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**UNITED STATES AIR FORCE
611TH AIR SUPPORT GROUP
611TH CIVIL ENGINEER SQUADRON**

ELMENDORF AFB, ALASKA

**FIVE-YEAR REVIEW FOR OT001
AND ST005
COLD BAY, ALASKA**

**FINAL
JULY 2012**

Prepared By



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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AST	aboveground storage tank
bgs	below ground surface
DRO	diesel-range organics
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
POL	petroleum, oil, and lubricants
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
USAF	U.S. Air Force
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
WACS	White Alice Communications System
µg/L	micrograms per liter

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1.0 INTRODUCTION

The purpose of this five-year review is to evaluate the performance of remedial action at the following sites at the former Cold Bay Long-Range Radar Site:

- **OT001: White Alice Communications System (WACS).** It is noted this site was previously referred to as OT01.
- **ST005: Petroleum, Oil, and Lubricants (POL) Storage Facility.** It is noted this site was previously referred to as ST05.

The decision documents for each of these sites require a review every five years after the initiation of remedial action (Alaska Department of Environmental Conservation [ADEC] 2001a, 2001b). Remedial actions at these sites remain protective of human health and the environment. Sections 2.0 and 3.0 summarize the history of the sites, selected remedies, remedial actions taken, and status of contaminants for each site.

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2.0 OT001: WHITE ALICE COMMUNICATION SYSTEM

The OT001 site was initially a WACS that consisted of a composite building, several other structures, two underground storage tanks (UST), and a gasoline aboveground storage tank (AST). In 1987 and 1988, the facility was demolished and the debris buried onsite in accordance with a solid waste disposal permit. As part of the facility demolition activities, the two USTs were abandoned in place. In 1991, the U.S. Fish and Wildlife Service (USFWS) informed the U.S. Air Force (USAF) that a sinkhole had developed in the vicinity of the abandoned USTs and that a petroleum sheen had appeared on accumulated water.

The following remedial action goals were developed and documented in the Declaration of Decision for OT001 (ADEC 2001a):

- Soil from the surface to 15 feet below ground surface (bgs) – Soil containing more than 1,000 milligrams per kilogram (mg/kg) diesel-range organics (DRO) was to be excavated and thermally treated to 250 mg/kg. This work was planned in 2002 and executed in 2003 (USAF 2002, 2004b).
- Contaminated groundwater – Monitored natural attenuation was to achieve no greater than 1.5 milligrams per liter (mg/L) DRO throughout the aquifer and to achieve surface water quality standards (10 micrograms per liter [$\mu\text{g/L}$] total aromatic hydrocarbons [TAH], 15 $\mu\text{g/L}$ total aqueous hydrocarbons [TAqH]) at the point where groundwater discharges into surface water. Groundwater quality at the OT001 site is discussed below. Surface water was a concern because water containing sheen was accumulating in sinkholes adjacent to where the abandoned USTs were located. Analytical samples were collected in this area; all results were below site-specific cleanup levels (USAF 2004b). The sinkholes were then backfilled. Because surface water is no longer accumulating at the site, surface water quality standards are no longer applicable (USAF 2004b).

To eliminate physical hazards presented by the sinkholes at the demolition debris landfill, the following actions were to be performed:

- Fill remaining sinkholes with clean soil. (Completed) (USAF 2004b)
- Add additional soil cover for a minimum cover of 2 feet over the non-asbestos cell and 3 feet over the asbestos cell. (Completed) (USAF 2004a)
- Grade finish cover material to promote runoff and minimize erosion. (Completed) (USAF 2004b)
- Revegetate the landfill area to minimize the potential for future erosion. (Completed. See discussion below.)

- Perform an as-built survey of the landfill. (Completed) (USAF 2006c)
- Annually inspect the demolition landfill for five years to monitor for any further sinkhole or erosion development. Fill any sinkholes and erosion channels with clean fill, grade, and revegetate as necessary. (Completed from 2002-2006)
- Install and sample groundwater monitoring wells. (Completed) (USAF 2004b)
- Monitor natural attenuation for any residual contamination. (Completed) (USAF 2006b)
- Develop institutional controls to record the landfill survey information in the applicable property records and record them in the Aleutian Islands Recording District in Anchorage, Alaska. (Completed) (USAF 2006c)
- If groundwater contamination is present above the cleanup levels listed in the Alaska Administrative Code (AAC), Title 18, Section 75.345, Table C, institutional controls in the form of notice in the land records will be developed by USAF, with ADEC concurrence, to document that groundwater should not be used as a drinking water source until it meets the applicable cleanup levels. (Completed) (USAF 2006c)

In 1987 to 1988, the two USTs were drained of fuel, filled with sand, and abandoned in place. In 2001, DRO-contaminated soil was removed, based on the cleanup levels stated in the WACS Declaration of Decision for OT001 (ADEC 2001a).

Soil remediation was performed by thermal desorption. Results of soil samples collected in 2002 and 2003 at OT001 confirmed that soil between the ground surface and 15 feet bgs met the cleanup levels. USAF and USFWS are worked to develop a plan to revegetate areas that are bare. During the 2011 site inspection revegetation had was occurring and all indications pointed to continued revegetation naturally occurring.

Groundwater was remediated by natural attenuation, and monitoring wells were placed to monitor progress. Cleanup activities are further discussed in Section 1.4 of the Environmental Cleanup Plan: Investigation, Removal, and Treatment of Petroleum-Contaminated Soils (USAF 2002) and in the Environmental Cleanup Report (USAF 2004b). Institutional controls were put in place to document that groundwater should not be used as a drinking water source if contamination were present above ADEC cleanup levels (USAF 2006c). In March 2006, ADEC requested yearly groundwater monitoring in 2006 and 2007 (ADEC 2006a). Groundwater samples collected at OT001 in 2006 and 2007 were analyzed for DRO; all results were below cleanup levels. In May 2007, ADEC granted permission to decommission

the wells at OT001. The removal occurred 15 May 2007. ADEC approved a conditional closure in April 2008.

The Air Force, ADEC, and USFWS conducted landfill inspection in 2011 (USAF 2012). There were no sinkholes and the landfill cap was intact. Natural vegetation has continued to spread.

Based on the analysis presented above, the selected remedy at OT001 remains protective of human health and the environment.

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3.0 ST005: PETROLEUM, OIL AND LUBRICANTS STORAGE FACILITY

The ST005 site was initially a POL Storage Area that consisted of two 70,000-barrel ASTs, a pump house, a fueling island, and associated piping. The ASTs and piping were demolished in 1994. In 1993 and 1996, contaminated soil was discovered inside the dike and near the former pump house.

The following remedial action goals were developed and documented in the Declaration of Decision for ST05 (ADEC 2001b):

- Soil from the surface to 10 feet bgs – Soil containing more than 250 mg/kg DRO was to be excavated and thermally treated to meet the cleanup levels stated in the WACS Declaration of Decision for ST005 (ADEC 2001b). This work was performed in 2000 and 2003 (USAF 2004b, 2006a).
- Soil between 10 and 15 feet bgs – Removal and treatment of soil containing more than 1,000 mg/kg DRO was to be performed to ensure that inhalation and ingestion standards are met and to reduce the time needed for natural attenuation to meet cleanup levels. This work was performed in 2003 (USAF 2004b).
- Fuel-contaminated groundwater – Monitored natural attenuation was to be performed to achieve no greater than 1.5 mg/L DRO throughout the aquifer (18 AAC 75.345, Table C), and to achieve surface water quality standards (10 µg/L TAH, 15 µg/L TAqH) at the point where the groundwater discharges into surface water. Sampling results indicated DRO concentrations greater than 1.5 mg/L in one monitoring well (ADEC 2001b). During spring and fall 2004 groundwater monitoring events, analytical results for all BTEX compounds were below the detection limit. The September 2004 Biannual Groundwater Sampling Report recommended that analysis be limited to GRO and DRO in future sampling events. ADEC accepted the recommendation. During the fall 2003 and spring and fall 2004 groundwater monitoring events, GRO concentrations were below cleanup levels, and subsequently analysis for GRO was also terminated. Thus, groundwater analysis is currently limited to DRO.

The following cleanup actions were to be performed:

- Grade cover material to promote runoff and minimize erosion. (Completed 2003) (USAF 2004b)
- Revegetate the site to minimize the potential for future erosion. (Completed 2003) (USAF 2004b)
- Install and sample groundwater monitoring wells. (Completed 2003) (USAF 2004b)
- Perform a monitored natural attenuation study for any residual contamination. (See discussion below) (USAF 2006b)

- Develop institutional controls to document residual soil contamination in the applicable property records and record them in the Aleutian Islands Recording District in Anchorage, Alaska. (Completed) (USAF 2006d)
- If groundwater contamination is present above the cleanup levels listed in 18 AAC 75.345, Table C, institutional controls in the form of notice in the land records will be developed by USAF, with ADEC concurrence, to document that groundwater should not be used as a drinking water source until it meets the applicable cleanup levels. (Completed) (USAF 2006d)

In 2003, contaminated soils were excavated up to 15 feet deep, based on the cleanup levels stated in the WACS Declaration of Decision for ST005 (ADEC 2001b). The soil was thermally treated to the cleanup levels stated in the Declaration of Decision for ST005 (USAF 2001b). Results of soil sampling in 2003 at ST005 confirmed that soil between the ground surface and 15 feet bgs met the cleanup levels.

In 2003, three storage tanks were emptied and sealed but left onsite. One 17,000-gallon tank contained fuel mixed with water. The contents of this tank were drained, treated, and disposed of. A Container Express unit was removed from the site, and two drums were decontaminated, crushed, and disposed of. Cleanup activities are further discussed in Section 1.3 of the Environmental Cleanup Plan (USAF 2002).

Sampling events from 2003 through 2005 showed one groundwater well at ST005 that exceeded cleanup levels for DRO, which ranged between 1.6 and 4.24 mg/L.

The first five-year sampling even occurred in September 2009. The results for the six wells were four non-detect and two hits. MW-3 was 1.44 mg/L and MW-6 was 2.34 mg/L. While the result for MW-3 was below the ADEC clean-up level of 1.5 mg/L, the overall trend is still inconclusive. The MW-6 result, while above the ADEC clean-up goal, shows a definite decreasing trend. (USAF 2010)

Land use at the site is recreational, and the actions taken remain protective of human health and the environment; however, contaminants remain onsite above levels stated in the Declaration of Decision (ADEC 2001b). In 2006, ADEC requested groundwater monitoring

once every two years starting in 2007 (ADEC 2006b). Significant reduction of DRO in groundwater is not expected over the span of two years due to the low rate of biodegradation. Monitored natural attenuation is recommended to continue on a five-year basis. Cleanup activities are further discussed in Section 1.3 of the Environmental Cleanup Plan (USAF 2002) and in the Environmental Cleanup Report (USAF 2004b).

The Air Force completed a Long Term Monitoring Optimization report recommending three of the six wells be decommissioned (USAF, 2010). ADEC concurred (ADEC, 2010) and the three wells were decommissioned.

The groundwater remediation alternative selected consisted of natural attenuation and the installation of monitoring wells to monitor contaminant reduction. Institutional controls were promulgated, documenting that groundwater should not be used as a drinking water source if contamination exists above ADEC cleanup levels (USAF 2006d). The next five-year review is scheduled for 2017. Based on the analysis presented above, the selected remedy at ST005 remains protective of human health and the environment.

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4.0 REFERENCES

- ADEC (Alaska Department of Environmental Conservation). 2010 (19 April). Letter to Pat Roth from Deb Caillouet. Re: Long Term Monitoring Optimization for POL Storage Area, ST005, Cold Bay Long Range Radar Station, Cold Bay Alaska, April 2010
- ADEC. 2008 (28 April). Letter to Glen Verplancke from Deb Caillouet. Re: Cold Bay Radio Relay Station OT01 Closure Report, Final April 2008
- ADEC. 2006a (6 March). Letter to Scott Tarbox from Deb Caillouet. Re: Report OT01 Monitored Natural Attenuation Evaluation, Cold Bay, Alaska, Draft, February 2006.
- ADEC. 2006b (3 March). Letter to Scott Tarbox from Deb Caillouet. Re: Report ST05 Monitored Natural Attenuation Evaluation, Cold Bay, Alaska, Draft January 2006.
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- USAF 2010 (April). *Long Term Monitoring Optimization for POL Storage, ST005 Cold Bay Long Range Radar Station Cold Bay Alaska.*
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- USAF. 2006c (May). Record of Survey Remediation Site OT-01, ADEC Permit 8721-BA015 Protracted NW1/4 NE1/4 Section 11 Township 57 South, Range 90 West, Seward Meridian Alaska. Aleutian Islands Recording District. St. Denny Surveying, Inc.
- USAF. 2006d (February). Record of Survey Remediation Site ST-05 Protracted SE1/4 NE1/4 Section 36 Township 57 South, Range 89 West, Seward Meridian Alaska. Aleutian Islands Recording District. St. Denny Surveying, Inc.
- USAF. 2004a (August). *Environmental Site/Project Summary and Landfill Closure Report for OT01 and LF02. Final.*
- USAF. 2004b (April). *Environmental Site/Project Summary Report. Investigation, Removal, and Treatment of Petroleum-Contaminated Soil at the White Alice Communications System (OT01) and POL Storage Facility (ST05).*

USAF. 2002 (October). *Environmental Cleanup Plan: Investigation, Removal, and Treatment of Petroleum-Contaminated Soils at the White Alice Communication System (OT01) and POL Storage Facility (ST05)*. Final.

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From: ROTH, PATRICK A GS-12 USAF PACAF 611 CES/CEAR
To: ["Caillouet, Debra J \(DEC\)"](#)
Subject: RE: Cold Bay 5-year review 2012
Date: Monday, July 23, 2012 9:05:00 AM

Thanks Deb.

I have made the correction and will include a copy of this in Appendix A Comments and Response.

Pat

-----Original Message-----

From: Caillouet, Debra J (DEC) [<mailto:deb.caillouet@alaska.gov>]
Sent: Wednesday, July 18, 2012 12:54 PM
To: ROTH, PATRICK A GS-12 USAF PACAF 611 CES/CEAR
Subject: RE: Cold Bay 5-year review 2012

Pat

One change in the introduction. The second bullet should say "It is noted this site was previously referred to as ST05", rather than the OT01 that is there now.

The rest looks fine.

Deb Caillouet
269-0298

-----Original Message-----

From: ROTH, PATRICK A GS-12 USAF PACAF 611 CES/CEAR
[\[mailto:patrick.roth.1@us.af.mil\]](mailto:patrick.roth.1@us.af.mil)
Sent: Tuesday, July 10, 2012 11:52 AM
To: Caillouet, Debra J (DEC)
Subject: Cold Bay 5-year review 2012

Hi Deb,

Thanks to you giving me the heads up, I was able to update the Five-Year Review document. I used the last one and just updated was had changed.

Please review and comment. The last review was finalized August 2007 - so we have plenty of time to finalize this.

Pat

APPENDIX A
Comments and Response