SECOND CERCLA FIVE-YEAR REVIEW FOR SITES OT001, WP002, SS004, LF007, AND FOUR UNNUMBERED SITES (ANTENNA PADS, CONTAMINATED SOIL REMOVAL AREAS, DRUM STORAGE AREA, AND FOCUS AREA)
AND
FIRST NON-CERCLA PERIODIC REVIEW REPORT FOR SITE SS006 AT THE FORMER PORT HEIDEN RADIO RELAY STATION, ALASKA

Final
December 2019

Prepared by

United States Air Force
Joint Base Elmendorf-Richardson, Alaska

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

26 Feb 2020
Date

Table of Contents

List of Tables

List of Figures

Appendices

List of Abbreviations & Acronyms

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AFCEC	Air Force Civil Engineer Center
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical or contaminant of concern
COPC	contaminant of potential concern
DCE	dichloroethylene
DRO	diesel-range organics
ERA	ecological risk assessment
ERP	Environmental Restoration Program
ERPIMS	Environmental Restoration Program Information Management System
FYR	Five-Year Review
GRO	gasoline-range organics
HI	hazard index
HQ	hazard quotient
ICs	institutional controls
LUC	land use control
mg/kg	milligrams per kilogram
ND	non-detect
PAH	polynuclear aromatic hydrocarbon
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
POL	petroleum, oils, and lubricants
RA	remedial action
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
RRO	residual-range organics
RRS	Radio Relay Station
Stantec	Stantec Consulting Services, Inc.
SVOC	semi-volatile organic compound
TCB	trichlorobenzene
TCE	trichloroethylene
TPH	total petroleum hydrocarbons
TSCA	Toxic Substances Control Act
µg/L	micrograms per liter
USAF	United States Air Force
UST	underground storage tank
VOC	volatile organic compound

(This page intentionally left blank.)

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) or Periodic Review is to evaluate the implementation and performance of a remedy for a site in order to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in FYR or Periodic Review reports such as this one. In addition, FYR and Periodic Review reports identify issues found during the review, if any, and document recommendations to address them.

The United States Air Force (USAF) conducted a statutory FYR and a policy Periodic Review of environmental remedies at nine sites at the former Port Heiden Radio Relay Station (RRS), Alaska. The U.S. Air Force (USAF) is preparing this FYR pursuant to Department of Defense policy, consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, and with the National Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Section 300.430(f)(4)(ii)), and considering U.S. Environmental Protection Agency (EPA) policy.

The sites in this report are grouped collectively into Environmental Restoration Program (ERP) sites (RRS Facility Source Areas) and the Former Pipeline Corridor (SS006, a non-CERCLA site) (**Figure 1**). This is the second FYR for ERP Sites OT001, WP002, SS004, LF007, and four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area).

This is the first Periodic Review for Site SS006. Statutory review under CERCLA is not required for Site SS006, as no CERCLA contaminants were identified and Site SS006 does not yet have an official Decision Document. Therefore, the inclusion of Site SS006 in this FYR is prepared at the discretion of the USAF due to the fact that petroleum oil is a State listed hazardous substance regulated under Alaska State law. Contamination resulting from releases of petroleum products, remain at Site SS006 above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The triggering action for this FYR is the September 2014 signature date on the prior FYR report. This report has been prepared because hazardous substances or contaminants regulated under CERCLA and/or by the State of Alaska remain at these sites above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The status of Sites: OT001, WP002, SS004, SS006 LF007 and the four unnumbered sites in the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database are listed as “Active” (ADEC, 2018a).

This FYR and Periodic Review was led by Stantec Consulting Services, Inc. (Stantec) on behalf of the Air Force Civil Engineer Center (AFCEC) under Contract Number FA8903-16-D-0032, Task Order 144. Participants included AFCEC, Stantec, and ADEC staff with expertise in site investigation and remediation. The review began in August 2018.

Site Background

The former Port Heiden RRS is located approximately 1.5 miles east of Bristol Bay and approximately 400 miles southwest of Anchorage on the north side of the Alaska Peninsula (**Figure 1**). The former Port Heiden RRS is located within the former Fort Morrow, a World War II Army Corps Air Base. Access to the installation is by commercial air carrier to the airstrip nearby or by barge to the barge landing area approximately 3 miles to the southwest.

The former RRS site, accessed by Site Road, is located approximately 3.5 miles north of the Native Village of Port Heiden (NVPH). Site Road extends north from the Port Heiden airport, then northwest to the former Port Heiden RRS. The majority of Site Road is southeast and south of the former Port Heiden RRS; however, a portion of the road extends into the former Port Heiden RRS, through ERP Site OT001 and the four unnumbered sites (**Figure 2**).

The Port Heiden installation was initially one of the 18 Distant Early Warning Line stations constructed in Alaska between 1950 and 1959. The Port Heiden RRS became operational in 1961 to provide reliable communications for the Distant Early Warning Line station. Originally known as White Alice Communications System, the Air Force Alaska Air Command redesignated White Alice Communications System facilities as RRSs in 1969. The Port Heiden RRS was deactivated in 1978. The site consisted of a Composite Building with dormitories, office space, storage space, and equipment for standby power generation, four billboard antennas and feed horns (White Alice Arrays), and a heliport. The buildings and facilities associated with the former Port Heiden RRS have been removed (USAF, 2014a).

Past activities resulting in potential environmental contamination at the Port Heiden RRS included road oiling, transformer use, improper disposal of contaminated waste, drum storage, the installation and use of underground storage tanks (USTs), and communications system operations. Site investigations, removal actions, and remedial activities were initiated as part of the Defense Environmental Restoration Program and have occurred at the Port Heiden RRS since an initial site inspection in 1977 (USAF, 2017a).

Four ERP sites and four unnumbered sites contain CERCLA hazardous substances identified as contaminants of concern (COCs) and are included in this FYR:

- Former Composite Building (OT001)
- Septic Tank and Septic System Outfall (SS004)
- Radio Relay Station Landfill (Site LF007)
- Black Lagoon Outfall (WP002)
- Four Unnumbered Sites – Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area

This report also includes a Periodic Review for Site SS006, a former pipeline corridor, where groundwater was contaminated with petroleum, oil, and lubricants (POL), which are not regulated under CERCLA. The following sections provide more detailed background information on the sites that are the subject of this FYR and Periodic Review.

It should be noted that because the source areas were identified as ERP/non-CERCLA sites at different times, their numeric site designations were not necessarily established when discussing

historic documents and results. As a result, response actions described in this FYR do not refer to the individual ERP site numbers when the action occurred prior to 1995.

Investigation of the contamination found at the former Port Heiden RRS was initiated in 1986. Site-specific activities are described below.

Site OT001 – Former Composite Building

Site OT001 consists of a gravel pad that contained the Former Composite Building along with four former USTs around the Former Composite Building. The Former Composite Building was constructed of reinforced concrete slabs and contained offices, dormitories, storage space, a garage, and a generator room.

Investigations conducted at OT001 identified polychlorinated biphenyls (PCBs) and chlorinated solvent-contaminated soil around the perimeter of the former concrete foundations. The foundation of the composite building was covered with soil at some point after contaminated soil removal phases (USAF, 2006); however, no documentation regarding this cover was available.

In 1986, soil samples were collected throughout the former Port Heiden RRS and tested for PCBs, metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver), SVOCs, and halogenated volatile organic compounds (VOCs). At the Former Composite Building, results indicated the presence of PCBs up to 15 milligrams per kilogram (mg/kg) near the auto shop, and the halogenated VOC, trichlorofluoromethane, at a maximum concentration of 84.2 parts per billion outside the generator room (USAF, 2006).

In 1987 and 1988, 80 soil samples were collected from the north end of the Former Composite Building analyzed for PCBs. Analytical results identified PCB-contaminated soil along the entire northern wall of the Former Composite Building at concentrations up to 190 mg/kg. The highest concentrations were found generally at the east edge of the concrete slab in front of the large garage doors. The north end of the Former Composite Building was subsequently the focus for soil excavation and removal during the 1990 investigation and restoration activities (USAF, 2006).

In 1990, contaminated soil excavation activities were conducted. Approximately 170 cubic yards (cy) of PCB-impacted soil removed from the Former Facility Area and from an FAA site were sent offsite for disposal. The exact amount of PCB-contaminated soil removed only from the Former Facility Area was not estimated (USAF, 2006).

Surface soil with total petroleum hydrocarbons (TPH) concentrations above 5,000 mg/kg on the north side of the former composite building was removed in 1-foot-thick intervals; the remaining soil was then retested. The goal in 1990 was to achieve TPH concentrations below 100 mg/kg throughout the excavation area. This cleanup goal was not achieved. In 1991, ADEC agreed to a 5,000 mg/kg TPH cleanup concentration. Soil with TPH concentrations below 5,000 mg/kg and PCB concentrations below 10 mg/kg was placed into the soil covers of Landfills A and B. Soil with analytical results above 5,000 mg/kg TPH and PCB concentrations below 25 mg/kg was stockpiled on site for subsequent remediation (USAF, 2006).

During 1990 activities, a search was conducted for a 30,000-gallon motor gas UST which was shown to exist on previous as-built drawings, but the UST could not be located. The absence of the tank was confirmed during 2004 Remedial Investigation (RI) work (USAF, 2006). Additional USTs formerly located at the site but removed prior to 1990 activities include a 600-gallon ADEC-registered UST and two 20,000-gallon diesel USTs.

In 1995, soil was excavated along the north wall of the former composite building, as described in Section II, *Response Actions*. The site inspection report concluded that no further action was needed at OT00l, as analytical results indicated that POL and PCB soil concentrations above the cleanup levels were removed. The USTs were also removed (USAF, 2006).

In 1999, nine subsurface samples were collected from underneath the vegetated cover near the composite building and analyzed for benzene, toluene, ethylbenzene, and xylenes (BTEX). No BTEX constituents were detected above the laboratory's method detection limits (MDL) (USAF, 2006).

During the 2004 RI, Aroclor 1260 (PCB) was detected above the screening criteria (1 mg/kg) in four of the initial nine surface soil samples. A PAH compound, benzo(a)pyrene, was also found slightly above the screening criteria (1 mg/kg) in one sample and its duplicate. Based on the initial analytical results, an additional six soil samples were collected laterally, away from the initial samples, and were analyzed for PCBs. Of the soil samples collected during the 2004 RI, eight had concentrations of PCBs above the screening criteria (1 mg/kg), with a maximum detected concentration of 6.4 mg/kg (USAF, 2014a).

Site SS004 – Septic Tank and Septic System Outfall

Site SS004 consists of a former septic tank location, septic tank piping, and a septic system outfall area. The septic system was located in the southwestern portion of the former Port Heiden RRS. Piping from the Former Composite Building ran west to the septic tank, which was approximately 200 feet long. Piping from the septic tank branched off to the northwest, continued under a manmade dirt ridge for approximately 250 feet, and turned west into an outfall area. The outfall area consists of a concrete wing wall that discharges into a depressed area, approximately 50 feet in diameter. The septic tank may have been abandoned in place during an initial response action conducted in 1990. Site SS004 contains PCB contamination in soils, and the site was also suspected to have been used to dispose of POL wastes from Site OT001 (USAF, 2014a).

In 1999 five soil samples were collected at the septic tank location and analyzed for VOCs, SVOCs, priority pollutant metals, PCBs, and pesticides. One sample collected at the southwest corner of the septic tank area reportedly contained Aroclor 1260 at a concentration of 13,100 mg/kg. The highest reported DRO and residual-range organics (RRO) concentrations were 1,310 mg/kg and 1,180 mg/kg, respectively (USAF, 2006).

During the 2004 RI, low-level DRO and PCBs were found in surface soil directly below the outfall discharge point. No analytes were detected above screening criteria in subsurface soil or groundwater (USAF, 2006).

Subsequent investigations conducted at ERP Site SS004 identified an area of PCB-contaminated soil measuring approximately 100 feet by 100 feet. PCB contamination near the septic tank portion of the site was above the screening criteria in surface soil. During the 2004 RI, PCBs were also detected in surface soil directly below the outfall discharge point during the 2004 RI (USAF, 2009a).

Site LF007 – Radio Relay Station Landfill

Site LF007, the RRS Landfill, is located to the north of the former Port Heiden RRS and covers an area of approximately 350 feet long by 300 feet wide. Several feet of fill have been placed over

the RRS Landfill contents as a cover. PCBs, polynuclear aromatic hydrocarbon (PAHs), and pesticide contamination were detected in the soil cover material over the landfill (USAF, 2014a).

During the 2004 RI, numerous surface and subsurface soil samples were collected, and PCBs, PAHs, and pesticide contamination were detected in the soil cover material over the landfill. PCBs were detected in three of the collected soil samples obtained at 2 feet bgs. PAHs and pesticides were also detected in one sample above cleanup levels. The maximum concentration of PCBs detected was 360 mg/kg (USAF, 2009a). The aerial extent of buried debris in the landfill is approximately 300 feet by 400 feet, the thickness of the cover soil averages approximately 3.5 feet. No detections of contaminants above screening criteria in surface or subsurface soil around the perimeter of the landfill have been detected (USAF, 2014a).

Site WP002 – Black Lagoon Outfall

The BLO, located southwest of the former RRS, was the location of a series of holding ponds at the outfall of a pipe that conveyed effluent from a floor drain in the Former Composite Building located 500 feet to the east of the outfall area. POL wastes were reported to have been disposed of in a floor drain that connected the auto shop in the Former Composite Building to the Black Lagoon.

In 1987 four samples were collected from the Black Lagoon Outfall. Fuels, PCBs, and chlorinated solvents were all detected at low concentrations. In 1988, 16 samples were tested for metals; no samples contained detectable concentrations (USAF, 2006). A review of the analytical results from soil samples collected in 1987 and 1988 show total petroleum hydrocarbons, PCBs, and semi-volatile organic compounds (SVOCs) in exceedance of preliminary action levels. Based on the results, it was estimated that approximately 4,000 cubic yards of soil impacted with total petroleum hydrocarbon concentrations above 5,000 mg/kg were present at Site WP002 (USAF, 2014a).

In 1990, surface samples were analyzed for TPH and PCBs, and four trenches were excavated in the Black Lagoon Outfall to delineate the extent of impacted soil. All PCB results were non-detect. Impacted soil with greater than 5,000 mg/kg TPH was found locally at the surface and to a depth of 12 feet bgs. Approximately 4,000 cy of impacted soil with concentrations above 5,000 mg/kg was estimated to remain at the site (USAF, 2006).

During the 2004 RI, DRO, RRO, metals, PCBs, VOCs, GRO, PAHs, and herbicides were identified as potential COCs within surface and subsurface soil samples. PCE and DRO were the only contaminants identified with concentrations above cleanup levels (USAF, 2015a).

Based on the results of the 2004 RI data, two plumes were identified in the aquifer underlying the former Port Heiden RRS. They include a TCE plume (approximately 700 feet long, 400 feet wide, and at a depth of 50 feet bgs) underlying the former Port Heiden RRS pad and a smaller benzene and TCE plume (approximately 100 feet long, 100 feet wide, and at a depth of 50 to 60 feet bgs) underlying the Black Lagoon Outfall (USAF, 2014a).

Antenna Pads

Four former Port Heiden RRS antennas and feed horns were constructed on four separate concrete pads situated around the Former Composite Building (OT001). The antennas were previously removed, but the concrete pads remain in place. Three of the four pads were covered with soil following removal of the antennas and feed horns. It is suspected that liquids containing PCBs

may have been used as coolants for the antennas, and solvents, such as trichloroethylene (TCE), may have been used to periodically clean the antennas (USAF, 2006).

Based on analytical results from soil samples collected during the 2004 RI, PCBs were detected above the screening criteria (maximum detected concentration of 15 mg/kg) in samples obtained from two borings around the perimeter of Antenna Pads 1 and 2. The contamination may have resulted from the migration of contaminated soil from the adjacent contaminated soil removal areas. Per the ROD, native soil around the perimeter of Pads 3 and 4 appears to be uncontaminated (USAF, 2009a). The results suggest that it is unlikely that operation of the former antennas caused any large release of PCBs or solvents based on analytical results (USAF, 2006).

Contaminated Soil Removal Areas

The extent of contamination associated with the contaminated soil removal areas spans across the former Port Heiden RRS (**Figure 2**). Pesticides and PCBs constituted most of the contaminants found at the contaminated soil removal areas (USAF, 2014a).

Drum Storage Area

The Drum Storage Area is located in the northwestern portion of the Former Facility Area, northwest of the Former Composite Building (Site OT001). As-built drawings indicate that a 1,450-gallon truck-filled motor gasoline tank and pump were located in the southeastern portion of the Drum Storage Area. During the 2004 Remedial Investigation (RI), no USTs were found (USAF, 2014a).

Investigations conducted at this site identified approximately 200 feet by 150 feet of PCB- and pesticide-contaminated surface soil (USAF, 2009a). PCBs have been detected up to 9.9 mg/kg in surface soil in the southern portion of this site in an area referred to as the "Diamond Area." During the RI, PCBs were detected at a maximum concentration of 19 mg/kg in an area just north of this site (USAF, 2014a).

Focus Area

The Focus Area was identified during the 2004 RI fieldwork and consists of an area of stressed vegetation at the northwestern portion of the former Port Heiden RRS, located approximately 200 feet west of the Former Composite Building foundation (USAF, 2014a).

During the RI, reconnaissance was performed over the entire pad to locate any areas of stained soil or stressed vegetation in an attempt to identify all possible sources of contamination. The Focus Area site consists of one area of stressed vegetation that was identified in the northwestern portion of the site. Analytical results from soil samples collected during the 2004 RI indicated that soil was impacted with PCBs. This area is relatively small and is likely due to the result of surface spills. The maximum PCB concentration detected was 5.4 mg/kg (USAF, 2014a).

Site SS006 – Former Pipeline Corridor

The Former Pipeline Corridor (SS006), formerly known as AOC05, connected the Port Heiden RRS Former Facility Area to the Marine Terminal Area, located south of the Former Facility Area in the village of Meshik (**Figure 1**). Site SS006 includes the subsites of the above ground portion of the pipeline from the Marine Terminal Area at the Former Facility Area, and the buried portion within the Former Facility Area. The POL distribution system, operated by the USAF until the

Former Facility Area was abandoned in 1978, consisted of two large aboveground storage tanks, a pumphouse, and piping. The tanks were refueled by barge through piping located along the beach which extended to the tanks. Fuel was distributed from the tank farm pumphouse to the Former Facility Area through a 2-inch pipeline over approximately 5.8 miles. The pipeline was primarily above ground except at locations where it intersected driveways and was buried. The pipeline was also buried from the eastern margin of the Former Facility Area pad to the former USTs northeast of the Former Composite Building. The above ground portion of the pipeline between the airport and the former composite building was dismantled in 1990 (US Army Corps of Engineers Alaska District, 2009). The two POL tanks and fuel pipeline to the airport were sold by the USAF to Reeve Aleutian Airways in 1989 under a U.S. Army Corps of Engineers contract sale Invitation for Bids No. 88-1 and 88-3.

The Former Pipeline Corridor was investigated in the 2004 RI. Surface and subsurface soil surface water, and groundwater samples were collected at intervals along the length of the pipeline. Soil and water samples were analyzed for GRO, DRO, RRO, VOCs, pesticides, herbicides, metals, PCBs, and PAHs. Fuels constituents (DRO and GRO) were detected above screening criteria in soils along the Former Pipeline. It was recommended that impacted soils be excavated and treated or disposed. Groundwater and surface water contamination along the pipeline was linked to contaminated source soils, and it was determined that source controls (i.e. contaminated soils removal) would result in rapid decline of contaminant levels in water media (US Army Corps of Engineers Alaska District [USAF], 2009b).

In 2009, a hydrogeological study was performed to characterize the nature and extent of groundwater contamination identified during the 2008 removal action. Two spill sites located in wetland areas along the pipeline corridor were also further investigated. The study concluded that petroleum hydrocarbon contamination was not widespread, and that impacts were limited in areal extent but extended down to the water table. A 2008 soil removal action, described in Section II, *Response Actions*, appeared to have addressed most soil and groundwater contamination, and natural attenuation mechanisms were expected to continue to eliminate residual contamination. The study recommended annual monitoring be initiated at FPC-066, FPC-215 (**Figure 3**), and additional soil investigation at FPC-086. No further actions were recommended for FPC-029 and FPC-074 (USAF, 2010b).

In 2010, groundwater monitoring results indicated that DRO remained above cleanup levels in one FPC-066 well (MW-05), with a concentration of 4.5 mg/L. At FPC-215, DRO exceeded cleanup level at a concentration of 9.68 mg/L (MW-09) (NVPH, 2012).

In 2011, FPC-066 wells were sampled and analyzed for VOCs only. All results were non-detect. At FPC-215, wells were sampled and analyzed for DRO and BTEX. DRO remained above cleanup levels at a concentration of 14.0 mg/L (MW-09) (NVPH, 2012). In addition to groundwater sampling, additional soil samples were collected in the area identified as FPC-086, which is located just north of FPC-066 along the road. All results were below cleanup levels (NVPH, 2012).

In 2013, groundwater samples were collected from the four wells at FPC-066 and analyzed for DRO. Monitoring well MW-05 slightly exceeded the cleanup level of 1.5 mg/L at a concentration of 1.6 mg/L. All other results were below cleanup levels. The three wells at FPC-215 were sampled and analyzed for DRO; MW-09 was the only cleanup level exceedance with a DRO concentration of 11 mg/L (USAF, 2014c).

In 2014, groundwater samples were collected from two wells at FPC-066 and analyzed for DRO. Monitoring wells MW-05 and MW-06 contained DRO concentrations of 1.3 mg/L and 0.032 mg/L, respectively. This marked the first sampling event where DRO concentrations at FPC-066 were all below cleanup levels. The three wells at FPC-215 were sampled and analyzed for DRO. Concentrations of DRO in monitoring well 215-MW-09 exceeded the cleanup level (12 mg/L) and appear to be increasing over time. Based on this observation, it is possible that one or more contamination sources remain onsite (USAF, 2015b). Additional investigation into possible contributing source areas was recommended.

In 2016, monitoring well MW-05 at FPC-066 was sampled and analyzed for DRO. Results showed DRO concentration of 3.1 mg/L, significantly higher than in previous events with the exception of 2010. The 2016 DRO exceedance may represent seasonal fluctuation in the groundwater contaminant levels. Sample results from three downgradient monitoring wells (066-MW-04, 066-MW-06, and 066-MW-07) no longer exceed the groundwater cleanup levels indicating that the DRO plume is stable and likely decreasing in concentration overall (Jacobs, 2016). Continued annual alternating-season monitoring was recommended.

FYR and Periodic Review Summary Form

SITE IDENTIFICATION		
Site Name: Port Heiden Radio Relay Station Sites: OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area) and SS006		
EPA ID: Not applicable		
Region: 10	**State:** AK	**City/County:** Port Heiden/ Lake and Peninsula Borough
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? No	**Has the site achieved construction completion?** No	
REVIEW STATUS		
Lead agency: Other Federal Agency ***[If "Other Federal Agency", enter Agency name]*:** USAF		
Author name (Federal or State Project Manager): Stantec, on behalf of AFCEC		
Author affiliation: Contractor		
Review period: 9/2/2014 - 9/2/2019		
Date of site inspection: 8/22/2018		
Type of review: Statutory review for OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area); policy review for SS006		
Review number: Second for OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area); first for SS006		
Triggering action date: 9/2/2014		
Due date *(five years after triggering action date)*: 9/2/2019		

(This page intentionally left blank.)

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

A response action was determined to be warranted under CERCLA at Sites OT001, SS004, LF007, WP002, and four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) because the individual risk posed by each COC, and cumulative risk posed by all COCs detected at each site, are greater than acceptable risk levels (USAF, 2009a). A response action was determined to be warranted under State of Alaska regulations at Site SS006 because diesel range organics (DRO) and gasoline range organics (GRO) concentrations in soils and groundwater exceeded 18 AAC 75 Method Two soil cleanup levels (Tables B1 and B2) and groundwater cleanup levels (Table C), and surface water concentrations exceeded 18 AAC 70 Water Quality Standards. **Table 1** lists the COCs identified in the Port Heiden RRS Record of Decision (ROD) for sites included in this FYR. No COCs were identified for Site SS006, as a decision document has not been completed for the site.

Table 1: Port Heiden RRS COCs

Site	Medium	COC
OT001, SS004, LF007, Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area	Soil	Polychlorinated biphenyls
		Benzo(a)pyrene
		Benzo(a)anthracene
		Dibenzo(a,h)anthracene
		Dieldrin
		Heptachlor epoxide
Black Lagoon Outfall Plume and Former Facility Area Plume	Groundwater	Trichloroethylene
		Benzene

Key:
COC – contaminant of concern
PCBs – polychlorinated biphenyls

Risk Summary

Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites Human Health Risks

Results from a baseline human health risk assessment, conducted as part of the 2004 RI were included in the 2009 ROD.

Cancer risks were found to exceed 1×10^{-4} for both future and current scenarios. For almost all scenarios, carcinogenic risks were primarily due to soil ingestion and to a lesser extent, dermal contact. Aroclor 1260 and benzo(a)pyrene contributed over 92% of the total cancer risk across all media. Several PAHs and pesticides also slightly exceeded the carcinogenic threshold of 1×10^{-6}. Groundwater risks exceeded 1×10^{-4}, primarily due to TCE and arsenic (USAF, 2009a).

Hazard Indices (HIs) also exceeded 1.0 for future and current scenarios. Noncancer risks from soil were primarily due to soil ingestion and, to a lesser extent, dermal contact. Aroclor 1260 concentrations in soil contributed to up to 85% of the total noncancer risk. Groundwater HIs exceeded 1.0, primarily due to TCE via groundwater ingestion. More than 76% of the total noncancer HI for the child subsistence resident was from TCE (USAF, 2009a).

Site SS006 Human Health Risks

Cancer risks and noncancer hazards at Site SS006 (Former Pipeline Corridor) were also evaluated in the 2004 RI; however, results were not included in the 2009 ROD because the site was determined to not be a CERCLA site per the petroleum exclusion under CERCLA section 101(14).

The RI found that noncancer HQs at SS006 were relatively minimal with manganese (HQ, 3.9) having the highest HQ via groundwater ingestion from the child subsistence resident. Manganese and vanadium had HQs of 1.3 and 1.1, respectively, for the current/future adult subsistence user. These HQs from surface water near the Former Pipeline Corridor are essentially equal to the noncancer point of departure of 1.0 (USAF, 2006).

Carcinogenic risks in groundwater were driven by 1,2-dibromo-3-chloropropane (via groundwater ingestion) and benzene (via dermal contact while bathing). Carcinogenic risk exceedances from these two COPCs at SS006 ranged from 7.0×10^{-5} to 2.3×10^{-6}, with the greatest risk to the adult subsistence resident (from 1,2-dibromo-3-chloropropane, 7.0×10^{-5}). Risks from surface water under the current/future use scenario slightly exceeded 1×10^{-6} for the adult subsistence resident. Arsenic had a CR of 1 .7E-06. Arsenic was the only chemical that exceeded a cancer risk of 1×10^{-6} in soil for the future use scenario; however, arsenic is naturally occurring and was determined to be within background levels (USAF, 2006).

Baseline Ecological Risks

A baseline ecological risk assessment (ERA), which assessed the potential for adverse impact to ecological receptors at all sites within the Port Heiden RRS area, was conducted as part of the RI. The ERA focused on the potential link between mammalian and avian wildlife, food sources, and soil at the source areas of the site. Through a qualitative assessment of the conservative factors applied to the risk analyses, the ERA concluded that there is the potential for risk from PCBs to all feeding guilds and from pesticides primarily to insectivorous and carnivorous birds (USAF, 2006).

Response Actions

Response actions completed at Site OT001 and Contaminated Soil Removal Areas prior to the ROD are described below. A response action was also conducted at Site SS006.

Site OT001 – Former Composite Building

In 1995, a site inspection was conducted at the Port Heiden RRS. Soil was excavated along the north wall of the former composite building. Field analytical results from 1990 indicated that TPH-impacted soil above the 5,000 mg/kg cleanup concentration may remain in this vicinity. Soil was removed to approximately 6 feet below ground surface (bgs). Photoionization detector readings of soil removed from the trench and from the soil at the trench limits were non-detect (ND). There was no odor or visible impact to the soil. No samples were submitted for laboratory analysis and the excavated soil was returned to the trench. The site inspection report concluded that no further

action was needed at OT00l. Analytical results indicated that POL and PCB soil concentrations above the cleanup levels were removed. The USTs were also removed (USAF, 2006).

Contaminated Soil Removal Areas

Several hundred drums of PCB-contaminated soil were excavated from several areas within the former Port Heiden RRS and shipped offsite in the late 1980s and early 1990s. The areas include soil on the north and east sides of the Former Composite Building, an area to the west of former Antenna No. 3, and two large areas south of the Former Composite Building between Antenna Nos. 1 and 2. The contaminated soil removal areas are located across the former Port Heiden RRS and correspond to locations where contaminants exceeded screening criteria in soil based on data obtained during previous studies (USAF, 2006).

Pesticides and PCBs constituted most of the contaminants found at the contaminated soil removal areas. The maximum pesticide and PCB concentrations were 5 mg/kg and 930 mg/kg, respectively (USAF, 2009a).

Site SS006 – Former Pipeline Corridor

In 2008, a removal action was conducted at SS006. Approximately 12,000 feet of in-place pipe and 6,000 feet of previously-abandoned pipe were removed, cleaned, and consolidated. Minimal fluids were collected from the in-place pipe; 200 gallons of fuel with water, and 50 gallons of fuel-contaminated water were collected and disposed (USAF, 2009b).

Contaminated soil was excavated from six sites along the pipeline corridor. Contamination at four of the sites (FPC-029, FPC-036, FPC-066, and FPC-215) had been documented in previous investigations. Two new areas of soil contamination (FPC-015 and FPC-034) were identified during pipeline removal activities. Approximately 1,015 cubic yards (cy) of soil was excavated and treated from the six sites (USAF, 2009b).

Remedial Action Objectives

Remedial Action Objectives (RAOs) provide a general description of what the cleanup will accomplish. The 2009 ROD established RAOs for Sites OT001, SS004, LF007, WP002, and the four unnumbered sites, and are described below. No RAOs were established for SS006.

- Reduce PAH (benzo(a)pyrene, benzo(a)anthracene, dibenzo(a,h)anthracene), PCB and pesticide (dieldrin, heptachlor epoxide) concentrations in soil to chemical-specific applicable or relevant and appropriate requirements (ARARs);
- Reduce TCE and benzene in groundwater to chemical-specific ARARs. When addressing TCE in groundwater through natural attenuation, the expected daughter or breakdown products of TCE (cis and trans-1,2-dichloroethylene [DCE] and vinyl chloride) will also be monitored until they have met the required Federal maximum contaminant levels (MCLs) and State cleanup levels (18 AAC 75 Table C);
- Prevent exposure (via ingestion, inhalation and/or dermal contact) to contaminated groundwater until such time as the Federal drinking water standards and State cleanup levels are met;

- Restrict excavations and the installation of water wells (except for the purposes of monitoring) where contamination levels exceed cleanup levels to reduce the possibility of exposure to contaminants in the contaminated aquifer;
- Prevent excavation into or development over buried solid waste and potentially hazardous materials in the former RRS landfill and maintain that current land use designation.
- Prevent ecological receptor ingestion of, dermal contact with, and inhalation of dust and/or vapors from soil containing PCBs, pesticides, and PAHs presenting a HI greater than one;
- Prevent the possible migration of groundwater containing TCE and benzene to the tributary stream to Reindeer Creek resulting in surface water concentrations in excess of Alaska fresh surface water criteria for aquatic organisms (18 AAC 70).

Remedy Components

The ROD selected remedies for groundwater and soils at the Port Heiden RRS CERCLA sites. No Decision Document has been completed for the state Site SS006 (Former Pipeline Corridor), and thus no formal remedy has been selected. However, monitoring of natural attenuation is ongoing.

Soil Remedy Components

The ROD-selected remedy for soil applies to the following areas:

- Former Composite Building (OT001)
- Septic Tank and Septic System Outfall (SS004)
- RRS Landfill (LF007)
- Four Unnumbered Sites
    - Antenna Pads
    - Contaminated Soil Removal Areas
    - Drum Storage Area
    - Focus Area

The initial selected remedy components for soil include (USAF, 2009a):

- Excavation of soil containing PCBs greater than or equal to 10 mg/kg (soil may contain incidental pesticides and PAHs);
- Alcohol-based washing of the excavated soil containing PCBs greater than or equal to 10 mg/kg to reduce the PCB concentration to less than 10 mg/kg;
- Excavation of soil containing greater than 1 mg/kg of PCBs but less than 10 mg/kg and pesticides/PAHs over their respective cleanup levels;
- Offsite disposal of washed or unwashed soil in a permitted Class III landfill in the vicinity of the Village of Port Heiden;
- Residuals from the soil washing process will be disposed of off-site in accordance with appropriate State and Federal regulations.

- A notice type of institutional control (IC) will be implemented (with the landowners' consent) to control the use of soil containing residual concentrations of dieldrin above 0.0076 mg/kg.
- At the RRS Landfill (SS007), ICs will be established to provide notice that the remaining buried wastes may contain COCs, that the cover should be maintained, and excavation into or development over the Port Heiden RRS Landfill should be restricted to maintain the integrity of the cap and to prevent migration of contaminants.

The soil remedy was modified in a 2010 ESD, this increased the quantity of estimated PCB-contaminated soil (PCB concentration greater than 1 mg/kg) from 7,000 tons to 13,200 tons, due to an additional 4,200 tons of soil being identified as above clean up levels during the 2009 remedial action. The selected remedy was also amended, this removed the option to wash contaminated soils to <10 mg/ kg and dispose in a local landfill (USAF, 2010a). In 2017, a second ESD was published, this increased the estimated quantity of PCB-contaminated soil (from 13,200 tons to 36,452 tons) following the discovery of a previously unidentified PCB contaminated area, as well as the increased associated cost (USAF, 2017a).

Groundwater Remedy Components

The ROD-selected remedy for groundwater applies to the Black Lagoon Outfall Plume (WP002) and the Former Facility Area Plume and includes MNA and ICs. Specific elements of the groundwater remedy include (USAF, 2009a):

- Natural attenuation of groundwater contaminated with TCE and benzene.
- Periodic groundwater monitoring to assess changes in groundwater contaminant concentrations over time.
- ICs shall include limitations on groundwater use, and notices to the landowner and Village Council of site status. The ICs would remain in place until the groundwater cleanup levels are achieved through natural attenuation.

Under the selected remedy, natural attenuation will continue until groundwater contamination is no longer a threat to human health and the environment, verified by a minimum of two (2) years of consecutive sampling events where analytical results show that COCs are less than the ROD cleanup levels, as well as the expected daughter products (cis-1,2-DCE, trans-l,2-DCE and vinyl chloride) derived from the COCs. Sampling for individual groundwater COCs and their associated daughter products may be discontinued at any time after a minimum of two years of consecutive sampling events show concentrations are below chemical-specific Federal MCLs and State groundwater cleanup levels (USAF, 2009a). ROD cleanup levels for soil and groundwater COCs are presented in **Table 2**.

Table 2: Site COCs and ROD Cleanup Levels

Site	COC	ROD Cleanup Level
Soils (mg/kg)		
OT001, SS004, LF007, Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area	Polychlorinated biphenyls	1
	Benzo(a)pyrene	0.49
	Benzo(a)anthracene	3.6
	Dibenzo(a,h)anthracene	0.49
	Dieldrin	0.015
	Heptachlor epoxide	0.2
Groundwater (µg/L)		
Black Lagoon Outfall Plume (WP002) and Former Facility Area Plume	Trichloroethylene	5
	Benzene	5

Key:
COC – contaminant of concern
mg/kg – milligrams per kilogram
µg/L – micrograms per liter
ROD – Record of Decision (USAF, 2009a)

Status of Implementation

Remedial activities at the Port Heiden RRS conducted since the first FYR include excavation and offsite shipment of PCB-contaminated soil (Sites OT001, SS004, Four Unnumbered Sites, and State Site SS006), groundwater monitoring (Black Lagoon Outfall Plume and Former Facility Area Plume), and investigation and a treatability study (Black Lagoon). The status of remedy implementation for each activity is discussed below.

Soil – Sites OT001, SS004, LF007, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)

In 2014, a total certified weight of 10,800.79 tons of PCB-contaminated soil, 2,082.11 tons of Toxic Substances Control Act (TSCA) -regulated (PCB concentrations equal to or greater than 50 mg/kg) and 8,718.68 non-TSCA-regulated, was generated from pre-existing stockpiles and newly excavated grid cells and sent offsite for disposal at approved landfills (USAF, 2015c). In addition, approximately 1,144.94 tons of non-TSCA PCB-contaminated soil from the Site Road area (discovered during 2009 activities as a result of a vehicle rollover cleanup) was also sent for offsite disposal (USAF, 2017a).

In 2015, a total certified weight of 11,783.96 tons of PCB-contaminated soil (9,638.18 non-TSCA and 2,145.78 tons TSCA-regulated) was generated from newly excavated grid cells and sent offsite for disposal at approved landfills (USAF, 2016b).

During excavations at the Drum Storage Area, approximately 100 buried electrical components (transformers and batteries) were found. Batteries used during the operation period of the RRS were often lead-acid, and not all the batteries found were completely sealed. As a result, three discrete targeted samples were collected from areas where batteries were uncovered to ensure soil from those areas could not be classified as a Resource Conservation and Recovery Act hazardous

waste. Samples were submitted for analysis of total lead. Results ranged from 8.06 to 18.0 mg/kg (USAF, 2016b).

Due to an observed strong odor, two soil samples were collected in the area of an antenna pad that had been recently exposed below the surface, and in an area with PCB concentrations above 3,000 mg/kg. The samples were analyzed for VOCs and GRO. Results revealed the presence of 1,2,3-trichlorobenzene (TCB) and 1,2,4-TCB. 1,2,4-TCB was detected at a maximum concentration of 1.38 mg/kg, above the ADEC Method Two migration to groundwater cleanup level of 0.85 mg/kg (USAF, 2016b). The 2015 report indicated that the ESD (at that time, undergoing internal review) would include 1,2,4-TCB as a new COC for the RRS Site, but the final ESD contains no discussion of new COCs.

In 2015 and 2016, additional quantities of PCB-contaminated soil were identified outside the previously-defined boundaries of contamination at the RRS and Site Road areas. In 2016, two electrical transformers were found in the southeast portion of the RRS where PCB concentrations were reported up to 4,010 mg/kg, the highest concentrations recorded to date at the RRS. The surrounding soil has been disposed in permitted landfills (USAF, 2017a).

In 2016 and 2017, 8,895.46 tons of PCB-contaminated soil (7,991.74 tons non-TSCA and 903.72 tons TSCA-regulated) soil was removed (ADEC, 2018a).

A second ESD was published in 2017 (USAF, 2017a), documenting the increased PCB-contaminated soil volume estimates and associated increased cost. At the time of this FYR, it is unknown if the activities planned for 2017 as described in the ESD (including removal of previously-staged PCB-contaminated materials and excavation of additional quantities) were completed.

In 2019 ADEC issued a determination that site SS004 was Cleanup Complete, without institutional controls (ADEC, 2019).

Groundwater – Black Lagoon Outfall Plume and Former Facility Area Plume

Per the ROD-selected remedy, annual groundwater monitoring was required for the first five years after the ROD; monitoring after that point was to be on an approved schedule. Activities conducted since the previous FYR include groundwater monitoring conducted in 2014 and 2016 in accordance with the ROD. These results are detailed in Section IV, *Data Review*.

A workplan for annual groundwater monitoring at the former Port Heiden RRS and the Former Pipeline Corridor indicated that monitoring would be conducted in 2016 and 2017 (USAF, 2017c). Results from these monitoring activities were unavailable at the time of this FYR. **Figure 4** presents the plumes based on 2014 monitoring data. A limited groundwater monitoring, event, supplemental to the annual monitoring, was conducted in 2016; these results (Jacobs, 2016) are discussed in Section IV, *Data Review*.

Black Lagoon Treatability Study

In 2009, DRO and PCE in excess of ADEC Method Two migration to groundwater cleanup levels were detected in soils at several locations. DRO and PCE maximum concentrations were detected in the same sample at 15,000 mg/kg and 0.72 mg/kg, respectively (USAF, 2014b).

In 2011, DRO, PCE and TCE were detected at maximum concentrations of 4,250 mg/kg, 0.622 mg/kg, and 3.83 mg/kg, respectively. Consistent with the 2004 RI, all PCE and TCE detections

were co-located with DRO exceedances, but not all DRO exceedances were associated with detectable levels of PCE and TCE (USAF, 2014b).

In 2013, 58 soil borings were advanced and sampled to delineate the extent of PCE and its daughter products, GRO, DRO, RRO, and PCBs. PCE contamination was modeled to guide excavation activities in 2014. Approximately 117 cy of PCB-contaminated soil was excavated based on sampling results (USAF, 2014b).

In 2014, approximately 42 cy of additional PCB-contaminated soil was excavated (USAF, 2014b). Approximately 3,800 cy of PCE- and fuel-contaminated soil was also excavated from the BLO and used to construct two passively ventilated biopiles to assess the effectiveness of biopiles as a remediation technique for PCE-contaminated soil. The biopiles were constructed with interfingered ventilation pipes designed to passively move air through the soil and thereby promote the evaporation and removal of PCE, TCE, and any other volatile contaminants. An initial sampling event was conducted after construction to provide baseline contaminant concentrations (USAF, 2015a).

In 2015, after one year of operation, a second round of samples were collected from the biopiles to evaluate system efficacy and remediation of PCE, TCE, and DRO. Sample results demonstrated a significant reduction in concentrations of all three analytes; PCE concentrations had fallen below ADEC cleanup levels in all but two samples, and TCE concentrations were all below cleanup levels. Concentrations of DRO showed a significant decrease, but 13 of the 15 samples remained above ADEC cleanup levels (USAF, 2016a). One additional year of operation was recommended, as well as the possibility of calculating and Method 3 Alternative Cleanup Level or landspreading of soil to address persistent DRO concentrations above cleanup levels.

In 2017, a Technical Memorandum was prepared to present biopiles sampling results from 2014 through 2016. PCE and TCE concentrations fell below their respective cleanup levels; however, DRO concentrations remained above cleanup levels. Because landspreading is the chosen remedial option for soil contaminated with POL, soil from previous landspreading actions will be removed and the same area will be used to spread the decommissioned biopiles (Jacobs, 2017).

Site SS006

No remedy has been formally selected for Site SS006. Activities conducted at this site are discussed in *Response Actions* section of this report.

LUC Summary

The remedies for Sites OT001, SS004, LF007, four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area), and the Black Lagoon Outfall and Former Facility Area Plumes include ICs and/or land use controls (LUCs). The LUC Management Plan for the Pacific Air Forces Regional Support Center Installation (LUC Management Plan) (USAF, 2017b) includes Port Heiden RRS, and identifies that there are LUCs in effect at Sites OT001, SS004, and LF007. A table of the LUCs in effect and a map identifying the LUC boundaries from the LUC Management Plan are provided in **Appendix B**.

Annual IC performance reports were required by the ROD for the first five years. IC performance reports for 2010 through 2012 were reviewed in the first FYR. This period has passed, and it is unclear if annual IC inspections continue to be performed; no additional reports were available for the period of review of this FYR.

III. PROGRESS SINCE THE LAST REVIEW

This is the first periodic review for SS006. This is the second FYR for OT001, SS004, LF007, WP002, and four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area). The prior FYR, completed in 2014, identified the remedies as "short-term protective" and included the following protectiveness statement:

> *Based on the findings of this first five-year review, the actions performed for soil and groundwater at ERP Sites OT001, WP002, SS004, LF007, and four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) are considered protective in the short-term because exposures appear to be under control, and no unacceptable risks are occurring. The remedy is ongoing, however, and it is not clear yet that the selected remedy, when complete, will be protective in the long-term because the quantities of soil to be remediated has changed since the decision documents were issued. In addition, soil stockpiling practices should be reviewed and modified to ensure contaminated soil stockpiles are contained in a manner that prevents exposure and cross contamination due to wind erosion or runoff of PCB-contaminated soil. At ERP Site LF007, the exposed debris and subsidence should be assessed, and repairs made, if necessary. Lastly, groundwater ICs should be implemented according to the requirements of the ROD, and a site-specific operation and maintenance plan should be prepared to provide the methods and reporting requirements for ICs.*
>
> *The remedy selected for groundwater at the former Port Heiden RRS remains protective of human health and the environment in the short-term. To assess long-term protectiveness of groundwater, an MNA evaluation should be conducted, prior to the second five-year review, using the groundwater analytical results from 2004, 2009, 2010, 2011, 2012, and 2013 sampling events. The ICs required by the ROD should be implemented to formally prevent groundwater use. Also, 1,4-dioxane should be added to the list of groundwater sample analytes for two consecutive sampling events, and a statistical analysis of groundwater concentration trends should be performed. The actions taken for soil are considered protective in the short-term, and protectiveness should be achieved in the long-term once the issues identified in this five-year review report are addressed.*

No issues were identified during the first FYR that affected the current protectiveness of the remedies at Port Heiden RRS ERP sites, but issues that affect future remedy protectiveness were identified. The status of issues for Port Heiden RRS ERP sites from the first FYR are presented in **Table 3**.

Table 3: Status of Recommendations from the 2014 FYR

Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
During the site inspection, PCB-contaminated soil stockpiles were observed to be uncovered. The stockpiles were likely uncovered as the soil remedial action (RA) was ongoing at the time of the inspection; however, the U.S. Air Force should assess if additional measures are needed to prevent migration of PCB-contaminated soil as a result of wind or runoff.	Review and modify stockpile maintenance plans to ensure contaminated soil stockpiles are covered and contained in a manner that prevents exposure to, and migration of, PCB-contaminated soil.	Completed	Stockpiles generating during PCB-contaminated soil excavation activities are managed in accordance with the *Stockpile Construction and Maintenance Standard Operating Procedure, PH-SOP-5* (USAF, 2016c). Procedures include a bottom liner and a top cover.	5/1/2016
Increased quantities of PCB-contaminated soil have been identified at the site during the course of the RA. An ESD was prepared in 2010 to address an increase in the amount of contaminated soil identified following the 2009 field season; however, since the ESD was prepared in 2010, a significant amount of additional PCB-contaminated soil has been identified during the 2011, 2012, and 2013 field seasons that is not addressed in the decision documents (ROD and ESD).	Review the existing decision documents (ROD and ESD) and prepare an amendment or additional ESD to address additional quantities of PCB-contaminated soil not covered by the current decision documents.	Completed	A second ESD was prepared in 2017 (signed in 2018), increasing the estimated volume of PCB-contaminated soil and documenting increased cost of disposal.	4/16/2018
PCB-contaminated soil has been identified within Site Road and some adjoining areas which are not included in the decision documents (ROD and ESD).	Review the Administrative Record including existing decision documents (ROD and ESD) to assess if an amendment or additional document is needed to address PCB-contaminated soil within Site Road and adjoining areas.	Completed	The Site Road source area is discussed in the 2017 ESD, but is not included as part of the remedy modification.	4/16/2018
The soil RA has not been completed at the site, and is anticipated to continue through at least the 2015 field season. Increased quantities of soil, discrepancies associated with soil washing and landfilling during the 2009 field season, and the presence of contamination within Site Road and adjoining areas has required a longer	Complete the soil RA.	Ongoing	The soil RA is ongoing at the Port Heiden RRS; however, it has not yet been initiated at Site SS007.	--

Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
timeframe to complete the soil RA than originally anticipated in the ROD. PCB-contaminated soil should be removed in accordance with the decision documents to ensure continued protectiveness of the soil remedy.				
During the site inspection of ERP Site LF007, it was observed that the landfill appeared to have subsided in places, and in one instance, the subsidence exposed metallic debris. Some metal debris was also visible on the ground surface. While this is not indicative of current exposure, if left unchecked the landfill cap may further erode and contaminated soil may be exposed.	Address exposed debris and subsidence at ERP Site LF007.	Ongoing	The site inspection conducted in August 2018 for this FYR indicated conditions at Site LF007 similar to those described in the first FYR. Metallic debris was exposed and the geofabric liner was eroded in some areas. However, the Landfill at Site LF007 is programmed to be removed beginning summer of 2020.	--
Although Annual IC Performance Reports are prepared to document reviews of the remedial actions and to determine whether these actions are protective, including whether the intent of the ROD-required ICs are being met, ICs for soil and groundwater have not been put into place formally. Soil ICs will be put into place once the soil remedy is complete, but there is no reason to wait on implementation of groundwater ICs.	Implement groundwater ICs	Completed	Groundwater restrictions are in effect at Sites OT001, SS004, and LF007 and are documented in the LUC Management Plan (USAF, 2017b).	2017
The ROD requires an evaluation of the progress of natural attenuation based on 5 years of groundwater monitoring (at a minimum). Only 4 years of data were available at the time of this five-year review. It was noted during the review of these data that MNA parameters included major cations such as iron and manganese; however, other major cations such as calcium, sodium magnesium, and potassium were not analyzed. Similarly, major anions, sulfate and alkalinity, were analyzed, but major	Perform an evaluation of the progress of natural attenuation based on 5 years of groundwater monitoring as required by the ROD. Future MNA evaluations should include an assessment of whether or not additional MNA parameters should be added to the analyte list for future groundwater sampling	Completed	An evaluation of MNA parameters was conducted in 2015. Based on the available data, TCE concentrations are not naturally attenuating at a rate that will likely achieve the proposed ROD timeframe of 26 years in some areas (USAF, 2015b).	2015

Issue	Recommendations	Current Status	Current Implementation Status Description	Completion Date (if applicable)
anions such as chloride and carbonate/bicarbonate were not analyzed. Also, other common MNA parameters such as ethene, ethane, and methane are not included in the data set. The purpose of the five-year evaluation is to compile, analyze, and review all groundwater data collected to determine the effectiveness of natural attenuation. The ROD also states that if during this evaluation the data indicates contaminant concentrations in groundwater are not declining as estimated, the remedy decision may be re-considered.	events. Results from the additional analytes, in conjunction with analytical results for TCE and daughter products cis-1,2-dichloroethene, trans-1,2-dichloroethene, and vinyl chloride, can be used to evaluate if TCE degradation is occurring and assist in identifying the process(es) through which it is occurring.			
The compound 1,4-dioxane was not included in the list of analytes for groundwater samples collected during the long-term monitoring program. This compound should be added to the list of analytes for two consecutive groundwater sampling events after 2014, but before the next five-year review. Analytical results from these sampling events can then be used to assess if additional or future sampling of 1,4-dioxane is warranted.	The compound 1,4-dioxane should be added to the list of analytes for two consecutive groundwater sampling events after 2014, but before the next five-year review. Analytical results from these sampling events can then be used to assess if additional or future sampling of 1,4-dioxane is warranted.	Completed	In 2016, monitoring well DSA-MW-02, located near the Drum Storage Area, was sampled and analyzed for 1,4-dioxane. Only one sampling event included 1,4-dioxane analysis; however, ADEC agreed with the conclusion that no additional sampling was necessary (Jacobs, 2016).	12/14/2016

Key:
ERP – Environmental Restoration Program
ESD – Explanation of Significant Differences
IC – institutional control
MNA – monitored natural attenuation
PCB – polychlorinated biphenyls
RA – remedial action
ROD – Record of Decision
TCE – trichloroethylene

IV. FYR AND PERIODIC REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by newspaper posting in the *Bristol Bay Times & Dutch Harbor Fisherman* on 18 July 2019 stating that there was a FYR for the Port Heiden RRS inviting the public to submit any comments to the USAF (**Appendix C**). No comments were received. The FYR and Periodic Review report will be made available in the Port Heiden RRS Administrative Record, a copy of which is available online at http://afcec.publicadmin-record.us.af.mil/.

During the FYR and Periodic Review process, interviews were conducted via email questionnaire to document any perceived problems or successes with the remedy that has been implemented to date. Questionnaire responses were provided by Mr. Louis Howard (Environmental Program Specialist, ADEC) on 19 October 2018 and by Mr. Richard Mauser (Remedial Project Manager, AFCEC) on 5 November 2018.

Mr. Howard stated that long term monitoring of groundwater is on hold for the year 2018 due to delayed release of funding for monitoring contracts at all remote USAF sites in Alaska, which includes the Port Heiden RRS. Additionally, Mr. Howard stated that per- and polyfluoroalkyl substances contamination from aqueous film-forming foam used in firefighting has yet to be investigated at the site.

Mr. Mauser stated that no known LUC breaches had occurred at the site. Mr. Howard's and Mr. Mauser's complete interview responses are provided in **Appendix D**.

Data Review

Available data collected at the Port Heiden RRS during the period of this FYR (2014-2019) were reviewed. Data reviewed included: PCB-contaminated soil removal activities (USAF, 2015c; USAF, 2016b); Black Lagoon treatability study activities (USAF, 2014b; USAF, 2015; USAF, 2016; Jacobs, 2017), and; groundwater monitoring activities (USAF, 2015b; Jacobs, 2016). Additionally, some data that was outside the period of review for this FYR was reviewed because it was not included in the previous FYR data review. This included groundwater monitoring activities in 2011 (NVPH, 2012) and 2013 (USAF, 2014c). Data reviewed are discussed in the *Status of Implementation* section of this FYR.

In 2014, seven wells were sampled and analyzed for GRO, DRO, RRO, and VOCs. Five wells (BLO-MW-01, DSA-MW-01, DSA-MW-02, DSAl-MW-04, and PG1-MW-01) exceeded cleanup levels. DRO was detected at 1,600 mg/L exceeding the cleanup level of 0.005 mg/L in one monitoring well (BLO-MW-01). RRO was detected at a concentration of 150 mg/L, in the same monitoring well, exceeding the cleanup level of 0.005 mg/L. The concentration of 1,1,2,2-tetrachloroethane, reported at 0.027 mg/L, exceeded the cleanup level of 0.0043 mg/L in monitoring well BLO-MW-01 (USAF, 2015b).

TCE was detected above the cleanup level of 0.005 mg/L in five wells. The reported concentrations of TCE ranged from 0.005 mg/L (monitoring well BLO-MW-01) to 0.49 mg/L (monitoring well DSA-MW-02). Monitoring well BLO-MW-07 was successfully sampled for the first time since being installed in 2012. All analytes were reported as ND or at concentrations well below applicable cleanup criteria. TCE was not detected. All other target analytes at the former RRS were

either detected at concentrations that were less than the cleanup levels or were reported as ND, with a laboratory DL below the applicable cleanup levels (USAF, 2015b).

An assessment of MNA parameters indicated that although the potential for biodegradation exists, the data do not show a significant decreasing trend in TCE concentrations over time, and the process of natural attenuation via reductive dichlorination is most likely impeded in groundwater at the former RRS. Based on the available data, TCE concentrations are not naturally attenuating at a rate that will likely achieve the proposed ROD timeframe of 26 years in the areas surrounding monitoring wells DSA-MW-01, DSA-MW-02, DSA-MW-04, and PG1-MW-01. In wells containing lower TCE concentrations, such as BLO-MW-01, natural attenuation may be successful in reducing concentrations to below the cleanup level within the proposed timeframe (USAF, 2015b).

In 2016, monitoring well DSA-MW-02, located near the Drum Storage Area, was sampled and analyzed for 1,4-dioxane based on a recommendation in the 2014 report (USAF, 2015b). This well was selected because it contained the highest TCE concentration (0.49 mg/L) during 2014 sampling. 1,4-dioxane was not detected in the primary or duplicate groundwater samples collected from this well. The limit of quantitation (LOQ) for 1,4-dioxane in the primary and duplicate samples were 0.0020 and 0.0021 mg/L, respectively, which are below the ADEC Table C groundwater cleanup level of 0.077 mg/L. Based on these sample results, 1,4-dioxane is not considered a COPC at this site (Jacobs, 2016).

Data collected under the ERP are typically archived in the USAF ERP Information Management System (ERPIMS) database; however, limited data was available for the Port Heiden RRS. All historical data available in ERPIMS (2012 through 2017 for Site OT001 only) were reviewed. ERPIMS data, as well as data presented in the 2004 RI/FS (USAF, 2006) were used to support a technical assessment of chemical-specific toxicity changes and cleanup levels since the ROD was signed. See Section V.

Site Inspection

Site inspections were conducted on 22 August 2018 by John Marshall of Stantec as part of this FYR and Periodic Review. The following sections summarize the findings of the site inspections. The complete site inspection checklist and photologs are provided in **Appendix E**.

Sites OT001, SS004, LF007, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)

Site OT001 and the four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) are located approximately 1.5 miles north of the Port Heiden airport. These sites are located on an elevated gravel area that is approximately 500 feet by 600 feet in size within the rolling coastal tundra landscape. The majority of the area is exposed gravel with intermittent patches of established vegetation.

Immediately around the remnant concrete foundations of the Former Composite Building the area is relatively flat and openly accessible (**Appendix E,** ERP Sites Photolog, page 5). There are several unlabeled monitoring wells in the area, most of which are secure and in good working condition.

The Antenna Pads and the Contaminated Soil Removal Areas consist of a series of open excavations in the proximity of the remnant concrete pads (**Appendix E,** ERP Sites Photolog,

pages 9-11). These excavations vary in size and depth, with some holding several inches of water. There is very little established vegetation. There is a partial fence with PCB contamination warning signs posted along the northern and eastern boundaries. Moderate erosion is common on the exposed gravel surface of the site.

The Drum Storage Area consists of a series of open excavations, flat gravel pads, and established vegetation. These open excavations are generally smaller and shallower than those observed around the Antenna Pads. No standing water was observed. Surface erosion was not a common feature in this area. There is a partial fence with "Danger Keep Out" signs posted along the eastern boundary. There are several unlabeled monitoring wells in the area, most of which are secure and in good working condition.

Site WP002

Site WP002 consists of the former blackwater lagoon (Black Lagoon Outfall Area) west/southwest of the gravel area of ERP Site OT001. This site is a relatively flat gravel pad with sparse vegetation (**Appendix E,** ERP Sites Photolog, page 11). There was no erosion observed. The monitoring wells in the area are secure and in good working condition.

Site SS004

There are two portions to ERP site SS004. The first portion consists of a former septic tank that was located at the southwest corner of the gravel area of ERP Site OT001. The septic tank has been removed and the excavation backfilled. The ground surface is now gravel that is consistent with the rest of the site. Vegetation has yet to be re-established at this location.

The second portion of ERP Site SS004 consists of the former septic system outfall. The former outfall was located during the site inspection (**Appendix E,** ERP Sites Photolog, page 14). The concrete wing wall and 8-inch-diameter steel pipe have been removed. The depression that received the effluent remains with sparse vegetation. Surface soil appeared to have been relatively recently excavated.

Site LF007

Site LF007 is located approximately 800 feet north of the former Port Heiden RRS. The site can be accessed by a gravel road that passes through the Drum Storage Area. The current condition of the site suggests that the final landfill cap is not in place and that there are ongoing remediation activities (**Appendix E,** ERP Sites Photolog, pages 1-4). The current landfill cap consists of sections of geofabric held in place by sandbags. Some sandbags show signs of deterioration and weathering, while others appear to be relatively new. There are several locations where it appears that proposed test pit locations and monitoring well locations have been marked in spray paint. There are also several new monitoring wells installed that are locked and in good working condition.

Metal debris can be seen on the landfill surface and just underneath the landfill cover. Erosion was not observed on site. Ponding water was observed on the access road, but not on the landfill. There was no signage in place at LF007.

Site SS006

Site SS006 consists of the Former Pipeline Corridor that extends approximately 5.8 miles between the Marine Terminal and the Former Composite Building. There are currently two locations along this corridor where ground water is monitored for natural attenuation; FPC-215 and FPC-066.

FPC-215 is located near the Port Heiden Airport, off Site Road. This area is generally flat with well-established tundra vegetation. Seven monitoring wells were observed on or near the site. Some monitoring sells had steel bollards, while others had only a snow pole duct taped to their outer protective casing. Most monitoring wells were observed in good working condition, although few had permanent identification markings. Monitoring Well MW-10 and the two bollards were knocked over, potentially by a snowplow. Observed security or maintenance issues are documented on the Site Inspection Checklist and Photolog (**Appendix E**).

FPC-066 is located near the Port Heiden school. This site is bisected by Airport Road, with two Monitoring Wells on either side. This area is also generally flat with well-established tundra vegetation. Four monitoring wells were located and found to be secure and in good working condition.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

FYR - Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)

The review of documents, site data, and the results of the site inspections indicate that the soil remedy at Sites OT001, SS004, LF007, WP002, and four unnumbered sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) is functioning as intended by the Port Heiden RRS ROD and subsequent ESDs (2010 and 2017). The remedy includes contaminated soil removal and ICs. Removal of PCB-contaminated soil is ongoing. ICs and LUCs have been recorded in the LUC Management Plan to prevent exposures to contaminated media at Sites OT001, SS004, and LF007; however, no ICs are documented for the Black Lagoon Outfall Plume, Former Facility Area Plume, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area).

The remedy stated: Groundwater monitoring will be conducted in accordance with a plan approved by ADEC and the Air Force to monitor natural attenuation of the plume. The latest approved work plan for groundwater monitoring states that the monitoring is to be on an annual basis (Jacobs, 2017).

An assessment of MNA parameters in 2015 indicated that natural attenuation of TCE concentrations will not likely achieve the proposed ROD timeframe of 26 years (2035) in some areas (USAF, 2015b).

Periodic Review – Site SS006

At Site SS006, no decision document has been completed and thus a formal remedy has not been selected. For the purposes of this periodic review, MNA is considered the remedy. Groundwater monitoring is ongoing and is conducted in conjunction with ERP groundwater monitoring for the Black Lagoon Outfall Plume and the Former Facility Area Plume. The FPC-066 DRO plume appears stable and likely decreasing in concentration overall (USAF, 2015b). Continued annual alternating-season monitoring was recommended (USAF, 2015b) and is supported by the findings of this periodic review. Concentrations of DRO in monitoring well 215-MW-09 and appear to be increasing over time; it is possible that one or more contamination sources remain onsite (USAF, 2015b). Additional investigation into potential source areas adjacent to monitoring well 215-MW-09 was recommended (USAF, 2015b) and is supported by the findings of this periodic review.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?

The exposure assumptions and RAOs used at the time of the remedy selection (for ERP sites) and remedy evaluation (for Site SS006) are still valid. However, revised human health risk-based cleanup levels, which incorporate changes to toxicity data, were promulgated since the ROD was signed (for ERP sites) and since the RI was completed (for Site SS006). In 2017, ADEC issued updates to 18 AAC 75 that included revisions to soil and groundwater cleanup levels (ADEC, 2018b). The current soil cleanup levels for benzo(a)anthracene and heptachlor epoxide and groundwater cleanup levels for TCE and benzene are all now more stringent than ROD cleanup levels. **Table 4** presents ROD cleanup levels and current ADEC cleanup levels for COCs.

Table 4: ROD Cleanup Levels and Current ADEC Cleanup Levels

Site	COC	Media (Units)	ROD Cleanup Level	Current ADEC Cleanup Level[1]
LF007, OT001, SS004, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area)	Polychlorinated biphenyls	Soil (mg/kg)	1	1
	Benzo(a)anthracene		3.6	0.7
	Benzo(a)pyrene		0.49	1.5
	Dibenzo(a,h)anthracene		0.49	1.5
	Heptachlor epoxide		0.2	0.0019
Black Lagoon Outfall Plume and Former Facility Area Plume	Trichloroethylene	Groundwater (µg/L)	5	4.6
	Benzene		5	2.8

1 – 18 AAC 75.341 Table B1 and 18 AAC 75.345 Table C

Appendix F provides a comparison of the maximum detected concentrations of contaminants of potential concern (COPCs) at all Port Heiden RRS Sites to the revised ADEC cleanup levels. For all sites except OT001, maximum concentrations were those presented in the 2004 RI. For Site OT001, additional data from 2012-2017 was available in ERPIMS. Calculations were performed for chemicals with detections above the new standards to determine exposure risk (**Appendix F, Tables F-1 through F-3**). These calculations, based on maximum site concentrations and the residential exposure assumption, result in noncancer HQs ranging from 0.0029 to 244 and cancer risks ranging from 2.3×10^{-5} to 5.8×10^{-3}. Chemicals with historic detections above new or more stringent standards that resulted in risk and/or hazard threshold exceedances (HQ greater than 1 or cancer risks exceeding the upper end of the EPA risk management range of 1×10^{-6} to 1×10^{-4} for ERP sites, and 1×10^{-5} for SS006) are presented in **Table 5**.

Table 5: Risk/Hazard Estimates for Chemicals above New Standards

Media (Units)	COPC[1] (ROD COCs in bold)	ADEC Cleanup Level[2]	Applicable Site Concentration[3]	Hazard Quotient	Cancer Risk[4]	Pathway Driving Risk
Site LF007 – Former RRS Landfill						
Surface/Subsurface Soil[a] (mg/kg)	**Benzo(a)anthracene**	0.7	7.2	--	**1.0×10^{-4}**	Inhalation
	Cadmium	9.1	10.3	**1.1**	--	Direct
	Thallium	0.19	10.2	**54**	--	Direct
Site OT001 – Former Composite Building/ Former Facility Area						
Groundwater (µg/L)	Chromium	0.35	65	0.0029	--	Direct
	Heptachlor	0.014	0.24	0.19	**1.7×10^{-4}**	Direct
	Naphthalene	1.7	250	**41**	**1.5×10^{-3}**	Inhalation
	Trichloroethene	2.8	690	**244**	**1.4×10^{-3}**	Inhalation
Surface/Subsurface Soil[a] (mg/kg)	**Benzo(a)anthracene**	0.7	4.1	--	5.9×10^{-5}	Inhalation
	Thallium	0.19	8.34	**44**	--	Direct
Site SS004 – Septic Tank and Septic System Outfall						
Surface/Subsurface Soil[a] (mg/kg)	**Benzo(a)anthracene**	0.7	1.6	--	2.3×10^{-5}	Inhalation
	Thallium	0.19	6.81	**36**	--	Direct
Site WP002 – Black Lagoon Outfall						
Surface/Subsurface Soil[a] (mg/kg)	Benzo(a)anthracene	0.7	36	--	**5.2×10^{-4}**	Inhalation
	Thallium	0.19	4.91	**26**	--	Direct
Site SS006 – Former Pipeline Corridor						
Groundwater (µg/L)	1,3,5-Trimethylbenzene	60	200	**3.3**	--	Direct
	Naphthalene	1.7	270	**44**	**1.6×10^{-3}**	Inhalation
Surface/Subsurface Soil[a] (mg/kg)	1,2,4-Trimethylbenzene	0.61	18	**29**	--	Direct
	1,3,5-Trimethylbenzene	0.66	43	**65**	--	Direct
	Naphthalene	0.038	22	**156**	**5.8×10^{-3}**	Inhalation

Key:

Bold indicates a cancer risk that exceeds 1×10^{-4} or a hazard quotient greater than 1

a – 0-15 feet

-- - Not applicable

1 - As identified in the 2004 RI/FS (USAF, 2006)

2 - For soil COPCs, the most stringent Method Two cleanup levels from 18 AAC 75.341 Table B1 (Under 40 Inch Zone Human Health and Migration to Groundwater) and Table B2 for petroleum hydrocarbons (Ingestion, Inhalation, and Migration to Groundwater) were used. For soil COCs, the basis for cleanup level as presented in the ROD was used. For groundwater, 18 AAC 75.345 Table C cleanup levels were used. For surface water, the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (Human Health for Consumption Water and Aquatic Organisms; if no value, then Drinking Water) criteria (18 AAC 70.020) were used.

3 - The maximum concentration detected at the site was used as the applicable site concentration.

4 - For Site SS006, cancer risks were compared to a threshold of 1 x 10-5 because it is a state site and not subject to CERCLA.

FYR - Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)

Calculations for the ERP sites resulted in potential risk and hazard exceedances in soils for benzo(a)anthracene, cadmium (only at LF007), and thallium (in soils) and TCE (in groundwater, only at OT001).

Benzo(a)anthracene thresholds were exceeded for soils at LF007 and WP002. LUCs are in place restricting soil excavation at LF007, but no LUCs are in place at WP002.

Although calculated potential risks and hazards exceed thresholds for cadmium in soils at LF007, it was eliminated as a COC because the result appeared to be anomalous, and there is no known source for cadmium contamination at the former Port Heiden RRS (USAF, 2009a). Additionally, LUCs are in place preventing exposure to chemicals that may pose unacceptable level of risk.

Potential risk and hazard thresholds were exceeded for thallium in soils at LF007, OT001, SS004, and WP002. The background upper tolerance limit for thallium in subsurface soils Port Heiden were estimated as 7.12 mg/kg during the RI (USAF, 2006). The applicable site concentrations used for calculating risks and hazards only slightly exceeded background levels at LF007 (10.2 mg/kg) and OT001 (8.34 mg/kg), and LUCs are in place preventing exposure at these sites. Thallium concentrations used in calculations for SS004 and WP002 were within background ranges.

LUCs in place at OT001 restrict the use of groundwater and remain protective. However, because naphthalene and heptachlor remain above cleanup levels and risk/hazard thresholds are exceeded, it is recommended that these chemicals be evaluated for inclusion as remedy COCs in groundwater.

Risk calculations were also performed for all ROD COCs to evaluate whether toxicity changes affect the protectiveness of the remedy (**Appendix F, Table F-4**). These calculations, based on ROD cleanup levels and presented in **Table 6**, indicate that when the residential exposure assumption is used, heptachlor epoxide (in soil) and TCE (in groundwater) have noncancer HQs greater than 1 or exceed the upper end of the EPA risk management range of 1×10^{-6} to 1×10^{-4}. Thus, toxicity changes for these chemicals potentially result in the ROD cleanup level no longer being protective.

Table 6: Calculated Risks and Hazards for ROD COCs

Contaminant of Concern	Media	ROD Clean-up Level	Current Alaska Cleanup Level	Ingestion HQ	Ingestion Cancer Risk	Inhalation HQ	Inhalation Cancer Risk	Is Cleanup Level Sufficiently Protective?
LF007, OT001, SS004, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area)								
Polychlorinated biphenyls	Soil (mg/kg)	1	1	--	5.0×10^{-6}	--	1.7×10^{-5}	Yes
Benzo(a)pyrene		0.49	1.5	0.016	2.5×10^{-6}	0.00013	1.6×10^{-10}	Yes
Benzo(a)anthracene		3.6	0.7	--	6.1×10^{-6}	--	4.6×10^{-5}	Yes
Dibenzo(a,h)-anthracene		0.49	1.5	--	2.5×10^{-6}	--	1.6×10^{-10}	Yes
Dieldrin		0.015	0.44	0.056	1.1×10^{-5}	--	--	Yes
Heptachlor epoxide		0.2	0.86	**5.6**	**1.7×10^{-4}**	--	**6.8×10^{-4}**	**No**
Black Lagoon Outfall Plume (WP002) and Former Facility Area Plume								
Trichloroethylene	Ground-water (µg/L)	5	2.8	0.50	4.2×10^{-6}	**1.2**	5.2E-06	**No**
Benzene		5	4.6	0.062	3.5×10^{-6}	0.080	6.9E-06	Yes

Key:
Bold indicates a cancer risk that exceeds 1×10^{-4} or a hazard quotient greater than 1
COC – contaminant of concern
HQ – hazard quotient
ROD – Record of Decision

There have been no changes in the physical conditions of any sites that would adversely affect the protectiveness of the remedy, and there are no changes to the exposure pathways at any of the sites.

Periodic Review – Site SS006

At Site SS006, risk and hazard thresholds were exceeded for: (in soils) 1,2,4-TMB, 1,3,5-TMB, and naphthalene, and; (in groundwater) 1,3,5-TMB and naphthalene.

Changes in Exposure Pathways

It is possible that per- and polyfluoroalkyl substances may present in groundwater, but groundwater LUCs are in place at OT001, SS004, and LF007, and are preventing exposures.

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No additional information has been identified that calls into question the protectiveness of the Port Heiden RRS soil and groundwater remedies.

(This page intentionally left blank.)

VI. ISSUES/RECOMMENDATIONS

This section identifies issues affecting the protectiveness of the remedies at Port Heiden ERP Sites.

Issues Identified in the FYR and Periodic Review:				
Site(s): Black Lagoon Outfall Plume	**Issue Category: Remedy Performance**			
	Issue: Limited natural attenuation of the COC TCE in groundwater is occurring at the site, indicating that RAOs may not be achieved by the projected time frame in the ROD of 26 years (2035).			
	Recommendation: Conduct additional studies to determine if the remedy, as is, will be able to achieve remediation goals within the estimated time frame. Other studies may include, but are not limited to, site characterization to identify potential contaminant sources that remain onsite, ecological assessment, focused feasibilities studies, groundwater modeling, treatability studies, and/or sampling.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	USAF	ADEC	12/31/2021

Site(s): WP002	**Issue Category: Institutional Controls**			
	Issue: Potential cancer risks exceed 1 x 10^{-4} for benzo(a)anthracene in soil and no LUC is in place.			
	Recommendation: Conduct sampling to assess current benzo(a)anthracene concentrations in soil. If results indicate concentrations above current cleanup levels, it should be included as a remedy COC and a soil excavation LUC should be implemented. Record ICs in the AF LUC Management Plan and conduct annual IC inspections. Document any changes to the remedy in a decision document.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	USAF	ADEC	12/31/2021

Site(s): Black Lagoon Outfall Plume and Former Facility Area Plume	**Issue Category: Remedy Performance**			
	Issue: The ROD cleanup level for TCE in groundwater (5 µg/L) is less stringent than the current ADEC cleanup level (2.8 µg/L), and results in a calculated HQ of 1.2.			
	Recommendation: The current ADEC cleanup level for TCE in groundwater, 2.8 µg/L, should be adopted as the revised remedy cleanup level. Document this in a decision document.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	USAF	ADEC	12/31/2021

Site(s): LF007, OT001, SS004, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area)	**Issue Category: Remedy Performance**			
	Issue: The ROD cleanup level for heptachlor epoxide in soil (0.2 mg/kg) results in risks and hazards that potentially exceed acceptable thresholds.			
	Recommendation: Soil sampling should be conducted to assess current concentrations of heptachlor epoxide. Risk and potential changes to the remedy cleanup level should be reevaluated based on the results of the sampling.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	USAF	ADEC	12/31/2021

Site(s): LF007	**Issue Category: Remedy Performance**			
	Issue: No signage is in place as is required by the conditions of the ROD, and sandbags securing the landfill cap showed signs of deterioration and weathering. There are several areas of exposed soil, and metal debris is visible in some areas.			
	Recommendation: Signage should be erected, the deteriorating sandbags should be replaced, and procedures should be verified to ensure all debris is covered by the geofabric cap. Obtain landowner permission and environmental covenant where LUCs are part of a remedy on private property. Note that removal of contaminated soil at LF007 and disposal in a class III landfill is scheduled to begin during the summer of 2019.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	USAF	ADEC	12/31/2021

Site(s): Former Port Heiden RRS	Issue Category: Institutional Controls			
	Issue: There is incomplete fencing used to partially restrict access around open excavations associated with the Soil Removal Areas and the Drum Storage Area. OT001, WP002, and SS004 are all accessible. Access to LF007 is partially restricted by the fence on the east side of the Drum Storage Area. Sections of both fences are leaning over, and traffic cones placed on the fence posts to increase their visibility are scattered around the site. Note that removal of contaminated soil at LF007 and disposal in a class III landfill is scheduled to begin during the summer of 2019. As such, if the contaminated soil removal at LF007 is completed, no fencing at LF007 will be necessary.			
	Recommendation: Fencing should be repaired, and a procedure be developed for properly securing open excavations and preventing access to and warning of the presence of open excavations. Obtain landowner permission and environmental covenant where LUCs are part of a remedy on private property.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
Yes	Yes	USAF	ADEC	12/31/2021

Site(s): Former Port Heiden RRS	Issue Category: Institutional Controls			
	Issue: ICs are required remedy components for the Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) and the Black Lagoon Outfall and Former Facility Area Plumes. However, these LUCs are not documented in the LUC Management Plan.			
	Recommendation: Formally implement soil ICs at the Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) and groundwater ICs at the Black Lagoon Outfall and Former Facility Area Plumes. Record ICs in the AF LUC Management Plan and apply for a Notice of Activity and Use Limitation for the site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	USAF	ADEC	12/31/2021

The following recommendations that do not affect the protectiveness of the site remedies at ERP sites were identified during this FYR:

- Risks and hazards associated with thallium concentrations in soils at LF007 and OT001 exceed acceptable thresholds. LUCs are in place and protective, but it is recommended that sampling be conducted to assess current thallium concentrations for potential inclusion as a remedy COCs at these sites. Document any changes to COCs in a decision document.
- LUCs in place at OT001 restrict the use of groundwater and remain protective. However, because naphthalene and heptachlor remain above cleanup levels and risk and hazard thresholds are exceeded, it is recommended that these chemicals be included as remedy COCs in groundwater. Document any changes to COCs in a decision document.

- LUCs in place at OT001 restrict the use of soil and remain protective. However, 1,2,4-TCB was detected at a maximum concentration of 1.38 mg/kg, above the ADEC Method Two migration to groundwater cleanup level of 0.85 mg/kg (USAF, 2016b). The 2015 report indicated that the ESD (at that time, undergoing internal review) would include 1,2,4-TCB as a new COC for the RRS Site, but the final ESD contains no discussion of new COCs. It is recommended that 1,2,4-TCB be evaluated for potential inclusion as a remedy COC. Document any changes to COCs in a decision document.
- Annual IC monitoring and report submittal was required for the first five years after remedy selection, which has elapsed. No documentation of continuation or cessation of this reporting has been prepared. It is recommended that the current status and future requirements for IC monitoring and reporting be documented in a decision document.
- Several unlabeled monitoring wells were identified during the site inspection. It is recommended that all Port Heiden RRS monitoring wells are marked appropriately to ensure positive identification.
- The soil around Monitoring Well GLO-MW-03 has eroded significantly. This should be repaired to ensure integrity of the well.
- Monitoring Well PG1-MW-01 was found on its side and no longer functioning. This well should be repaired or replaced.

The following issues and recommendations were identified at Site SS006 during this Periodic Review:

- Site SS006, Monitoring Well MW-10 at FPC-215 appears to have been struck by a snowplow and is laying on its side. It is recommended that this well be repaired or replaced.
- Annual alternating-season monitoring should continue at Site SS006, and additional investigation into potential source areas adjacent to monitoring well 215-MW-09 should be conducted. Formal remedy selection should be pursued and documented in a decision document.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statements		
Site: **Former Port Heiden RRS ERP Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)**	*Protectiveness Determination:* **Protectiveness Deferred**	*Planned Addendum Completion Date:* 12/31/2021
Protectiveness Statement: The protectiveness determination of the remedy at the Former Port Heiden RRS ERP Sites OT001, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) is Protectiveness Deferred. Further information will be obtained by taking the following actions: conduct additional studies at the Black Lagoon Outfall Plume and Former Facility Area Plume to determine if the remedy, as is, will be able to achieve remediation goals within the estimated time frame; implement a soil LUC at WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) and a groundwater LUC at the Black Lagoon Outfall Plume and Former Facility Area Plume; repair fencing and damaged sandbags, install signage, and implement procedures to properly secure open excavations; and evaluate ROD cleanup levels based on toxicity changes. It is expected that these actions will take approximately 2 years to complete, at which time a protectiveness determination will be made.		

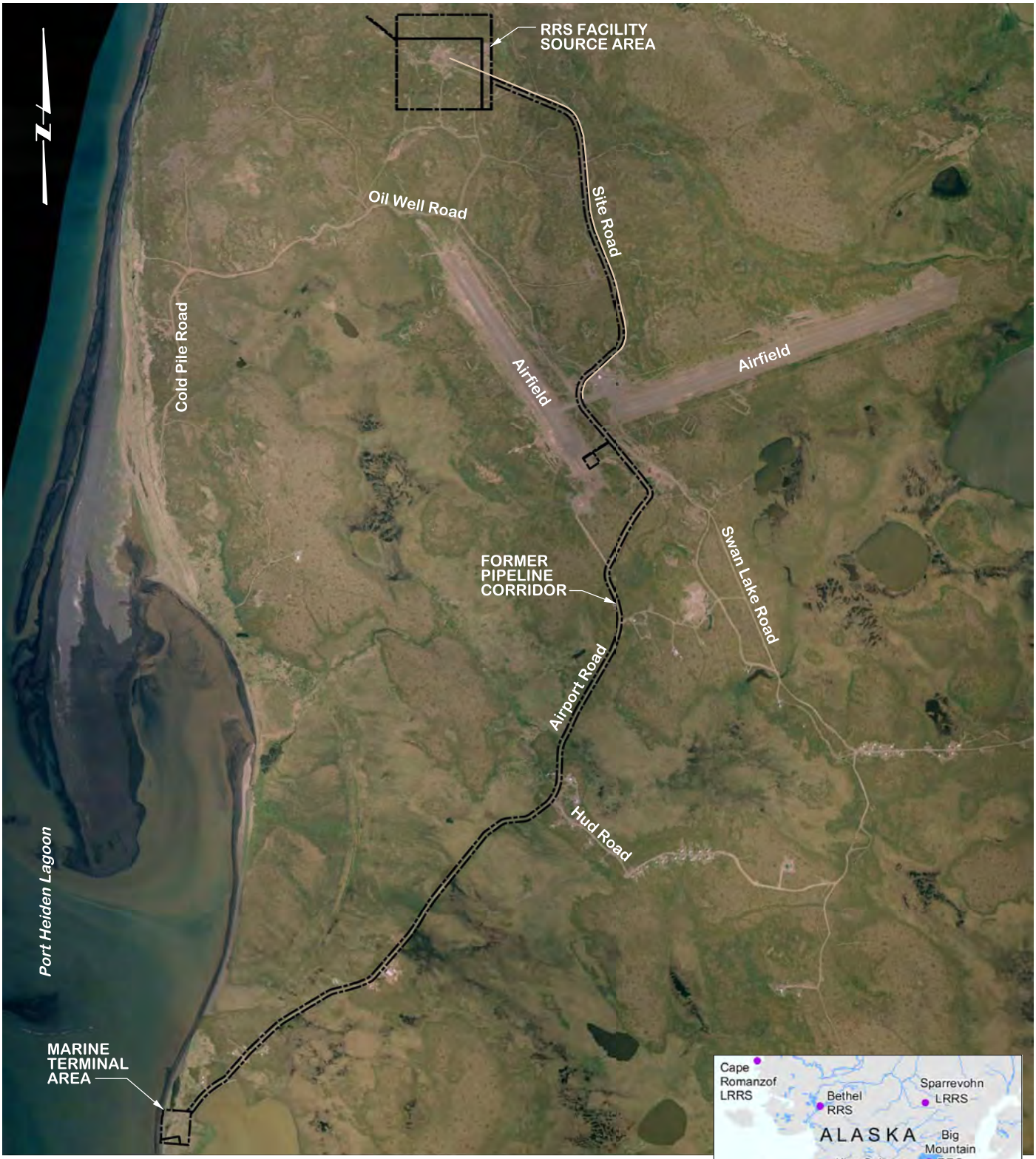
(This page intentionally left blank.)

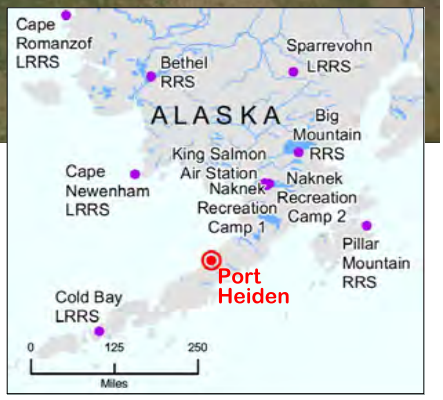
VIII. NEXT REVIEW

The next FYR for ERP Sites OT001, LF007, WP002, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) and the next Periodic Review for Site SS006 will be completed 5 years from the USAF signature date on this FYR and Periodic Review report.

(This page intentionally left blank.)

FIGURES





Legend:

Installation Boundary

Notes:

1. RRS = Radio Relay Station.
2. Data from 611th GeoBase for Port Heiden RRS. GeoBase data could be incomplete and are of unknown accuracy.
3. Data are rendered in UTM Zone 4N, WGS84, Meters.

Source:
USAF, 2014. First Five-Year Review of Environmental Restoration Program Sites OT001, WP002, SS004, LF007, and Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) Former Port Heiden Radio Relay Station. August.

SCALE IN FEET
0 1,500

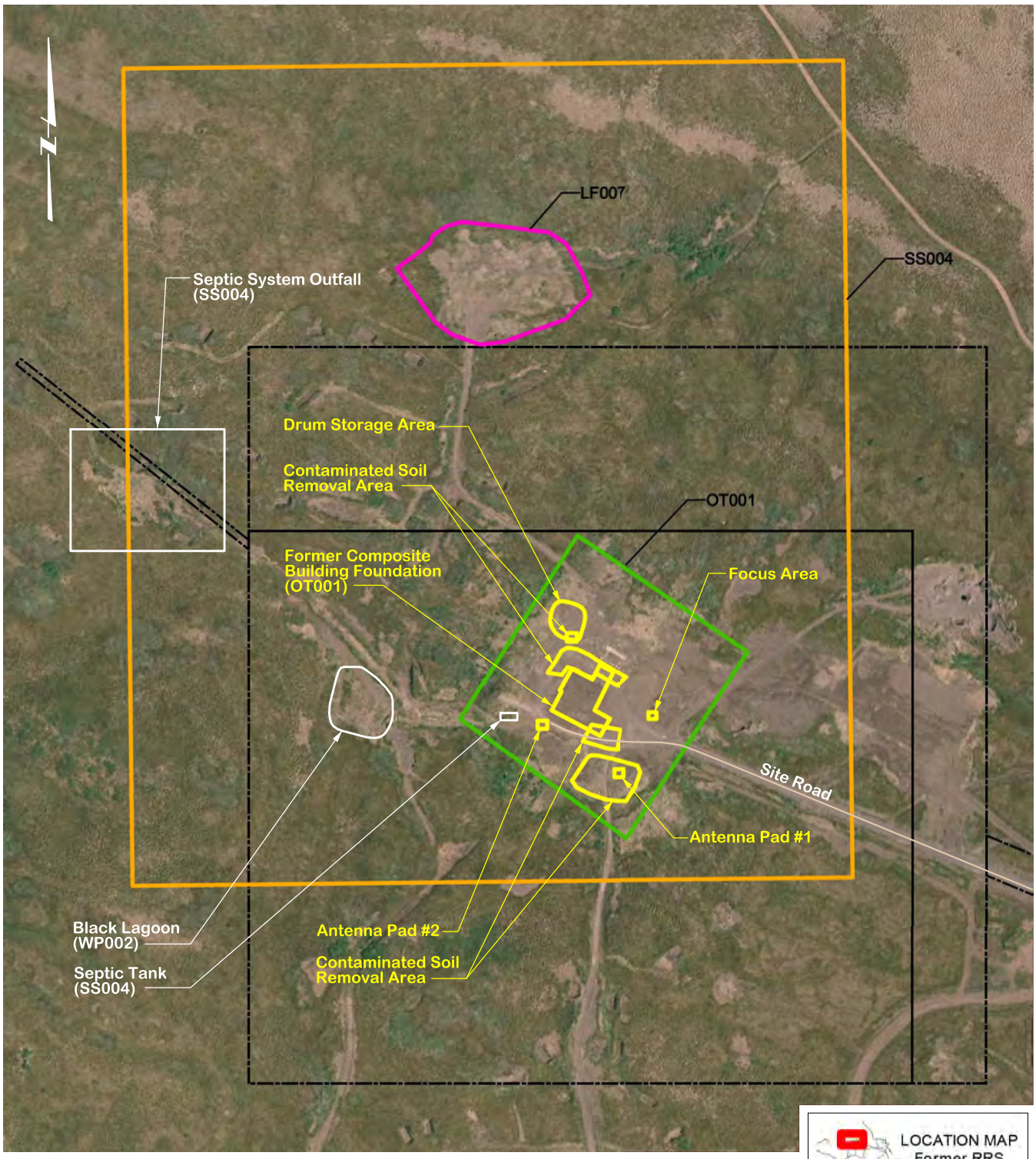
UNITED STATES AIR FORCE
SECOND FIVE-YEAR REVIEW AND FIRST PERIODIC REVIEW
FOR SITES AT THE FORMER
PORT HEIDEN RADIO RELAY STATION, ALASKA

PORT HEIDEN RRS
LOCATION AND VICINITY MAP

FIGURE
1

185751121.
100.44010401

FILE: C:\D\CAD\Proj\AFCEC\2018 Port Heiden_5year report_185751121\October 29-2018\fig01_location map.dgn
TIME: 01-NOV-2018 13:40



Legend:

- Installation boundary
- Buried Solid Waste Area (Soil)
- Dig Restriction Area
- Groundwater Use Restriction Area
- Environmental Restoration Site Boundary

Notes:

1. RRS = Radio Relay Station.
2. ERP = Environmental Restoration Program.
3. Data from 611th GeoBase for Port Heiden RRS. GeoBase data could be incomplete and are of unknown accuracy.
4. Data are rendered in UTM Zone 4N, WGS84, Meters.

Source:
USAF, 2014. First Five-Year Review of Environmental Restoration Program Sites OT001, WP002, SS004, LF007, and Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) Former Port Heiden Radio Relay Station. August.

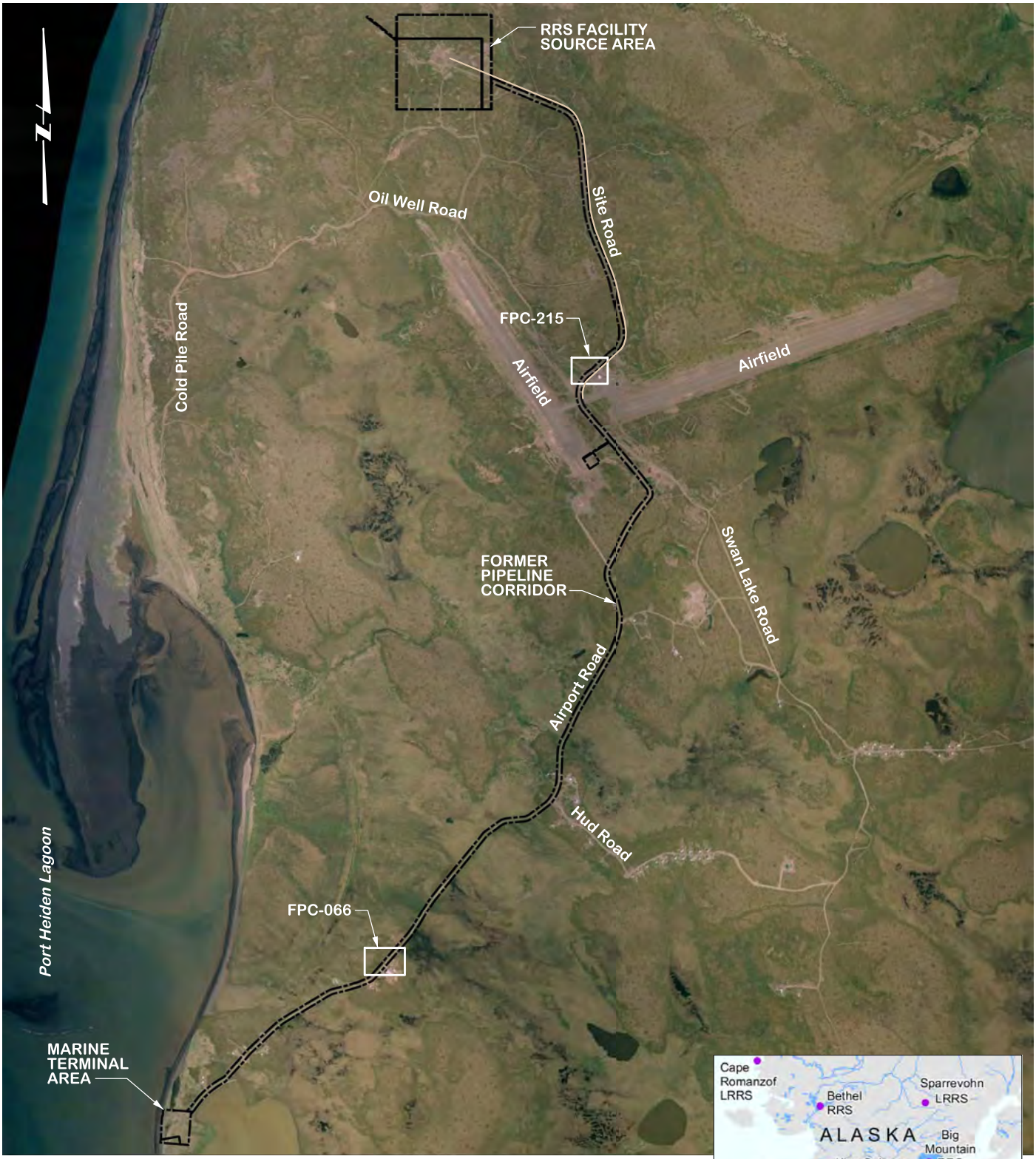
SCALE IN FEET
0 200

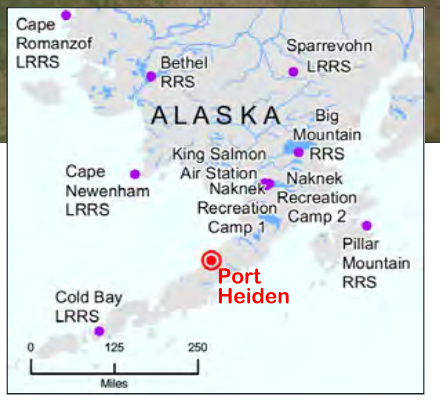
UNITED STATES AIR FORCE
SECOND FIVE-YEAR REVIEW AND FIRST PERIODIC REVIEW
FOR SITES AT THE FORMER
PORT HEIDEN RADIO RELAY STATION, ALASKA

PORT HEIDEN RRS
OT001, WP002, SS004, LF007
FOUR UNNUMBERED SITES,
AND SS006

FIGURE
2
185751121.
100.44010401

FILE: C:\D\CAD\Proj\AFCEC\2018 Port Heiden_5year report_185751121\October 29-2018\fig02_site.dgn
TIME: 02-NOV-2018 10:39





Legend:

Installation Boundary

Notes:

1. RRS = Radio Relay Station.
2. Data from 611th GeoBase for Port Heiden RRS. GeoBase data could be incomplete and are of unknown accuracy.
3. Data are rendered in UTM Zone 4N, WGS84, Meters.

Source:

- USAF, 2014. First Five-Year Review of Environmental Restoration Program Sites OT001, WP002, SS004, LF007, and Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) Former Port Heiden Radio Relay Station. August.
- Jacobs, 2016. Technical Memorandum, Port Heiden 2016 Groundwater Monitoring After-Action Report (Final). 14 December.

SCALE IN FEET
0 1,500

UNITED STATES AIR FORCE
SECOND FIVE-YEAR REVIEW AND FIRST PERIODIC REVIEW
FOR SITES AT THE FORMER
PORT HEIDEN RADIO RELAY STATION, ALASKA

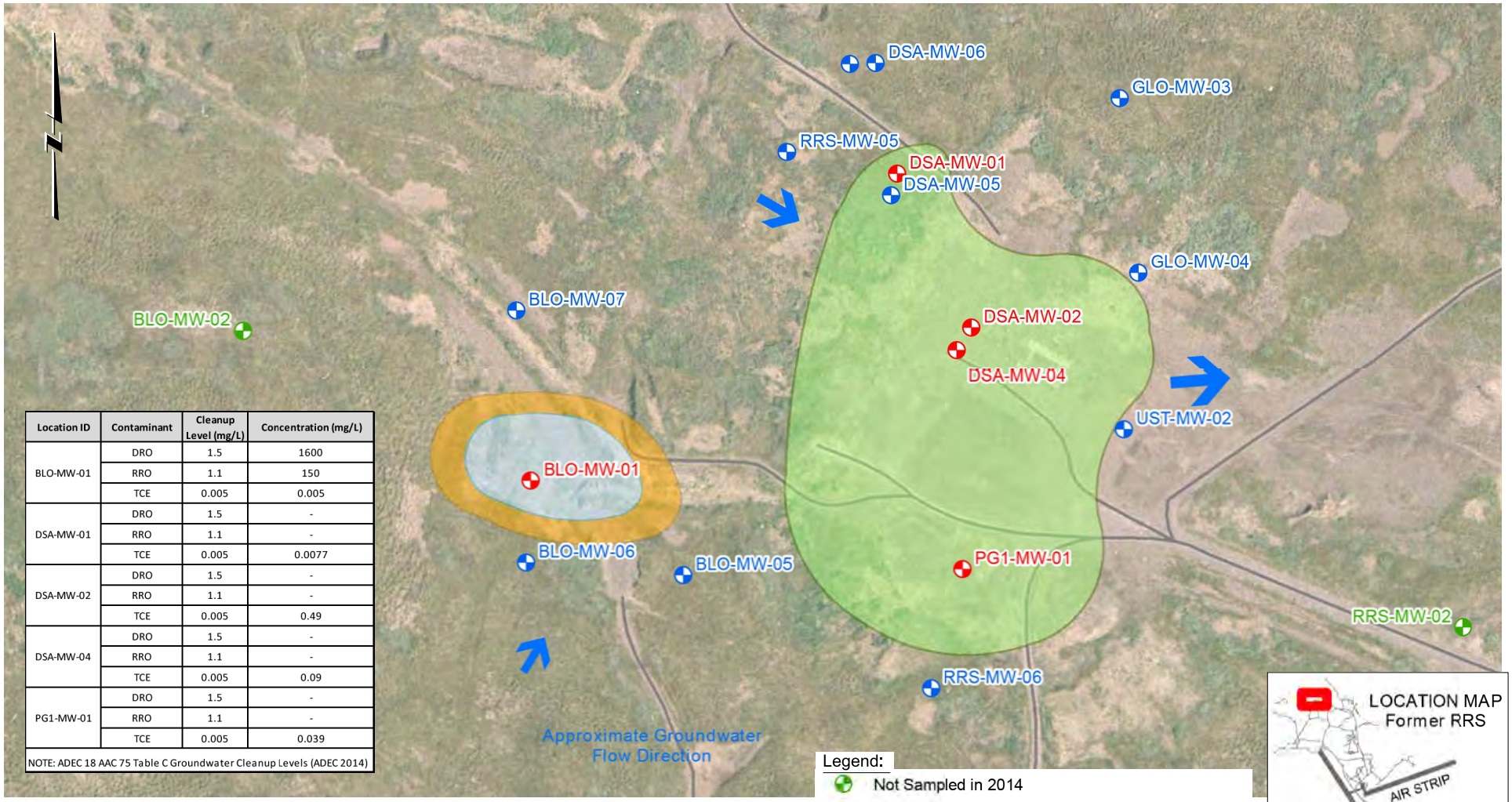
PORT HEIDEN RRS
FORMER PIPELINE CORRIDOR

FIGURE
3

185751121.
100.44010401

FILE: C:\D\CAD\Proj\AFCEC\2018 Port Heiden_5year report_185751121\October 29-2018\fig03_corridor.dgn
TIME: 02-NOV-2018 10:47

TIME: 02-NOV-2018 10:51 FILE: C:\D\CAD\Proj\AFCEC\2018 Port Heiden_5year report_185751121\October 29-2018\fig04_plume.dgn



Location ID	Contaminant	Cleanup Level (mg/L)	Concentration (mg/L)
BLO-MW-01	DRO	1.5	1600
	RRO	1.1	150
	TCE	0.005	0.005
DSA-MW-01	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	0.0077
DSA-MW-02	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	0.49
DSA-MW-04	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	0.09
PG1-MW-01	DRO	1.5	-
	RRO	1.1	-
	TCE	0.005	0.039

NOTE: ADEC 18 AAC 75 Table C Groundwater Cleanup Levels (ADEC 2014)

Legend:
- Not Sampled in 2014
- Groundwater monitoring wells with no exceedances
- Groundwater monitoring wells with exceedances
- Interpolated TCE Groundwater Plume
- Interpolated RRO Groundwater Plume
- Interpolated DRO Groundwater Plume
- Road

Note:
Primary flow direction is east-northeast.

Source:
USAF, 2015b. 2014 Annual Groundwater Monitoring Report, Former Radio Relay Station, Port Heiden, Alaska. May.

SCALE IN FEET
0 100

UNITED STATES AIR FORCE
SECOND FIVE-YEAR REVIEW AND FIRST PERIODIC REVIEW
FOR SITES AT THE FORMER
PORT HEIDEN RADIO RELAY STATION, ALASKA

PORT HEIDEN RRS
GROUNDWATER - FORMER FACILITY AREA PLUME
AND BLACK LAGOON OUTFALL PLUME

FIGURE
4

185751121.
100.44010401

APPENDIX A
REFERENCE LIST

REFERENCE LIST

Alaska Department of Environmental Conservation (ADEC), 2018a. Port Heiden Site Reports for OT001, WP002, SS004, and SS006. ADEC Division of Spill Prevention and Response, Contaminated Sites Program Database. Available online: http://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/Search.

ADEC, 2018b. 18 AAC 75, Oil and Hazardous Substances Pollution Control, as amended through September 29, 2018.

ADEC, 2019. Decision Document: Port Heiden Septic Tank (SS004) – Cleanup Complete Determination. May

Jacobs Engineering Group, Inc. (Jacobs), 2016. Technical Memorandum, Port Heiden 2016 Groundwater Monitoring After-Action Report (Final). 14 December.

Jacobs, 2017. Work Plan Addendum: Landspreading Technical Memorandum, Former Port Heiden Radio Relation Station, Port Heiden, Alaska. February.

Native Village of Port Heiden (NVPH), 2012. Final Groundwater Monitoring Report, Former Port Heiden Radio Relay Station, Port Heiden, Alaska. March.

United States Air Force (USAF), 2006. Final Remedial Investigation / Feasibility Study, Port Heiden Radio Relay Station, Port Heiden, Alaska. April.

USAF, 2009a. Record of Decision for Port Heiden Radio Relay Station, Port Heiden, Alaska. February.

USAF, 2009b. 2008 Pipeline Corridor Removal Action, Port Heiden, Alaska. June.

USAF, 2010a. Explanation of Significant Differences for Port Heiden Radio Relay Station, Port Heiden, Alaska. May.

USAF, 2010b. 2009 Groundwater Investigation, Former Pipeline Corridor, Port Heiden, Alaska. August.

USAF, 2014a. First Five-Year Review of Environmental Restoration Program Sites OT001, WP002, SS004, LF007, and Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) Former Port Heiden Radio Relay Station. August.

USAF, 2014b. Black Lagoon Site Inspection Report, Port Heiden, Alaska. December.

USAF, 2014c. 2013 Annual Groundwater Monitoring Report, Former Radio Relay Station, Port Heiden, Alaska. March.

USAF, 2015a. 2014 Black Lagoon Biopile Treatability Study Report, Port Heiden, Alaska. May.

USAF, 2015b. 2014 Annual Groundwater Monitoring Report, Former Radio Relay Station, Port Heiden, Alaska. May.

USAF, 2015c. PCB-Contaminated Soil Removal Action, 2014 Interim Data Report Summary, Port Heiden, Alaska. May.

USAF, 2016a. 2015 Black Lagoon Biopile Treatability Study Report, Port Heiden, Alaska. April.

USAF, 2016b. PCB-Contaminated Soil Removal Action, 2015 Interim Data Report Summary, Port Heiden, Alaska. April.

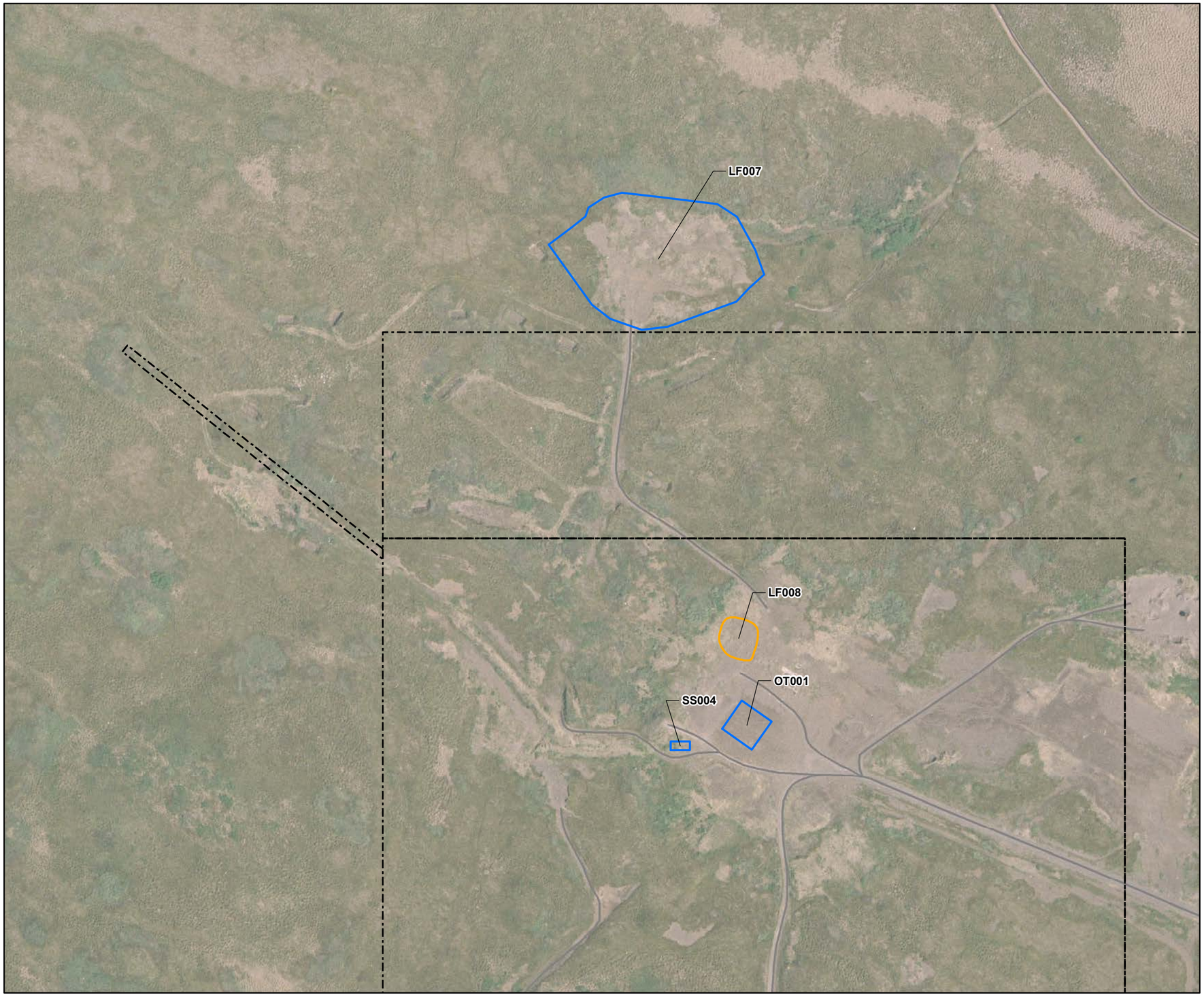
USAF, 2016c. PCB-Contaminated Soil Excavation and Removal Action, 2016 Work Plan, Former Radio Relay Station, Port Heiden, Alaska. May.

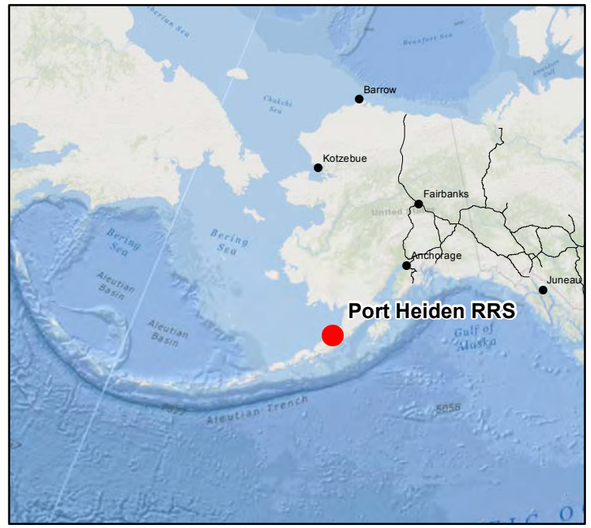
USAF, 2017a. Explanation of Significant Differences, Port Heiden Radio Relay Station, Port Heiden, Alaska. May.

USAF, 2017b. Land Use Control Management Plan, Pacific Air Forces Regional Support Center Installations. December.

USAF, 2017c. Groundwater Monitoring 2016 and 2017 Work Plan, Port Heiden Radio Relay Station, Alaska. April.

APPENDIX B
LUC BOUNDARY FIGURE AND DESCRIPTIONS FROM THE LUC MANAGEMENT PLAN, DECEMBER 2017





Land Use Control Restriction (See Table 2-1)

Landfill (See Table 1-3)

Installation Boundary

Notes (Not all notes apply to all pages):
1. LRRS = Long Range Radar Site.
2. RRS = Radio Relay Station.
3. LUC = Land Use Control. LUC boundaries depicted on this figure are preliminary pending final analysis of survey information. LUC boundaries will be updated once this information is available.
4. Data are from 611th GeoBase. Data could be incomplete and are of unknown accuracy.
5. For more detailed land use restriction information, see individual site summaries.

N

0 125 250 375 500
Feet

GCS WGS 1984 UTM Zone 04V (Calculated), Meters

Figure 32
Installation Map - **Port Heiden RRS**
Land Use Control Management Plan 2017
Pacific Air Forces Regional Support Center Installations
Joint Base Elmendorf-Richardson, Alaska

P:\TitleII\MXD\TitleII_LUC_ManagementPlan.mxd 12/18/2017 beatycj

TABLE 2-1
Description of Land Use Control Types Currently in Effect at Pacific Regional Support Center Environmental Restoration Program Sites
Land Use Control Management Plan 2017, Pacific USAFs Regional Support Center Installations, Joint Base Elmendorf-Richardson, Alaska

Installation: IRP Site(s) with LUCs in Effect	Purpose and Objectives	Prohibitions/Restrictions	Engineering Controls	Expected Durations	Monitoring/ Inspections/ Reporting/ Maintenance	Administrative Elements
Port Heiden: **OT001** **SS004** **LF007**	• Reduce PAH (benzo[a]pyrene, benzo[a]anthracene, dibenzo[a,h]anthracene), PCB and pesticide (dieldrin, heptachlor, epoxide) concentrations in soil to chemical• specific ARARs • Reduce TCE and benzene in groundwater to chemical specific ARARs • Prevent exposure (via ingestion, inhalation, and/or dermal contact) to contaminated groundwater until such time as the federal drinking water standards and state cleanup levels (i.e., 18 AAC 75 Table C) are met • Restrict excavations and the installation of water wells (except for the purposes of monitoring) where contamination levels exceed cleanup levels to reduce the possibility of exposure to contaminants in the contaminated aquifer • Prevent excavation into or development over buried solid waste and potentially hazardous materials in the former RRS landfill, and maintain current land use designation • Prevent ecological receptor ingestion of, dermal contact with, and inhalation of dust and/or vapors from soil containing PCBs, pesticides, and PAHs presenting a Hazard Index greater than 1 • Prevent the possible migration of groundwater containing TCE and benzene to the tributary stream to Reindeer Creek resulting in surface water concentrations in excess of Alaska fresh surface water criteria for aquatic organisms (18 AAC 70)	• Restriction of any soil disturbance without the approval of ADEC to prevent the constant contact of this media with water which could impact groundwater or surface water quality • Maintenance of the landfill cover and restriction of excavation into or development over the Port Heiden RRS landfill in order to maintain the integrity of cap and to prevent migration of contaminants • Limitation on groundwater use as approved by ADEC	• Landfill cover/cap	• None specified for soil • Groundwater LUCs will remain in place until groundwater cleanup levels are achieved through natural attenuation.	• Annual Institutional Control Performance Report to ADEC for the first five years; post-remedial action is put in place for both soil and groundwater • Five-Year Reviews	• Notice type of institutional controls will be implemented and make the Land Owner aware that ADEC approval is required for any disturbance of soil. • Notice will be provided to make Land Owner aware that the remaining buried wastes may contain contaminants of concern, that the cover should be maintained, and excavation into or development over the Port Heiden RRS Landfill should be restricted to maintain the integrity of the cap and to prevent migration contaminants. • Notices to Land Owner and Village Council of status of institutional controls for groundwater.

APPENDIX C
COMMUNITY INVOLVEMENT MATERIALS

The Bristol Bay Times
The Dutch Harbor Fisherman

CASE/PO/AIO: Stantec Consulting Services Inc
AD# or identifier: PACAF Environmental Restoration Program Office begins 5-yr Review Port Heiden RRS

REMIT TO: **Anchorage Daily News**
300 W 31st Ave
Anchorage, AK 99503
Ph: (907) 257-4251
Fax: (907) 279-7579

INVOICE(S):

AFFIDAVIT OF PUBLICATION

UNITED STATES OF AMERICA
STATE OF ALASKA, THIRD DISTRICT
BEFORE ME, THE UNDERSIGNED, A NOTARY PUBLIC THIS DAY PERSONALLY APPEARED **Kea Cuaresma** WHO, BEING FIRST DULY SWORN, ACCORDING TO LAW, SAYS THAT S/HE IS **Advertising Director** OF **The Bristol Bay Times/Dutch Harbor Fisherman** PUBLISHED AT **300 W 31ST AVE, ANCHROAGE AK ,** IN SAID THIRD DISTRICT STATE OF ALASKA AND THAT THE ADVERTISEMENT, OF WHICH THE ANNEXED OR ATTACHED IS A TRUE COPY, WHICH WAS PUBLISHED IN SAID PUBLICATION _____ AND THEREAFTER FOR A TOTAL OF ____ CONSECUTIVE ISSUE(S), THE LAST PUBLICATION APPEARING ON _____.

ATTACH PROOF OF PUBLICATION HERE

Kea Cuaresma

KEA CUARESMA
ADVERTISING DIRECTOR

SUBSCRIBED AND SWORN BEFORE ME THIS 18th DAY OF July 20 19

Kathleen L Seward

KATHLEEN L SEWARD
NOTARY PUBLIC STATE OF ALASKA
MY COMMISSION EXPIRES ON FEBRUARY 1, 2021

STATE OF ALASKA
NOTARY PUBLIC
Kathleen L. Seward
My Commission Expires Feb. 1, 2021

HOUSING

UNIQUE AND RARE DUTCH HARBOR / UNALASKA HOUSING OPPORTUNITY

- Spacious House - 116 Dutton Road, Unalaska, 99685
- Approximately 1,300 square feet
- 4 bedrooms / 1 bath
- Spacious living room and kitchen
- Mud room with washer & dryer
- Expansive outside deck
- Currently furnished, but can be rented unfurnished at tenant's request
- Price : $4,000.00 per month
- Term: Minimum 12 month lease
- Security Deposit - $4,000.00 (includes $350 non-refundable carpet and cleaning fee)
- Tenant responsible for utilities (electricity/cable tv/propane)
- For more detail contact: EJ Stenftenagel @ Offshore Systems, Inc. – (425)-828-6434

PUBLIC NOTICE

Pacific Air Forces Regional Support Center Environmental Restoration Program Five-Year Review Port Heiden RRS

Public Notice – The Pacific Air Forces (PACAF) Environmental Restoration Program Office announces the beginning of the Five-Year Review process for Port Heiden Radio Relay Station (RRS), Alaska. This process will document whether the remedies implemented at OT001 (Former Composite Building), WP002 (Black Lagoon Outfall), SS004 (Septic Tank and Septic System Outfall), LF007 (Radio Relay Station Landfill) and Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area), remain protective of human health and the environment. The remedies selected for Sites OT001, SS004, LF007, WP002 and the Four Unnumbered Sites were selected in the February 2009 Record of Decision and refined in Explanations of Significant Difference in 2010 and 2017. The remedies for Sites OT001, SS004, LF007, WP002 and the Four Unnumbered Sites is Soil Excavation with Offsite Disposal and Institutional Controls, and for Site WP002 is Monitored Natural Attenuation and Institutional Controls. This will be the second Five-Year Review for these sites.

The Department of Defense recognizes the importance of public participation in the PACAF Environmental Restoration Program and encourages your involvement. If you have any issues or concerns about Port Heiden RRS cleanup program, or if you have direct knowledge regarding the remedies, the Air Force would like to talk to you. Verbal and written comments to be included in the Five-Year Review may be provided to Mr. Robert Johnston, AFCEC Project Manager, by mail at 10471 20th Street, Suite 339, Joint Base Elmehdorf-Richardson, AK 995062201, or by email at robert.johnston17@us.af.mil or by calling 18002224137. The Air Force requests that comments for the Five-Year Review be provided to the Air Force by August 20, 2019. Another public notice will be issued informing the community that the review is complete.

Municipality Name	CITY OF UNALASKA
Fiscal Year	2020
Assessed Value	$677,127,246

FISCAL YEAR 2020 NOTICE TO TAXPAYER (AS 29.45.020)

For the current fiscal year, the City of Unalaska has been allocated the following amount of state aid for school and municipal purposes under the applicable financial assistance Acts:

PUBLIC SCHOOL FOUNDATION PROGRAM ASSISTANCE (AS 14.17)	$ 4,348,951
STATE AID FOR RETIREMENT OF SCHOOL CONSTRUTION DEBT (AS 14.11.100)	$ 274,890
COMMUNITY ASSISTANCE PROGRAM (AS 26.60.850-29.60.879)	$ 134,433
TOTAL AID	**$ 4,758,274**

The millage equivalent of this state aid, based on the dollar value of a mill in the municipality during the current assessment year and for the preceding assessment year, are:

	MILLAGE EQUIVALENT Last Year Mills	This Year Mills
PUBLIC SCHOOL FOUNDATION PROGRAM ASSISTANCE	7.4	6.42
STATE AID FOR RETIREMENT OF SCHOOL CONSTRUTION DEBT	1.13	0.41
COMMUNITY ASSISTANCE PROGRAM	0.23	0.2
TOTAL MILLAGE EQUIVALENT	8.76	7.03

APPENDIX D
INTERVIEW RECORDS

INTERVIEW DOCUMENTATION FORM

The following is a list of individuals interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

	Name	Title/Position	Organization	Date
1	Richard Mauser	Restoration PM	AFCEC / CZOP	5 November 2018
2	Louis Howard	Environmental Program Specialist	ADEC	19 October 2018

INTERVIEW RECORD

Site Name: Port Heiden LRRS	**EPA ID No.:**	
Subject: Second CERCLA Five-Year Review	**Time:** 1:25 pm	**Date:** 11/05/18
Type: ☐ Telephone ☐ Visit ☒ Email **Location of Visit:**	☒ Incoming ☐ Outgoing	

Contact Made By:

Name: Terence Dalton	**Title:** Prof. Env. Scientist	**Organization:** Stantec

Individual Contacted:

Name: Richard Mauser	**Title:** Restoration Project Manager	**Organization:** AFCEC/CZOP
Telephone No: 907.552.0788 **E-Mail Address:** richard.mauser@us.af.mil	**Street Address:** 10471 20th Street, Suite 339 **City, State, Zip:** JBER, AK 99506-2201	

Summary of Conversation

1. **Sites OT001, SS004, and LF007 include LUCs as part of the remedy. Have any breaches of the LUCs occurred or complaints been filed? If so, how were they addressed?**

   I do not know of any LUC breaches and nor has any complaints been filed

2. **How are ICs being enforced? What is the enforcement plan in the event of an IC breach?**

   The Air Force will submit an Institutional Control Performance Report to the ADEC on an annual basis for the first five years post-remedial action in-place. The frequency of the Institutional Control Performance Report will be evaluated with the five-year review under 42 USC 962 1 (c). This report shall include information pertaining to any breaches to IC's, corrective actions taken, and any property transfer. The Air Force will, with landowners consent, implement, monitor, maintain, and enforce the onsite remedies selected in this ROD.

3. **Do you have any general comments, suggestions, or recommendations regarding remedy implementation or ongoing work at the sites?**

   No.

4. **Do we have your permission to use your name in the Five-Year Review report and document the results of your interview in the report?**

   Yes

INTERVIEW RECORD

Site Name: Port Heiden LRRS		**EPA ID No.:** Not applicable
Subject: Second CERCLA Five-Year Review	**Time:** 12:27pm	**Date:** 10/19/18
Type: ☐ Telephone ☐ Visit ☒ Email **Location of Visit:**		☒ Incoming ☐ Outgoing

Contact Made By:

Name: Terence Dalton	**Title:** Prof. Env. Scientist	**Organization:** Stantec

Individual Contacted:

Name: Louis Howard	**Title:** Env. Program Specialist	**Organization:** ADEC
Telephone No: 907.269.7552 **E-Mail Address:** louis.howard@alaska.gov	**Street Address:** 555 Cordova Street, 2nd Floor **City, State, Zip:** Anchorage AK 99501-2617	

Summary of Conversation

1. **Sites OT001, SS004, and LF007 include LUCs as part of the remedy. Are the LUCs functioning as expected?**

2. **Has the USAF submitted annual performance reports on the LUCs at these sites as required?**

   Yes

3. **Do you know of any problems or difficulties that have been encountered which have impacted remedy implementation or progress at these sites?**

   Yes. Long-term monitoring of groundwater is on hold for the year 2018 due to Air Force delayed release of funding for contracts to perform the groundwater monitoring at all remote Air Force sites in Alaska which include Port Heiden LRRS.

   If so, will any of these problems require changes to the ROD?

   No.

4. **Are you aware of any community concerns regarding these sites? If so, please give details?**

   No.

5. **Are you aware of any events, incidents, or activities at these sites such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details?**

   No.

6. **Do you have any general comments, suggestions, or recommendations regarding the management of these sites, remedy implementation, or ongoing work at the sites?**

   Yes. Release of funding approvals for long-term monitoring in a timely manner before the field season is necessary to perform the required groundwater monitoring at Port Heiden LRRS. Per- and Polyfluoroalkyl Substances (PFAS) contamination from aqueous film-forming foam (AFFF) used in firefighting has yet to be investigated. Historical AFFF firefighting usage and/or discharge for testing purposes at Port Heiden RRS prior to 1978 may have occurred. It has not been verified through groundwater/soil sampling to determine the presence or absence of PFAS contamination?

   No.

7. **Do we have your permission to use your name in the Five-Year Review report and document the results of your interview in the report ?**

   Yes

APPENDIX E
SITE INSPECTION CHECKLISTS AND PHOTOLOGS, AUGUST 2018

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Former Port Heiden RRS ERP Sites OT001, WP002, SS004, LF007, and Four Unnumbered Sites (antenna pads, contaminated soil removal areas, drum storage area, and focus area).	**Date of inspection:** August 22, 2018
Location and Region: Former Port Heiden RRS, AK Region 10	**EPA ID:**
Agency, office, or company leading the five-year review: Stantec	**Weather/temperature:** Overcast, 55°F

Remedy Includes: (Check all that apply)

X Landfill cover/containment
☐ Access controls
X Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
☐ Other: _____
_____

X Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** __N/A_____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

2. **O&M staff** _____N/A_____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____ **ADEC** _____
Contact **Louis Howard, Environmental Program Specialist III** **10/22/2018** **(907) 269-7552**
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached __None_____
_____

Agency _____**USAF**_____
Contact **Richard Mauser, Remedial Project Manager** **11/5/2018** **(907) 552-0788**
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached __None_____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** — ☐ Readily available — ☐ Up to date — **x** N/A
   Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

7. **Groundwater Monitoring Records** — **x** Readily available — **x** Up to date — ☐ N/A

   Remarks: Annual Field Activities Reporting_____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — **x** N/A

    Remarks_____

IV. O&M COSTS

1. **O&M Organization** **N/A**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

_____

2. **O&M Cost Records** **N/A**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: N/A_____
_____
_____
_____
_____
_____

V. ACCESS AND INSTITUTIONAL CONTROLS x Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks: There is incomplete fencing used to partially restrict access around open excavations associated with the Soil Removal Areas and the Drum Storage Area. OT001, WP002, and SS004 are all openly accessible. Access to LF007 is partially restricted by the fence on the east side of the Drum Storage Area. Sections of both fence are leaning over, likely resulting from heavy winds common to this area. Traffic cones were placed on top of many of the steel fence posts to increase their visibility. However, most of those cones are now scattered around the site, again likely resulting from heavy winds common to the area.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
Remarks: There are a number of different signs associated with the sites covered by this inspection checklist. Attached to the fencing described in Section V, Part A, Number 1 (see above) there are "Danger Keep Out" signs, "Danger Do Not Enter" signs and "Caution PCB Contamination" signs. On the east side of the sites, north of the access road, there are two brown and white signs posted that warn of an asbestos waste disposal site. In addition, there are two hand-painted signs on the west side of the site, one that states "LSA 1&2" and the other that states "Evacuation Site."

C. Institutional Controls (ICs)

1. **Implementation and enforcement**
Site conditions imply ICs not properly implemented ☐ Yes **X** No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes **x** No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) Annual groundwater monitoring
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes **x** No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No **x** N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No **x** N/A
Violations have been reported ☐ Yes ☐ No **x** N/A
Other problems or suggestions: ☐ Report attached
Final reports for 2016 and 2017 were unavailable at the time of this FYR.

2. **Adequacy** **x** ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map **x** No vandalism evident
Remarks_____

2. **Land use changes on site** ☐ N/A
Remarks: There are ongoing remediation activities, but no observable changes in land use.

3. **Land use changes off site** ☐ N/A
Remarks: No observable changes in land use

VI. GENERAL SITE CONDITIONS

A. Roads **X** Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map **X** Roads adequate ☐ N/A
   Remarks: The access road to the site is well maintained.

B. Other Site Conditions

Remarks: _____

VII. LANDFILL COVERS **x** Applicable ☐ N/A

Landfill cover is applicable to LF007 only. LF007 had indications of recent active remediation activities, including test pit and monitoring well installations, and possibly soil/debris removal and/or cover placement. These remediation activities appeared incomplete, with additional locations marked for future installation of test pits and monitoring wells. The final landfill cover is not in place.

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth: **Shallow (1-12inches)**
   Remarks: **Low spots and settlement are common features of this landfill cover in its current status.**

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks: **Minor erosion was evident at several locations around LF007.**

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks: **The final landfill cover has not been placed, therefore the vegetation cover has not yet been established.**

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks: **Much of the cover consists of geo-fabric (or similar) held in place with sand bags. In addition, there are several areas of exposed soil.**

7. **Bulges** ☐ Location shown on site map **X** Bulges not evident
Areal extent_____ Height_____
Remarks_____

8. **Wet Areas/Water Damage** **X** Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map **X** No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable **x** N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable **x** N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations **x** Applicable ☐ N/A

1. **Gas Vents** ☐ Active☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
x N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance **x** N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
x Properly secured/locked ☐ Functioning ☐ Routinely sampled **x** Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks: **Four monitoring wells appear to have installed in 2018 based on their new condition and recent disturbances around them (e.g. drill rig tracks or drill cuttings). One of these monitoring wells (MW-10) penetrates the landfill cover. The other three are north or east of the landfill cover.**

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance **x** N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed **x** N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable **x** N/A

1. **Gas Treatment Facilities**
☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition☐ Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping**
☐ Good condition☐ Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
☐ Good condition☐ Needs Maintenance ☐ N/A
Remarks_____
_____

F. Cover Drainage Layer ☐ Applicable **X** N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
Remarks_____
_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
Remarks_____
_____

G. Detention/Sedimentation Ponds ☐ Applicable **x** N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
☐ Siltation not evident
Remarks_____
_____

2. **Erosion** Areal extent_____ Depth_____
☐ Erosion not evident
Remarks_____
_____

3. **Outlet Works** ☐ Functioning ☐ N/A
Remarks_____
_____

4. **Dam** ☐ Functioning ☐ N/A
Remarks_____
_____

H. Retaining Walls ☐ Applicable **x** N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____
_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____
_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable **x** N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____
_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable **x** N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable **x** N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____
   _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable **x** N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____
   _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____
   _____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

5. **Treatment Building(s)**
   ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____
   _____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

D. Monitoring Data

1. Monitoring Data
   x Is routinely submitted on time **x** Is of acceptable quality

2. Monitoring data suggests:
   x Groundwater plume is effectively contained **x** Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

x Properly secured/locked x Functioning x Routinely sampled x Good condition
x All required wells located x Needs Maintenance ☐ N/A

Remarks: **All Program wells were observed in the field. However, few wells were labeled making it challenging to positively identify all of them. Most wells were properly secured and appeared to be in good working condition. There were also a number of wells in need of maintenance (see photolog).**

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

There are ICs on land and water use to prevent access to contaminated media. Although there is clear evidence that there are ongoing remediation activities impacting the current condition of these sites, there is no evidence that the ICs are not functioning as intended.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. _None
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

OT001 - Remnant concrete foundation for the Former Composite Building, looking southeast. Much of this area remains unvegetated and as exposed soil. There are several monitoring wells found around the former Port Heiden LRRS, most of which are not labeled. On the far edge of the concrete pad, flanked by bollards with traffic cones is the Monitoring Well UST-MW-02, which is secure and in good condition.

OT001 - Partial fence on the northern boundary of the Soil Removal Areas (and former antenna pads). Note the excavations beyond the fence and the Danger sign attached to the fence.

OT001 - A PCB Caution sign posted on the partial fence around the Soil Removal Areas.

OT001 - A view of the Soil Removal Areas looking back towards the partial fence. Much of this area remains unvegetated with numerous open excavations and channels of erosion. Note in the foreground Monitoring Well PG1-MW-01, which is no longer functioning.

OT001 - A view south looking across a former antenna pad from within the Soil Removal Areas.

Eastern side of the site - Miscellaneous equipment storage on the.

Eastern side of the site - Miscellaneous equipment and/or soil stockpiles. There are no signs to indicate what is being stored.

Ground Water Monitoring - Well DSA-MW-01 is secure and in good working condition.

Ground Water Monitoring - Wells DSA-MW-02 and DSA-MW-04 are secure and in good working condition.

Ground Water Monitoring - Well DSA-MW-05 is secure and in good working condition.

Ground Water Monitoring - Well GLO-MW-03 is secure and in good working condition. The soil around the protective well casing has eroded significantly and if left unrepaired is likely to fall over and damage the well.

Ground Water Monitoring - Well GLO-MW-04 is secure and in good working condition.

Ground Water Monitoring - Well RRS-MW02 is secure and in good working condition.

Ground Water Monitoring - Well RRS-MW-05 is secure and in good working condition.

Ground Water Monitoring - Well RRS-MW-06 is secure and in good working condition.

WP002 - A view southwest looking across the Black Lagoon Outfall Plume. Much of this site remains unvegetated.

WP002 - A view west of the Black Lagoon, showing passively ventilated Biopile BSB.

WP002 - A view southwest of the Black Lagoon, showing passively ventilated Biopile BSA.

WP002 - Monitoring Wells BLO-MW-01 (background, yellow casing) and BLO-MW-06 (foreground) are secure and in good working condition.

WP002 - Monitoring Well BLO-MW-02 is secure and in good working condition.

WP002 - Monitoring Well BLO-MW-05 is secure and in good working condition.

WP002 - Monitoring Well BLO-MW-07 is secure and in good working condition.

SS004 – Septic System Outfall, a view of what remains at the outfall.

Drum Storage Area - A view east, much of this area remains unvegetated with numerous open excavations. Note in the background a partial fence along the eastern boundary of the Drum Storage Area.

Drum Storage Area - A view west and the partial fence on its eastern boundary.

Drum Storage Area - Monitoring Wells DSA-MW-07 and DSA-MW-06 are both secure and in good condition.

LF007 - General site condition looking west. Note Monitoring Well MW-10 in the background (right). Geo-fabric held in place by sandbags covers most of the site. In the foreground the green sandbags are more weathered than the white sandbags in the background, suggesting this cover consists of different aged materials.

LF007 – This photograph is of the eastern edge of the landfill cap, looking north. An example of an unvegetated area.

LF007 - An example of debris visible on the surface of the landfill cover. Debris is common on the site, either clearly visible or just beneath the surface of the geo-fabric.

LF007 - Location marked as TP8, assumed to the location of a test pit excavation. Several other locations were marked with similar nomenclature.

LF007 - Monitoring Well MW-10 penetrates the landfill cover and appears to have been recently installed and is secure and in good working condition.

LF007 - Monitoring Well MW-09 is secure and in good working condition. This well appears to have been recently installed based on its new condition and the recent disturbance around it.

LF007 - Monitoring Well MW-08 is secure and in good working condition. The well appears to have been recently installed based on its new condition and the recent disturbance around it.

LF007 - Monitoring Well MW-07 is secure and in good working condition. This well appears to have been recently installed based on its new condition and the recent disturbance around it.

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: SS006 Former Pipeline Corridor	**Date of inspection:** August 22, 2018
Location and Region: Former Port Heiden RRS, AK Region 10	**EPA ID:** N/A
Agency, office, or company leading the five-year review: Stantec	**Weather/temperature:** Overcast, 54°F

Remedy Includes: (Check all that apply)

☐ Landfill cover/containment
☐ Access controls
☐ Institutional controls
☐ Groundwater pump and treatment
☐ Surface water collection and treatment
X Other: **Active**_____
_____

X Monitored natural attenuation
☐ Groundwater containment
☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** __N/A_____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

2. **O&M staff** _____N/A_____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____ **ADEC** _____
Contact **Louis Howard, Environmental Program Specialist III** **10/19/2018** **(907) 269-7552**
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached __None_____
_____

Agency _____**USAF**_____
Contact **Richard Mauser, Remedial Project Manager** **11/5/2018** **(907) 552-0788**
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached __None_____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____
_____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - ☐ O&M manual — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ As-built drawings — ☐ Readily available — ☐ Up to date — ☐ N/A
   - ☐ Maintenance logs — ☐ Readily available — ☐ Up to date — ☐ N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** — ☐ Readily available — ☐ Up to date — **x** N/A
   Contingency plan/emergency response plan — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

3. **O&M and OSHA Training Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

4. **Permits and Service Agreements**
   - ☐ Air discharge permit — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Effluent discharge — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Waste disposal, POTW — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Other permits_____ — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

5. **Gas Generation Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

6. **Settlement Monument Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

7. **Groundwater Monitoring Records** — **x** Readily available — **x** Up to date — ☐ N/A

   Remarks: Annual Field Activities Reporting_____

8. **Leachate Extraction Records** — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

9. **Discharge Compliance Records**
   - ☐ Air — ☐ Readily available — ☐ Up to date — **x** N/A
   - ☐ Water (effluent) — ☐ Readily available — ☐ Up to date — **x** N/A

   Remarks_____

10. **Daily Access/Security Logs** — ☐ Readily available — ☐ Up to date — **x** N/A

    Remarks_____

IV. O&M COSTS

1. **O&M Organization** **N/A**

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

_____

2. **O&M Cost Records** **N/A**

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost
From_____ To_____ _____ ☐ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: N/A_____
_____
_____
_____
_____
_____

V. ACCESS AND INSTITUTIONAL CONTROLS x Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured **x** N/A

Remarks: No fencing used to restrict access.
_____
_____

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map **x** N/A

Remarks:

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No **x** N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No **x** N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No **x** N/A
Reports are verified by the lead agency ☐ Yes ☐ No **x** N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No **x** N/A
Violations have been reported ☐ Yes ☐ No **x** N/A
Other problems or suggestions: ☐ Report attached

_____
_____
_____
_____

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate **x** N/A
Remarks_____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map **x** No vandalism evident
Remarks_____
_____

2. **Land use changes on site** ☐ N/A
Remarks: No observable changes in land use.
_____
_____

3. **Land use changes off site** ☐ N/A
Remarks: No observable changes in land use
_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads **X** Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map **X** Roads adequate ☐ N/A
Remarks: Roads facilitate easy access to the site._____
_____

B. Other Site Conditions

Remarks: _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable **x** N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks:
   _____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____
   _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____
   _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____
_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____
_____

B. Benches ☐ Applicable ☐N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____
_____

C. Letdown Channels ☐ Applicable ☐ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____
_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____
_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____
   _____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____
   _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____
   _____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____
   _____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____
   _____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____
   _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____
   _____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks_____
   _____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
   ☐ Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____
   _____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

4. **Discharge Structure** ☐ Functioning ☐ N/A
   Remarks_____
   _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable **x** N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____
   _____

2. **Performance Monitoring** Type of monitoring_____
   ☐ Performance not monitored
   Frequency_____ ☐ Evidence of breaching
   Head differential_____
   Remarks_____
   _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable **x** N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____
   _____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable **x** N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition☐ Requires upgrade ☐ Needs to be provided
   Remarks_____
   _____

C. Treatment System ☐ Applicable **x** N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____
   _____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____
   _____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition☐ Needs Maintenance
   Remarks_____
   _____

5. **Treatment Building(s)**
   ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____
   _____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____
   _____

D. Monitoring Data

1. Monitoring Data
   x Is routinely submitted on time **x** Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)

x Properly secured/locked x Functioning x Routinely sampled x Good condition
x All required wells located x Needs Maintenance ☐ N/A

Remarks: **All Program wells at FPC-066 and FPC-215 were observed. Monitoring Well MW-10 at FPC-215 appears to have been struck by a snow plow and is laying on its side and will need repairs before future sampling. Monitoring wells lack permanent labelling to ensure positive identification.**

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

There are ICs on land and water use to prevent access to contaminated media. There is no evidence that the ICs are not functioning as intended.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

N/A

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. None
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

SS006 (FPC-066) - General site condition of, looking south southeast. Note Monitoring Well MW-5 in the immediate foreground and MW-4 behind it near the road. Also note the Port Heiden school in the background. No evidence of land use change observed.

SS006 (FPC-066) - Monitoring Well MW-4 is secure and in good working condition.

SS006 (FPC-066) - Monitoring Well MW-5 is secure and in good working condition.

SS006 (FPC-066) - Monitoring Well MW-7 is secure and in good working condition.

SS006 (FPC-066) - Monitoring Well MW-6 is secure and in good working condition

SS006 (FPC-215) - General site condition of looking south. Note Monitoring Well MW-8 in the foreground. No evidence of land use change observed.

SS006 (FPC-215) - Monitoring Well FPC3 is secure and in good working condition.

SS06(FPC-215) - Monitoring Well MW-8 is secure and in good working condition.

SS006 (FPC-215) - Monitoring Well MW-9 is secure and in good working condition.

SS006 (FPC-215) - Monitoring Well MW-10 appears to have been struck by a snowplow and needs repair before any future sampling can be conducted.

SS006 (FPC-215) - Unlabeled Monitoring Well within at the approximate location of a proposed new Monitoring Well (2016-2017 GW Monitoring Work Plan), north of the road. Although the protective casing is unsecure, the expansion plug is locked, and the well is in good working condition.

SS006 (FPC-215) - Unlabeled Monitoring Well within at the approximate location of a proposed new Monitoring Well (2016-2017 GW Monitoring Work Plan), south of the road. Although the protective casing is unsecure, the expansion plug is locked, and the well is in good working condition.

APPENDIX F
CLEANUP LEVELS, TOXICITY, AND RISK EVALUATION

APPENDIX F: CLEANUP LEVELS, TOXICITY, AND RISK EVALUATION

The effects of changes in standards used at the time of remedy selection that may impact the protectiveness of the remedy were evaluated as part of the technical assessment of the Five-Year Review (FYR) for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites at the Former Port Heiden Radio Relay Station (RRS). This was done according to USEPA (2001) Guidance. Results of the evaluation are discussed in the Technical Assessment of this FYR report. The evaluation is completed in a step-wise process documented in Tables F-1 through F-3. Additionally, the protectiveness of cleanup levels presented in the Record of Decision (ROD) were evaluated based on new toxicity data and the results are documented in Table F-4.

The first step in this process determined whether any of the contaminants of potential concern (COPCs) have new or changed standards since remedy selection. Table F-1 lists the COPCs as identified in the 2004 *Remedial Investigation/ Feasibility Study* (RI/FS), the ROD cleanup level (for contaminants of concern [COCs]) or applicable standard from the RI/FS, and the current ADEC standard. For soils, the most stringent of the 18 Alaska Administrative Code (AAC) 75.341 Table B1 Method Two Human Health for the Under 40-inch Zone or Migration to Groundwater cleanup level (as amended through November 7, 2017) was used for COPCs; for COCs, the cleanup level associated with the corresponding basis for the ROD cleanup level was used. For surface water and groundwater, the more conservative, or lower, of the values in 18 AAC 70 / Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (as amended through December 12, 2008) and 18 AAC 75 Table C (as amended through November 7, 2017) was used.

If a new or more stringent standard was identified, the COPC was then evaluated in Table F-2 by comparing the current cleanup level with the maximum detected concentration for each site. Maximum detections at the time of the ROD were used in this comparison. For Site OT001, additional data was available in the Environmental Restoration Program Information Management System.

Finally, if the COPC exceeded the new or more stringent cleanup level, a new risk evaluation was conducted for that contaminant in Table F-3.

In Tables F-3 and F-4, cancer risk and non-cancer hazard estimates were calculated using methods presented in Procedures for Calculating Cleanup Levels (ADEC, 2016). Soil COPCs were evaluated based on the more protective of the direct contact (the Under 40-inch Zone) or migration to groundwater pathways. Risk and hazard estimates presented in Tables F-3 and F-4 were compared to the U.S. Environmental Protection Agency (EPA) management decision risk range of $1 \times l0^{-6}$ to $1 \times l0^{-4}$ for carcinogens, and hazard quotient criterion of 1 for noncarcinogens.

Table F-1
Evaluation of Changes in Chemical-Specific Standards

Site	Media and Units	COPCs[1] (Final ROD COCs in bold)	ROD-Established Cleanup Level for COCs or Former Standard from Previous Review Period[2] for COPCs	Current Federal MCL[3]	Current Alaska Cleanup Level[4]	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aluminum	7.61	--	--	No	N/A
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Aroclor 1260**	1.00	--	1	No	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Arsenic	0.000553	--	0.2	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	Yes	Yes
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)pyrene**	0.49	--	1.5	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(b)fluoranthene	1.14	--	15	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Cadmium	10.1	--	9.1	Yes	Yes
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Dibenzo(a,h)anthracene**	0.49	--	1.5	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Dieldrin**	0.0150	--	0.44	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Indeno(1,2,3-cd)pyrene	1.14	--	15	Yes	No
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	Yes	Yes
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Vanadium	71.0	--	510	Yes	No
OT001	Groundwater (ug/L)	Aluminum	3650	--	--	No	N/A
OT001	Groundwater (ug/L)	Antimony	1.46	6	7.8	Yes	No
OT001	Groundwater (ug/L)	Aroclor 1260	0.0336	0.5	0.44	Yes	No
OT001	Groundwater (ug/L)	Arsenic	0.0568	10	0.52	Yes	No
OT001	Groundwater (ug/L)	Barium	256	2000	3800	Yes	No
OT001	Groundwater (ug/L)	**Benzene**	5	5	4.6	Yes	Yes
OT001	Groundwater (ug/L)	Chromium	11.0	100	0.35	Yes	Yes
OT001	Groundwater (ug/L)	Diesel Range Organics	1500	--	1500	No	No
OT001	Groundwater (ug/L)	Heptachlor	0.0189	0.4	0.014	Yes	Yes
OT001	Groundwater (ug/L)	Manganese	87.6	--	430	Yes	No
OT001	Groundwater (ug/L)	Methylene chloride	11.4	5	110	Yes	No
OT001	Groundwater (ug/L)	Naphthalene	73.0	--	1.7	Yes	Yes
OT001	Groundwater (ug/L)	Residual Range Organics	1100	--	1100	No	No
OT001	Groundwater (ug/L)	**Trichloroethene**	5	5	2.8	Yes	Yes
OT001	Groundwater (ug/L)	Vanadium	25.6	--	86	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	4,4'-DDT	2.44	--	5.1	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aluminum	7.61	--	--	No	N/A
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Aroclor 1260**	1.00	--	1	No	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Arsenic	0.000553	--	0.2	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	Yes	Yes
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)pyrene**	0.49	--	1.5	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(b)fluoranthene	1.14	--	15	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Dibenzo(a,h)anthracene**	0.49	--	1.5	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Dieldrin**	0.0150	--	0.44	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Diesel Range Organics	10300	--	250	Yes	Yes
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Heptachlor epoxide**	0.20	--	0.86	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Indeno(1,2,3-cd)pyrene	1.14	--	15	Yes	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Manganese	176	--	370	Yes	No

Table F-1
Evaluation of Changes in Chemical-Specific Standards

Site	Media and Units	COPCs[1] (Final ROD COCs in bold)	ROD-Established Cleanup Level for COCs or Former Standard from Previous Review Period[2] for COPCs	Current Federal MCL[3]	Current Alaska Cleanup Level[4]	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Residual Range Organics	10000	--	10000	No	No
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	Yes	Yes
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Vanadium	71.0	--	510	Yes	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aluminum	7.61	--	--	No	N/A
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Aroclor 1260**	1.00	--	1	No	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Arsenic	0.000553	--	0.2	Yes	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	Yes	Yes
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)pyrene**	0.49	--	1.5	Yes	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Dibenzo(a,h)anthracene**	0.49	--	1.5	Yes	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Manganese	176	--	370	Yes	No
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	Yes	Yes
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Vanadium	71.0	--	510	Yes	No
SS006	Groundwater (ug/L)	1,2-Dibromo-3-chloropropane	0.0476	0.2	--	No	N/A
SS006	Groundwater (ug/L)	1,3,5-Trimethylbenzene	183	--	60	Yes	Yes
SS006	Groundwater (ug/L)	Benzene	1.55	5	4.6	Yes	No
SS006	Groundwater (ug/L)	Diesel Range Organics	1500	--	1500	No	No
SS006	Groundwater (ug/L)	Gasoline Range Organics	1300	--	2200	Yes	No
SS006	Groundwater (ug/L)	Manganese	87.6	--	430	Yes	No
SS006	Groundwater (ug/L)	Naphthalene	73.0	--	1.7	Yes	Yes
SS006	Groundwater (ug/L)	Residual Range Organics	1100	--	1100	No	No
SS006	Surface Water (ug/L)	Aluminum	3650	--	--	No	N/A
SS006	Surface Water (ug/L)	Antimony	14.0	6	14	No	No
SS006	Surface Water (ug/L)	Arsenic	0.0180	10	10	Yes	No
SS006	Surface Water (ug/L)	Barium	256	2000	2000	Yes	No
SS006	Surface Water (ug/L)	Cobalt	73.0	--	--	No	N/A
SS006	Surface Water (ug/L)	Diesel Range Organics	1500	--	1500	No	No
SS006	Surface Water (ug/L)	Lead	15.0	15	15	No	No
SS006	Surface Water (ug/L)	Manganese	50.0	--	50	No	No
SS006	Surface Water (ug/L)	Residual Range Organics	1100	--	1100	No	No
SS006	Surface Water (ug/L)	Selenium	170	50	170	No	No
SS006	Surface Water (ug/L)	Thallium	1.70	2	1.7	No	No
SS006	Surface Water (ug/L)	Vanadium	25.6	--	86	Yes	No
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,2,4-Trimethylbenzene	9.25	--	0.61	Yes	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,3,5-Trimethylbenzene	3.81	--	0.66	Yes	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aluminum	7.61	--	--	No	N/A
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Arsenic	0.000553	--	0.2	Yes	No
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Naphthalene	12.3	--	0.038	Yes	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Vanadium	71.0	--	510	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	2-methyl-4-chlorophenoxyacetic acid (MCPA	3.06	--	--	No	N/A

Table F-1
Evaluation of Changes in Chemical-Specific Standards

Site	Media and Units	COPCs[1] (Final ROD COCs in bold)	ROD-Established Cleanup Level for COCs or Former Standard from Previous Review Period[2] for COPCs	Current Federal MCL[3]	Current Alaska Cleanup Level[4]	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aluminum	7.61	--	--	No	N/A
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Aroclor 1260	0.20	--	1	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Arsenic	0.000553	--	0.2	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(a)anthracene	1.14	--	0.7	Yes	Yes
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(a)pyrene	0.14	--	1.5	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(b)fluoranthene	1.14	--	15	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(k)fluoranthene	11.4	--	150	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Dibenzo(a,h)anthracene	0.11	--	1.5	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Diesel Range Organics	10300	--	250	Yes	Yes
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Indeno(1,2,3-cd)pyrene	1.14	--	15	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Manganese	176	--	370	Yes	No
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	Yes	Yes
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Vanadium	71.0	--	510	Yes	No

NOTES:

1 - As identified in the 2004 RI/FS (USAF, 2006)

2 - Since this is the first risk-based review of standards and ROD cleanup levels, the 2004 RI/FS (USAF, 2006) is considered the previous review

3 - EPA National Primary Drinking Water Regulations, May 2009. EPA 816-F-09-004.

4 - For soil COPCs, the most stringent Method Two cleanup levels from 18 AAC 75.341 Table B1 (Under 40 Inch Zone Human Health and Migration to Groundwater) and Table B2 for petroleum hydrocarbons (Ingestion, Inhalation, and Migration to Groundwater) were used. For soil COCs, the basis for cleanup level as presented in the ROD was used. For groundwater, 18 AAC 75.345 Table C cleanup levels were used.

Table F-2
Evaluation of Changes for New, More Stringent, Standards

Site	Media and Units	COPCs[1] (Final ROD COCs in bold)	ROD-Established Cleanup Level for COCs or Former Standard from Previous Review Period[2] for COPCs	Current Federal MCL[3]	Current Alaska Cleanup Level[4]	Maximum Detected at ROD[5]	Maximum Detected Concentration - Most Recent[6]	New Risk Evaluation Needed?
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	7.20	7.2	Yes
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Cadmium	10.1	--	9.1	10.3	10.3	Yes
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	10.2	10.2	Yes
OT001	Groundwater (ug/L)	**Benzene**	5	5	4.6	5.90	1.4	No
OT001	Groundwater (ug/L)	Chromium	11.0	100	0.35	65.0	65	Yes
OT001	Groundwater (ug/L)	Heptachlor	0.0189	0.4	0.014	0.24	0.24	Yes
OT001	Groundwater (ug/L)	Naphthalene	73.0	--	1.7	200	250	Yes
OT001	Groundwater (ug/L)	**Trichloroethene**	5	5	2.8	690	500	Yes
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	4.10	1.6	Yes
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Diesel Range Organics	10300	--	250	13000	12000	No[7]
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	8.34	8.34	Yes
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	3.60	--	0.7	1.60	1.6	Yes
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	6.81	6.81	Yes
SS006	Groundwater (ug/L)	1,3,5-Trimethylbenzene	183	--	60	200	200	Yes
SS006	Groundwater (ug/L)	Naphthalene	73.0	--	1.7	270	270	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,2,4-Trimethylbenzene	9.25	--	0.61	18.0	18	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,3,5-Trimethylbenzene	3.81	--	0.66	43.0	43	Yes
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Naphthalene	12.3	--	0.038	22.0	22	Yes
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(a)anthracene	1.14	--	0.7	36.0	36	Yes
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Diesel Range Organics	10300	--	250	12000	12000	No[7]
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.52	--	0.19	4.91	4.91	Yes

NOTES:

1 - As identified in the 2004 RI/FS (USAF, 2006)

2 - Since this is the first review of this type, the 2004 RI/FS (USAF, 2006) is considered the previous review

3 - EPA National Primary Drinking Water Regulations, May 2009. EPA 816-F-09-004.

4 - For soil COPCs, the most stringent Method Two cleanup levels from 18 AAC 75.341 Table B1 (Under 40 Inch Zone Human Health and Migration to Groundwater) and Table B2 for petroleum hydrocarbons (Ingestion, Inhalation, and Migration to Groundwater) were used. For soil COCs, the basis for cleanup level as presented in the ROD was used. For groundwater, 18 AAC 75.345 Table C cleanup levels were used. For

5 - Site-specific maximum concentrations were presented in the 2004 RI/FS (USAF, 2006).

6 - Only site OT001 had ERPIMS data available (2012-2017). The most recent available data for all other sites is from the 2004 RI (USAF, 2006) and 2009 ROD (USAF, 2009).

7 - Risk evaluation calculations for diesel range organics were not performed because DRO concentrations are evaluated directly against published cleanup levels that are not risk based.

Table F-3
Risk/Hazard Estimates for Chemicals above New Standards

Site	Media and Units	COPCs[1] (Final ROD COCs in bold)	Current Alaska Cleanup Level[2]	Applicable Site Concentration[3]	Oral Reference Dose (RfD_o) (mg/kg-d)	Inhalation Reference concentration (RfC) (mg/m^3)	Oral Slope Factor (Sf_o) $(mg/kg\text{-}d)^{-1}$	Inhalation Unit Risk (IUR) $(ug/m^3)^{-1}$	Hazard Quotient (> 1 listed in bold)	Cancer Risk (>$1x10^{-4}$ listed in bold)[4]	Pathway Driving Risk
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	0.7	7.2	-	-	0.1 E	0.00006 E	-	**1.0E-04**	Inhalation
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Cadmium	9.1	10.3	0.0005 I	0.00001 A	-	0.0018 I	**1.1**	-	Direct
LF007	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.19	10.2	0.00001 X	-	-	-	**54**	-	Direct
OT001	Groundwater (ug/L)	Chromium	0.35	65	1.5 I	-	-	-	0.0029	-	Direct
OT001	Groundwater (ug/L)	Heptachlor	0.014	0.24	0.0005 I	-	4.5 I	0.0013 I	0.19	**1.7E-04**	Direct
OT001	Groundwater (ug/L)	Naphthalene	1.7	250	0.02 I	0.003 I	-	0.000034 C	**41**	**1.5E-03**	Inhalation
OT001	Groundwater (ug/L)	**Trichloroethene**	2.8	690	0.0005 I	0.002 I	0.046 I	0.0000041 I	**244**	**1.4E-03**	Inhalation
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	0.7	4.1	-	-	0.1 E	0.00006 E	-	5.9E-05	Inhalation
OT001	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.19	8.34	0.00001 X	-	-	-	**44**	-	Direct
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	**Benzo(a)anthracene**	0.7	1.6	-	-	0.1 E	0.00006 E	-	2.3E-05	Inhalation
SS004	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.19	6.81	0.00001 X	-	-	-	**36**	-	Direct
SS006	Groundwater (ug/L)	1,3,5-Trimethylbenzene	60	200	0.01 I	0.06 I	-	-	**3.3**	-	Direct
SS006	Groundwater (ug/L)	Naphthalene	1.7	270	0.02 I	0.003 I	-	0.000034 C	**44**	**1.6E-03**	Inhalation
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,2,4-Trimethylbenzene	0.61	18	0.01 I	0.06 I	-	-	**29**	-	Direct
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	1,3,5-Trimethylbenzene	0.66	43	0.01 I	0.06 I	-	-	**65**	-	Direct
SS006	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Naphthalene	0.038	22	0.02 I	0.003 I	-	0.000034 C	**156**	**5.8E-03**	Inhalation
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Benzo(a)anthracene	0.7	36	-	-	0.1 E	0.00006 E	-	**5.2E-04**	Inhalation
WP002	Surface/Subsurface Soil (0-15 feet) (mg/kg)	Thallium	0.19	4.91	0.00001 X	-	-	-	**26**	-	Direct

NOTES:

1 - As identified in the 2004 RI/FS (USAF, 2006)

2 - For soil COPCs, the most stringent Method Two cleanup levels from 18 AAC 75.341 Table B1 (Under 40 Inch Zone Human Health and Migration to Groundwater) and Table B2 for petroleum hydrocarbons (Ingestion, Inhalation, and Migratic to Groundwater) were used. For soil COCs, the basis for cleanup level as presented in the ROD was used. For groundwater, 18 AAC 75.345 Table C cleanup levels were used. For surface water, the Alaska Water Quality Criteria Manual for Toxic

3 - The maximum concentration detected at the site was used as the applicable site concentration.

4 - For Site SS006, cancer risks were compared to a threshold of 1×10^{-5} because it is a state site and not subject to CERCLA.

Toxicity values (i.e., RfDO,RfC, SFo, and IUR) were obtained from USEPA's Regional Screening Levels Table (RSLs; May, 2018), except where ADEC provides a value for a contaminant not in the USEPA's RSLs (i.e., DRO. Toxicity values for DRO are listed as the toxicity value for the aliphatic and aromatic fractions, separated by a "/"). Toxicity values are derived from the following sources, as cited in the USEPA's RSLs Table:

A - Agency for Toxic Substances and Disease Registry
AK - ADEC's Procedures for Calculating Cleanup Levels (February 1, 2018)
C - California EPA
E - Extrapolated value
I - USEPA's Integrated Risk Information System
X - Provisional Peer Reviewed Toxicity Values Appendix

Table F-4
Risks and Hazards for ROD COCs

Site	Chemical	Media (units)	ROD Cleanup Level	Ingestion and Inhalation Factors [a]				Toxicity Values [b]				Risks and Hazards [c]				Is Cleanup Level Sufficiently Protective?
				Ingestion Intake Factor Noncancer (mg/kg-d)	Ingestion Intake Factor Cancer (mg/kg-d)	Noncancer Air Factor (mg/m^3)	Carcinogenic Air Factor ($\mu g/m^3$)	Oral Reference Dose (RfD_0) (mg/kg-d)	Oral Slope Factor (SF_0) $(mg/kg\text{-}d)^{-1}$	Reference Concentration (RfC) (mg/m^3)	Inhalation Unit Risk (IUR) $(\mu g/m^3)^{-1}$	Ingestion Hazard Quotient (HQ)	Ingestion Cancer Risk (CR)	Inhalation Hazard Quotient (HQ)	Inhalation Cancer Risk (CR)	
LF007, OT001, SS004, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, Focus Area)	Polychlorinated biphenyls	Soil (mg/kg)	1	-	0.000012	-	0.17	-	0.4	-	0.00010	-	5.0E-06	-	1.7E-05	Yes
	Benzo(a)pyrene		0.49	0.00	0.0000025	0.00000000027	0.00000027	0.0003	1	0.000002	0.0006	0.016	2.5E-06	0.00013	1.6E-10	Yes
	Benzo(a)anthracene		3.6	-	0.000061	-	0.76	-	0.1	-	0.00006	-	6.1E-06	-	4.6E-05	Yes
	Dibenzo(a,h)anthracene		0.49	-	0.0000025	-	0.00000027	-	1	-	0.0006	-	2.5E-06	-	1.6E-10	Yes
	Dieldrin		0.015	0.00000	0.00000072	-	-	0.00005	16	-	0.0046	0.056	1.1E-05	-	-	Yes
	Heptachlor epoxide		0.2	0.00007	0.000019	-	0.26	0.0000	9.1	-	0.0026	**5.6**	**1.7E-04**	-	**6.8E-04**	**No**
WP002	Trichloroethylene	Groundwater (ug/L)	5	0.00025	0.000092	0.0024	1.3	0.0005	0.046	0.002	0.0000041	0.50	4.2E-06	**1.2**	5.2E-06	**No**
	Benzene		5	0.00025	0.000064	0.0024	0.89	0.004	0.055	0.03	0.0000078	0.062	3.5E-06	0.080	6.9E-06	Yes

NOTES:

[a] Exposure modeling parameters used to calculate ingestion and inhalation factors were taken from ADEC's Procedures for Calculating Cleanup Levels (February 1, 2018).
[b] Toxicity values were obtained from USEPA's Regional Screening Levels Table May 2018).
[c] Risks and hazards for soil are protective of direct contact and migration to groundwater exposures.

Bold indicates exceedence of the acceptable noncancer hazard or cancer risk criteria of 1 and 1E-04, respectively.

Parameters for Groundwater Exposure Modeling	Unit	Value
Ingestion rate of water - adult (IR)	Liters/day	2.5
Ingestion rate of water - child (IR)	Liters/day	0.78
Exposure frequency (EF)	days/year	350
Exposure duration - adult (ED)	years	20
Exposure duration - child (ED)	years	6
Exposure Time (ET)	hours/day	24
Absorption factor (A)	-	1
Body Weight - adult (BW)	kilogram	80
Body Weight - child (BW)	kilogram	15
Volatilization Factor of Andelman (K)	Liters/cubic meter	0.5
Conversion factor (CF)	microgram per milligram	1000
Averaging time (noncancer; child) (Atnc)	year	6
Averaging time (cancer) (Atc)	year	70

Hazard Quotient = Ingestion dose or Inhalation Concentration / Noncancer Toxicity Value
Cancer Risk = Ingestion dose or Inhalation Concentration *Cancer Toxicity Value

Parameters for Soil to Groundwater Migration	Unit	Value
Dilution Attenuation Factor (DAF)	unitless	13.2
Conversion Factor (CF)	milligrams/ microgram	0.001
Water-filled Soil Porosity (θw)	$Liter_{water}/Liter_{soil}$	0.3
Air-filled Soil Porosity (θa)	$Liter_{air}/Liter_{soil}$	0.13
Dry Soil Bulk Density (pb)	Liter/kilogram	1.5
Fraction Organic Carbon in Soil (foc)	unitless	0.001
Unitless Henry's Law Constant (H')	unitless	Chemical-specific
Organic Carbon Partition Coefficient (Koc)	Liter/kilogram	

Parameters for Soil Exposure Calculations	Unit	Value
Ingestion rate of soil - adult (IR)	milligrams/day	100
Ingestion rate of soil - child (IR)	milligrams/day	200
Skin surface area - adult (SA)	square centimeters	6032
Skin surface area - child (SA)	square centimeters	2373
skin adherence factor - adult (AF)	milligrams/square centimeters	0.07
skin adherence factor - child (AF)	milligrams/square centimeters	0.2
Exposure Time (ET)	hours/day	24
Particulate Emission Factor	cubic meter/kilogram	1360000000
Exposure frequency (EF)	days/year	270
Exposure duration - adult (ED)	years	20
Exposure duration - child (ED)	years	6
Body Weight - adult (BW)	kilogram	80
Body Weight - child (BW)	kilogram	15
Conversion factor (CF)	kilograms/milligram	0.000001
Averaging time (noncancer; child) (Atnc)	year	6
Averaging time (cancer) (Atc)	year	70

APPENDIX G
RESPONSE TO COMMENTS

ADEC Approval Letter (December 3, 2019)

Final Response to Comments

THE STATE of ALASKA
GOVERNOR MICHAEL J. DUNLEAVY

Department of Environmental Conservation

DIVISION OF SPILL PREVENTION AND RESPONSE
Contaminated Sites Program
555 Cordova Street
Anchorage, AK 99501-2617
Phone: 907.269.7503
Fax: 907.269.7687

File No: 2637.38.002

December 3, 2019

Robert Johnston
AFCEC/CZOP
10471 - 20th Street, Suite 347
JBER, AK 99506-2201

Re: **ADEC Approval of the Redline and RTCs for Second Draft Five Year Review for Port Heiden RRS at Port Heiden, Alaska**

Dear Mr. Johnston:

The Alaska Department of Environmental Conservation (ADEC) has received the above document for review and comment. ADEC has reviewed the responses to ADEC's comments on the draft Five-Year Review and the redline version. ADEC will approve the responses, redline version and requests the document be finalized. ADEC requests the location of the Focus Area be reevaluated in the context of the various removals at the "Site Road" PCB-contaminated soil area and work by the Cooperative Agreement work by NVPH. A review of the documents may show that the various PCB-contaminated soil removals may have excavated the Focus Area PCB and petroleum-contaminated soils[1].

Sincerely,

Louis Howard

Louis Howard
Environmental Program Specialist

[1] RRS-SS-06-S01-0 5.4 mg/kg surface soil sample Figure 6.2-38 and RRS-SB-01-S01-0 12,000 mg/kg DRO and 19,000 mg/kg RRO at 0-2' bgs (RRS-SB-01 Northing 1088249.718 Easting 1509713.462 and Elevation 88.6293 Appendix F Survey Data- Borings) 2005 RI/FS.

Alaska Department of Environmental Conservation
2nd 5 Yr. Review for the Former Port Heiden Radio Relay Station, Alaska
Commenter: Louis Howard (ADEC), Comments Developed: November 5, 2019

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
1.	1	1	**Introduction** The text states: "This is the first Periodic Review for Site SS006. Statutory review under CERCLA is not required for Site SS006, as no CERCLA contaminants were identified and Site SS006 does not have an official Decision Document." The text should state: "This is the first Periodic Review for Site SS006. Statutory review under CERCLA is not required for Site SS006, as no CERCLA contaminants were identified and Site SS006 does not yet have an official Decision Document." The text states: "The status of Sites OT001, WP002, SS004, and SS006 in the Alaska Department of Environmental Conservation (ADEC) Contaminated Sites Database are listed as "Active" (ADEC, 2018a). Sites LF007 and the four unnumbered sites are not listed in the database." LF007, Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area and Focus Area are currently listed in the Contaminated Sites Database as an "Active" sites. Please change text in the document to reflect this information.	**Agree:** text changed to "does not yet have…" **Agree:** Text amended so all sites are now stated as being in the ADEC database as active.
2.	15		**Remedy Components** The text states: "The soil remedy was modified in a 2010 ESD that increased the quantity of estimated PCB-contaminated soil from 7,000 tons to 13,200 tons and refined the selected remedy, limiting it to excavation and offsite treatment/disposal of PCB-contaminated waste (USAF, 2010a). In 2017, a second ESD was published, again increasing the estimated quantity of PCB-contaminated soil (from 13,200 tons to 36,452 tons), as well as the increased associated cost (USAF, 2017a)." ADEC requests clarifying text be added for the basis for the estimates of polychlorinated biphenyls (PCB)-contaminated soil greater than 1 milligrams per kilogram (mg/kg) as described in the 2010 Explanation of Significant Differences (see pages 11 and 12) where it documented the change from 10 mg/kg in the 2009 Record of Decision to 1 mg/kg for PCBs.	**Agree:** Text added explaining the two increases in quantities, and text added to explain that the intermediate level of 10 mg/ kg only related to soil treatment, not soil cleanup levels.

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
			Third Bullet The text states: "ICs shall include limitations on groundwater use, and notices to the land owner and Village Council of site status. The ICs would remain in place until the groundwater cleanup levels are achieved through natural attenuation." ADEC request that either an environmental covenant per the Uniform Environmental Covenants Act (AS 46.04.300-390) be placed or Notices of Activity and Use Limitations (NAULs) be added as part of institutional controls (ICs). Covenants are an interest in real property and therefore travel with the land. Subordination Agreements are required. Sec. 46.04.300. Environmental covenant. (a) An environmental covenant is required if the department makes a remedial decision as part of an environmental response project and that environmental response project results in (1) residual contamination remaining in the environment in concentrations that are safe for some, but not all, uses; or (2) an engineered feature or structure that requires monitoring, maintenance, or operation, or that will not function as intended if disturbed. NAULs are designed for federal properties and for any site where a covenant is not an option. There should be very few exceptions where a covenant is not a feasible option outside of federal properties. Once a federal property is transferred out of federal hands, the NAUL will be converted to an environmental covenant.	**Agree:** This section quotes from the 2009 ROD, however the issue for institutional controls at the CERCLA sites (pg 36) will be amended to State 'Record ICs in the AF LUC Management Plan and apply for a Notice of Activity and Use Limitations for the site.
3.	17		**Status of Implementation** **Soil – Sites OT001, SS004, LF007, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)** The text states: "In 2014, a total certified weight of 10,800.79 tons of PCB-contaminated soil (8,718.68 non-Toxic Substances Control Act [TSCA] and 2,082.11 tons TSCA-regulated) was generated from preexisting stockpiles and newly excavated grid cells and sent offsite for disposal at approved landfills (USAF, 2015c)."	

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
			ADEC requests clarifying text be added or footnotes defining what defines soil as being non-Toxic Substances Control Act (TSCA)-regulated[1] and TSCA-regulated. The text states: "A second ESD was published in 2017 (USAF, 2017a), documenting the increased PCB-contaminated soil volume estimates and associated increased cost. At the time of this FYR, it is unknown if the activities planned for 2017 as described in the ESD (including removal of previously-staged PCB-contaminated materials and excavation of additional quantities) were completed." ADEC requests text be added in the document or as a footnote describing what "PCB-contaminated soil" is defined as when used in this section (e.g. greater than 1 mg/kg PCBs) in terms of cleanup levels.	**Agree:** After TSCA regulated, the following text added "(PCB concentrations equal to or greater than 50 mg/kg)". **Agree:** After PCB contaminated soil on pg 15, text added "(PCB concentration greater than 1 mg/kg)". Agrees with soil remedy on page 14.
4.	18		**LUC Summary** The text states: "Annual IC performance reports were required by the ROD for the first five years. IC performance reports for 2010 through 2012 were reviewed in the first FYR. This period has passed, and it is unclear if annual IC inspections continue to be performed; no additional reports were available for the period of review of this FYR." The ROD states: "The frequency of the Institutional Control Performance Report will be evaluated with the five-year review under 42 USC 9621(c)." ADEC recommends the annual performance reports be performed during the summer period every year and submitted to ADEC for as long as there is contamination present above levels in soil and/or groundwater which allow for unlimited use/unrestricted exposure[2]. Alternative intervals may be proposed by the Air Force for ADEC's consideration.	**Agree:** The AF will continue to conduct annual land use inspections. Recommendation will be added.

[1] Title 15 of the U.S. Code [USC], Section 2605) as either TSCA (PCB concentrations equal to or greater than 50 mg/kg) or non-TSCA (PCB concentrations less than 50 mg/kg).

[2] "Unlimited use and unrestricted exposure" (UU/UE) means that the selected remedy will place no restrictions on the potential use of land or other natural resources. In general, if the selected remedy relies on restrictions of land and/or groundwater use by humans and/or ecological populations to be protective, then

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
5.	20		**Issue:** PCB-contaminated soil has been identified within Site Road and some adjoining areas which are not included in the decision documents (ROD and ESD). **Current Implementation Status Description** The text states: "The Site Road source area is discussed in the 2017 ESD, but is not included as part of the remedy modification." ADEC requests clarification on when the Site Road source area PCB removals ever be discussed again and how it will be discussed (e.g. in the third Five Year Review).	**Agree:** The wording in the comment has been corrected. The site road source area is included in the ESD.
6.	21		**Issue:** During the site inspection [as noted in the 2014 1st Five Year Review] of ERP Site LF007, it was observed that the landfill appeared to have subsided in places, and in one instance, the subsidence exposed metallic debris. Some metal debris was also visible on the ground surface. While this is not indicative of current exposure, if left unchecked the landfill cap may further erode and contaminated soil may be exposed. Completion Date is blank. ADEC requests written clarification on why this landfill cap repair was not completed in the subsequent five years (2014-2019) or before the milestone date listed in the 1st Five Year Review[3] (October 2016).	**Agreed:** LF007 is programmed to be removed beginning the summer of 2020. Text added to Current Implementation Status to read: *"However, the Landfill at Site LF007 is programmed to be removed beginning summer of 2020. "*
7.	27		**Question A: Is the Remedy Functioning as Intended by the decision documents:** **FYR - Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads,** **Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)**	

the use has been limited and a five-year review should be conducted. For example, if a site is cleaned up to an industrial-use level, and/or other types of uses are restricted (e.g., residential use), then, generally, UU/UE is not met (EPA OSWER 9355.7-03B-P).

[3] Table 9-1 Recommendations and Follow-up Actions

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
			The text states: "The remedy for the Black Lagoon Outfall Plume and the Former Facility Area Plume includes ICs and MNA. MNA is ongoing; however, USAF funding delays resulted in no monitoring being conducted in 2018." ADEC requests the following text be included: "The remedy stated: "Groundwater monitoring will be conducted in accordance with a plan approved by ADEC and the Air Force to monitor natural attenuation of the plume. The latest approved work plan (e.g. April 2017[4]) for groundwater monitoring states that the monitoring is to be on an annual basis." FYI: The earliest work plan (NVPH Final Remediation Work Plan 2010) states one of the primary tasks is to "- implement an annual groundwater monitoring program. The frequency and number of groundwater wells monitored at the Former RRS are subject to change as needed based on a periodic review of the sampling results and concentration trends observed. If the groundwater monitoring data indicates contaminant concentrations in groundwater are not declining as estimated, the 611 CES and ADEC may reconsider the ROD remedy decision."	**Agree:** Sentence changed as suggested.
			The text states: "ICs and LUCs have been recorded in the LUC Management Plan to prevent exposures to contaminated media at Sites OT001, SS004, and LF007; however, no ICs are documented for the Black Lagoon Outfall Plume, Former Facility Area Plume, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area). The remedy for the Black Lagoon Outfall Plume and the Former Facility Area Plume includes ICs and MNA." The requirement for ICs and environmental covenants exists at any source area which has contamination left in place (in soil or groundwater) above cleanup levels which does not allow for UU/UE. Please elaborate why there are no ICs in	**Agree:** A recommendation to add IC to the LUC management plan and apply for an NAUL has been be added for the sites: Black Lagoon Outfall Plume, Former Facility Area Plume, Four Unnumbered Sites (Antenna Pads,

[4] Amended Final Groundwater Monitoring 2016 and 2017 Work Plan. April 2017

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
			place for the Black Lagoon Outfall Plume, Former Facility Area Plume, Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area and Focus Area).	Contaminated Soil Removal Areas, Drum Storage Area and Focus Area).
8.		30	**QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?** **FYR - Sites OT001, SS004, LF007, WP002, Four Unnumbered Sites (Antenna Pads,** **Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area)** The text states: "The applicable site concentrations used for calculating risks and hazards only slightly exceeded background levels at LF007 (10.2 mg/kg) and OT001 (8.34 mg/kg), and LUCs are in place preventing exposure at these sites. Thallium concentrations used in calculations for SS004 and WP002 were within background ranges." ADEC requests the Air Force include a citation and reference for the site-specific soil background study[5] for the Port Heiden Radio Relay Station (RRS) that includes thallium.	**Agree**: The background metal concentrations were established in the RI (USAF, 2006), this document reference is now stated in this paragraph.
9.	34		**LF007** **Issue Category: Remedy Performance** **Recommendation:** The text states; "Signage should be erected, the deteriorating sand bags should be replaced, and procedures should be verified to ensure all debris is covered by the geofabric cap. Obtain landowner permission and environmental covenant where LUCs are part of a remedy on private property. Note that removal of contaminated soil at LF007 and disposal in a class III landfill is scheduled to begin during the summer of 2019. As such, if the contaminated soil removal at LF007 is completed, no signage at LF007 will be necessary." ADEC has not received the draft Supplemental Remedial Investigation report documenting removal and disposal of contaminated soil from LF007. The report is expected by ADEC to include, at a minimum: report text, field notes and forms, photographs, figures, analytical results, laboratory reports, data quality	

[5] Remedial Investigation/Feasibility Study. Port Heiden Radio Relay Station. Appendix H "Background Statistical Calculations" (April 2006)

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
			assessment report(s), sample receipt forms, chain of custody forms. ADEC QA Checklists, from the 2019 field work at LF007 by AHTNA Environmental Inc. (Prime contractor) and its sub-contractors acting on behalf of the Air Force for this project[6]. Note, the final approved work plan stated in section 14.3.3 Buried Landfill Contents: "Up to 30 drums, four transformers, 1,000 gallons of fluid waste, and 90 tons of contaminated landfill cap soils encountered during excavation of test pits within the landfill will be removed, containerized, characterized, transported and disposed of, as described in Section 14.4. If additional volumes of landfill cap soils are required to be removed during investigation of any source materials encountered in the test pits, contractual options exist to perform additional PCB-contaminated soil removals in 10-ton increments up to an additional 100 tons total. This optional, additional landfill cap volume would be characterized, containerized, and disposed of in the same manner as the base quantities described above, if encountered." Removal of up to 190 tons of PCB-contaminates soil as part of the work by AHTNA, may or may not achieve the levels necessary to eliminate the need for signage, engineering controls and land use controls (i.e. UU/UE).	**Agree**: The 2019 Supplemental RI Report is being completed and will be submitted to ADEC once available. This will confirm anticipated status of landfill after removal actions. The sentence stating that no signage will be required has been deleted.
10.	35		**Site Former Port Heiden RRS** **Issue Category: Institutional Controls** **Recommendation:** The text states: "Formally implement soil ICs at the Four Unnumbered Sites (Antenna Pads, Contaminated Soil Removal Areas, Drum Storage Area, and Focus Area) and groundwater ICs at the Black Lagoon Outfall and Former Facility Area Plumes. Record ICs in the LUC Management Plan." An environmental covenant or a NAUL per UECA will need to be utilized for those source areas that require ICs. See comment #2 above.	**Agree:** The AF will apply for an NAUL (or NEC) for the sites, see also comment #2

[6] Contract No. W911KB-17-D-0019 Delivery Order No.. W911KB17F0078

Cmt. No.	Pg.	Sec.	Comment/Recommendation	Response
11.	App. B	Pg. 57 of the PDF	**LUC Boundary Figure & Descriptions From the LUC Management Plan December 2017** **Installation: IRP Site(s) with LUCs in Effect** **Port Heiden: OT001, SS004, LF007** **Purpose and Objectives** **1st and 2nd Bullets** The text states: "• Reduce PAH (benzo[a]pyrene, benzo[a]anthracene, dibenzo[a,h]anthracene), PCB and pesticide (dieldrin, heptachlor, epoxide) concentrations in soil to chemical-specific ARARs • Reduce TCE and benzene in groundwater to chemical specific ARARs" Note, these are not the purpose of objective of land use controls[7]. Please eliminate text such as this throughout the next version of the LUC Management Plan update in the Purpose and Objectives sections. **Administrative Elements** ADEC requests the Air Force update the elements in this section during the next LUC Management Plan update to incorporate the requirements from Alaska's UECA for environmental covenants.	**Agree:** The AF will revise the purpose and objective for the LUC in the next issue of the LUC Management Plan

[7] 18 AAC 75.375(b) Institutional controls include
(1) the requirement for and maintenance of physical measures, such as fences and signs, to limit an activity that might interfere with cleanup or result in exposure to a hazardous substance at the site;
(2) the requirement for and maintenance of engineering measures, such as liners and caps, to limit exposure to a hazardous substance;
(3) restrictive covenants, easements, deed restrictions, or other measures that would be examined during a routine title search, and that limit site use or site conditions over time or provide notice of any residual contamination; and
(4) a zoning restriction or land use plan by a local government with land use authority.