKS

Risks to human health, plants, and animals from contaminants at the Port Heiden RRS Former Facility Area were evaluated in a **risk assessment** (US Air Force, 2006) using all of the sample results discussed above for soil and water. Soil was analyzed for fuels, PCBs, PAHs, metals, pesticides and herbicides. In addition, crowberries and cockles (community subsistence foods) were collected during 2004 and tested for pesticides, PCBs, PAHs, mercury, and other metals to help determine risk.

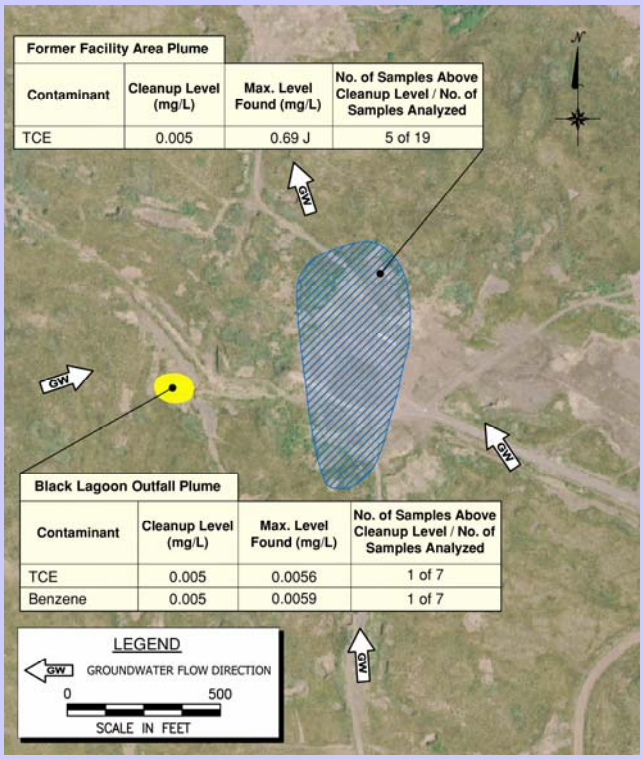

Figure 5 - Groundwater Contamination Port Heiden RRS Former Facility Area

__Plume:__ a portion of contaminated groundwater that rests in or on uncontaminated groundwater. Plumes typically extend downward and outward from the source of initial contamination. The natural flow of groundwater in an area will determine the direction in which a given contaminant plume moves.

__Benzene:__ a common chemical found in gasoline, solvents, and coal tar. It has been designated a known carcinogen in the US.

Risk assessment: an evaluation of the risks to human health and the environment from site contaminants. Risks are determined at each site according to a study of the chemical(s) present and the different ways that people, plants or animals can come into contact with those chemicals.

The human health risk assessment used data from the 2004 investigation to calculate risks associated with eating, drinking, or coming in contact with contaminated soil, surface water and groundwater, and subsistence foods. Risk was also evaluated for breathing in vapors from these contaminants. Risks to adults and children were evaluated. Different risk levels were evaluated for people working at a site, living at a site, or eating subsistence foods from a site. Categories of people analyzed included: Subsistence Users (current & future adult & child), Residential Users (current & future adult & child), and Workers (current & future short-term & long-term workers). Many very conservative assumptions were made in order to calculate risk.

Small mammal tissue data were not collected at the Port Heiden RRS. As a result, surface soil data in combination with uptake factors identified in the literature were used to predict concentrations in small mammal tissue to evaluate ingestion of small mammals. This modeling most likely results in an overestimation of predicted concentrations in small mammal tissue and risk. It is extremely cautious to assume that all subsistence activity takes place in contaminated areas at the Former Facility Area.

The intention of this risk evaluation is to ensure that all risks are identified so that a cleanup effort is selected that will protect people regardless of how this land is used in the future.

The ecological risk assessment used data from the 2004 investigation to determine if plants and animals could be harmed by contamination at the site. The items evaluated included plants, wildlife and birds, worms, frogs, and fish. Bird and mammal tissue samples were not collected as part of the RI. The risks presented in the risk assessment are based on a "qualitative" assessment and discuss "potential" risks. Historical analytical data was employed qualitatively to assess data gaps, contaminants of concern, and focus areas for the ecological risk assessment.

Human health risk is divided into two types:

- Cancer risk (the chance of getting cancer from contaminants at the site) and
- Non-cancer risk (the chance of getting a disease other than cancer from contaminants at the site).

SITE RISKS (CONTINUED)

Human Health Risk Assessment Results

The results of the risk assessment on site soils (including risks for subsistence activities) concluded that if people ingested (ate) PCB-contaminated (Aroclor 1260) soil from the Former Facility Area, they would be exposed to a non-cancer risk that is above the **non-cancer risk standard** (exceeds acceptable levels). Cancer risks that were above acceptable levels (exceeded the **cancer risk standard** of 1 in 100,000) to people were due to eating and touching the soil (dermal contact) at the Former Facility Area because of the presence of PCBs and PAHs (e.g., benzo (a) pyrene), and to a lesser extent, pesticides and metals (e.g., arsenic). The results of the risk assessment also concluded that there was a non-cancer risk posed to people from eating subsistence foods (berries, cockles, and small mammals) from contaminated areas, with the greatest (non-cancer) risk coming from eating berries contaminated with PCB dust. Cancer risks posed to people from eating dust-coated berries and small mammals exceeded the 1 in 100,000 risk standard for arsenic and PCBs (refer to paragraph 3 from Site Risks section above). It should be noted that arsenic is naturally occurring and within background levels, therefore, it was concluded that its presence is not the result of Air Force activities at the RRS. Thus, arsenic is not a contaminant that will require cleanup. Refer to pages 7-68 to 7-70 in the 2006 RI for a more detailed summary of the human health risk from surface soil in the Former Facility Area.

The non-cancer risk standard *is a hazard index of 1. This hazard index measures the likelihood that a person who comes into contact with contaminants at the site over the course of a lifetime will experience non-cancer health effects. A hazard index of 1 is the maximum level at which people are not expected to experience any unacceptable health effects.*

The cancer risk standard *is 1 in 100,000. This means that contact with contaminants at the site over a 70-year lifetime will not increase the cancer risk among individuals by more than 1 in 100,000. These levels are calculated to protect people who are both easily affected by the chemicals and often come into contact with the contaminants at the site, so a 1 in 100,000 increase in cancer risk applies to these individuals. In any given community or population associated with a contaminated site, the actual risk may be lower than 1 in 100,000.*

The results of the risk assessment concluded that both the cancer and non-cancer risks from groundwater to people were primarily based on drinking or bathing in (dermal contact) groundwater contaminated with TCE and metals (manganese and arsenic) at the Former Facility Area. However, these risks are only present if people live in the area and use contaminated water for drinking and/or bathing. The cancer risk was 8.4 in 10,000, which is above the standard 1 in 100,000 risk. Refer to pages 7-68 to 7-70 in the 2006 RI for a more detailed summary of the human health risk from groundwater in the Former Facility Area.

Ecological Risk Assessment Results

The ecological risk to wildlife receptors is expected to be acceptable. A qualitative assessment of risks to birds and mammals was conducted using highly conservative assumptions. The conclusions stated that there is the potential for risks to birds from pesticides and one PAH, and the potential for risk to small mammals from PCBs (refer to paragraph 3 from Site Risks section above). Refer to pages 8-34 to 8-35 in the 2006 RI for a more detailed summary of the ecological risk in the Former Facility Area.

REMEDIAL ACTION OBJECTIVES

The remedial action objectives (i.e., specific goals for protecting human health and the environment) for the surface soil and groundwater at the Former Facility Area that have contaminants in concentrations greater than the cleanup levels are: 1) to protect the current and future residents of Port Heiden by reducing the PCB, PAHs, and pesticides in soils and the benzene and solvents (e.g., TCE) in groundwater to meet cleanup levels, 2) to minimize sediment runoff associated with disturbance to area vegetation, and 3) to reduce the potential for contaminants in soil to migrate to groundwater or surface water.

CLEANUP OPTIONS

This Proposed Plan discusses cleanup options for the Former Facility Area that were developed to protect human health and the environment and to comply with state and federal applicable or relevant and appropriate requirements (ARARs). These cleanup options are the components and/or families of cleanup options that are combined together to form individual alternatives. Different types of cleanup options applicable to this project are summarized below. Refer to pages 2-1 to 2-15 (relates to Section 2.2 General Response Actions) in the 2006 FS for more detailed information about the cleanup options.

The cleanup options for groundwater are particularly limited at Port Heiden RRS. This is because some options would be difficult to implement due to the remote nature of the site and the lack of available infrastructure (i.e., sources of electrical power and fuel). Final cleanup levels have been determined and established by environmental statutes/regulations. The preferred alternative will be selected and documented in the ROD based on input from Air Force, ADEC, EPA, and the community.

Surface Soil

- **No Action.** Nothing is done that could contain, treat, or reduce human exposure to the contaminated soil. The no-action option is included to show what would occur in the contaminated area(s) without any cleanup effort. This option is used for comparison to each of the other options.
- **Institutional Controls.** Exposure to contaminated soil is reduced or prevented through land zoning restrictions, placing a notice of contamination on the property record, or monitoring and analysis of the soil, but the contaminated soil is neither contained nor treated.
- **Engineering Controls.** Installation of a physical barrier (i.e., fencing and/or warning signs) to limit access to contaminated soil without providing any containment or treatment of the soil.
- **Containment**. Physical barriers are placed over or around the area of contamination (above or below ground) to limit direct contact of humans, animals, or plants with the soil and the migration of the contaminant in the soil without excavation of soil or treatment (includes "impervious capping").
- **Excavation-No Treatment.** There are two types of excavation options: 1) excavations at "hot spots" (relatively small areas of high concentrations of contamination) would leave behind soil that is contaminated at lower levels, but still above the cleanup level, which would be covered (or "capped") with clean soil, and 2) excavations of larger areas with lower level contamination would remove all of the contaminated soil. The excavation and non-treated contaminated soil under either of these types of excavation must be disposed of in a permitted landfill.
- **Excavation-With Treatment (Ex-Situ).** The excavation and treatment of the soil prior to disposal. The type of treatment is referred to as "ex-situ" because the soil has been removed from original site and can be: 1) biological (for example bioaugmentation)- this bioremediation process adds bacteria or nutrients to the soil to help naturally destroy the contaminants. The contaminated soil is excavated and placed on a liner, then mixed with the bacteria. The treated soil is analyzed for contamination to ensure that cleanup levels were achieved; 2) thermal (for example incineration) - on-site or off-site treatment for this option involves combustion (burning) of contaminated soil; 3) physical (for example soil washing) - this process involves mixing contaminated soil with a washing solution to remove most of the contamination from the soil; or 4) solidification - involves injection and mixing stabilizing agents into the contaminated soil to solidify soils, which prevents the chemicals from seeping out.
- **In-Situ Treatment.** The treatment of the contaminated soil "in-situ" (meaning in place, no excavation) without collection and discharge. This type of treatment involves in-situ heating in which thermal blankets are used to heat the soil to high enough temperatures that the contaminants are separated from the soil (and collected and treated) or destroyed.
- **Disposal.** The type of disposal depends on whether or not the excavated soil was treated. Treated soil that has achieved cleanup levels may be placed back into the excavated area ("backfilling"). Non-treated soil must be either placed in a permitted landfill on-site or packaged into "Supersacks", loaded onto barges, and shipped off-site to a permanent commercially-available thermal treatment facility or permitted landfill. Soil from a local borrow source would be used to backfill the excavations.

CLEANUP OPTIONS (CONTINUED)

Groundwater

- **No Action.** Same as for soil, see above.
- **Institutional Controls.** Actions are taken to reduce or prevent the exposure of humans, animals, and plants to contaminated groundwater. Such actions may include the placement of a notice of contamination on the property records and starting a water monitoring program that would periodically check for contamination. This option would neither contain nor destroy the contaminants in the water.
- **In-Situ Treatment.** The treatment of the contaminated water in place without collection or discharge. This type of treatment can be: 1) natural attenuation - this process relies on the reduction of contaminant concentrations passively through natural biological processes (degradation), as well as physical and chemical processes. The groundwater is sampled and analyzed to verify that the desired cleanup levels are achieved, or 2) chemical oxidation - chemical oxidants injected into the plume of contamination act to degrade the contaminant in the water to levels below the cleanup level. The groundwater is sampled and analyzed to verify that the desired cleanup levels are achieved.

ALTERNATIVE EVALUATION CRITERIA

Once the families of cleanup options are combined into specific cleanup alternatives, the Air Force, ADEC, and the EPA use nine criteria to compare cleanup alternatives and to choose the preferred cleanup alternative:

- **Overall Protection of Human Health and the Environment**—How well does the alternative protect the health and safety of humans, animals, and plants?
- **Compliance with Regulations**—Does the alternative meet all state and federal laws?
- **Long-Term Effectiveness and Permanence**—How long will it take to complete cleanup? What is the long-term risk at the site? Are the contaminants permanently removed or destroyed?
- **Reduction of Toxicity, Mobility, or Volume through Treatment**—How well does the alternative treat contamination?
- **Short-Term Effectiveness**—Could humans, animals, or plants be harmed when performing the work? Would the alternative reduce the site risks in the short term?
- **Implementability**—Is the alternative easily constructed, maintained, and/or enforced?
- **Cost**—Is the alternative cost effective?
- **State Acceptance**—State acceptance will be determined after public comments are received. The public comment period has not ended, so this is not discussed further in this document. State comments will be addressed in the final decision document for each site.
- **Community Acceptance**—The Air Force will review and consider all comments received during the public comment period before making a final decision. The public comment period has not ended, so this is not discussed further in this document. Public comments will be addressed in the final decision document for each site.

ALTERNATIVES EVALUATED

One no-action and several action alternatives were developed for both surface soil and groundwater at the Former Facility Area. Each alternative is a different combination of the various families of cleanup options described above for soil and groundwater. The alternatives were described and compared in detail in the 2006 Final RI/FS (US Air Force, 2006). This version of the RI/FS was amended in 2008 to include an additional alternative (Surface Soil Alternative 10). As mentioned in the introduction, this Proposed Plan follows the guidance of CERCLA, which does not regulate the cleanup of fuels. For this reason, the alternatives listed below in this Proposed Plan are abbreviated from what was presented in the RI/FS to describe only the treatments for non-fuel-contaminated surface soil and water. The alternatives presented and analyzed in the RI/FS included cleanup alternatives for fuel contamination as well as PCB, pesticide, and PAH contamination.

The cleanup alternatives were compared to determine the advantages and disadvantages of each alternative relative to the other alternatives based on the first seven of the nine criteria. The last two criteria (state acceptance and community acceptance) will be determined after receiving your comments to this Proposed Plan. The alternatives are summarized in

the text below and evaluated in the following tables (refer to Tables 2 and 3). The cleanup levels for the contaminants discussed below are listed in Table 1.

The cost information for all alternatives listed in Tables 2 and 3 comes directly from the RI/FS document and includes cleanup of both fuel and non-fuel contaminants. The ratings for the criteria presented in Tables 2 and 3 of this Proposed Plan have been modified from the ratings originally presented in the RI/FS tables to more closely reflect the environmental effects solely at Port Heiden, as opposed to the environmental effects of other communities in the state of Alaska or the U.S. Table 2 originates from Table 4.2-5 (page 4-82) and Table 3 originates from Table 4.2-9 (page 4-95) of the 2006 FS. It is important that the alternatives be rated to accurately reflect the benefits and drawbacks to the residents and environment of Port Heiden, which are the focus of the cleanup efforts.

The ten Former Facility Area **Surface Soil Alternatives** are as follows (refer to Table 2):

Surface Soil Alternative 1 – No Action. In this alternative, no action is taken to remediate surface soil at the Former Facility Area contaminated with PCBs, pesticides, and PAHs at concentrations above cleanup levels. Soil contaminated with these constituents would likely remain a risk for the foreseeable future. No monitoring would be performed at the facility to assess site conditions over time.

Surface Soil Alternative 2 –Impervious Capping and Long-term Monitoring. In this alternative, an impermeable asphalt cap would be placed over surface soil contaminated with PCBs, pesticides, and PAHs above cleanup levels. Signs would be placed at the property so people would know the area is contaminated. Fences would be erected around the capped areas. Current and future property owners would be made aware of the contamination and a notice would be placed on the property records. Periodic site inspections would be performed to check the condition of the cap and any needed maintenance would be completed.

Surface Soil Alternative 3 –Soil Hot Spot Excavation, Off-site Incineration and Disposal, and Soil Capping. In this alternative, soil contaminated with PCBs greater than 20 mg/Kg (hot spots) would be excavated. It is difficult to definitively delineate PCB concentrations in surface soil because of the previous use of low-level PCB-contaminated soil as fill material to re-grade the site; however, hot spots greater than 20 mg/Kg are more readily identifiable and traceable to specific release sources. All soil with remaining contaminants above cleanup levels that is not excavated would be capped with clean soil to prevent physical contact with the contaminated soil. Excavated contaminated soil would be sent off-site for incineration to destroy the contaminants. Soil from a local borrow source would be used to backfill the excavations. As under Alternative 2, signs and fences would be erected and property owners would be notified of the contamination present. Periodic site inspections would also occur to check the condition of the cap and needed maintenance would be completed. Maintenance would be completed on an as-needed basis.

Surface Soil Alternative 4 – Soil Excavation, Solidification, and On-site Disposal. In this alternative, all soil contaminated with PCBs, pesticides, and PAHs above cleanup levels would be excavated. The excavated soil would be solidified and disposed of on-site in a constructed landfill located on Air Force property. No soil cap would be required as this alternative would be protective under an unrestricted use scenario (i.e., protective of a residential child and adult) at the excavation site. Soil from a local borrow source would be used to backfill the excavations. A notice would be placed on the property records of the Air Force landfill noting the contamination on site at concentrations not protective of residential use (i.e., groundwater use restrictions). Land use restrictions may also be employed that would prevent residential use of the Air Force landfill property.

Surface Soil Alternative 5 – Soil Excavation, Off-site Incineration, and Disposal. In this alternative, soil contaminated with PCBs, pesticides, and PAHs above cleanup levels would be excavated as under Alternative 4. However, under this alternative, the excavated soil would then be shipped off-site to be incinerated (to destroy the contaminants). Soil from a local borrow source would be used to backfill the excavations. No soil cap or institutional controls would be required as this alternative would be protective under an unrestricted use scenario (i.e., protective of a residential child and adult).

Surface Soil Alternative 6 – Soil Excavation and Off-site Disposal in a Permitted Landfill. In this alternative, soil contaminated with PCBs, pesticides, and PAHs above cleanup levels would be excavated as under Alternative 4. This alternative is similar to Alternatives 4 and 5 except that the excavated soil would be shipped off-site and disposed of in a permitted landfill. Soil from a local borrow source would be used to backfill the excavations. No soil cap or institutional controls would be required as this alternative would be protective under an unrestricted use scenario (i.e., protective of a residential child and adult).

ALTERNATIVES EVALUATED (CONTINUED)

Surface Soil Alternative 7 – **In-situ Soil Treatment**. In this alternative, soil containing PCBs, pesticides, and PAHs above cleanup levels would be treated "in-situ" using thermal blankets to heat the soil to a high enough temperature that the contaminants are either separated from the soil or destroyed. Contaminants separated from the soil but not destroyed would be collected and then incinerated. No soil cap or institutional controls would be required as this alternative would be protective under an unrestricted use scenario (i.e., protective of a residential child and adult). Confirmation soil samples would be collected to ensure that cleanup levels were achieved.

Surface Soil Alternative 8 – **In-situ Soil Treatment**. This alternative is the same as Alternative 7 for PCB, pesticides, and PAH treatment. The only difference in this alternative is the approach for other chemical constituents, which are not discussed in this Proposed Plan.

Surface Soil Alternative 9 – **Soil Excavation and Bioremediation**. In this alternative, soil containing PCBs, pesticides, and PAHs above cleanup levels would be excavated then treated on site in "ex-situ" biocells through bioaugmentation to destroy the contamination. Confirmation soil samples would be collected to ensure that cleanup levels were achieved.

Surface Soil Alternative 10 – **Soil Excavation, Washing, and Off-site Disposal in a Permitted Landfill**. In this alternative, soil containing PCBs, pesticides, and PAHs above cleanup levels would be excavated. Surface soils containing PCBs $\geq$ 10 mg/Kg would be excavated, and washed in an alcohol based solvent to reduce the PCB concentration to <10 mg/Kg. The PCBs would be concentrated in the solvent, which would either be filtered on site to remove the contamination or shipped off-site for proper disposal. Soils containing >1 mg/Kg of PCBs but <10 mg/Kg of PCBs would also be excavated but not washed. Confirmation soil samples would be collected to ensure that cleanup levels were achieved. After treatment, all soil would be disposed of in a permitted landfill.

The Former Facility Area **Groundwater Alternatives** are as follows (refer to Table 3):

Groundwater Alternative 1 – **No Action**. In this alternative, no action is taken to remediate groundwater contaminated with TCE at the Former Facility Area. The contamination would be allowed to naturally degrade. No monitoring would be performed.

Table 2 Comparison of Former Facility Area Surface Soil Alternatives to Evaluated Criteria at Port Heiden

Alternatives for Surface Soil	Overall Protection of Human Health & the Environment	Compliance with ARARs	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, or Volume	Short-Term Effectiveness	Implement-ability	Estimated Costs (Total Present Value)
Alternative 1 – No Action	-	-	NA	NA	NA	NA	N/A
Alternative 2 – Capping/Monitoring	+	+	0	0	+	0	$2,080,000
Alternative 3 – Hot Spot Removal/Incineration/Capping	+	+	+	0	0	0	$17,500,000
Alternative 4 – Excavation/Solidification/Disposal	+	+	-	0	0	-	$20,400,000
Alternative 5 – Excavation/Incineration/Disposal	+	+	+	+	0	0	$19,300,000
Alternative 6 – Excavation/Landfilling	+	+	0	0	0	0	$11,200,000
Alternative 7 – In-Situ Thermal Treatment	+	+	+	0	0	0	$7,570,000
Alternative 8 – In-Situ Thermal Treatment	+	+	+	0	0	0	$5,870,000
Alternative 9 – Excavation/Bioremediation	+	+	+	0	0	-	$5,900,000
Alternative 10 – Excavation/Washing	+	+	0	0	0	0	$9,001,000

Notes:
ARAR=Applicable or Relevant and Appropriate Requirement
(+) – Criterion is fully met; the alternative meets the criterion better than the average alternative
(0) – Criterion is partially met; the alternative meets the criterion equal to the average alternative
(-) – Criterion is not met; the alternative meets the criterion less than the average alternative
NA = Criterion not evaluated at this time

Groundwater Alternative 2 –**Natural Attenuation and Long-term Monitoring**. In this alternative, groundwater contaminated with TCE would be left to naturally attenuate. Periodic groundwater monitoring would be performed at the facility to assess changes in groundwater contaminant concentrations over time. Institutional controls restricting the use of groundwater would be implemented and would remain in place until groundwater cleanup levels were achieved through natural attenuation. Property owners would be notified of the contamination on site and land use restrictions may also be

employed. Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. These reviews will be conducted until cleanup levels are achieved at the site. When long term monitoring results show that the concentrations have dropped below cleanup levels, the property use restrictions and land use restrictions would be removed.

Groundwater Alternative 3 – In-Situ Enhanced Bioremediation and Long-term Monitoring. In this alternative, groundwater contaminated with TCE would be treated "in-situ" by the injection of a hydrogen releasing chemical agent to enhance natural biodegradation of the contaminants. This treatment would help activate the naturally occurring bacteria within the groundwater/soil matrix and result in a decrease of the TCE concentrations until cleanup levels were met. Periodic groundwater monitoring would be performed at the facility to assess changes in groundwater concentrations over time. As under Surface Soil Alternative 4, property owners would be notified of the contamination on site and land use restrictions may be employed (i.e., groundwater use restrictions). Because this remedy will result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. These reviews will be conducted until cleanup levels are achieved at the site. Institutional controls would be implemented for groundwater and would remain in place until groundwater cleanup levels were achieved through natural attenuation. Property and land use restrictions would be removed after long-term monitoring results show that the concentrations had dropped below cleanup levels.

Groundwater Alternative 4 – In-Situ Chemical Treatment and Short-term Monitoring. Similar to Groundwater Alternative 3 except that under this alternative, groundwater contaminated with TCE would be treated using a chemical oxidant, not a hydrogen releasing compound, which would be injected into the contaminated groundwater plume. As under Groundwater Alternative 3, the chemical oxidation would act to degrade the contaminants in the groundwater to concentrations below cleanup levels. Contaminated soil associated with the groundwater plume would also be degraded by the chemical oxidant. The chemical reaction time under this alternative would be faster than for bioremediation. Groundwater samples would be collected after a short reaction period (on the order of weeks) to ensure the TCE contamination was reduced to below the cleanup levels. As under Groundwater Alternative 3, property owners would be notified of the contamination on site and land use restrictions may be employed.

Table 3 Comparison of Former Facility Area Groundwater Alternatives to Evaluation Criteria

Alternatives for Groundwater	Overall Protection of Human Health & the Environment	Compliance with ARARs	Long-Term Effectiveness &Permanence	Reduction of Toxicity, Mobility, or Volume	Short-Term Effectiveness	Implement-ability	Estimated Costs (Total Present Value)
Alternative 1 – No Action	-	-	-	-	-	-	N/A
Alternative 2 – Institutional Controls/Monitoring	+	+	+	0	0	0	$118,000
Alternative 3 – Institutional Controls/Bioremediation/Monitoring	+	+	+	0	0	0	$677,000
Alternative 4 – In-Situ Treatment	+	+	+	0	0	0	$703,000

Notes: Same as Table 2.

PREFERRED CLEANUP ALTERNATIVE

The Air Force proposes to address the contamination that poses a potential risk to human health and the environment to the maximum extent practicable with available funding. The community understands that even with the best efforts made by all parties, some contamination may remain. Any remaining contamination will be dealt with in such a way as to eliminate the risk to human health and the environment. As necessary, the Air Force would request access from landowners prior to initiating any cleanup activities. The Preferred Cleanup Alternative as described in this Plan is comprised of one alternative each for surface soil and groundwater, and is as follows:

Surface Soil Alternative 10 – Soil Excavation, Washing, and Off-Site Disposal in a Permitted Landfill

In this alternative, all surface soil contaminated with PCBs, pesticides, and PAHs would be excavated to a depth necessary to meet the required cleanup level (refer to Table 1) and removed entirely from the site. This ensures that this alternative would be protective under an unrestricted use scenario (i.e., protective of a residential child and adult). The on-site washing of soil with PCB contaminant concentrations $\geq$ 10 mg/Kg would require the participation of local workers from the community of Port Heiden. All excavated soil would then be trucked and disposed of in a permitted landfill in the vicinity of Port Heiden. Soil from a local borrow source would be used to backfill the excavations. No soil cap or institutional controls would be required under this alternative.

Although Preferred Surface Soil Alternative 10 does not rate as high as some of the other alternatives in Table 2, it will protect the health of the community and meets applicable regulations, which dictate the way sites must be cleaned up. The first two "+" in Table 2 indicate that the alternative fully meets the criteria for "Overall Protection of Human Health and the Environment" and "Compliance with ARARs". It is important that an alternative fully meet these criteria because the risk of exposure is reduced in that the contamination would be removed from the site and that all applicable state and federal laws are met for the contaminants.

The four "0" for the remainder of the criteria ("Long Term Effectiveness and Permanence", "Reduction of Toxicity, Mobility, or Volume", "Short-Term Effectiveness" and "Implementability") indicate that they are equal to the average alternative.

"Long Term Effectiveness and Permanence" and "Reduction of Toxicity, Mobility or Volume" criteria are about equal to the average alternative because the contamination would not be destroyed with this approach, but removed by the washing solution which is then transferred to an offsite facility for disposal. If the contamination in the washing solution is destroyed by the offsite disposal facility rather than land disposed, these ratings may be closer to "+" resulting in a much higher ranking of the alternative.

The "Short Term Effectiveness" criterion is about equal to the average alternative due to short term risks that may occur during excavation of the contaminated soil and during operation of the soil washing process.

The "Implementability" criterion is about equal to the average alternative because it requires barging somewhat specialized soil washing equipment to the site, setting up the equipment, and testing/fine tuning the process so it removes the contaminants to the levels required to allow the soil to be disposed in the community Class III Landfill.

The Preferred Surface Soil Alternative 10 is not the cheapest alternative because it involves use of soil washing chemicals (which are expensive) as well as construction of a Class III Landfill at Port Heiden. Surface Soil Alternative 10 is also not the most expensive; it has the median cost of all the alternatives evaluated.

There were three primary reasons for selecting the soil washing method presented as Surface Soil Alternative 10: 1) this technology is much less complicated to implement compared to incineration, thermal treatment, or destruction of the contaminants using biological methods, 2) this technology treats the most highly contaminated soil to remove toxic chemicals (which complies with the state and federal preference for incorporating treatment and alternative technologies as a principal element in the cleanup) rather than just excavating the contaminated soil and moving it to another location for disposal, and 3) the technology is locally available, i.e., there is a local Alaskan company familiar with working at Port Heiden that has access to a soil washing process that can be used to remove the contaminants from the soil.

Overall, Preferred Surface Soil Alternative 10 involves the most efficient and effective way to confidently and permanently remove PCB, pesticide, and PAH contamination down to the cleanup levels from the surface soil, thereby ensuring the ultimate return of the land to the residents of Port Heiden for unrestricted use.

PREFERRED CLEANUP ALTERNATIVE (CONTINUED)

Groundwater Alternative 2 –Natural Attenuation and Long-term Monitoring

Two TCE plumes are present in groundwater at the Former Facility Area. The depth of the water table at this location is approximately 50 feet below ground surface. The depth of the plumes make active remedial systems (such as pump and treat, which has a significant power requirement, complex discharge requirements, and limited effectiveness) technologically impractical. Therefore, the Air Force proposes to use up to four existing wells to establish a network such that monitored natural attenuation of the plume can be conducted. As other contaminants (i.e., fuels) in the groundwater breakdown over time, their by-products will help to break down the TCE. Therefore, no treatment is proposed for the TCE-contaminated groundwater. This approach is supported by the fact that there are no residences within the groundwater contamination region and there are currently no drinking water wells being used and none are planned. Therefore, the risk from drinking and or bathing in groundwater would be low. However, institutional controls would be implemented to restrict the use of groundwater and would remain in place until groundwater cleanup levels were achieved through natural attenuation.

Preferred Groundwater Alternative 2 is the least expensive of all the other action alternatives. It rates the same as Alternatives 3 and 4 for all other criteria. The more aggressive contamination treatment approaches described in Alternatives 3 and 4 would be more practical choices if groundwater contamination threatened the public drinking water supply or if residents lived within the contamination plume. Since neither of these situations is applicable to the Port Heiden RRS, the natural approach presented as the preferred groundwater cleanup alternative is the superior choice considering the situation at the site.

Because this remedy would result in hazardous substances, pollutants, or contaminants remaining on site above levels that allow for unlimited use and unrestricted exposure, a statutory review will be conducted every five years after initiation of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment. These reviews will be conducted until cleanup levels are achieved at the site.

Summary of Preferred Cleanup Alternative

Overall, this Preferred Alternative is: 1) protective of human health and the environment by eliminating contamination in a large quantity of soil and establishes institutional controls and a protection monitoring program for all remaining on-site contaminants; 2) compliant with regulations; 3) utilizes a permanent solution that removes contamination from Native- and State- owned land, and reduces the risks at the former RRS to a point where the site is ultimately suitable for residential use; and 4) moderately priced compared with the other alternatives.

REFERENCES

US Air Force. 2006. Port Heiden Radio Relay Station Remedial Investigation/Feasibility Study**.** Port Heiden, Alaska**.** Prepared for: 611th Air Support Group Civil Engineering Squadron, Civil Environmental Restoration Element and Air Force Center for Environmental Excellence by Weston Solutions, Inc. April.

PUBLIC MEETING

A public meeting will be held in Port Heiden at Ray's Place Thursday, October 23, 2008 12:00 PM (noon)

How You Can Participate

You are encouraged to participate in the decision-making process for the Port Heiden Former Facility Area. You can participate by commenting on the proposed cleanup options presented in this Proposed Plan during the public comment period from October 10, 2008 to November 10, 2008. If you have questions or wish to comment on this project you may meet with the Air Force representative at the public meeting, to be held on October 23, 2008 at 12:00 PM at Ray's Place in Port Heiden. You may also send your written comments to the following address before the public comment period ends:

Air Force Community Relations Coordinator
611 CES/CEVR
10471 20th Street, Suite 340
Elmendorf AFB, Alaska 99506-2200
907-552-4506 or 1-800-222-4137
Tommie.Baker@elmendorf.af.mil

Your comments will help the Air Force make a decision that is technically sound and addresses your concerns. All public comments, whether in person or in writing, will be considered by the Air Force before making a final decision for cleanup action at the Former Facility Area. Depending on public comments or new information, the actual cleanup remedy selected for each site may be the preferred cleanup remedy, a modification to the preferred cleanup remedy, or a combination of other cleanup remedies. The chosen remedy will be described in the ROD.

The Air Force will present their comment responses in a document called a "Responsiveness Summary." The decision on the cleanup action will be presented in a decision document. The Responsiveness Summary will be part of the decision document and will be available for review at the information repositories.

Air Force Community Relations Coordinator
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