



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

CAPE ROMANZOF, ALASKA

**SECOND CERCLA FIVE-YEAR REVIEW
& SECOND NON-CERCLA PERIODIC
REVIEW REPORT**

CAPE ROMANZOF LRRS, ALASKA

**FINAL
JUNE 2013**

**UNITED STATES AIR FORCE
611TH AIR SUPPORT GROUP
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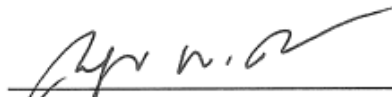
**SECOND CERCLA FIVE-YEAR REVIEW
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LEAD AGENCY ACCEPTANCE
SECOND CERCLA FIVE-YEAR REVIEW &
FIRST AND SECOND NON-CERCLA PERIODIC REVIEWS
CAPE ROMANZOF LRRS, ALASKA

This signature sheet documents the U.S. Air Force acceptance of the Second Comprehensive Response, Compensation, and Liability Act (CERCLA) Five-Year Review of Site LF003, the Second Non-CERCLA Periodic Review of Sites SS013 and SS015, and the first non-CERCLA Periodic Review of Sites ST009, SS014, and DP011 at the Cape Romanzof Long-Range Radar Site, Cape Romanzof, Alaska.



ROBYN M. BURK, Colonel, USAF
Commander, 611th Air Support Group

24 July 2013
Date

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ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
611 CES	611th Civil Engineer Squadron
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARAR	Applicable or Relevant and Appropriate Requirement
AST	aboveground storage tank
BGP	Base General Plan
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	chemical of concern
cy	cubic yards
DD	Decision Document
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
ERP	Environmental Restoration Program
FS	Feasibility Study
GRO	gasoline-range organic
HI	Hazard Index
IC	institutional controls
Jacobs	Jacobs Engineering Group Inc.
LRRS	Long-Range Radar Site
LTM	long-term monitoring
mg/kg	milligrams per kilogram
mg/L	milligrams per Liter
MNA	monitored natural attenuation
NCP	National Contingency Plan
NM	not measured
PA	Preliminary Assessment

ACRONYMS AND ABBREVIATIONS (Continued)

PCB	polychlorinated biphenyl
PCOR	Preliminary Close Out Report
PRG	preliminary remediation goal
RAB	Restoration Advisory Board
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
RRO	residual-range organics
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SVOC	semivolatile organic compound
TSCA	Toxic Substances Control Act
TPH	total petroleum hydrocarbons
USAF	United States Air Force
USC	U.S. Code
UST	underground storage tank
UU/UE	unlimited use and unrestricted exposure
VOC	volatile organic compound

EXECUTIVE SUMMARY

Under the direction of the 611th Civil Engineer Squadron (611 CES), a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review was conducted for site Landfill No. 2 (LF003) and a non-CERCLA Periodic Review was conducted at the Diesel Seep Area (SS013), Underground Storage Tank (UST) Spill Area (SS015), Spill/Leak 3 (ST009), Drum Storage Area (SS014), and Dump Area (DP011) at the Cape Romanzof Long-Range Radar Site (LRRS). Figure 1-1 provides a site map showing these locations.

This Report presents the findings of the second CERCLA Five-Year Review for the following site:

- LF003 Landfill No. 2

This Report presents the findings of the second Periodic Review for the following sites:

- SS013 Diesel Seep Area
- SS015 UST Spill Area

This Report presents the findings of the first Periodic Review for the following sites:

- ST009 Spill/Leak 3
- SS014 Drum Storage Area
- DP011 Dump Area

The review process was conducted pursuant to Section 121(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), U.S. Code, Title 42, Part 9601, and Code of Federal Regulations, Title 40, Part 300.430(f)(4)(ii). The review process has been undertaken in accordance with the *Comprehensive Five-Year Review Guidance* (Office of Solid Waste and Emergency Response Directive 9355.7-03B-P [June 2001]).

Although no CERCLA hazardous substances are present at sites SS013, SS015, ST009, SS014, or DP011, the U.S. Environmental Protection Agency *Comprehensive Five-Year*

Guidance has been followed for the approach, format, and content for the review of these sites.

This CERCLA Five-Year Review and non-CERCLA Periodic Review process is intended to ensure that the remedial actions selected in the Interim Record of Decision (ROD) for LF003 and the Decision Documents (DD) for SS013, SS015, ST009, SS014, and DP011 are being implemented and continue to be protective of human health and the environment. To achieve this purpose, this Report evaluates the implementation status of the selected remedies, identifies significant variances from the Interim ROD and DDs, and makes recommendations for reconciling variances and improving the performance of the remedial actions.

Jacobs Engineering Group Inc. (Jacobs) prepared this CERCLA Five-Year Review and non-CERCLA Periodic Review Report for the Cape Romanzof LRRS on behalf of the 611 CES under the U.S. Air Force Civil Engineer Center Contract No. FA8903-08-D-8773, Task Order 138. Jacobs conducted the site work for this Five-Year Review and Periodic Review in August 2012.

Based on the information contained in this CERCLA Five-Year Report and non-CERCLA Periodic Review Report, the remedies for SS014, ST009, DP011, SS013, and SS015 have been implemented, meet the remedial action objectives (RAO) defined in the DDs, and are protective of human health and the environment.

Because the first CERCLA Five-Year Review for LF003 (completed in 2008) found that the ROD-selected remedy, Cleanup with Institutional Controls, was not protective of human health and the environment, an initial screening of new alternatives for LF003 was conducted in 2010. A Final ROD for LF003 was completed and signed by the U.S. Air Force (USAF) and the Alaska Department of Environmental Conservation (ADEC) in March 2013.

As part of the Five-Year and Periodic Review process, site inspections were conducted that resulted well maintenance recommendations at four sites: at LF003, SS015, ST009, and SS014. This maintenance should be conducted as follows:

- At LF003, Monitoring Well CMW7 has an exposed wellhead and should be repaired and inspected for proper function; the protective metal casing has fallen to the ground and standing water surrounds the well.
- Monitoring Well WW-03 at SS015 has a broken lock and cap that need repair and protective casing, and Monitoring Well WW-01 on the south end of SS015 is currently unmarked.
- Monitoring Wells MW-5 at ST009 have experienced frost jacking and should be inspected for proper function.
- Monitoring Wells MW-1, MW-2, and MW-3 at SS014 have also experienced frost jacking and should be inspected for proper function. Additionally, at SS014, broken glass surrounds a plywood platform, which should be removed.

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CERCLA FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Cape Romanzof LRRS, LF003 Landfill No. 2		
EPA ID: N/A ADEC RecKey: 199125X123810		
Region: 10	State: AK	City/County: Cape Romanzof, Alaska

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? No	Has the site achieved construction completion? N/A

REVIEW STATUS
Lead agency: Other Federal Agency If "Other Federal Agency" was selected above, enter Agency name: U.S. Air Force 611th Civil Engineer Squadron
Author name (Federal or State Project Manager): Keith Barnack
Author affiliation: 611 CES Remedial Project Manager
Review period: 27 February 2008 through 26 February 2013
Date of site inspection: 20 August 2012
Type of review: Statutory
Review number: 2 (Second)
Triggering action date: 12 June 2008 (Previous Five-Year Review)
Due date (five years after triggering action date): 12 June 2013

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Five-Year Review:
None.

CERCLA FIVE-YEAR REVIEW SUMMARY FORM (Continued)

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): LF003	Issue Category: Monitoring			
	Issue: The protective metal casing at CMW-7 has exposed the wellhead and standing water surrounds the well.			
	Recommendation: Repair CMW-7.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): LF003	Issue Category: None.			
	Issue: N/A			
	Recommendation: Continue ongoing monitoring at LF003 and schedule the third Five-Year Review.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013

Protectiveness Statement(s)

Include each individual OU protectiveness determination and statement. If you need to add more protectiveness determinations and statements for additional OUs, copy and paste the table below as many times as necessary to complete for each OU evaluated in the FYR report.

<i>Operable Unit:</i> LF003	<i>Protectiveness Determination:</i> Not Protective	<i>Addendum Due Date (if applicable):</i> A new ROD for LF003 has been prepared that addresses protectiveness issues at the site.
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Protectiveness Statement:
The selected remedies for LF003 in the 2002 Interim ROD are not protective of human health and the environment, and do not comply with federal and state requirements that are legally applicable or relevant and appropriate. A new ROD was approved and signed in March 2013.

Sitewide Protectiveness Statement (if applicable)

Protectiveness Determination: N/A *Addendum Due Date (if applicable):* N/A
Protectiveness Statement: N/A

NON-CERCLA PERIODIC REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Cape Romanzof LRRS (Multiple Sites)		
EPA ID: AK9572728633		ADEC RecKey: Multiple
Region: 10	State: AK	City/County: Cape Romanzof, Alaska

SITE STATUS	
NPL Status: Non-NPL	
Multiple OUs? No	Has the site achieved construction completion? N/A

REVIEW STATUS
Lead agency: Other Federal Agency If "Other Federal Agency" was selected above, enter Agency name: U.S. Air Force 611th Civil Engineer Squadron
Author name (Federal or State Project Manager): Keith Barnack
Author affiliation: 611th CES Remedial Project Manager
Review period: 27 February 2008 through 26 February 2013
Date of site inspection: 20 and 21 August 2012
Type of review: Periodic
Review number: 2 (Second): SS013 and SS015 1 (First): ST009, SS014, and DP011
Triggering action date: 12 June 2008 (SS013 and SS015) and 27 February 2008 (ST009, SS014, DP011)
Due date (five years after triggering action date): 12 June 2013 (SS013 and SS015) and 27 February 2013 (ST009, SS014, DP011)

Issues/Recommendations
OU(s) without Issues/Recommendations Identified in the Periodic Review:
None. However, no issues or recommendations affect the protectiveness of the site remedies at Cape Romanzof LRRS.

PERIODIC REVIEW SUMMARY FORM (Continued)

Issues and Recommendations Identified in the Five-Year Review:				
OU(s): SS013	Issue Category: None			
	Issue: .None			
	Recommendation: Continue ICs and schedule the third Five-Year Review.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): SS015	Issue Category: Monitoring			
	Issue: WW-3 lock and protective cap are broken off; WW-01 on south side of site is unmarked.			
	Recommendation: Replace the lock and cap at WW-3 and mark WW-01. Continue ongoing monitoring and schedule the third Five-Year Review.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): ST009	Issue Category: Monitoring			
	Issue: MW-5 has experienced frost jacking.			
	Recommendation: Inspect MW-5 for proper functioning.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): ST009	Issue Category: None			
	Issue: N/A			
	Recommendation: Continue monitoring and schedule the second Five-Year Review.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013

PERIODIC REVIEW SUMMARY FORM (Continued)

Issues and Recommendations Identified in the Five-Year Review (Continued):				
OU(s): SS014	Issue Category: Monitoring			
	Issue: MW-1, MW-2, and MW-3 have experienced frost jacking.			
	Recommendation: Inspect MW-1, MW-2, and MW-3 for proper functioning.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): SS014	Issue Category: Change in Site Condition			
	Issue: Broken glass surrounding old wooden platform.			
	Recommendation: Remove broken glass.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): DP011	Issue Category: Site Inspection			
	Issue: Extreme weather conditions prevented site access. Terrain also makes this site inaccessible for any digging/drilling activities and none of the ICs were affected.			
	Recommendation: Continue monitoring and schedule the second and third periodic reviews.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013
OU(s): ALL	Issue Category: None			
	Issue: N/A			
	Recommendation: Continue monitoring and schedule the second and third periodic reviews.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	No	Other (611 CES)	State (ADEC)	2013

PERIODIC REVIEW SUMMARY FORM (Continued)

Protectiveness Statement(s)

<i>Operable Unit:</i> Multiple	<i>Protectiveness Determination:</i> Protective	<i>Addendum Due Date (if applicable):</i> N/A
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Protectiveness Statement:

The selected remedies for Sites SS013, SS015, ST009, SS014, and DP011 comply with federal and requirements that are legally applicable or relevant and appropriate, and are considered cost-effective. The remedies currently meet the RAOs established in the DDs by containing contaminants within the site, restricting excavation, and transportation of contaminants, and preventing exposure to the contaminants.

Sitewide Protectiveness Statement (if applicable)

For sites that have achieved construction completion, enter a sitewide protectiveness determination and statement.

<i>Protectiveness Determination:</i> N/A	<i>Addendum Due Date (if applicable):</i> N/A
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Protectiveness Statement: N/A

1.0 INTRODUCTION

The purpose of the Five-Year and Periodic Review process is to evaluate the overall protectiveness of the remedial actions implemented at six Environmental Restoration Program (ERP) sites at Cape Romanzof Long-Range Radar Site (LRRS), Alaska. This Report summarizes the second Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Five-Year Review for the ERP site Landfill No. 2 (LF003), the second non-CERCLA Periodic Review for the ERP sites Diesel Seep Area (SS013) and Underground Storage Tank (UST) Spill Area (SS015) and the first non-CERCLA Periodic Review for ERP sites Spill/Leak 3 (ST009), Drum Storage Area (SS014), and Dump Area (DP011). The objectives of the ERP, formerly known as the Installation Restoration Program, are to assess sites where potentially hazardous materials may exist and to develop and recommend remedial actions for those sites that are found to pose a threat to human health and welfare or the environment. Site locations are shown on Figure 1-1.

The Second CERCLA Five-Year Review and Second Periodic Reviews presented herein all have a triggering action date of 12 June 2008, which coincides with the Alaska Department of Environmental Conservation (ADEC) approval of the *Final First Five-Year Review for Cape Romanzof Sites Landfill No. 2 (LF003), Diesel Seep Area (SS013), and UST Spill Area (SS015)* (U.S. Air Force [USAF] 2008b). Because the First Five-Year Review for LF003 found that the remedy originally selected in the Record of Decision (ROD) for Interim Remedial Action for LF003 (USAF 2002) was not protective of human health and the environment, the site is in the Open status (i.e., the site does not meet the criteria for Cleanup Complete or Cleanup Complete with ICs); a new ROD for LF003 was completed and signed by the USAF and ADEC in March 2013. The protectiveness of the remedy selected in this ROD will be evaluated in the next CERCLA Five-Year Review for LF003. Cleanup Complete with ICs was approved on 23 February 2011 in a separate Decision Document (DD) for SS013 and SS015 (USAF 2011).

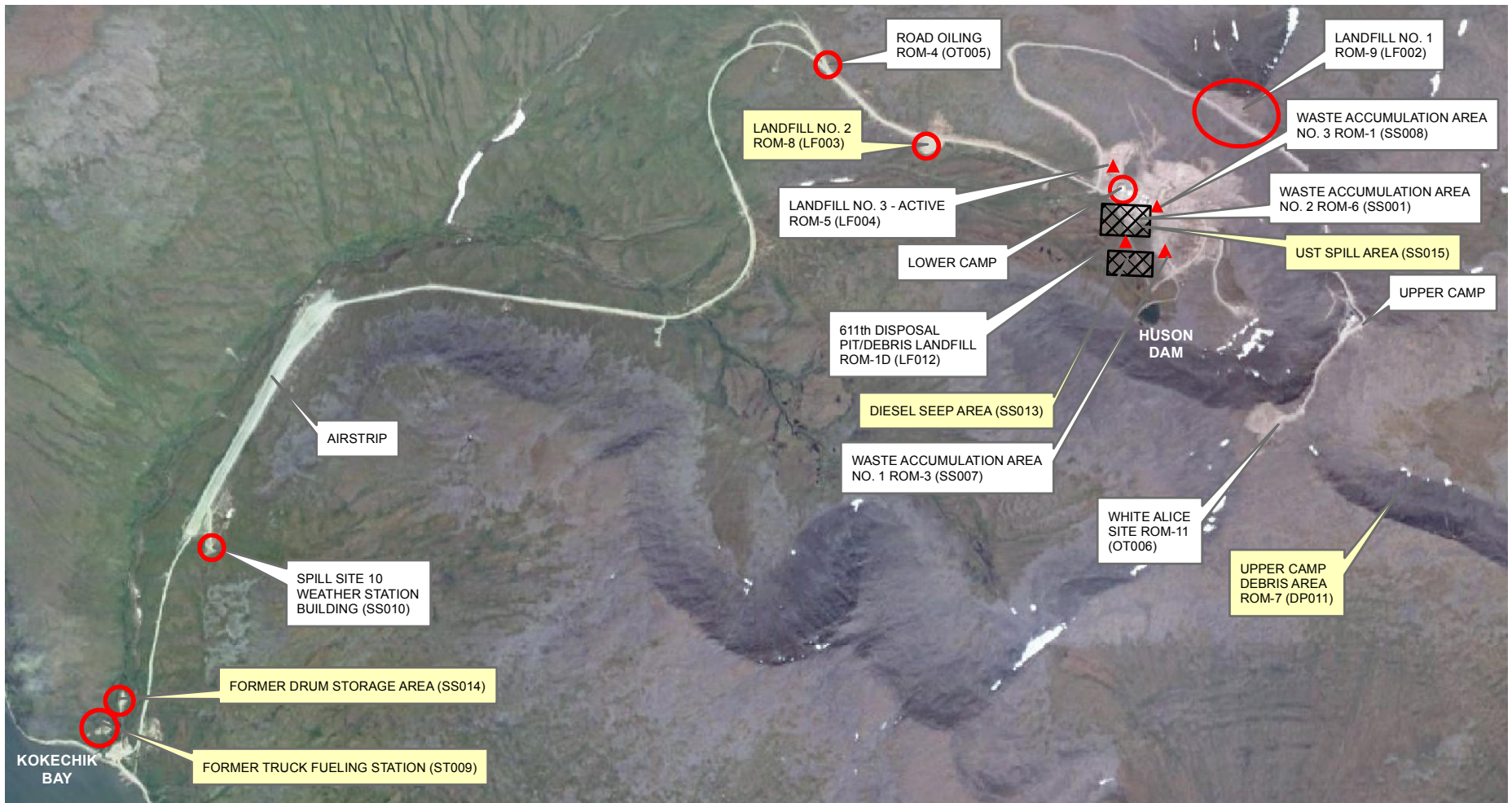
This First Periodic Reviews presented herein have a triggering action date of 27 February 2008, which coincides with the ADEC approval of the DD titled *Record of Decision for SS007 (Spill/Leak 1 & 2), ST009 (Spill/Leak 3), SS014 (Drum Storage Area), and DP011*

(Dump Area) (USAF 2008d). Cleanup Complete with Institutional Controls (IC) was approved for ST009, SS014, and DP011, and No Further Action (now designated as Cleanup Complete) was approved for Spill/Leak 1 & 2 (SS007) (USAF 2008d). Site SS007 is not included in the 2012 Periodic Review process, and is therefore not discussed in this Report. Cape Romanzof LRRS ERP sites not discussed in this Report are listed with their current statuses in Table 1-1.

**Table 1-1
Cape Romanzof LRRS ERP Sites**

Site Number	Site Name	ROD/DD Signed	Site Condition
SS007	Spill/Leak 1 & 2	2008	Cleanup Complete
SS001 (ROM 6)	Waste Accumulation Area No. 2	2007	Cleanup Complete
SS008 (ROM 1)	Waste Accumulation Area No. 3	2007	Cleanup Complete
LF002 (ROM 9)	Landfill No. 1	2007	Cleanup Complete
LF012	611 th / Disposal Pit / Debris Landfill	2007	Cleanup Complete
OT005 (ROM 4)	Road Oiling	2007	Cleanup Complete
OT006 (ROM 11)	White Alice	2007	Cleanup Complete
LF004 (ROM 5)	Landfill No. 3	N/A	Open
SS010 (ROM 2)	Spill Site 10 (Weather Station Building)	N/A	Open
SS016	Upper Tram Area	N/A	Open
SS017	Lower Tram Area	N/A	Open

USAF is the lead agency for remedial actions at the Cape Romanzof LRRS. Jacobs Engineering Group Inc. (Jacobs) prepared this Five-Year and Periodic Review Report on behalf of the 611th Civil Engineer Squadron (CES) under the Air Force Civil Engineer Center Contract No. FA8903-08-D-8773, Task Order 138. Jacobs conducted the site work for the Five-Year Review and Periodic Review in August 2012.

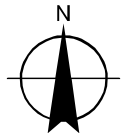
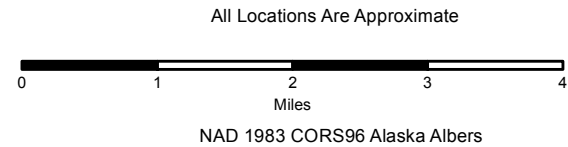


P:\Cape Romanzof\NMXD\Fig-1-1 - CapeRomanzof_LRRS_ERP\Sites.mxd beatyjcj



NOTE:
The yellow highlighted boxes are sites discussed in the 2012 Five-Year Review Report.

Source:
Google Earth Imagery 2012



CAPE ROMANZOF LRRS
ENVIRONMENTAL RESTORATION PROGRAM SITES
CAPE ROMANZOF, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	08 APR 2013	J. WEHRMANN	1-1

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The selected final remedial actions for Cape Romanzof LRRS, Alaska, were chosen in accordance with State of Alaska regulations governing the protection of human health and the environment from hazardous substances (Alaska Administrative Code, Title 18, Chapter 75, Article 3 [18 AAC 75.300 et al.], Alaska Water Quality Standards, Article 1 [18 AAC 70.005 through 18 AAC 70.050]); the Federal Toxic Substances Control Act of 1976 (TSCA) (U.S. Code [USC], Title 15, Sections 2601-2692); and the Resource Conservation and Recovery Act (RCRA). Selected final remedial actions are consistent with procedures set forth by the Federal CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986.

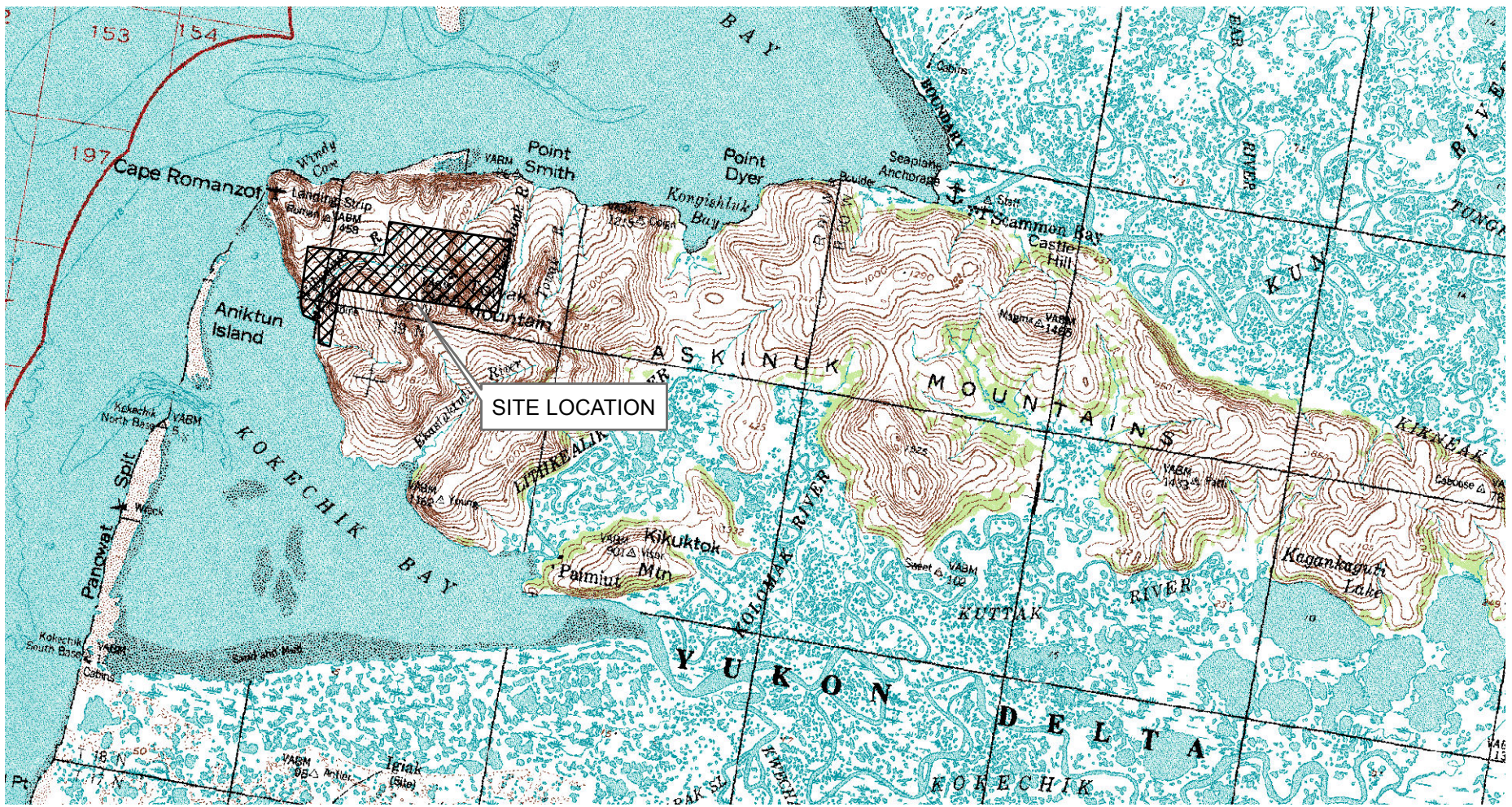
Cape Romanzof LRRS is located in coastal western Alaska, in the Yukon-Kuskokwim Coastal Lowland region at the western end of the Askinuk Mountains and on a small peninsula that extends into the Bering Sea. The site is approximately 560 miles west of Anchorage, 165 miles northwest of Bethel, and 170 miles southeast of Nome (Figure 1-2). The USAF property at the installation encompasses about 4,900 acres of land situated within the boundaries of the Yukon-Kuskokwim Delta National Wildlife Refuge, a federally protected habitat area. Cape Romanzof lies within the Alaskan Transitional Climatic Zone, with an approximate average annual precipitation of 27 inches, average wind speed of 12 miles per hour. Summer average high temperatures are in the 40s and 50s, and winter average high temperatures are in the teens. Permafrost is not known to exist at Cape Romanzof. The Cape Romanzof installation is comprised of two main areas: the Lower Camp where the main camp facilities (i.e. housing, power plant, and bulk fuel storage area) are located and the Upper Camp where the Long-Range Radar equipment is located (Figure 1-1). The Upper Camp is situated at the top of Towak Mountain (elevation 2,250 feet above mean sea level), with the two areas connected by a gravel road and tramway service. The Upper Camp geology is characterized by a thin layer of soil overlying bedrock.

The Lower Camp lies at the head of the valley next to tundra fields and ephemeral streams. The Lower Camp is underlain by deposits of talus and other colluvial materials that form an apron at the base of the steep slope. A 1-mile-long gravel runway serving the installation is located near the beach at Kokechik Bay approximately 4 miles southwest of the Lower Camp

by road. Almost all of the original installation facilities have been demolished. A new composite facility, consisting of two dome-type structures, was constructed at the Lower Camp in 1984 and provides working and living facilities for installation personnel. A small building located at the end of the airstrip is used as a weather station. Further down the valley, alluvial/glacial deposits make up the surface geology.

The nearest local communities are Scammon Bay, population 474 (2010 census), and Hooper Bay, population 1,093 (2010 census), which are located about 15 miles east and south of the installation, respectively. Although the communities are not connected to Cape Romanzof by road, the community members use off-road vehicles, boats, snow machines, and walking to travel all around the Cape Romanzof area. The populations of Scammon Bay and Hooper Bay are 95 to 97 percent Native Alaskan. Local wildlife includes Dolly Varden, along with spawning pink salmon, inhabit Fowler (Nilumat) Creek, and beaver have constructed several ponds there. Fowler (Nilumat) Creek is used by Cape Romanzof workers for recreational fishing. Kokechik Bay and Scammon Bay are important subsistence resources for members of nearby communities. Employment is seasonal, with peak economic activity occurring in the summer months. Major sources of employment are the Bureau of Land Management firefighting programs, commercial fishing, and the associated canneries.

Cape Romanzof LRRS was one of the ten original aircraft control and warning sites in the Alaska Air Defense System. Construction of the installation was completed in 1952 and operations began in 1953. The White Alice Communication Station became operational in 1958, and replaced the initial communication and warning system. As technologies improved, the communications systems were upgraded, eventually allowing the station to become a Minimally Attended Radar Station. By 1977, technological advances and significant reduction in site personnel allowed USAF to turn over operational support of the installation to independent contractors. The current site operations contractor is ARCTEC Alaska. Approximately six contractor personnel currently live at the installation year-round. In the summer, the number of people living at the installation can significantly increase (up to 30 people) when contractors and government agencies are conducting studies and performing work at the site.



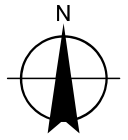
SITE LOCATION



 SiteLocation

Source:
U.S.G.S Topography Map
Hooper Bay, Alaska
Dated 1953, Revised 1985.

All Locations Are Approximate



NAD 1983 CORS96 Alaska Albers

**CAPE ROMANZOF LRRS
LOCATION MAP**

CAPE ROMANZOF, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	14 NOV 2012	J. WEHRMANN	1-2

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Groundwater has been identified in three different geologic units at Cape Romanzof LRRS and is used as the drinking water source for the area. The most significant water-bearing units appear to be the alluvial/glacial deposits and fractures in the weathered and fresh bedrock. Groundwater is also present in the colluvium on the steep valley sides and adjacent valley floor. Groundwater has not been encountered at Upper Camp, and the presence of a permanent groundwater aquifer is considered unlikely. The water supply well, Well No. 1 at Lower Camp, produces groundwater from confined water-bearing zones at 82 to 102 feet deep and 146 to 148 feet deep. However, the shallow groundwater at ST009 and SS014 is affected by saltwater intrusion and is not considered drinking water by application of the requirements specified in 18 AAC 75.350. Groundwater recharge is from infiltration of precipitation within the drainage basin. Little or no regional flow exists across drainage boundaries. Surface runoff and groundwater flow follow the downward slopes of the valley and exit the main valley to the west.

Surface water drainage at Lower Camp is generally by overland flow to intermittently flowing streams feeding into Fowler (Nilumat) Creek, which then flows westward into Kokechik Bay. Surface water drainage at Upper Camp is generally by overland flow to intermittent streams feeding into Ekashluak Creek, which then flows northward into Scammon Bay.

1.1 PURPOSE OF THIS REVIEW

This Five-Year and Periodic Review is intended to evaluate and ensure that the remedial actions selected in the ROD and DDs for Cape Romanzof LRRS, Alaska are being implemented and continue to be protective of human health and the environment. To achieve this purpose, this Report describes the methods used, issues identified, and recommendations and/or conclusions drawn from this review. In addition, this Report:

- Presents any new information that became evident during the review process;
- Confirms that no new contaminant sources or exposure pathways were discovered;
- Confirms that no new concerns were established; and
- Confirms that no additional work was performed that was not agreed upon in the original ROD (USAF 2002) and DDs (2008d and 2011).

1.2 AUTHORITY FOR CONDUCTING THE FIVE-YEAR AND PERIODIC REVIEW

Executive Order 12580 delegated lead agency status to the Department of Defense (DoD) for all CERCLA remedial actions. Authority was further delegated to the USAF which is the lead agency for remedial actions at Cape Romanzof LRRS. This Report has been prepared in accordance with the following regulations:

- U.S. Environmental Protection Agency (EPA) *Comprehensive Five-Year Review Guidance* (EPA 2001)
- CERCLA, Section 121
- National Oil and Hazardous Substances Pollution Contingency Plan (NCP)
- DODM 4715.20 (March 2012); Enclosure 3, Section 5.a.(4) – authorizes Periodic Review of site-specific remedies if a responses is conducted under non-CERCLA authorities.

The USAF must conduct Five-Year Reviews consistent with CERCLA and the NCP. Additionally, the USAF is following DoD policy by conducting this Periodic Review (DoD 2012). The EPA *Comprehensive Five-Year Guidance* has been followed for the approach, format, and content of this review.

CERCLA Section 121(c) states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with Section (104) or (106), the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The EPA interpreted this requirement further in the NCP (Code of Federal Regulations, Title 40, Part 300.430[f][4][ii]) as follows:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after initiation of the selected remedial action.

The Comprehensive EPA *Five-Year Review Guidance* (EPA 2001) states:

The initiation, or trigger date, that starts the Five-Year Review period depends upon whether it is a statutory or policy review and if the review is a first or subsequent review. A statutory review is triggered by the initiation of the first remedial action that leaves hazardous substances, pollutants, or contaminants on-site at levels that do not allow for unlimited use and unrestricted exposure. In cases where there are multiple remedial actions, the earliest remedial action that leaves such substances on-site should trigger the initial review, even if it is an interim remedial action ...

... a policy review is initially triggered by the date that the construction phase for all remedies is completed at a site. The date of construction completion is generally the date of the Preliminary Close Out Report (PCOR) or the date of the Final Close Out Report for sites that do not have a PCOR.

...the date of actual remedial action on-site construction generally corresponds to the date the contractor begins work at a site for the remedial action, typically the date of on-site mobilization. The definition of the actual remedial action start varies as outlined in the Superfund/Oil Program Implementation Manual. For remedies where on-site mobilization may not occur, as a matter of policy, the date of the first monitoring event following ROD signature or the ROD signature itself should be used to trigger the Five-Year Review period.

1.3 RESPONSIBILITIES

As stated above, the selected final remedial actions for LF003, SS013, SS015, ST009, SS014, and DP011 were chosen in accordance with State of Alaska regulations governing the protection of human health and the environment from hazardous substances (Alaska Administrative Code, Chapter 75, Article 3 [18 AAC 75.300 et al.], Alaska Water Quality Standards, Article 1 [18 AAC 70.005 – 18 AAC 70.050]), TSCA of 1976 (15 USC 2601-2692), and the site-specific ROD or Initial Screening of Alternatives (LF003). The selected final remedial actions are consistent with procedures set forth by CERCLA as amended by SARA of 1986. ADEC concurred with the selected remedies for LF003, SS013, SS015, ST009, SS014, and DP011.

1.4 EVENTS LEADING UP TO THIS REPORT

Hazardous and potentially hazardous substances have historically been used or stored at Cape Romanzof LRRS to support base activities. The 611 CES has been conducting environmental

investigations at Cape Romanzof LRRS since 1985 in order to determine whether any contamination associated with past installation activities was present that posed a potential unacceptable risk.

Various methods of waste management have been used at Cape Romanzof. Waste oils were applied to roads until 1978. Since then, these wastes have been accumulated and then barged to off-base disposal locations. Other wastes have been disposed of in landfills, dumps, hardfill, and incinerators. Much of the hazardous waste at Cape Romanzof is due to spills and leaks of diesel fuel and motor gasoline either from drums in landfills or from petroleum, oil, and lubricants tanks or pipes (USAF 1989).

A Phase I Records Search, AAC Southern Region identified 11 sites potentially containing hazardous contaminants and potential for contaminant migration from past activities at Cape Romanzof LRRS (USAF 1985). The Phase I assessment included interviews with current and former installation personnel and local, state and federal agencies, file searches, and field surveys at suspected past hazardous waste activity sites. The eleven sites were assessed using a Hazard Assessment Rating Methodology and follow-up (Phase II) investigation activities were recommended.

The information gathered evaluated potential human and ecological risks such as contaminant toxicity and persistence, migration pathways, and sensitive receptor routes. Results of these remedial investigations (RI) indicated that CERCLA hazardous substances (polychlorinated biphenyls [PCB]) were present at LF003; they are being addressed pursuant to CERCLA applicable laws and regulations. No chemicals of concern (COC) were considered CERCLA hazardous substances at SS013, SS015, ST009, SS014, or DP011. Because petroleum substances (not regulated under CERCLA) were found at concentrations above State of Alaska regulations, these sites are being addressed under 18 AAC 75.

Table 1-2 summarizes the COCs at LF003, SS013, SS015, ST009, SS014, and DP011.

**Table 1-2
Chemicals of Concern and Quality Standards**

COCs¹	Applicable Sites	ADEC Cleanup Level	Regulatory Source for Quality Standards
Soil/Sediment (mg/kg)			
PCBs	LF003	1.0 ²	ADEC Method Two, Table B2 for Under 40-Inch Zone (18 AAC 75; ADEC 2012c)
DRO	SS013	205,000 ³	ADEC Method Three, Based on the ADEC Site-Specific Hydrocarbon Risk Calculator (18 AAC 75; ADEC 2011)
DRO	ST009, SS014, DP011	12,500 ³	ADEC Method Three, Based on the ADEC Site-Specific Hydrocarbon Risk Calculator (18 AAC 75; ADEC 2011)
DRO	SS015	250 ²	ADEC Method Two, Table B2 for Under 40-Inch Zone (18 AAC 75; ADEC 2012c)
RRO	SS015	11,000 ²	ADEC Method Two, Table B2 for Under 40-Inch Zone (18 AAC 75; ADEC 2012c)
GRO	ST009, SS014	1,400 ³	ADEC Method Three, Based on the ADEC Site-Specific Hydrocarbon Risk Calculator (18 AAC 75; ADEC 2011)
Surface and Groundwater (mg/L)			
PCBs	LF003	0.0005 ⁴	ADEC Water Quality Standards Regulations (18 AAC 70; ADEC 2012b)
DRO	ST009, SS015	1.5 ⁴	
GRO	SS015	2.5 ⁴	
Benzene	SS015	0.005 ⁴	

Notes:

For definitions, see the Acronyms and Abbreviations section.

¹ Diesel-Range Organics (DRO) are a mixture of organic compounds found in diesel fuel, jet fuel, and heating oil. GRO are light-range petroleum products such as gasoline. RRO are heavy-range petroleum products such as lubricating oils. PCBs are compounds derived from biphenyl and containing chlorine. Benzene is an aromatic hydrocarbon; a natural constituent of crude oil.

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2.0 SITE LF003 LANDFILL NO. 2

The ADEC RecKey for LF003 is 199125X123810. The ADEC Hazard Identification Number for Site LF003 is 1341. No EPA identification number has been assigned. Refer to Figure 2-1 for an overview of the site including sample locations from the 2008 RI.

2.1 CHRONOLOGY OF SITE EVENTS AT LF003

Table 2-1 presents a chronology of site events from the 1970s to 2010. The ICs were established in 2002 when the ROD for Interim Remedial Action (USAF 2002) was signed.

**Table 2-1
Chronology of Site Events at LF003 Landfill No. 2**

Event	Date
Landfill is used for garbage, rubbish, wood, metal, plastic, construction and demolition debris, shop wastes, and incinerator ash.	Until mid-1970s
Stage I Work Plan is established for 11 Cape Romanzof sites; the purpose of the investigation outlined in the Work Plan is to define the quality and quantity of effluent emanating from the landfill, appraise the effects of this effluent on Fowler Creek and provide data to assist in developing remedial measures; four monitoring wells are installed.	1989
Remedial Investigation/Feasibility Study (RI/FS) of soil, surface water, and groundwater contamination is conducted as a follow-up to 1989 field activities; landfill area is mapped and surface water courses and points of effluent were located.	1990; Report finalized in 1992
Landfill is capped in order to minimize water flowing through it.	1994
Seven monitoring wells around LF003 are installed; soil, sediment, groundwater, and surface water samples are collected and analyzed.	1996 & 1997
USAF collects 50 soil samples in order to ascertain the extent of PCB and petroleum hydrocarbon contamination adjacent to LF003; Long-term groundwater and surface water sampling also conducted.	1998
LTM is initiated and a landfill cap inspection is performed.	1999
LTM and landfill inspection efforts are continued.	2000
The CERCLA Proposed Plan for cleanup is submitted.	2001
The CERCLA ROD for Interim Remedial Action is issued.	2002
611 CES performs a Clean Sweep Program entailing an assessment of PCB soil contamination downgradient of LF003 and inspects the landfill cap for integrity and serviceability.	2003
LTM of groundwater, surface water, and sediment are continued.	2003
A detailed surface soil sampling grid consisting of 29 field screening and 18 laboratory sample locations are performed to assess PCB contamination near a prior sediment location (SD-2) downgradient of LF003.	2004
LTM of groundwater, surface water, and sediment are continued.	2006
The Environmental Monitoring Report is finalized from 2007 field activities.	2008
First CERCLA Five-Year Review is conducted, and concludes that the selected remedy for LF003 is not protective of human health and the environment.	2008
An RI is conducted in order to characterize the nature and delineate the extent of hazardous	2008

**Table 2-1
Chronology of Events at LF003 Landfill No. 2 (Continued)**

Event	Date
waste contamination in the soil and groundwater; baseline human health risk assessment is conducted as part of the RI.	
Initial Screening for Alternatives is prepared to identify potential remedial alternatives for contaminated media at LF003.	2010

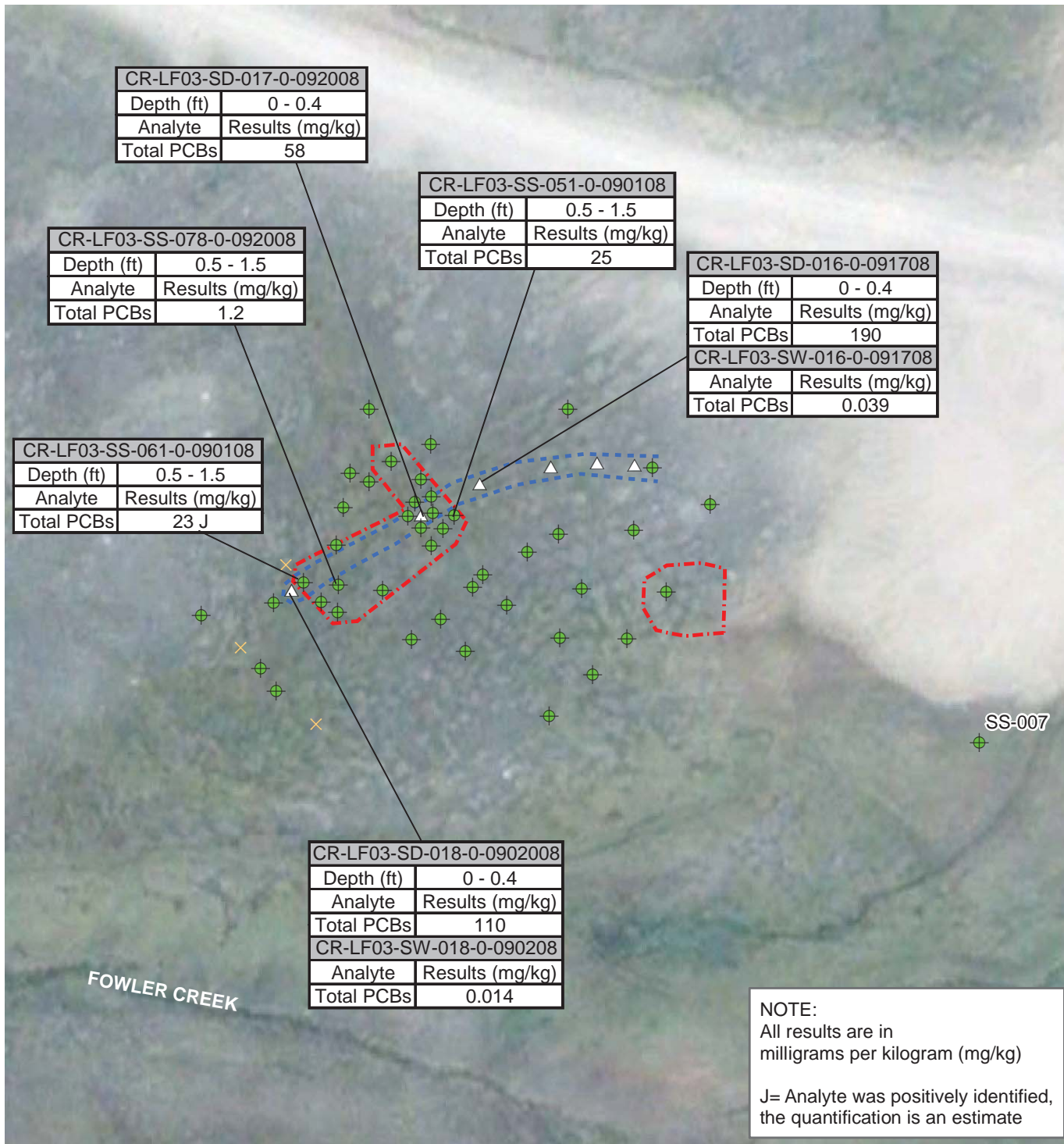
The USAF prepared a new Proposed Plan for LF003, and a new ROD was approved in March 2013; the protectiveness of the updated remedial action objectives (RAO) and site remedy will be evaluated in the next CERCLA Five-Year Review for LF003.

2.2 BACKGROUND OF SITE LF003

This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at LF003.

2.2.1 Physical Characteristics

Site LF003 is a formerly used, capped landfill located approximately 1 mile west of the residential dome at the Lower Camp on the south side of the access road between the Lower Camp and the airstrip. The landfill covers approximately 43,800 square feet (about 1 acre) on a slope that descends to a lower plateau. The landfill received garbage, rubbish, wood, metal, plastic, construction and demolition debris, shop wastes, and incinerator ash until the mid-1970s. Fowler (Nilumat) Creek lies approximately 250 feet south of the landfill, with two small tributaries located between the landfill and the creek. One of these tributaries is directly adjacent to the landfill and receives surface flow and effluent flow from the landfill. Groundwater flows to the west, approximately parallel to the streams. Effluent streams have been observed to be reddish in color, have a multi-color sheen, and a foul odor in places. Vegetation around the landfill has been reported to be dead (USAF 1989). No facilities exist within 1,500 feet of LF003. Site LF003 has also been known as ROM-8.

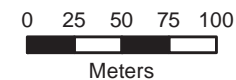


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- + Soil Sample Location
- x Screening Sample Location
- △ Sediment Surface Water Sample Location
- Sediment/Surface Water Exceedance Area
- Surface Soil Exceedance Area

All Locations Are Approximate



NAD 1983 CORS96 Alaska Albers



CAPE ROMANZOF LRRS SITE LF003 2008 SOIL AND SEEP (SEDIMENT) SAMPLE RESULTS (EXCEEDANCES) CAPE ROMANZOF, ALASKA			
JACOBS	DATE: 17 DEC 2012	PROJECT MANAGER: J.WEHRMANN	FIGURE NO: 2-1

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2.2.2 Land and Resource Use

LF003 was used by the LRRS as an area to discard debris and household and industrial wastes. Current land use around LF003 is unrestricted for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, the adjacent/surrounding land, including LF003, is a federally protected environment. The current use of adjacent/surrounding land, industrial use with temporary residents as well as subsistence use by local residents, is expected to remain the same over the foreseeable future.

2.2.3 History of Contamination

Numerous studies have been conducted at LF003 since 1989 to characterize the nature and extent of contamination. Four monitoring wells (MW-1 to MW-4) were installed at LF003 in 1989 and seven more (CMW1 to CMW7) were installed in 1996. Monitoring wells have been sampled frequently since 1996 and are routinely analyzed for diesel-range organics (DRO); gasoline-range organics (GRO); benzene, toluene, ethylbenzene, and xylenes (BTEX); and PCBs.

The 1990 Remedial Investigation/Feasibility Study (RI/FS) documented unsightly conditions at the landfill with various types of exposed debris (USAF 1992). Additionally, several areas of stained soil, points of effluent from the downslope side of the landfill, and active surface water drainages upslope and adjacent to the landfill, were documented. Results from the 1989 and 1990 RI/FS indicated the presence of total petroleum hydrocarbon (TPH) contamination in soil and sediment, and PCB and TPH contamination in surface water in the vicinity of the landfill and the drainages. Groundwater contamination at LF003 (including some BTEX and volatile organic compound [VOC] constituents) was identified in both upgradient monitoring wells, MW-1 and MW-2, and the cross-gradient well MW-4. Long-term monitoring (LTM) conducted in August 2000 indicated that PCBs in surface water and sediment were the only COCs for this site (USAF 2001c). The 2002 ROD for Interim Remedial Action (USAF 2002)

suggested proposed final cleanup levels based on the findings of the 2001 *Final Long-Term Monitoring Report* (USAF 2001c).

2.2.4 Initial Response

In 1994, the 611 CES collected debris from the periphery of the landfill, diverted the drainage at the toe of the landfill, and covered the landfill with a protective surface cap (USAF 1995). The landfill cap was constructed of an impermeable Hypalon[®] membrane overlain with geotextile fabric between layers of sand and pit-run material. The cap was designed to prevent the infiltration of surface water that could potentially create contaminated effluent due to contact with buried debris.

2.2.5 Basis for Taking Action

A response action was warranted under CERCLA because concentrations of PCBs (a CERCLA hazardous substance) detected in surface water and sediment at LF003 posed an unacceptable risk to human health and the environment. Threatened or actual releases of PCBs, if not addressed by implementing response actions, could present an imminent or substantial threat to public health, welfare, or the environment.

2.3 REMEDIAL ACTIONS

The landfill cap was constructed in 1994. No additional remedial actions have been performed at LF003.

2.3.1 Remedial Action Objectives

The RAOs as outlined in the 2002 ROD for Interim Remedial Action (USAF 2002) have not been met for LF003. A new LF003 ROD was completed by USAF and approved by ADEC in March 2013. The new RAOs (see Section 2.3.4) will be presented and their protectiveness will be evaluated in the next CERCLA Five-Year Review.

2.3.2 Selected Remedy

The original ROD for Interim Remedial Action was signed by the USAF on 31 July 2002 and by ADEC on 14 July 2002 (USAF 2002). However, the status of LF003 is Open in the ADEC Contaminated Sites Database because during the Five-Year Review period, the RAOs as outlined in the 2002 ROD for Interim Remedial Action were not achieved and no ADEC-approved remedy had yet been selected and implemented at LF003.

Because the 2002 ROD for Interim Remedial Action did not address any formal Land Use Controls (LUC) as required by the LUC Management Plan (USAF 2012), the following LUC standards have been applied to LF003:

- A notice in the Base General Plan (BGP) (USAF 2008a) will show LF003 boundaries with the objective to prevent access to PCB-contaminated soil and/or groundwater. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil and/or groundwater.
- Visual inspections performed every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Approval from ADEC is required prior to making any changes to the ICs. The 611 CES is the point of contact for the ICs.

A Final ROD was completed and approved by the USAF and ADEC in March 2013. The new remedy for LF003 will be presented and its effectiveness will be evaluated in the next CERCLA Five-Year Review.

2.3.3 Remedy Implementation

The PCB removal action agreed upon in the 2002 ROD for Interim Remedial Action at LF003 has not been implemented. Sampling conducted in 2003 and 2004 immediately before the planned removal action revealed that the PCB-affected area was larger than expected; therefore, technical and fiscal limitations at the time made complete removal impractical. ICs are in place to prohibit disturbance of the landfill cap and landfill contents. ICs currently in place prohibit digging, excavation, or trespassing on the PCB hot spot area downgradient of the landfill site.

The following remedial actions have been implemented at LF003 (USAF 2002):

- Capping of the landfill was completed in 1994. Inspection of the landfill cap has occurred during each of the LTM events conducted from 1996 through 2007.
- LTM of groundwater, surface water, and sediments at LF003 was performed in 1996, 1997, 1998, 1999, 2000, 2003, 2004, 2006, and 2007.
- PCB surface soil and sediment sampling efforts conducted in 2003 and 2004 indicate that the extent of PCB contamination exceeded the 0.5 cubic yards estimated in the ROD for Interim Remedial Action. Because cleanup efforts will be complicated due to the presence of large on-site boulders, additional sampling was recommended to generate more accurate estimates of the extent of PCB contamination. ADEC and USAF agreed that an expanded RI of the area was necessary before a suitable remedy could be selected.
- Soil, surface water, and groundwater samples were collected in 2008 as part of an expanded RI.
- A follow-up study was completed in 2010 to screen alternatives that would be protective of human health and the environment and mitigate contamination migration.
- On 20 August 2012, Jacobs conducted a Five-Year Review site inspection. Based on observations during the inspection, ICs to limit unauthorized excavation appeared to be effective. No excavations or disturbed soils were identified during the inspection.

2.3.4 Progress Since the Last Five-Year Review

This is the second Five-Year Review for LF003. The first Five-Year Review, signed on 18 April 2008 (USAF 2008b), concluded that the selected remedy for LF003 was not protective. Since the 2008 Five-Year Review, a 2008 RI was conducted, a 2010 Initial Screening of Alternatives was prepared, and a Final ROD was approved in March 2013.

The 2008 RI identified PCB contamination at the landfill that was leaching into sediments, and recommended additional PCB source investigations within the landfill itself. Generally, as PCBs were only detected from the northwest seep, the source of these PCBs is likely to be located within the landfill, along the northwest edge. Soil, surface water, and sediment sample results indicate that the highest concentrations of PCBs are present in sediments along the northwest seep, and that PCBs are also present in surface water. It also appears that PCBs within the seep have affected the soils surrounding the seep bed through time, likely based on seasonal precipitation and natural meandering of surface water throughout the boulder field. Additionally, the contaminated sediment migrating from seeps along the toe of the landfill

appears to be the most likely source of the PCB contamination in the surface water samples, as opposed to the water itself.

The RI Report recommended, to the extent practical, that sediments be removed from the toe of the landfill to the approximate location of historical sample SS07. Removal of these sediments would reduce impacts to soil and sediment downstream of this location, and protect Fowler Creek (USAF 2010b).

Because the First Five-Year Review for LF003 (USAF 2008b) concluded that the RAOs from the 2002 ROD for Interim Remedial Action were not protective, the following revised RAOs were developed based on an Initial Screening of Alternatives conducted in 2010:

- Prevent ingestion of, dermal contact with, inhalation of dust from, and uptake of biota of contaminants from surface soil containing fuel, PCB, and lead concentrations in excess of Preliminary Remediation Goals (PRG) and/or resulting in a cancer risk greater than 1×10^{-6} or a Hazard Index (HI) great than 1.
- Prevent possible migration of fuels, PCBs, or lead (as identified in the 2010 Initial Screening of Alternatives [USAF 2010b]) in surface soil to surface water resulting in surface water concentrations that exceed the Alaska Water Quality Standards.

A Proposed Plan for LF003 was developed that recommended soil excavation and disposal at an off-site landfill permitted to accept PCB-contaminated soil. After excavation, the soil would be loaded onto barges and shipped to a commercially operated landfill for disposal. A new ROD for LF003 was approved and signed in March 2013. The effectiveness of the new RAOs, site remedy implementation, and ICs at LF003 will be evaluated in the next CERCLA Five-Year Review.

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3.0 SITE SS013 DIESEL SEEP AREA

The ADEC RecKey for SS013 is 199125X123802. The ADEC Hazard Identification Number for Site SS013 is 1335. The EPA identification number is AK9572728633.

3.1 CHRONOLOGY OF SITE EVENTS AT SS013

Table 3-1 presents a chronology of site events from 1979 to 2011. The ICs currently in place were established in 2011 when the DD was signed.

**Table 3-1
Chronology of Site Events at SS013 Diesel Seep Area**

Event	Date
14,000-gallon diesel fuel spill is caused by a fuel bladder rupture.	1979
RI/FS is conducted. TPH detected in soil and groundwater. Further investigation is recommended.	1989
RI/FS is conducted and results in LTM Plan. Main COCs identified are petroleum hydrocarbons in soil and groundwater. The 1992 FS recommended intrinsic remediation and LTM as the remedial alternative.	1992
RI is conducted in order to delineate nature and extent of soil, surface water, and groundwater contamination.	1997
LTM of groundwater is conducted.	1997, 1999, 2000, 2003, 2004
LTM of surface water is conducted.	1997, 1999, 2000
Long-Term Management Plan is developed and includes determination of aquifer characteristics and natural attenuation parameters in groundwater.	1998
Long-Term Management program is initiated.	1999
A non-CERCLA Proposed Plan for cleanup is developed.	2001
DD for Interim Remedial Action is signed by USAF and ADEC.	2002
LTM samples indicate no COC exceedances in groundwater and conclude that groundwater contaminants are attenuating naturally over time; groundwater monitoring is discontinued.	2004
Long-Term Management program is reduced to include only surface soil and sediment sampling for DRO and residual-range organics (RRO) analysis per the 2002 Interim ROD.	2006
Long-Term Management program is performed for surface soil and sediment samples for DRO and RRO analysis.	2007
An Environmental Monitoring Report is finalized from the 2007 field activities.	2008
The First Periodic Review is issued.	2008
The Final non-CERCLA Proposed Plan is issued.	2010
The Final DD is issued and Cleanup Complete with ICs is approved by ADEC. LTM is discontinued.	2011

3.2 BACKGROUND OF SITE SS013

This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at SS013.

3.2.1 Physical Characteristics

SS013 is the former location where new drummed products and liquid wastes were stored until 1982. SS013 is located approximately 1,000 feet south of the Lower Camp and can be accessed by foot or vehicle by the north-south road from the Lower Camp. The Lower Camp lies at the head of the valley next to tundra fields and ephemeral streams. Fowler Creek (Nilumat) runs through the site, which may be hydraulically connected to the Lower Camp's drinking water supply (Well-1). Well-1 is located south of the Lower Camp and east of SS013. Depth to groundwater measured at the site varies from near ground surface to approximately 20 feet below ground surface (bgs). SS013 has also been known as ROM-1S and Spill/Leak No. 5.

3.2.2 Land and Resource Use

SS013 is currently used for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since the Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, the adjacent/surrounding land, including SS013, is a federally protected environment. The current use of adjacent/surrounding land, industrial use with temporary residents as well as subsistence use by local residents, is expected to remain the same over the foreseeable future.

3.2.3 History of Contamination

Contamination at SS013 resulted from a 14,000-gallon diesel fuel spill in 1979 that was caused by a fuel bladder rupture. The spill apparently ran over ground onto surface soil; it affected 10 to 15 acres of land. The spill flow path was clearly defined by a swath of dead

vegetation and continued for several hundred feet toward Fowler (Nilumat) Creek. The soils and tundra in the flow path were darkly stained and smelled strongly of diesel. In some areas, the spill percolated down to the water table (USAF 1989).

3.2.4 Initial Response

No response actions were taken at SS013 prior to the 2002 ROD for Interim Remedial Action (USAF 2002).

3.2.5 Basis for Taking Action

No response action is warranted under CERCLA because concentrations of CERCLA hazardous substances in soil at SS013 do not pose an unacceptable potential risk for human health and the environment. A response action is warranted under State of Alaska regulations under 18 AAC 75.341 because concentrations of DRO and GRO in soil at SS013 exceed the ADEC 18 AAC 75.341 Method Two Table B2 cleanup levels for the under 40-inch zone of 250 milligrams per kilogram (mg/kg) and 300 mg/kg respectively. The following conditions exist:

- DRO and GRO are considered COCs for soil at SS013. Although contamination at SS013 does not pose an unacceptable potential risk to human health or the environment under CERCLA, soil contamination is above State of Alaska cleanup levels that allow for unlimited use and unrestricted exposure (UU/UE).
- Site-specific ADEC Method Three cleanup levels were calculated for DRO and GRO in SS013 soil (USAF 2011). The Method Three cleanup levels represent the maximum allowable DRO and GRO concentrations under Alaska regulations; these cleanup levels are protective of the ingestion and inhalation pathways at SS013 based on nonresidential use.

3.3 REMEDIAL ACTIONS

No remedial activities have occurred at SS013. The Long-Term Management program was initiated in October 1999 (ADEC 2012a).

3.3.1 Remedial Action Objective

The overall objectives for SS013 are to ensure that conditions are protective of human health and the environment and comply with state and federal regulations that are legally applicable or relevant to SS013. The site-specific RAO for SS013 as listed in the 2011 DD are to restrict the use of the site to commercial/industrial use. This RAO was developed based on the current and reasonably anticipated future land use of SS013 as described in Section 3.2.2. The implementation of ICs will limit human exposure to remaining contamination until concentrations meet State of Alaska cleanup levels that are protective of the environment and will allow for UU/UE at SS013.

The objective for SS013 has been met.

3.3.2 Selected Remedy

The selected remedy for SS013 as set forth in the 2011 DD is ICs (USAF 2011). ICs are required to meet the RAO and achieve protectiveness at SS013. The selected remedy implementation is consistent with recommendations from the 2008 Periodic Review. The selected remedy for SS013 meets the RAO and is expected to satisfy the following remedy selection criteria for the State of Alaska:

- Practicability
- Protectiveness
- Regulatory compliance
- Short-term risk and long-term effectiveness
- Public acceptance

The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs identified below in accordance with State of Alaska contaminated site regulations. The remedy as specified by the DD (USAF 2011) is summarized below:

- The presence of petroleum in soil above levels allowing for UU/UE will be documented in the LUC Management Plan (USAF 2012). Any excavation within these areas must include procedures to evaluate any excavated soils and provide for soil remediation contingency scenarios.

- Any contaminated groundwater that is encountered (i.e. dewatering for construction within an area of groundwater contamination) will be managed properly.
- Future land use within the IC area will be restricted to commercial/industrial land use.

The USAF will implement the ICs as required by the LUC Management Plan (USAF 2012) at SS013 by taking the following actions:

- Place a notice in the BGP (USAF 2008a) to inform site workers that DRO and GRO-contaminated soil is not to be moved or disturbed without notifying ADEC. An appropriate notice will also be filed with the U.S. Fish and Wildlife Service. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil.
- Perform visual inspections every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Obtain approval from ADEC prior to making any changes to the ICs. The 611 CES is the point of contact for the ICs.

The DD for SS013 was signed by the USAF on 9 February 2011. A Cleanup Complete with ICs designation for site SS013 was issued upon ADEC's signature of the DD on 23 February 2011 (USAF 2011).

3.3.3 Remedy Implementation

On 20 August 2012, Jacobs conducted a Periodic Review site inspection. Based on observations during the inspection, ICs to limit off-site transport, control exposure, and protect human health and the environment appear to be effective. No evidence of excavations or disturbed soil was identified during the inspection. Site land use remains industrial.

3.3.4 Progress Since the Last Five-Year Review

This is the second Periodic Review for this site. A Periodic Review of the interim remedy was prepared in 2008 and concluded that the remedy is functioning as intended. Monitoring data indicated that hydrocarbon impacts are primarily limited to the spill site with no evidence of an impact to surface water.

The 2008 review recommended a continuation of LTM activities and ICs, but in 2011, the Final DD for SS013 (USAF 2011) determined that Cleanup Complete with ICs was appropriate with no continued monitored natural attenuation (MNA) for SS013 (USAF 2011).

4.0 SITE SS015 UST SPILL AREA

The ADEC RecKey for SS015 is 199125X023809. The ADEC Hazard Identification Number for SS015 is 1329. The EPA identification number is AK9572728633. Refer to Figure 4-1 for an overview of the site, including historical sample locations and results from 1997, 2000, 2004, 2007, and 2008 monitoring events.

4.1 CHRONOLOGY OF SITE EVENTS AT SS015

Table 4-1 presents a chronology of site events from 1991 to 2011. The ICs were established in 2011 when the DD was signed.

Table 4-1
Chronology of Site Events at SS015 UST Spill Area

Event	Date
Preliminary Assessment (PA) is conducted. Two USTs (5,000 and 15,000-gallon capacities) are discovered during excavation of fuel-contaminated soils.	1991
RI/FS is performed; six monitoring wells are drilled and installed; soil borings are drilled, test pits are excavated.	1993
USAF removes approximately 600 cy of petroleum-contaminated stockpiled soils and places it in a lined cell for storage and later treatment.	1994
Data is collected to determine whether intrinsic remediation would be effective in reducing contaminant concentrations; LTM is recommended based on the investigation; two monitoring wells are installed.	1997
LTM efforts are continued.	2000
The non-CERCLA Proposed Plan for cleanup is issued.	2001
The DD for Interim Remedial Action is signed by USAF and ADEC.	2002
LTM of wells WW-02 and WW-08 are performed; results are above RAOs for Benzene, GRO, DRO; one monitoring well is installed but never sampled.	2003 & 2004
1994 Fuel-contaminated soils at SS015 are treated and used as landfill capping material at LF003.	2004
LTM of groundwater is continued.	2006 & 2007
An Environmental Monitoring Report is finalized from the 2007 field activities.	2008
The First Periodic Review is issued.	2008
The Final non-CERCLA Proposed Plan is issued.	2010
The Final DD is issued and Cleanup Complete with ICs is approved by ADEC.	2011

4.2 BACKGROUND OF SITE SS015

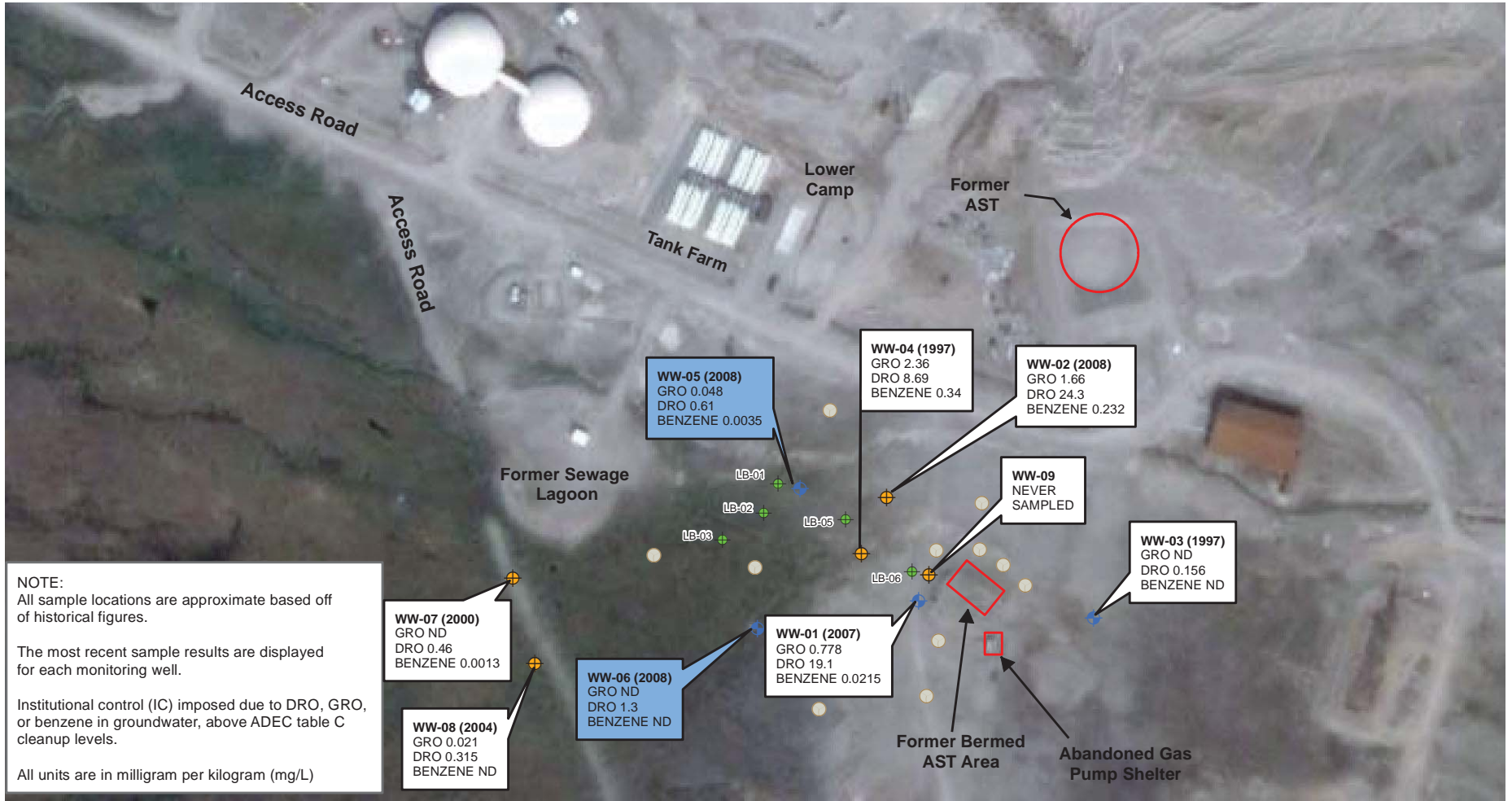
This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at SS015.

4.2.1 Physical Characteristics

SS015 is the location of two former USTs. SS015 is located 200 feet south of the Lower Camp, north of SS013, and is accessible by road. The Lower Camp lies at the head of the valley next to tundra fields and ephemeral streams. There is no surface water at SS015. Depth to groundwater measured at the site varies from approximately 3 feet bgs at the western edge of the site to approximately 50 feet bgs at the eastern edge of the site. SS015 has also been known as Old Leaking UST site. No ROM designation was ever assigned.

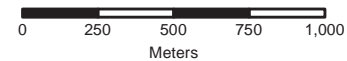
4.2.2 Land and Resource Use

Current land use at SS015 is unrestricted access for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, the adjacent/surrounding land, including SS015, is a federally protected environment. The current use of adjacent/surrounding land, industrial use with temporary residents as well as subsistence use by local residents, is expected to remain the same over the foreseeable future.



- Monitoring Well Location
- Former Monitoring Well Locations (Abandoned in 2007)
- 1993 or 1997 Soil Boring Sample Location
- 1997 Surface Soil Sample Location

All Locations Are Approximate



NAD 1983 CORS96 Alaska Albers



**CAPE ROMANZOF LRRS
 SITE SS015 (UST AREA)
 HISTORICAL GROUNDWATER SAMPLE RESULTS
 CAPE ROMANZOF, ALASKA**

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	18 DEC 2012	J. WEHRMANN	4-1

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4.2.3 History of Contamination

SS015 is the result of a diesel fuel spill that occurred from two USTs. The two tanks were discovered in 1991 as part of an excavation of fuel-contaminated soils and buried fuel lines adjacent to an aboveground storage tank (AST). Fuel was reportedly released through the vent pipe of a UST due to overfilling. Numerous studies have been conducted at SS015 since 1991 to characterize the nature and extent of contamination. During the 1993 RI/FS, soil and groundwater were found to be contaminated by petroleum hydrocarbons; however, the extent of diesel contamination was not effectively delineated (USAF 1995).

COCs and media of concern for SS015 were identified as BTEX, GRO, DRO, and RRO in groundwater. Historically, DRO levels in soil have also been above ADEC cleanup action levels at site SS015.

4.2.4 Initial Response

On 29 June 1991, site personnel reported a fuel seep adjacent to the AST impoundment at the abandoned Lower Camp facility. Spill response activities involving construction of a sump to collect fuel seeping from surficial soils and excavation of buried fuel lines to determine the source of the release, commenced immediately. Recovered fuel and fuel-affected soils were stored in 85-gallon overpack drums until construction of a lined and bermed containment area was completed. Fuel-affected soils were then transferred to the containment area, and recovered fuel was pumped into an abandoned 25,000-gallon AST within the AST impoundment. Excavation of buried fuel lines within and north of the AST impoundment was completed by 3 July 1991. No leaks were found.

Continued excavation of fuel-affected soils adjacent to the AST impoundment revealed the presence of two USTs immediately north of the AST impoundment. Fuel and water were pumped from both USTs into the 25,000-gallon AST. The USTs were removed along with approximately 900 cy of fuel-affected soils. Additional fuel seepage was recovered from the UST excavation (USAF 1991). The recovered fuel was reported to be diesel.

Measurements conducted during the site reconnaissance indicated that approximately 1,900 gallons of fuel and 7,800 gallons of water were stored in the 25,000 gallon AST. No groundwater was encountered in the UST excavation. The depth to groundwater in the vicinity of the UST excavation is estimated at between 20 and 40 feet below the original ground surface (USAF 1991).

4.2.5 Basis for Taking Action

No response action is warranted under CERCLA because concentrations of CERCLA hazardous substances in soil and groundwater at SS015 do not pose an unacceptable potential risk for human health and the environment. A response action is warranted under State of Alaska regulations under 18 AAC 75.341 because concentrations of DRO soil at SS015 exceed the ADEC 18 AAC 75.341 Method Two Table B2 cleanup level for the under 40-inch zone of 250 mg/kg. The following conditions exist:

- DRO is considered a COC for soil at SS015. Benzene, GRO, and DRO are COCs for groundwater at SS015. Although contamination at SS015 does not pose an unacceptable potential risk to human health or the environment, soil and groundwater contamination is above the State of Alaska cleanup levels that allows for unrestricted use.
- A site-specific ADEC Method Three cleanup level was calculated for DRO in SS015 soil (USAF 2011). The Method Three cleanup level is 12,500 mg/kg for DRO. The Method Three cleanup level represents the maximum allowable DRO concentration under Alaska regulations; this cleanup level is protective of the ingestion and inhalation pathways at SS015 based on nonresidential site use.
- ADEC Table C groundwater cleanup levels are appropriate for SS015 groundwater. USAF and ADEC have agreed to classify groundwater at SS015 as a non-drinking water source by application of criteria stipulated in 18 AAC 75.350 (USAF 2011).

4.3 REMEDIAL ACTIONS

As part of the 1991 Preliminary Assessment (PA) the 5,000 and 15,000-gallon USTs were removed from the site along with approximately 900 cy of contaminated soil (USAF 1991). In 1994, the USAF removed approximately 600 cy of petroleum-contaminated stockpiled soils from SS015 and placed it in a lined cell for storage and treatment (USAF 1995). The treated soils were later used as landfill capping material at LF003.

4.3.1 Remedial Action Objectives

The overall objectives for SS015 are to ensure that conditions are protective of human health and the environment and comply with state and federal regulations that are legally applicable or relevant to site concerns. The site-specific RAOs for SS015 as listed in the 2011 DD are as follows:

- Clean up contaminated groundwater to the ADEC Table C cleanup levels.
- Restrict access to contaminated groundwater until it is cleaned up.

These RAOs were developed based on the current and reasonably anticipated future land use of SS015 as described in Section 4.2.2. These RAOs address the potential risks by reducing the concentration of contaminants below State of Alaska regulatory criteria that are considered protective of human health and the environment, and will allow for UU/UE at SS015 once cleanup levels have been met.

4.3.2 Selected Remedy

The selected remedy for SS015 as set forth in the 2011 DD is MNA with ICs (USAF 2011). The ICs are an integral part of the selected remedy and are required to meet the RAOs. The selected response actions are consistent with the RAOs listed in the 2011 DD and recommendations from the 2008 Periodic Review of the interim remedies.

The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs identified below in accordance with State of Alaska contaminated site regulations. The remedy for SS015 meets the RAOs and is expected to satisfy the following remedy selection criteria for the State of Alaska:

- Practicability
- Protectiveness
- Regulatory compliance
- Short-term risk and long-term effectiveness
- Public acceptance

The remedy as specified by the DD (USAF 2011) is summarized below:

- The presence of petroleum in soil above levels allowing UU/UE will be documented in the USAF Real Property Records. Any excavation within these areas must include procedures to evaluate any excavated soils and provide for soil remediation contingency scenarios. Any contaminated groundwater that is encountered (i.e. dewatering for construction within an area of groundwater contamination) will be managed properly.
- Future land use within the IC area will be restricted to commercial/industrial land use.
- The installation of water supply wells will be prohibited within the site boundaries as long as the aquifer fails ADEC Table C cleanup levels protective of drinking water.
- One source area Monitoring Well (WW-01) and two downgradient monitoring wells (WW-05 and WW-06) will be monitored at least once every five years. Groundwater samples will be analyzed for DRO, GRO, and BTEX.
- Monitoring will continue until 18 AAC 75.350 Table C groundwater cleanup levels are reached and the cumulative risk is below Alaska threshold levels or until the groundwater plume reaches a steady state or decreases and contaminant concentrations meet applicable cleanup levels or an approved alternative point of compliance.

The USAF will implement the ICs as required by the LUC Management Plan (USAF 2012) at SS015 by taking the following actions:

- Place a notice in the BGP (USAF 2008a) to inform site workers that DRO-contaminated soil is not to be moved or disturbed without notifying ADEC. An appropriate notice will also be filed with the U.S. Fish and Wildlife Service. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil.
- Perform visual inspections every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Obtain approval from ADEC prior to making any changes to the ICs. The 611 CES is the point of contact for the ICs.

The DD for SS015 was signed by the USAF on 9 February 2011. A Cleanup Complete with ICs designation for SS015 was issued upon ADEC's signature of the DD on 23 February 2011 (USAF 2011).

4.3.3 Remedy Implementation

On 20 August 2012, Jacobs conducted a Periodic Review site inspection at SS015. Based on observations during the inspection, ICs to limit off-site transport, control exposure, and

protect human health and the environment appear to be effective. No evidence of excavations or disturbed soil was identified during the inspection.

4.3.4 Progress Since the Last Five-Year Review

This is the second Periodic Review for this site. The first Periodic Review (USAF 2008b) of the interim remedy concluded that the remedy is functioning as intended. Based on the 2003 through 2008 groundwater monitoring results, benzene, GRO, and DRO remain in the groundwater at concentrations above the ADEC Table C cleanup levels protective of drinking water. The Final DD for SS015 was issued in 2011.

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5.0 SITE ST009 SPILL/LEAK 3

The ADEC RecKey for ST009 is 199125X123807. The ADEC Hazard Identification Number for Site ST009 is 1339. The EPA identification number is AK9572728633. Refer to Figure 5-1 for an overview of the site, including sample locations from the 2009 LTM event.

5.1 CHRONOLOGY OF SITE EVENTS AT ST009

Table 5-1 presents a chronology of site events from 1989 to 2012. The ICs were established in 2008 when the DD was signed.

**Table 5-1
Chronology of Site Events at ST009 Spill/Leak 3**

Event	Date
Stage I Work Plan is established for 11 Cape Romanzof sites; one soil sample is proposed for collection at ST009	1989
RI/FS of soil, surface water, and groundwater contamination is conducted as a follow-up to 1989 field activities; one surface water and one sediment sample is collected; excavation of TPH-contaminated soil and landfarming is recommended for ST009.	1990; Report finalized in 1992
Spill estimate is upgraded to 46,000 gallons of petroleum hydrocarbons released to the environment.	1991
The USAF conducts a field investigation and field screens potentially contaminated soil; no samples are collected.	1994
Site inspection (SI) is conducted to characterize existing conditions. Soil, surface water, sediment, and groundwater quality were evaluated in the SI; soil, surface water, and sediment samples are collected; six monitoring wells are installed and sampled.	2004
Site Characterization Report based on results from 2004 SI activities is finalized.	2006
Groundwater and surface water monitoring are conducted.	2007, 2008, 2009
Final non-CERCLA Proposed Plan is issued.	2007
The Final DD is issued and Conditional Site Closure (now Cleanup Complete with ICs) is approved by ADEC.	2008
Long-Term Management Work Plan is approved by ADEC.	2012

5.2 BACKGROUND OF SITE ST009

This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at ST009.

5.2.1 Physical Characteristics

Site ST009 is a former truck fueling station located downstream of Lower Camp, less than 200 feet east of Kokechik Bay and north of the barge landing area. The site is located near a former beach warehouse (now demolished) and the northern wall of a passive biocell used to treat fuel-contaminated soil. RI/FS activities in 1989 discovered petroleum contamination in the soil at site ST009. A number of small fuel spills are reportedly associated with tank filling and transfers since the 1950s. Based on site maps, the area affected was estimated to be approximately 170 square feet. The area is currently graded and covered in pit rut material. This site has also been known as Truck Fueling Station and ROM-10.

5.2.2 Land and Resource Use

This site was used by the LRRS as a truck fueling station. Current land use at ST009 is unrestricted access for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, ST009 and the adjacent/surrounding land is a federally protected environment. The current use of adjacent/surrounding land is expected to remain the same over the foreseeable future: industrial use with temporary residents as well as subsistence use by local residents. The shallow groundwater at ST009 is affected by saltwater intrusion and is not considered drinking water when applied to the criteria stipulated in 18 AAC 75.350 (USAF 2008d).

FORMER TRUCK FUELING STATION
(ST009)

Well MW-4 Groundwater Sample Results (mg/L)							
Year	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes
RAO	1.3	1.5	1.1	0.005	1	0.7	10
2004	75.7	1,360	34.5 F	0.00596	0.0599	0.34	0.291
2006	0.0601	13.7	0.336	0.00065	ND (0.002)	0.00142	0.0056 JB
2007	0.251 J	5.9	NM	ND (0.0005)	ND (0.002)	0.00133 F	0.00801
2008	0.24	40 J	NM	ND (0.00012)	ND (0.00021)	ND (0.00020)	ND (0.00015)
2009	0.142	1.14	NM	ND (0.00015)	0.00141 J	ND (0.00062)	0.00213

Well MW-9 Groundwater Sample Results (mg/L)							
Year	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes
RAO	1.3	1.5	1.1	0.005	1	0.7	10
2004	0.456	4	0.505	0.000402 F	ND (0.002)	0.0033	0.0051
2006	0.441 J	2.24	0.458 FB	0.00018 F	0.00262	0.00437	0.014 J
2007	0.236	2.86	NM	0.00198 F	ND (0.002)	0.00198 F	0.00589
2008	0.28	1.4	NM	ND (0.00012)	ND (0.00021)	0.0015	0.0031
2009	0.217	1.15	NM	ND (0.00015)	0.00143 J	0.00157 J	0.00574 J

Well MW-7 Groundwater Sample Results (mg/L)							
Year	GRO	DRO	RRO	Benzene	Toluene	Ethylbenzene	Total Xylenes
RAO	1.3	1.5	1.1	0.005	1	0.7	10
2004	1.02	3	0.427 F	ND (0.0005)	0.0013 F	0.014	0.0193
2006	0.0156 FB	135	2.31	ND (0.0005)	0.00066F	ND (0.002)	0.0028 JB
2007	1.30 J	4.44	NM	0.000185 F	0.0086	0.0188	0.00331
2008	0.37	2.1	NM	ND (0.00012)	ND (0.00021)	0.0037	0.0089
2009	0.421 JS	3.03 JD	NM	ND (0.00015)	0.00205	0.00536	0.01516

SW-5 Surface Water Sample Results (mg/L)								
Year	Benzene	Toluene	Ethylbenzene	P & M-Xylene	o-Xylene	PAH - Naphthalene	TAH	TAqH
RAO	0.005	0.0098	0.0073	0.0018	0.013	0.012	0.01	0.015
2004	ND (0.004)	ND (0.001)	ND (0.001)	ND (0.001)	ND (0.002)	0.000039 FJ	ND (0.002)	0.000039
2006	ND (0.0005)	ND (0.002)	ND (0.002)	0.00146 FB	ND (0.002)	ND (0.0001)	0.00146	0.00146
2007	ND (0.005)	ND (0.002)	ND (0.002)	0.00130 FB	ND (0.002)	0.0000634 F	0.0013	0.00136
2008	ND (0.15)	ND (0.21)	ND (0.20)	ND (0.27)	ND (0.15)	ND (0.014)	ND (0.27)	ND (0.014)
2009	ND (0.0015)	ND (0.0062)	ND (0.00062)	ND (0.0062)	ND (0.00062)	ND (0.0000323)	ND (0.00062)	ND (0.00127)

Results shown in **BOLD** indicate exceedances of RAOs (Remedial Action Objectives)
 RAOs from 18 AAC 75 and 70
 B = Analyte Detected in a blank
 F = Results between detection and reporting limits
 J = Results is estimated
 S = Associated surrogate recovery outside quality control limits
 D = Relative percent difference for field duplicate outside quality control limits
 mg/L = milligrams per liter
 ND = Non-detected, value shown is detection limit
 NM = Not Measured

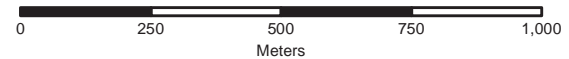
KOKECHIK BAY

SW-5



Source:
Google Earth Imagery 2012

All Locations Are Approximate



NAD 1983 CORS96 Alaska Albers

CAPE ROMANZOF LRRS
 SITE ST009 GROUNDWATER AND SURFACE WATER
 HISTORICAL SAMPLE RESULTS
 CAPE ROMANZOF, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO:
	18 DEC 2012	J. WEHRMANN	5-1

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5.2.3 History of Contamination

In 1989, RI/FS activities discovered petroleum contamination in the soil at ST009. A number of historical small fuel spills were reportedly associated with tank filling and transfers. Additionally, an initial report to ADEC in June 1991 estimated a 4,000-gallon fuel spill resulting from an active 1.5-inch buried steel pipeline between the bulk storage area and the abandoned truck fill stand; only 1,000 gallons of spilled fuel was collected. Later it was determined that two abandoned USTs were still connected to the active pipeline and had leaked, and that the pipeline was not the direct or main contributor to the release. The estimate was revised in July 1991 to 46,000 gallons of product released to the environment (ADEC 2012a).

In 1994, approximately 955 cy of contaminated soil were estimated to be present at ST009. Soil was left in place during initial investigation activities and later characterized during the 2004 SI. This investigation provided a new estimate of 3,333 cy of DRO-contaminated soil. Additional DRO-contaminated soil was identified at the groundwater interface in subsurface samples collected in borings and wells located downgradient of the area with surface soil contamination (USAF 2006b).

5.2.4 Initial Response

In 1990, the USAF conducted an RI/FS at ST009. Because the former truck fueling station had been removed and the site graded, no accurate points of reference for sample collection remained. Based on a site map, a sample was collected where the old truck fueling station was thought to have been previously located and analyzed for TPH. The ERP recommendation, based on the results of the RI/FS, was excavation and landfarming of TPH-contaminated soil (USAF 1992).

5.2.5 Basis for Taking Action

No response action is warranted under CERCLA because concentrations of CERCLA hazardous substances in soil and groundwater at ST009 do not pose an unacceptable potential risk for human health and the environment. However, soil and groundwater contamination is

above State of Alaska cleanup levels that allow for unrestricted site use. The following conditions exist:

- DRO is considered a COC for soil and groundwater at ST009. No COCs were identified for surface water or sediment.
- A response action is warranted under 18 AAC 75.341 and 18 AAC 75.345 because concentrations of DRO in soil and groundwater at ST009 exceed the ADEC 18 AAC 75.341 Method Two Table B2 and ADEC 18 AAC.75.345 Table C cleanup levels for the under 40-inch zone of 250 mg/kg and 1.5 milligrams per Liter (mg/L), respectively.
- A site-specific ADEC Method Three DRO cleanup level of 12,500 mg/kg was calculated for ST009 soil (USAF 2006b). The Method Three cleanup level represents the maximum allowable DRO concentration under State of Alaska regulations; the cleanup level is protective of the ingestion and inhalation pathways at ST009 based on nonresidential use. ADEC Method Two cleanup levels were selected for all other analytes in soil.
- USAF and ADEC agree that the groundwater at ST009 meets the criteria spelled out in 18 AAC 75.350 to classify groundwater as a non-drinking water source, ADEC Table C groundwater cleanup levels are appropriate and will be protective of surface water quality for ST009 (USAF 2008d).

5.3 REMEDIAL ACTIONS

All structures/buildings in the area of ST009 were removed prior to the 1989 RI field activities. Based on the results of the 2004 SI, no remedial actions were recommended at ST009 and the site was not recommended for further investigation under CERCLA. Under State of Alaska regulations, ST009 was recommended for additional monitoring of groundwater and surface water quality in order to demonstrate that detected concentrations of contaminants in groundwater are not migrating to adjacent surface waters (USAF 2006b).

5.3.1 Remedial Action Objectives

The overall RAOs for ST009 are to ensure that conditions are protective of human health and the environment and comply with state and federal regulations that are legally applicable or relevant to site concerns. The specific RAOs that the remedial action is designed to achieve at ST009 from the 2008 DD (USAF 2008d) are as follows:

- Ensure that groundwater contamination is not migrating downgradient into Kokechik Bay at levels that could be detrimental to surface water quality.

- Restrict use of the groundwater as long as the groundwater DRO concentrations exceed the ADEC Table C cleanup level, which is protective of drinking water.
- Restrict direct contact with petroleum-contaminated subsurface soil and document that petroleum hydrocarbons in surface and subsurface soil exceed levels protective of unrestricted use.
- Restrict excavation and transportation of contaminated soil to prevent migration of contaminants.

These RAOs were developed based on the current and reasonably anticipated future land use of ST009 as described in Section 2.2.2 to reduce risk by limiting the potential for spreading contamination through unauthorized excavation and disposal.

The objectives for ST009 have been met.

5.3.2 Selected Remedy

The selected remedy for ST009 as set forth in the 2008 DD is groundwater and surface water monitoring with ICs (USAF 2008d). The ICs are an integral part of the selected remedy and are required in order to meet the RAOs. The goals of the ICs are to restrict access to contaminated soil, document (for waste management purposes in the event of subsurface activities) that DRO concentrations exceed the ADEC Method Two cleanup level that allows for UU/UE, and prevent the use of groundwater contaminated above the ADEC Table C cleanup level considered protective of drinking water.

USAF is responsible to implement, monitor, maintain, and enforce the ICs identified below in accordance with State of Alaska contaminated site regulations. The remedy for ST009 meets the RAOs and satisfies the following remedy selection criteria for the State of Alaska:

- Practicability
- Protectiveness
- Regulatory compliance
- Short-term risk and long-term effectiveness
- Public acceptance

The remedy as specified by the DD (USAF 2008d) is summarized below:

- Annual monitoring of three groundwater monitoring wells (MW-4, MW-7, and MW-9) and one surface water location (SW-5) will be performed for a minimum of three years. Groundwater samples will be analyzed for DRO, GRO, and BTEX, and surface water samples will be analyzed for total aromatic hydrocarbons and total aqueous hydrocarbons. The monitoring program will be consistent with the technical requirements set forth in State of Alaska regulations and is designed to meet the RAOs.
- After three consecutive years of monitoring, the data will be evaluated using a statistically valid trend analysis. If monitoring data show that downgradient wells (MW-7 and MW-9) do not have increasing levels of DRO, GRO, or BTEX, and surface water results are consistently below water quality criteria and not increasing, sampling will be discontinued. Otherwise, the monitoring program will be reviewed for protectiveness, revised if appropriate, and extended until three consecutive years of monitoring data establish that the criteria listed above have been met.
- ICs will consist of excavation and construction restrictions within the ST009 site boundaries, documentation that soil exists above levels allowing UU/UE, a requirement that future land use remains nonresidential, and a prohibition on the installation of water supply wells within the ST009 site boundaries as long as the aquifer fails 18 AAC 75.345(b)(1) Table C cleanup levels protective of drinking water.

The USAF will implement the ICs as required by the Land Use Control (LUC) Management Plan (USAF 2012) at ST009 through the following actions:

- Delineate boundaries of soil with DRO above the ADEC Method Two cleanup level.
- Include a notice in the BGP (USAF 2008a) to inform site workers that DRO-contaminated soil is not to be moved or disturbed without ADEC notification. An appropriate notice will also be filed with the U.S. Fish and Wildlife Service. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil.
- Perform visual inspections every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Notify ADEC prior to making any major changes to the ICs. The 611 CES is the point of contact for the ICs.

The USAF signed the DD for ST009 on 26 February 2008. A Cleanup Complete with ICs designation for ST009 was issued upon ADEC's signature of the DD on 27 February 2008 (USAF 2008d).

5.3.3 Remedy Implementation

On 20 August 2012, Jacobs conducted a Periodic Review site inspection at ST009. Based on observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soils were identified during the inspection. Evaluation of the 2004, 2007, 2008, and 2009 monitoring data indicates that groundwater and surface water results are consistently below the ADEC Table C cleanup levels protective of drinking water.

5.3.4 Progress Since the Last Periodic Review

This is the first Periodic Review for this ST009.

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6.0 SITE SS014 DRUM STORAGE AREA

The ADEC RecKey for SS014 is 199125X123808. The ADEC Hazard Identification Number for SS014 is 1340. The EPA identification number is AK9572728633.

6.1 CHRONOLOGY OF SITE EVENTS AT SS014

Table 6-1 presents a chronology of site events from 1989 to 2008. The ICs were established in 2008 when the DD was signed.

**Table 6-1
Chronology of Site Events at SS014 Drum Storage Area**

Event	Date
Field team discovers SS014 during field investigations related to other Cape Romanzof ERP sites; soil, sediment/surface water samples are collected.	1989
RI/FS of soil, surface water, and groundwater contamination is conducted as a follow-up to 1989 field activities.	1990; Report finalized in 1992
The USAF excavates 2,730 cubic yards of petroleum-contaminated soil; confirmation samples are collected.	1994
An SI is conducted to characterize existing conditions. Soil, surface water, sediment, and groundwater quality are evaluated in the SI; soil, surface water, and sediment samples are collected. Three groundwater wells are installed and sampled.	2004
Site Characterization Report based on results from 2004 SI activities is finalized.	2006
Final non-CERCLA Proposed Plan is issued.	2007
The Final DD is issued and Conditional Site Closure (now Cleanup Complete with ICs) is approved by ADEC.	2008

6.2 BACKGROUND OF SITE SS014

This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at SS014.

6.2.1 Physical Characteristics

SS014 is a former drum storage area located east of a beaver pond, along the south side of Fowler Creek, and downstream of Lower Camp adjacent to Kokechik Bay. The area was used to stage drummed POL waste for shipment off-site on the annual barge. The area affected by

POL contamination was estimated in 1989 to cover 10,300 square feet. The 2004 SI estimated that approximately 965 cy of DRO-contaminated soil present at the site. Site SS014 was formerly known as ROM-12.

6.2.2 Land and Resource Use

This site was used by the LRRS as a drum storage area. Current land use at SS014 is unrestricted access for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, the adjacent/surrounding land (including SS014) is a federally protected environment. The current use of adjacent/surrounding land is expected to remain the same over the foreseeable future: industrial use with temporary residents as well as subsistence use by local residents. The shallow groundwater at SS014 is affected by saltwater intrusion and is not considered drinking water, by application of the criteria stipulated in 18 AAC 75.350 (USAF 2008d).

6.2.3 History of Contamination

SS014 was discovered during field investigations in 1989. SI activities discovered a dark-stained area approximately ¼-acre in size at this site. Vegetation within the affected area was dead and there was an odor of old fuel. Petroleum contamination was confirmed with analytical sample results. The source of the petroleum contamination is not documented, but it presumably resulted from historical spills from the storage of drummed POL waste. Surface water, sediment, and groundwater were not adversely affected by POL contamination at SS014 (USAF 2006b).

6.2.4 Initial Response

During the 1989 field investigations, when SS014 was first identified as a potentially contaminated site, the stained area was mapped. Two soil samples were collected from the stained area, and one water and sediment sample set were collected from the beaver pond

downslope (southwest) of this area. The soil and sediment samples were analyzed for TPH, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), metals, and pesticides/PCBs. The surface water sample was analyzed for TPH, halogenated and aromatic VOCs, SVOCs, pesticides, PCBs, and recoverable and dissolved metals (USAF 1992).

6.2.5 Basis for Taking Action

No response action is warranted under CERCLA because concentrations of CERCLA hazardous substances in soil at SS014 do not pose an unacceptable potential risk for human health and the environment. However, a response action is warranted under State of Alaska regulations under 18 AAC 75.341 because historical concentrations of DRO and GRO in soil at SS014 exceed the ADEC 18 AAC 75.341 Method Two Table B2 cleanup levels for the under 40-inch zone of 250 mg/kg and 300 mg/kg, respectively (USAF 2008d). The following conditions exist:

- DRO and GRO are considered COCs for soil at SS014. No COCs in surface water, groundwater, or sediment were identified. Although contamination at SS014 does not pose an unacceptable potential risk to human health or the environment, subsurface contamination is above State of Alaska cleanup levels protective of unrestricted use.
- Site-specific ADEC Method Three cleanup levels were calculated for DRO and GRO in SS014 soil (USAF 2006b). The Method Three cleanup level is 12,500 mg/kg for DRO and 1,400 mg/kg for GRO. The Method Three cleanup levels represent the maximum allowable DRO and GRO concentrations under State of Alaska regulations; these cleanup levels are protective of the ingestion and inhalation pathways at SS014 based on nonresidential use.
- ADEC Method Two cleanup levels were selected for all other analytes in soil.

6.3 REMEDIAL ACTIONS

In 1994, the USAF excavated 2,730 cy of petroleum-contaminated soil from SS014. Due to the possible presence of PCBs, a PCB sampling grid was used to guide the excavation. The final excavation covered approximately 25,000 square feet, and most of the area was excavated down to approximately 3 feet bgs. At several locations, the contaminated soil was excavated down to the water table at 8 feet bgs.

The contaminated soil was placed in Containment Cell 1, which was constructed near the coast at ST009. In 1996, the containment cell was converted into two biocells (soil piles constructed by the mechanical addition of air, water, and nutrients). The biocells were closed out in 2004; the treated soil from one cell was placed in the main camp area, and the treated soil from the other cell was used as cover material for LF003 (USAF 2008d).

Based on the field screening results, the volume of contaminated soil at SS014 exceeded the initial estimate, and an estimated 2,000 cy of contaminated soil (extending across the road from the excavated area) was left in place.

6.3.1 Remedial Action Objectives

The overall objectives for SS014 are to ensure that conditions are protective of human health and the environment and comply with state and federal regulations that are legally applicable or relevant to site concerns. The site-specific RAOs for SS014 as listed in the 2008 DD (USAF 2008d) are as follows:

- Restrict direct contact with petroleum-contaminated subsurface soil and document that petroleum hydrocarbons in surface and subsurface soil exceed levels considered protective of UU/UE.
- Restrict excavation and transportation of contaminated soil to prevent the migration of contaminants.

These RAOs were developed based on the current and reasonably anticipated future land use of SS014 as described in Section 6.2.2. These RAOs are intended to reduce risk by limiting the potential for spreading contamination through unauthorized excavation and disposal.

These objectives for SS014 have been met.

6.3.2 Selected Remedy

The selected remedy for SS014 as set forth in the DD is ICs (USAF 2008d). The ICs are an integral part of the selected remedy and are required to meet the RAOs. The goals of the ICs are to restrict access to contaminated subsurface soil and document (for waste management

purposes in the event of subsurface activities) that soil impact exceeds ADEC Method Two cleanup levels that allow for of UU/UE.

The USAF is responsible to implement, monitor, maintain, and enforce the ICs identified below in accordance with State of Alaska contaminated site regulations. The remedy for SS014 meets the RAOs and satisfies the following remedy selection criteria for the State of Alaska:

- Practicability
- Protectiveness
- Regulatory compliance
- Short-term risk and long-term effectiveness
- Public acceptance

The remedy as specified by the DD (USAF 2008d) is summarized below:

- ICs that consist of excavation and construction restrictions within the SS014 site boundaries.
- Documentation that soil is contaminated above levels that allow for UU/UE.
- Requirements to ensure that future land use remains nonresidential.

The USAF will implement the ICs at SS014 as required by the LUC Management Plan (USAF 2012) by taking the following actions:

- Delineate boundaries of soil with DRO or GRO above Method Two cleanup levels.
- Place a notice in the BGP (USAF 2008a) to inform site workers that DRO and GRO-contaminated soil is not to be moved or disturbed without notifying ADEC. An appropriate notice will also be filed with the U.S. Fish and Wildlife Service. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil.
- Perform visual inspections every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Notify ADEC prior to making any major changes to the ICs. The 611 CES is the point of contact for the ICs.

The DD for ST009 was signed by the USAF on 26 February 2008. A Cleanup Complete with ICs designation for SS014 was issued upon ADEC signature of the DD on 27 February 2008 (USAF 2008d).

6.3.3 Remedy Implementation

On 20 August 2012, Jacobs conducted a Periodic Review site inspection. Based on observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soils were identified during the inspection.

6.3.4 Progress Since the Last Periodic Review

This is the first Periodic Review for this site.

7.0 SITE DP011 DUMP AREA

The ADEC RecKey for DP011 is 199125X123813. The ADEC Hazard Identification Number for Site DP011 is 1344. No EPA identification number has been assigned.

7.1 CHRONOLOGY OF SITE EVENTS AT DP011

Table 7-1 presents a chronology of site events from 1989 to 2008. The ICs were established in 2008 when the DD was signed.

**Table 7-1
Chronology of Site Events at DP011 Dump Area**

Event	Date
Stage I Work Plan is established for 11 Cape Romanzof sites; one soil sample is proposed for collection at DP011.	1989
An RI/FS of soil, surface water, and groundwater contamination is conducted as a follow-up to 1989 field activities; no evidence was found of the dump area so the proposed soil sample collection is not executed.	1990; Report finalized in 1992
Drum Survey and Inventory Report is issued.	2001
RI/FS of surface soil, surface water, and sediment quality is evaluated.	2004; Report finalized in 2006
Final non-CERCLA Proposed Plan is issued.	2007
The Final DD is issued and Conditional Site Closure (now Cleanup Complete with ICs) is approved by ADEC.	2008

7.2 BACKGROUND OF SITE DP011

This section describes the physical characteristics, land and resource use, the history of contamination, the initial response, and the basis for taking action at DP011.

7.2.1 Physical Characteristics

DP011 is a formerly used disposal area located in the valley east of Towak Mountain where discarded debris was deposited over the years when Upper Camp was active. DP011 consists of two glacially carved bowls (cirques) that drain into Ekashluak Creek. Ekashluak Creek flows into Scammon Bay and, eventually, into the Bering Sea. These two cirques divide the site into two topographical units: the northern cirque and the southern cirque. The hanging valley floor of the northern cirque has served as an effective catchment for discarded drums

and debris. The southern cirque, a topographically smooth bowl that contours down to the headwaters of Ekashluak Creek, also contains discarded drums and debris (USAF 2006a). DP011 has also been known as Upper Camp Debris Area and ROM-7.

7.2.2 Land and Resource Use

This site was used by the LRRS as an area to discard debris. Current land use at DP011 is unrestricted access for recreational and subsistence hunting and fishing. Community members consider the lands and oceans surrounding Cape Romanzof to be important for subsistence purposes. The possibility of contaminant migration is of extreme concern and importance to the health and well-being of local residents. Since Cape Romanzof LRRS is located within the limits of the Yukon Delta National Wildlife Refuge, the adjacent/surrounding land, including DP011, is a federally protected environment. The current use of adjacent/surrounding land, industrial use with temporary residents as well as subsistence use by local residents, is expected to remain the same over the foreseeable future.

7.2.3 History of Contamination

A preliminary survey of DP011 conducted in 2001 concluded that approximately 1,300 to 1,500 primarily empty drums were spread over an area of about a 1 square mile in the Towak Mountain East Valley, which encompasses the northern and southern cirque (USAF 2001b). The northern cirque contained drums that were noted to be primarily empty and concentrated near the ridge directly east of the radar dome. Batteries, electrical components, old paint cans, auto parts, and tower/cable parts were also noted in this area (USAF 2006a).

An estimated 600 to 800 drums were present in the southern cirque. An old dumpsite is present in the northern part of the southern cirque, near the ridge. Old towers, bicycles, rebar, refrigerators, pipes, and miscellaneous cans were also identified. Drums can be found throughout the basin, but the majority of drums are strewn on the northern part of this cirque and have not been removed due to accessibility issues at the site (USAF 2006a).

7.2.4 Initial Response

In 2001, a Cape Romanzof drum inventory identified 1,300 to 1,500 drums in the Towak Mountain East Valley, and approximately 200 drums in the Fowler Creek drainage area just northwest of DP011. Subsequently, 148 drums were removed from the Fowler Creek drainage area; however, accessibility issues have constrained the removal of the drums at Towak Mountain East Valley (USAF 2001b).

7.2.5 Basis for Taking Action

No response action is warranted under CERCLA because concentrations of CERCLA hazardous substances in soil at DP011 do not pose an unacceptable potential risk for human health and the environment. However, a response action is warranted under State of Alaska regulations because DRO concentrations in soil exceed the ADEC 18 AAC 75.341 Method Two Table B2 cleanup level for the under 40-inch zone of 250 mg/kg. The following conditions exist.

- DRO and PCBs are considered the COCs for soil at DP011. However, soil is scarce at the site, and DRO contamination was identified in only two out of sixteen samples. PCB contamination was not above the Method Two cleanup level. Therefore, contamination at DP011 does not pose an unacceptable potential risk to human health or the environment.
- A response action is warranted under State of Alaska regulations (18 AAC 75.341) because concentrations of DRO in soil at DP011 exceed the level that allows for UU/UE.
- A site-specific ADEC Method Three cleanup level of 12,500 mg/kg was calculated for DRO in DP011 soil (USAF 2006a). This cleanup level is protective of the ingestion and inhalation pathways at DP011 based on nonresidential use. ADEC Method Two cleanup levels were selected for all other analytes in soil.

7.3 REMEDIAL ACTIONS

No remedial activities have occurred at DP011 beyond the initial drum removal. Although all debris is accessible by foot, the 2001 survey concluded that transporting or removing additional drums would require special equipment and procedures due to the steep and rocky landscape (USAF 2001b). Based on the 2006 RI/FS, no remedial actions are required at DP011 because PCB concentrations are below the ADEC Method Two cleanup level, DRO contamination is limited, and soil is scarce. Additionally, surface soil and sediment located

downgradient of DP011 have not been affected by PCB or DRO contamination or contaminant migration (USAF 2006a).

7.3.1 Remedial Action Objectives

The overall objectives for DP011 are to ensure that conditions are protective of human health and the environment and comply with state and federal regulations that are legally applicable or relevant to site concerns. The site-specific RAOs for DP011 as listed in the 2008 DD (USAF 2008d) are as follows:

- Document that petroleum hydrocarbons in surface soil exceed levels of protective of unrestricted land use.
- Restrict excavation and transportation of contaminated soil to prevent the migration of contaminants.

These RAOs were developed based on the current and reasonably anticipated future land use of DP011 as described in Section 7.2.2. These RAOs are intended to reduce risk by limiting the potential contamination to spread through unauthorized excavation and disposal.

The objectives for DP011 have been met.

7.3.2 Selected Remedy

The selected remedy for DP011, as set forth in the 2008 DD, is ICs. Proper implementation of ICs and are required to meet the RAOs for DP011 (USAF 2008d). The goals of the ICs are to restrict access to contaminated subsurface soil and document (for waste management purposes in the event of subsurface activities) that soil contamination exceeds the ADEC Method Two cleanup levels that allow for unrestricted use.

USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs identified below in accordance with State of Alaska contaminated site regulations. The selected remedy for DP011 meets the RAOs and satisfies the following remedy selection criteria for the State of Alaska:

- Practicability

- Protectiveness
- Regulatory compliance
- Short-term risk and long-term effectiveness
- Public acceptance

The remedy as specified by the DD (USAF 2008d) is summarized below:

- ICs will consist of excavation and construction restrictions within the DP011 site boundaries.
- Documentation that soil is contaminated above levels that allow for unrestricted use.
- A requirement that future land use remain nonresidential.

The USAF will implement the ICs at DP011 as required by the LUC Management Plan (USAF 2012) through the following actions:

- Delineate boundaries of soil with DRO above the ADEC Method Two cleanup level.
- ICs will consist of a notice in the BGP (USAF 2008a) to inform site workers that DRO-contaminated soil is not to be moved or disturbed without notifying ADEC. An appropriate notice will also be filed with the U.S. Fish and Wildlife Service. The USAF's established dig permit and construction review system will continue to be utilized to restrict activities incompatible with contaminated soil.
- Perform visual inspections every five years to verify the effectiveness of the ICs. The USAF will implement, monitor, maintain, and enforce the ICs until cleanup goals have been met.
- Notify ADEC prior to making any major changes to the ICs. The 611 CES is the point of contact for the ICs.

The DD for DP011 was signed by the USAF on 26 February 2008. A Cleanup Complete with ICs designation for DP011 was issued upon ADEC signature of the DD on 27 February 2008 (USAF 2008d).

7.3.3 Remedy Implementation

On 21 August 2012 and 29 March 2013, Jacobs conducted a Periodic Review site inspection. Based on limited observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soils were identified during the inspection. However, extreme

weather conditions and limited visibility prevented full access to the site at the time of inspections.

7.3.4 Progress Since the Last Periodic Review

This is the first Periodic Review for this site.

8.0 PROGRESS SINCE THE LAST REVIEW

This is the second Five-Year Review for LF003, the second Periodic Review for SS013, and SS015, and the first Periodic Review for ST009, SS014, and DP011.

Since the first Five-Year Review (USAF 2008b) for LF003, a Final ROD has been completed and signed in March 2013. Since the first Periodic Review for SS013, and SS015, a *Proposed Plan Final Remedial Actions for ERP Sites SS013 and SS015* (USAF 2010a) and a *Record of Decision for Diesel Seep Area (SS013) and UST Spill Area (SS015)* (USAF 2011) have been issued.

The conditions reported in this review will serve as the baseline for the next review, which is scheduled to be finalized in 2018.

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9.0 FIVE-YEAR AND PERIODIC REVIEW PROCESS

9.1 ADMINISTRATIVE COMPONENTS OF THE FIVE-YEAR AND PERIODIC REVIEW PROCESS

The USAF initiated a CERCLA Five-Year Review for LF003 and a Non-CERCLA Periodic Review for ST009, SS014, DP011, SS013, and SS015 in May 2012. Jacobs conducted the Five-Year and Periodic Reviews on behalf of the 611 CES. The components listed below were conducted support the development of this Review Report:

- Community Notification and Involvement
- Document Review
- Data Review and Evaluation
- Site Inspection
- Stakeholder Interviews

All of these components were initiated in 2012 and will be completed when this Report is finalized.

9.2 COMMUNITY RELATIONS ACTIVITIES

A Community Relations Plan was prepared for Cape Romanzof LRRS in September 1996 (USAF 1996). The Community Relations Plan was prepared to promote communication between the USAF and the general public during environmental restoration activities at Cape Romanzof. The objective of the Community Relations Plan is to provide accurate, straightforward, and up-to-date information about all phases of cleanup activities to public officials, commercial interests, the community, and other interested parties.

A restoration advisory board (RAB) was formed on 1 September 2000 to serve as a forum for discussion and exchange of information between federal/state agencies and the community regarding the cleanup program at Cape Romanzof LRRS. The RAB provides an opportunity for stakeholders to review cleanup progress, provide input, and participate in dialogue with decision-makers. The RAB is composed of representatives from the local communities and

federal, state, and local governments. RAB meetings have been scheduled at the convenience of the local communities since the first official meeting on 1 September 2000.

As required by CERCLA, an Administrative Record has been established for Cape Romanzof LRRS environmental restoration. The Administrative Record contains the information used to support the USAF decision-making processes regarding Cape Romanzof LRRS. It has been established at the 611 CES located at Joint Base Elmendorf-Richardson and is open to the public. The Administrative Record contents are also available online, although there may be a delay between a document's availability in the physical Administrative Record and its electronic availability on the internet.

A mailing list of interested parties in the community is maintained and updated regularly by the USAF Remedial Project Manager or the Community Relations Coordinator. The mailing list is used to provide interested parties copies of the newsletters, fact sheets, and public meeting notices pertaining to the environmental issues at Cape Romanzof LRRS.

9.2.1 Community Notification and Involvement

The public participation process was performed in a manner consistent with NCP Section 300.430(f)(3). In accordance with the NCP requirements, the USAF distributed the 2011 CERCLA Proposed Plan for LF003 (USAF 2001), the 2010 non-CERCLA Proposed Plan for SS013 and SS015 (USAF 2010a), and the 2007 non-CERCLA Proposed Plan for SS007, ST009, SS014, and DP011 (USAF 2007) to the local communities to solicit public input. USAF mailed the CERCLA and non-CERCLA Proposed Plans to stakeholders two weeks before the start of their respective 30-day public comment periods (15 November to 15 December 2001 for LF003; 15 May 2010 to 15 June 2010 for SS013 and SS015; 31 May 2007 to 30 June 2007 for SS007, ST009, SS014, and DP011).

The CERCLA and non-CERCLA Proposed Plan distribution lists included the Traditional Village Councils and Village Corporations, Post Offices, and local stores for the nearby communities of Hooper Bay, Chevak, and Scammon Bay. Copies of the Proposed Plans were also sent to the Traditional Village Council and Village Corporation of Piamit, which is

currently a summer fish camp with no year-round residents. In addition, copies of the Proposed Plans were also mailed directly to each of the 20 RAB members.

A public meeting for LF003 was held at Chevak City Hall on 28 November 2001 to discuss the proposed remedies. Three sets of written comments were provided to USAF and verbal comments were taken during the public meeting. USAF responses to comments received during the public comment period are part of the Administrative Record for Cape Romanzof (USAF 2001).

A Public Meeting for SS013 and SS015 was not requested by the community. No requests for an extension of the 30-day comment period were received, and no comments were provided to the USAF.

A public meeting was held for SS007, ST009, SS014, and DP011 in Hooper Bay on 30 July 2007 to discuss the proposed remedies. Three sets of written comments were provided to USAF and verbal comments were taken during the public meeting. USAF responses to comments received during the public comment period are part of the Cape Romanzof Administrative Record and are also documented in the Final DD (USAF 2008d).

A public notice for the 2012 second Five-Year Review and first and second Periodic Review process presented herein was published 12 September 2012 in *The Delta Discovery*. To date, no public comments have been received. A copy of the published public notice is located in Appendix E.

9.3 DOCUMENT REVIEW

The document review included monitoring data, RODs, DDs, the Administrative Record, and ADEC contaminated sites database reports. Specific documents used in the preparation of this Five-Year Review and Periodic Review Report are listed in Section 14.0 of this document. Applicable soil and groundwater cleanup standards were also reviewed.

9.4 DATA REVIEW AND EVALUATION

Soil and groundwater monitoring has been conducted at these sites since the 1990s. In general, most contaminants were detected at their highest levels early in the history of the site. These high concentrations were followed by a drop in contaminant concentrations that are likely the result of natural attenuation.

9.4.1 LF003

Based on the findings of the 2008 RI (USAF 2009), remedial action was recommended to eliminate PCB sources at the landfill, which may continue to leach into surface water and sediments. The ADEC required removal of PCB-contaminated soils to a concentration of 1 mg/kg, which is the ADEC Method Two cleanup level that allows for UU/UE, or 10 mg/kg with ICs and the placement of a cap over remaining contaminated soils.

Contaminated sediments along the seep emanating from the northwest toe of the landfill contain much higher PCB concentrations, ranging from 40 mg/kg to 230 mg/kg. As PCBs were generally only detected from the northwest seep, the source of these PCBs may be located within the landfill, along the northwest edge. These data indicate that PCB contamination is migrating from an identified location within the landfill, and downgradient toward Fowler Creek, although no PCB contamination of the creek has been discovered to date (USAF 2009).

9.4.2 SS013

Based on the 2003 through 2008 monitoring results, no soil contamination above cleanup levels remains at SS013. DRO and RRO concentrations are below ADEC Method Three cleanup levels calculated for the site and other petroleum constituents are below ADEC Method Two cleanup levels. Groundwater contamination levels have decreased below ADEC Table C cleanup levels (USAF 2011).

Overall, the monitoring data indicate that the hydrocarbon impacts are primarily limited to the spill site area with no evidence of impact to surface water in Fowler Creek. Natural attenuation is likely occurring.

9.4.3 SS015

Historical data from 1993 through 2007 shows that the petroleum hydrocarbon plume at this site is primarily defined by Monitoring Wells WW-01, WW-02, and WW-04.

The downgradient extent of the hydrocarbon plume is constrained by Monitoring Wells WW-05 and WW-06, and to a lesser extent, wells WW-07 and WW-08. The groundwater monitoring data for these monitoring wells show no evidence of hydrocarbon impacts from the groundwater contamination; all results have been below RAOs with the exception of DRO reported at WW-06 in 1993. These groundwater monitoring results indicate that the plume is stable (no downgradient migration of contaminants to these well locations).

The primary lines of evidence for natural attenuation at SS015 are a stable plume size and declining (benzene) or stable hydrocarbon levels at WW-02. The geochemical data for dissolved oxygen, iron, and manganese provide a secondary line of evidence for natural attenuation of the petroleum hydrocarbon contamination (USAF 2008b).

9.4.4 ST009

In 1990, one soil sample was collected at ST009 and analyzed for TPH as part of the RI/FS. Analytical results indicated a TPH concentration of 4,900 mg/kg. This contamination indicated a potentially significant environmental risk at ST009 (USAF 1992).

The results of the 2004 SI concluded that surface water and sediment are not adversely affected by the on-site soil contamination. Elevated metal concentrations were present in surface water samples, but do not appear to be a result of petroleum contamination. Soil and groundwater have been affected by former site activities, as evidenced by elevated concentrations of DRO. The detected concentrations of GRO, RRO, PCBs, BTEX compounds, and lead were below the ADEC Method Two cleanup levels specified in 18 AAC

75, Tables B1, B2, and C. DRO concentrations were below the Method Three site-specific cleanup level for this site. The recommendations for ST009, based on these results, included annual monitoring of groundwater and surface water conditions for three years in order to establish a general trend for contaminants. Additionally, it was proposed that after three consecutive years of monitoring and after review of the data, the monitoring frequency and list of analytes would be evaluated (USAF 2006b).

Evaluation of the 2004, 2007, 2008, and 2009 monitoring data indicates that surface water results are consistently below water quality criteria specified in 18 AAC 70 and are not increasing. The historical data from ST009 and the 2009 analytical results indicate that the concentration of fuel contamination at the site is decreasing over time and the contamination plume is likely not measurably affecting Kokechik Bay. The 2009 LTM results recommended sampling for two consecutive years in order to provide three consecutive years of data evaluation using a statistically valid trend analysis (as stipulated in the 2008 ROD) to demonstrate that downgradient wells (MW-7 and MW-9) do not have increasing levels of DRO, GRO, or BTEX, and surface water results are consistently below water quality criteria (USAF 2010c).

9.4.5 SS014

In 1989, two soil samples were collected from within the stained area and one water sample and one sediment sample were collected immediately downstream in one of the beaver ponds. The samples were analyzed for TPH, metals, VOCs, SVOCs, PCBs, and pesticides. High concentrations of TPH were detected in the two soil samples, and a low concentration of PCBs was detected in one of the soil samples. BTEX were not detected in any of the samples. The 1989 soil sample results do not reflect current site conditions because the area sampled was subsequently removed during excavation in 1994. Of 27 confirmation samples collected from the excavation in 1994, three sample results exceeded the ADEC Method Two DRO cleanup level (250 mg/kg). The excavation was deepened in these areas and new confirmation samples were collected. The new confirmation sample results were below the Method Two cleanup level for DRO (USAF 2008d).

Based on the 2004 sample results, surface water, sediment, and groundwater have not been adversely affected at SS014. Soil has been affected by former site activities as evidenced by elevated concentrations of DRO and GRO, but the detected concentrations of RRO, PCBs, VOCs, and polycyclic aromatic hydrocarbons were below the ADEC Method Two soil cleanup levels specified in 18 AAC 75, Tables B1 and B2, and the detected concentrations of DRO and GRO were below Method Three site-specific cleanup levels approved for use at SS014. No further monitoring was recommended (USAF 2006b).

9.4.6 DP011

Based on the 2004 sample results, contamination levels at DP011 do not pose unacceptable risk to human health or the environment. In soil, the maximum DRO concentration is below the ADEC Method Three DRO cleanup level of 12,500 mg/kg, which has been approved for use at DP011. Concentrations of all other analytes are below ADEC Method Two cleanup levels. Groundwater has not been encountered at DP011 (USAF 2008d).

9.5 SITE INSPECTIONS

On 20 and 21 August 2012, and 29 March 2013 (DP011 only) Jacobs conducted site inspections at LF003, SS013, SS015, ST009, SS014, and DP011 as part of the Five-Year and Periodic Review process. The purpose of the inspections was to assess the protectiveness of the ROD- and DD-selected remedies and ICs. No evidence of excavations or soil disturbance was identified during the inspections.

The ICs that are in place include prohibitions on the use or disturbance of soil and groundwater until cleanup levels are achieved. No activities were observed that would have violated the ICs. The site areas and boundaries were relatively undisturbed except for minor damage to wells that will need maintenance (LF003, SS015, ST009, SS014) and some glass debris that should be removed (SS014). No groundwater use was observed.

The integrity of the landfill at LF003, as observed during the 2012 site inspection, supports the assessment in the 2008 Five-Year Review (USAF 2008b). The landfill liner appears to be

intact; however, seeps at the toe of the landfill that indicate that groundwater is still entering and exiting the landfill area.

No photographs were taken from site DP011 due to extreme weather conditions and limited visibility. On 29 March 2013, a second inspection was attempted at site DP011; however, weather conditions (i.e. limited visibility and winds) prevented personnel from accessing the site on foot. One photograph was taken during this inspection. Photographs from the all of the site inspections are provided in Appendix A. This might affect the conclusions documented in this review.

9.6 STAKEHOLDER INTERVIEWS

Interview questionnaires were generated as part of the Five-Year and Periodic Review process. Additionally, Jacobs reviewed the LUC Management Plan (USAF 2012) and the BGP (USAF 2008a) to confirm that these documents are operational (or are being followed) at Cape Romanzof LRRS. Jacobs confirmed with the Base Operating System Contractor and the USAF that the dig permit system is being followed for the ERP sites located at the Cape Romanzof LRRS.

Appendix C includes copies of the original interviews submitted by each stakeholder. Table 9-1 presents the interview team.

**Table 9-1
Cape Romanzof LRRS Five-Year Review and Periodic Review Team**

Team Member	Organization	Phone	Contact E-mail
Keith Barnack	USAF 611 CES	907-552-5160	keith.barnack@us.af.mil
Louis Howard	ADEC Contaminated Sites Program	907-269-7552	louis.howard@alaska.gov
Eric Stice	ARCTEC Alaska	907-562-4917	eric.stice@arctecalaska.com
Paul Cooley	ARCTEC Alaska	907-552-7586	paul.cooley@arctecalaska.com

On 26 October 2012, interview questionnaires were sent to Louis Howard, ADEC Contaminated Sites Environmental Program Specialist, Keith Barnack, Remedial Project Manager for the 611 CES, and Eric Stice, Contracts Manager for ARCTEC Alaska, the Base Operation Support contractor.

Mr. Howard did not have any additional information to add to the Five-Year and Periodic Review process regarding LF003, SS013, SS015, ST009, SS014, or DP011. Mr. Howard also commented, “the Final ROD for LF003 is in progress and should be final in early 2013. Additional characterization was accomplished at LF003 resulting in a (future) larger scale remedial action response in the upcoming Final ROD verses the original Interim ROD.”

Mr. Barnack commented, “there has been some animosity and mistrust of the Air Force by local communities over Cape Romanzof LRRS since it was first constructed in the late 1950s.”

Mr. Howard and Mr. Barnack stated that they were satisfied with the progress and the implementation and effectiveness of the LTM and ICs at the Cape Romanzof LRRS sites.

Mr. Paul Cooley returned the interview form on behalf of ARCTEC Alaska. Mr. Cooley said that site operations and administration at LF003, SS013, SS015, ST009, SS014, and DP011 had no impact on the operations at the LRRS.

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10.0 TECHNICAL ASSESSMENT

10.1 LF003 LANDFILL NO. 2

Question A: Is the remedy functioning as intended by the Record of Decision?

Answer: No

Remedial Action Performance: The remedy is not functioning as intended by the 2002 ROD for Interim Remedial Action. The USAF identified that a new remedy was necessary in the First Five-Year Review (USAF 2008b), and a new ROD was approved and signed by the USAF and ADEC in March 2013.

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 2.3.3 in accordance with 18 AAC 75.375. Landfill cap inspections have occurred during each of the LTM events. In addition to the ICs, the following actions have been or will be taken to ensure the integrity (or to monitor the deficiencies) of the selected remedies:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC. Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- The USAF shall address any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the ICs as soon as practicable after discovery, but in no case will the process be initiated later than 10 days after the USAF becomes aware of the breach.
- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the ICs.
- In the event that the ICs fail or are deficient and could imminently lead to actual risk to human health and the environment, the USAF will address the situation promptly, including notification to ADEC.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC prior to any transfer, sale, or lease of the property,

so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain the ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: No opportunities for optimization have been identified since the last Five-Year Review was conducted in 2008. New remedies are discussed in the 2013 ROD and opportunities for optimization will be discussed in the next Five-Year Review.

Early Indicators of Potential Issues: The protective metal casing at monitoring well CMW7 has exposed the wellhead and standing water surrounds the well. No effects on remedy protectiveness are anticipated as a result, but maintenance is recommended. No additional actions other than ongoing inspections are necessary at this time.

Implementation of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent human and environmental exposure to contaminants. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: The ADEC cleanup level for PCBs in surface water has changed from 0.0005 mg/L to 0.000014 mg/L (24-hour average, ADEC 2012b). The ADEC cleanup level for PCBs in soil has changed from 10 mg/kg to 1.0 mg/kg (ADEC 2012c). ADEC does not provide cleanup levels for sediment, but ADEC guidance included a PCB screening criteria of 0.0341 mg/kg in sediments (National Oceanic and Atmospheric Administration [NOAA 2008]).

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, or other contaminant characteristics have occurred at LF003.

Changes in Toxicity and Other Contaminant Characteristics: Toxicity and contaminant concentrations have not been reduced through remedial actions at LF003. The originally

selected remedies for LF003 are not protective of human health and the environment and do not comply with State of Alaska requirements. A new ROD was approved and signed in March 2013.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the baseline Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to the surrounding residents (USAF 2009). The toxicity factors for the contaminants of concern are the same as those used in the risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs: The selected remedy does not prevent exposure to humans and the environment and does not fulfill the RAOs stated in the 2002 ROD for Interim Remedial Action (USAF 2002). A new ROD was approved and signed in March 2013 and is expected to prevent exposure to humans and the environment and fulfill the revised RAOs (see Section 2.3.4).

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

Answer: Yes

The current remedy is not protective as implemented. A new ROD was approved and signed by USAF and ADEC in March 2013. The protectiveness of the new LF003 site remedy will be evaluated in the next Five-Year Review.

10.1.1 LF003 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is not functioning as intended by the 2008 ROD for Interim Remedial Action (USAF 2002). The protectiveness of the remedy selected in the 2013 ROD will be addressed in the next Five-Year Review.

10.2 SS013 DIESEL SEEP AREA

Question A: Is the remedy functioning as intended by the Decision Document?

Answer: Yes

Remedial Action Performance: The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended by the DD (USAF 2011).

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 3.3.2, in accordance with 18 AAC 75.375. Interim reports will be prepared no less often than once every five years to ensure that the remedy is still protective of human health and the environment. In addition to the ICs, the following actions have been or will be taken to ensure the integrity of the selected remedy:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC.
- Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- A report on the status of ICs at SS013 will be submitted to ADEC with IC monitoring results no less often than once every five years. The report shall include (1) the inspection checklists completed during the reporting period, (2) a statement as to whether all ICs defined herein are being adhered to and (3) a description of any deficiencies in the ICs, if identified, and what efforts or corrective measures have been taken or will be taken to correct those deficiencies. The report will be filed in the Cape Romanzof LRRS Administrative Record.
- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the ICs. USAF shall include in such notice a list of corrective actions taken or planned to address such deficiency or failure.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- If the USAF requires a substantial IC modification or termination of the ICs inconsistent with the DD, USAF and ADEC will issue an addendum to the DD.

- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC at least six months prior to any transfer, sale, or lease of the property, so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain the ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: Due to the remote nature and approval process required to visit SS013, optimization of remedies is not necessary at this time. Construction costs to improve the remedies would not add a proportionate value to the ICs.

Early Indicators of Potential Issues: No early indicators of potential issues were discovered during the 2012 site inspection. No actions other than ongoing inspections are necessary at this time.

Implementations of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent contaminant exposure to humans and the environment. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection are still valid. The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection are still valid. The selected remedies for SS013 comply with State of Alaska requirements under 18 AAC 75.325-390.

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, and other contaminant characteristics have occurred at SS013.

Changes in Toxicity and Other Contaminant Characteristics: No remedial actions have occurred at SS013 since remedy implementation. LTM samples from 2004 indicate that COCs groundwater are below cleanup criteria and groundwater toxicity and contaminants appear to be attenuating naturally over time. The selected remedies for SS013 are protective of human health and the environment, comply with State of Alaska requirements, and are cost-effective.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the Ecological Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to the environment (USAF 2011). The toxicity factors for the contaminants of concern are the same as those used in the risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAO: The selected remedy continues to prevent exposure to humans and the environment and to fulfill the RAO stated in the 2011 DD (USAF 2011).

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

Answer: No

10.2.1 SS013 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is functioning as intended by the DD (USAF 2011).

10.3 SS015 UST SPILL AREA

Question A: Is the remedy functioning as intended by the Decision Document?

Answer: Yes

Remedial Action Performance: The results of the August 2012 site inspection indicate that the remedy is functioning as intended by the DD (USAF 2011). Both the lock and well cap on WW-03 are broken and WW-01 is unmarked; both require maintenance.

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 4.3.2, in accordance with 18 AAC 75.375. Interim reports will be prepared no less often than once every five years to ensure that the remedies are still protective of human health and the environment. In addition to the ICs, the following actions have been or will be taken to ensure the integrity of the selected remedy:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC.
- Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- A status report on the ICs will be submitted to ADEC with IC monitoring results no less often than once every five years. The report shall include (1) the inspection checklists completed during the reporting period, (2) a statement as to whether all ICs defined herein are being adhered to and (3) a description of any deficiencies in the ICs, if identified, and what efforts or corrective measures have been taken or will be taken to correct those deficiencies. The report will be filed in the Cape Romanzof LRRS Administrative Record.
- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the ICs. The USAF shall include in such notice a list of corrective actions taken or planned to address such deficiency or failure.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- If the USAF requires a substantial IC modification or termination of the ICs inconsistent with the DD, USAF and ADEC will issue an addendum to the DD.
- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC at least six months prior to any transfer, sale, or lease of the property, so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: Due to the remote nature and approval process required to visit SS015, optimization of remedies is not necessary at this time. Continued monitoring is

sufficient and construction costs to improve the remedies would not add a proportionate value to the ICs.

Early Indicators of Potential Issues: No early indicators of potential issues were discovered during the 2012 site inspection. No actions other than ongoing inspections are necessary at this time.

Implementations of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent contaminant exposure to humans and the environment. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid. The selected remedies for SS015 comply with State of Alaska requirements under 18 AAC 75.325-390.

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, and other contaminant characteristics have occurred at SS015.

Changes in Toxicity and Other Contaminant Characteristics: Toxicity and contaminant concentrations have been reduced through remedial actions. The selected remedies for SS015 are protective of human health and the environment, comply with Federal and State of Alaska requirements, and are cost-effective.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the Ecological Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to the environment (USAF 2011). The toxicity factors for the contaminants of

concern are the same as those used in the baseline risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Toward Meeting RAOs: The selected remedy continues to prevent exposure to humans and the environment and to fulfill the RAOs stated in the 2011 DD (USAF 2011).

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

Answer: No

10.3.1 SS015 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is functioning as intended by the DD (USAF 2011).

10.4 ST009 SPILL/LEAK 3

Question A: Is the remedy functioning as intended by the Decision Document?

Answer: Yes

Remedial Action Performance: The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended by the DD (USAF 2008d). The beaver dam and Fowler Creek showed no signs of stress, and no signs of trespassing were evident at ST009. Natural attenuation and ICs have achieved the RAOs to minimize migration of contaminants to groundwater and surface water, and to prevent direct contact or ingestion of contaminants in soil and groundwater.

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 5.3.2, in accordance with 18

AAC 75.375. In addition to the ICs, the following actions have been or will be taken to ensure the integrity of the selected remedy:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC. Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- The USAF shall address any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the IC as soon as practicable after discovery, but in no case will the process be initiated later than 10 days after USAF becomes aware of the breach.
- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the IC.
- In the event that the ICs fail or become deficient and could imminently lead to actual risk to human health and the environment, the USAF will address the situation promptly, including notification to ADEC.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC prior to any transfer, sale, or lease of the property so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain the ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: Due to the remote nature and approval process required to visit ST009, optimization of remedies is not necessary at this time. Continued monitoring is sufficient and construction costs to improve the remedies would not add a proportionate value to the ICs.

Early Indicators of Potential Issues: Frost jacking was observed at MW-5, but this is unlikely to affect the future protectiveness of the remedy; maintenance is recommended. No additional actions other than ongoing inspections are necessary at this time.

Implementations of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent contaminant exposure to humans and the environment. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: Revisions to the footnotes in ADEC 18 AAC 75.341 Method Two, Table B2 took effect in 2009 and 2012. However, these changes did not affect the cleanup levels agreed upon in the 2008 DD (USAF 2008d). The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid. The selected remedies for ST009 comply with State of Alaska requirements under 18 AAC 75.325-390 (ADEC 2012c).

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, or other contaminant characteristics have occurred at ST009.

Changes in Toxicity and Other Contaminant Characteristics: No changes in toxicity and other contaminant characteristics have occurred at ST009. All of the buildings/structures were removed prior to the 1989 RI and no further remedial actions have occurred at ST009 because detected concentrations of contaminants in groundwater have not migrated to adjacent surface waters (USAF 2006b). The selected remedies for ST009 are protective of human health and the environment, comply with Federal and State of Alaska requirements, and are cost-effective.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to surrounding residents (USAF 2008d). The toxicity factors for the contaminants of concern are the same as those used in the baseline risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs: The selected remedy continues to prevent exposure to humans and the environment and to fulfill the RAOs stated in the 2008 DD (USAF 2008d).

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

Answer: No

10.4.1 ST009 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is functioning as intended by the 2008 DD (USAF 2008d). No changes in the toxicity factors or the standardized risk assessment methodology have occurred that affect the protectiveness of the remedy. Ongoing monitoring and continued Periodic Reviews of ST009 should continue as required by the DD.

10.5 SS014 DRUM STORAGE AREA

Question A: Is the remedy functioning as intended by the Decision Document?

Answer: Yes

Remedial Action Performance: The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended by the DD (USAF 2008d). The beaver dam and Fowler Creek showed no signs of stress and no signs of trespassing were evident at SS014. Natural attenuation and ICs have achieved the RAOs to minimize migration of contaminants to groundwater and surface water, and to prevent direct contact or ingestion of contaminants in soil and groundwater.

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 6.3.2, in accordance with 18 AAC 75.375. In addition to the ICs, the following actions have been or will be taken to ensure the integrity of the selected remedy:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC. Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- The USAF shall address any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the ICs as soon as practicable after discovery, but in no case will the process be initiated later than 10 days after USAF becomes aware of the breach.
- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, controls, or any action that may interfere with the effectiveness of the IC.
- In the event that the ICs fail or become deficient and could imminently lead to actual risk to human health and the environment, the USAF will address the situation promptly, including notification to ADEC.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC prior to any transfer, sale, or lease of the property, so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain the ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: Due to the remote nature and approval process required to visit SS014, optimization of remedies is not necessary at this time. Continued monitoring is sufficient and construction costs to improve the remedies would not add a proportionate value to the ICs.

Early Indicators of Potential Issues: Frost jacking was observed at MW-1, MW-2, and MW-3, but this is unlikely to affect the future protectiveness of the remedy; maintenance is recommended. No additional actions other than ongoing inspections are necessary at this time.

Implementations of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent contaminant exposure to humans and the environment. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: Revisions to the footnotes in ADEC 18 AAC 75.341 Method Two, Table B2 took effect in 2009 and 2012. However, these changes did not affect the cleanup levels agreed upon in the 2008 DD (USAF 2008d). The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid. The selected remedies for SS014 comply with State of Alaska requirements under 18 AAC 75.325-390 (ADEC 2012c).

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, and other contaminant characteristics have occurred at SS014.

Changes in Toxicity and Other Contaminant Characteristics: Contaminant concentrations have been reduced through remedial actions. The selected remedies for SS014 are protective of human health and the environment, comply with Federal and State of Alaska requirements, and are cost-effective.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to surrounding residents (USAF 2008d). The toxicity factors for the contaminants of concern are the same as those used in the baseline risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs: The selected remedy continues to prevent exposure to humans and the environment and to fulfill the RAOs stated in the 2008 DD (USAF 2008d).

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

Answer: No

10.5.1 SS014 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is functioning as intended by the DD (USAF 2008d).

10.6 DP011 DUMP AREA

Question A: Is the remedy functioning as intended by the Decision Document?

Answer: Yes

Remedial Action Performance: The results of the August 2012 site inspections and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended by the DD (USAF 2008d). Based on limited observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soil was identified during the inspection; however, extreme weather conditions and limited visibility prevented access to the site on foot.

System Operations/Operations and Maintenance: The USAF is responsible for implementing, monitoring, maintaining, and enforcing the ICs listed in Section 7.3.2 in accordance with 18 AAC 75.375, and also responsible for environmental monitoring. In addition to the ICs, the following actions have been or will be taken to ensure the integrity of the selected remedy:

- Visual inspections have been performed to verify the effectiveness of the ICs and the inspection results have been reported to ADEC. Inspection reports are being prepared no less than once every five years to evaluate the status of the ICs and how any IC deficiencies or inconsistent uses have been addressed.
- Any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the IC shall be addressed by the USAF as soon as practicable after discovery, but in no case will the process be initiated later than 10 days after the USAF becomes aware of the breach.

- The USAF shall provide notice to ADEC as soon as practicable after discovery of any activity that is inconsistent with IC requirements, objectives, or controls, or any action that may interfere with the effectiveness of the IC.
- In the event that the ICs fail or are deficient and could imminently lead to actual risk to human health and the environment, the USAF will address the situation promptly, including notification to ADEC.
- The USAF will obtain ADEC approval prior to conducting any excavation activities within the contaminated areas.
- In the event that the property is transferred, the property transfer document will describe the ICs. The USAF will notify ADEC prior to any transfer, sale, or lease of the property so that ADEC can be involved in discussions to ensure that appropriate provisions to maintain the ICs are included in the transfer terms or conveyance of documents.

Opportunities for Optimization: Due to the remote nature and approval process required to visit DP011, optimization of remedies is not necessary at this time. Construction costs to improve the remedies would not add a proportionate value to the ICs.

Early Indicators of Potential Issues: No early indicators of potential issues were discovered during the 2012 site inspection. No actions other than ongoing inspections are necessary at this time.

Implementations of Institutional Controls and Other Measures: The ICs include access authorization and dig permits to prevent contaminant exposure to humans and the environment. The remote location of the site acts as an additional barrier by minimizing human exposure to contamination.

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

Answer: Yes

Changes in Standards and To Be Considered: Revisions to the footnotes in ADEC 18 AAC 75.341 Method Two, Table B2 took effect in 2009 and 2012. However, these changes did not affect the cleanup levels agreed upon in the 2008 DD (USAF 2008d). The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection

are still valid. The selected remedies for DP011 comply with State of Alaska requirements under 18 AAC 75.325-390 (ADEC 2012c).

Changes in Exposure Pathways: No changes in exposure pathways, toxicity, and other contaminant characteristics have occurred at DP011.

Changes in Toxicity and Other Contaminant Characteristics: No remedial actions at DP011 have occurred. Surface soil and sediment located downgradient of DP011 have not been affected by PCB or DRO contamination or contaminant migration (USAF 2006a). The selected remedies for DP011 are protective of human health and the environment, comply with State of Alaska requirements, and are cost-effective.

Changes in Risk Assessment Methods: No changes in the risk assessment methods have occurred. The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures to the Cape Romanzof LRRS staff and potential future exposures to surrounding residents (USAF 2008d). The toxicity factors for the contaminants of concern are the same as those used in the baseline risk assessment. These assumptions are considered conservative and reasonable in evaluating current and future risk. No changes to these assumptions are warranted. There has been no change to the standard risk assessment methodology that could affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs: The selected remedy continues to prevent exposure to humans and the environment and to fulfill the RAOs stated in the 2008 DD (USAF 2008d).

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

Answer: No

10.6.1 DP011 Technical Assessment Summary

According to the data reviewed, site inspection, and interviews, the remedy is functioning as intended by the DD (USAF 2008d).

11.0 ISSUES, RECOMMENDATIONS, AND FOLLOW-UP ACTIONS

Table 11-1 presents the recommendations and follow-up activities for the six ERP sites.

**Table 11-1
Recommendations and Follow-up Actions**

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Yes/No)	
					Current	Future
LF003						
The protective metal casing at monitoring well CMW7 has exposed the wellhead and there is standing water surrounding the well.	Maintenance	611 CES	ADEC	2013	No	No
SS013						
None	None	611 CES	ADEC	2013	No	No
SS015						
Well WW-03 lock and protective cap are broken off	Lock and cap replacement	611 CES	ADEC	2013	No	No
Well WW-01 on south side of site is unmarked	Mark well	611 CES	ADEC	2013	No	No
ST009						
Frost jacking has affected MW-5	Maintenance	611 CES	ADEC	2013	No	No
SS014						
Frost jacking has affected MW-1, MW-2, and MW-3	Maintenance	611 CES	ADEC	2013	No	No
Broken glass around wooden platform	Removed broken glass	611 CES	ADEC	2013	No	No
DP011						
Extreme weather conditions (high winds) and limited visibility prevented access to the site on foot	None	611 CES	ADEC	2013	No	No

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12.0 PROTECTIVENESS STATEMENT(S)

The selected remedies for LF003 (Landfill No. 2) as presented in the 2002 ROD for Interim Remedial Action are not protective of human health and the environment and do not comply with federal and state requirements that are legally applicable or relevant and appropriate. A new ROD was approved and signed in March 2013. The remedy selected in the new ROD will be reviewed as part of the next Five-Year Review for LF003 in 2018.

The selected remedies for ERP Sites SS013 (Diesel Seep Area), SS015 (UST Spill Area), ST009 (Spill/Leak 3), SS014 (Drum Storage Area), and DP011 (Dump Area) are protective of human health and the environment, comply with federal and state requirements that are legally applicable or relevant and appropriate, and are considered cost-effective. The exposure assumptions, toxicity data, and cleanup levels, used at the time of the remedy implementation are still valid. The remedies currently meet the RAOs established in the DDs (USAF 2008d and 2011), which include preventing contaminant migration from the site, and preventing exposure to the contaminants.

Monitoring wells at sites LF003, SS015, ST009, and SS014 should undergo maintenance to ensure proper function as discussed throughout this Review Report.

The ICs in place at LF003, SS013, SS015, ST009, SS014, and DP011 have been documented as required by the LUC Management Plan (USAF 2012) in the BGP (USAF 2008a).

As of this Five-Year and Periodic Review, the USAF certifies that the remedies selected for ERP SS013, SS015, ST009, SS014, and DP011 remain protective of human health and the environment, and a new ROD has been developed and approved to achieve protectiveness at LF003. The long-term protectiveness of all the selected remedies and ICs will be verified through future Five-Year and Periodic Reviews.

(intentionally blank)

13.0 NEXT FIVE-YEAR REVIEW AND PERIODIC REVIEW

The third Five-Year Review for ERP site LF003, the third Periodic Review for ERP sites SS013 and SS015, and the second Periodic Review for ERP sites ST009, SS014, and DP011, are tentatively scheduled to be finalized in 2018, five years from the date of this review.

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14.0 LIST OF DOCUMENTS REVIEWED

- ADEC (Alaska Department of Environmental Conservation). 2012a. *Contaminated Sites Program Database*. Available at: http://dec.alaska.gov/spar/csp/db_search.htm.
- ADEC. 2012b (April 8). *Alaska Water Quality Standards*. 18 AAC 70.
- ADEC. 2012c (April 8). *Oil and Other Hazardous Substances Pollution Control*. 18 AAC 75.
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- DoD (U.S. Department of Defense). DODM 4715.20 2012(March). *Defense Environmental Restoration Program (DERP) Management*. Enclosure 3, "Procedures." Section 5.a.(4).
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- EPA 2011a (December). Transmittal of the updated Five-Year Review Summary Form. Included in the Executive Summary of this document.
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- EPA. 2001 (June). *Comprehensive Five-Year Review Guidance*. Prepared by Office of Emergency and Remedial Response. OSWER Directive 9355.7-03B-P. Available at: <http://www.epa.gov/superfund/accomp/5year/index.htm>.
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- USAF. 2011 (January). *Record of Decision Diesel Seep Area (SS013) and UST Spill Area (SS015)*. Cape Romanzof, Alaska.
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- USAF. 2008b (April). *Final First Five-Year Review, Cape Romanzof Sites LF003, SS013, and SS015*. Cape Romanzof LRRS, Alaska.
- USAF. 2008c (April). *2007 Environmental Monitoring Report for Landfill 2 (LF003) and Spill Sites SS013 and SS015*. Cape Romanzof, Alaska.
- USAF. 2008d (February). *Record of Decision Spill/Leak 1 & 2 (SS007), Spill/Leak 3 (ST009), Drum Storage Area (SS014), Dump Area (DP011)*. Cape Romanzof, Alaska.
- USAF. 2007 (May). *Proposed Plan Final Actions for Four ERP Sites*. Cape Romanzof, Alaska.
- USAF. 2006a (July). *Final Remedial Investigation Report Debris Area (DP11)*. Cape Romanzof, Alaska
- USAF. 2006b (August). *Final Site Characterization Report for Sites SS014 and ST009*. Cape Romanzof LRRS, Alaska. Prepared by Paug-Vik, Inc.
- USAF. 2005. (February). *Former Landfill (LF003) Surface Soil Investigation Report*, Cape Romanzof LRRS, Alaska. (Prepared by Paug-Vik, Inc.).
- USAF. 2002 (March). *Record of Decision for Interim Remedial Action. Sites: Spill Site SS013, Spill Site SS015, and Landfill Site LF003*. Cape Romanzof LRRS, Alaska.
- USAF. 2001a (November). *Proposed Plan for Cleanup. Landfill (LF03), Spill Site SS13, and Spill Site SS15*. Cape Romanzof LRRS, Alaska.
- USAF. 2001b (October). *Drum Inventory and Survey Report for Clean Sweep Remedial Action, Cape Romanzof LRRS, Alaska*.
- USAF. 2001c (August). *Final Long-Term Monitoring for Landfill 2 (LF03), SS13, and SS15*. Cape Romanzof, Alaska.
- USAF. 1998. (July). *SS015 Technical Report. Final*.
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- USAF. 1995 (April). *Cape Romanzof LRRS Alaska Final Report: Investigation, Delineation, and Excavation of Contaminated Soil from Stockpile Near SS15 site, Waste Accumulation Area 3 (SS08); Drum Storage Area (SS14), Petroleum, Oil, and Lubricants Fill Stand (ST09); Construction of Cells for Contaminated Soil, Capping of*

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APPENDIX A
Photograph Log

Cape Romanzof LRRS Five-Year Review

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Photo No. 1 – 20 August 2012
ST009 Spill/Leak No. 3; MW-9 facing south.



Photo No. 2 – 20 August 2012
ST009 Spill/Leak No. 3; MW-8 facing south.

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Photo No. 3 – 20 August 2012
ST009 Spill/Leak No. 3; view facing southwest.



Photo No. 4 – 20 August 2012
ST009 Spill/Leak No. 3; view facing north.

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Photo No. 5 – 20 August 2012
ST009 Spill/Leak No. 3; MW-5; view facing northwest.



Photo No. 6 – 20 August 2012
ST009 Spill/Leak No. 3; MW-5; view facing northwest.

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Photo No. 7 – 20 August 2012
ST009 Spill/Leak No. 3; view facing northwest.



Photo No. 8 – 20 August 2012
SS014 Drum Storage Area; Fowler Creek; view facing north.

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Photo No. 9 – 20 August 2012
SS014 Drum Storage Area; road from ST009 to SS014; view facing north.



Photo No. 10 – 20 August 2012
SS014 Drum Storage Area; Fowler Creek; view facing north.

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Photo No. 11 – 20 August 2012
SS014 Drum Storage Area; MW3; view facing west



Photo No. 12 – 20 August 2012
SS014 Drum Storage Area; MW1; view facing west.

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Photo No. 13 – 20 August 2012

SS014 Drum Storage Area; plywood tent foundation; view facing south.



Photo No. 14 – 20 August 2012

SS014 Drum Storage Area; plywood tent foundation; view facing south.

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Photo No. 15 – 20 August 2012
SS014 Drum Storage Area; concrete slab at west end of site.



Photo No. 16 – 20 August 2012
SS014 Drum Storage Area; concrete slab at west end of site.

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Photo No. 17 – 20 August 2012
SS014 Drum Storage Area; Fowler Creek; view facing south.



Photo No. 18 – 20 August 2012
LF003 Landfill No. 2; View from south end of site.

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Photo No. 19 – 20 August 2012
LF003 Landfill No. 2; CMW5; view facing southwest.



Photo No. 20 – 20 August 2012
LF003 Landfill No. 2; CMW4; view facing southwest.

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Photo No. 21 – 20 August 2012
LF003 Landfill No. 2; CMW4; view facing down.

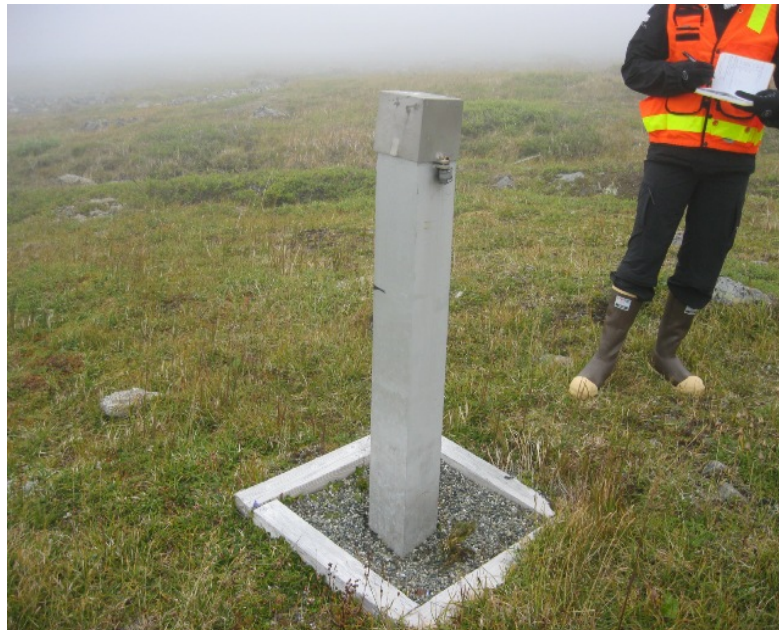


Photo No. 22 – 20 August 2012
LF003 Landfill No. 2; CMW6; view facing southeast.

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Photo No. 23 – 20 August 2012
LF003 Landfill No. 2; CMW7; view facing southeast.



Photo No. 24 – 20 August 2012
LF003 Landfill No. 2; CMW7; view facing northeast.

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Photo No. 25 – 20 August 2012
LF003 Landfill No. 2; debris located at south end of site.



Photo No. 26 – 20 August 2012
LF003 Landfill No. 2; hose near CMW7.

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Photo No. 27 – 20 August 2012

LF003 Landfill No. 2; looking northeast from southwest side of site.



Photo No. 28 – 20 August 2012

LF003 Landfill No. 2; CMW3; view looking east.

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Photo No. 29 – 20 August 2012
LF003 Landfill No. 2; CMW2; view looking south.



Photo No. 30 – 20 August 2012
LF003 Landfill No. 2

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Photo No. 31 – 21 August 2012
SS015 UST Spill Area; view of site; view facing south.



Photo No. 32 – 21 August 2012
SS015 UST Spill Area; WW03; top view.

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Photo No. 33 – 21 August 2012
SS015 UST Spill Area; WW03; view facing north.



Photo No. 34 – 21 August 2012
SS015 UST Spill Area; Concrete foundation at southeast end of site; view facing east.

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Photo No. 35 – 21 August 2012
SS015 UST Spill Area; Electrical components of foundation.



Photo No. 36 – 21 August 2012
SS015 UST Spill Area; AST cradle at southeast end of site; view facing west.

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Photo No. 37 – 21 August 2012
SS013 Diesel Seep Area; electrical lines; view facing southeast.



Photo No. 38 – 21 August 2012
SS013 Diesel Seep Area; electrical lines; view facing southeast.

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Photo No. 39 – 29 March 2013
DP011 Dump Area; view facing east.

APPENDIX B

Five-Year-Review and Periodic Review Site Inspection Checklists



Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: ST009	Date of Inspection: 20 August 2012
Location and Region: Cape Romanzof	EPA ID: AK9572728633
Agency, office, or company leading the five-year review: AFCEC	Weather/temperature: Cloudy, ~ 48 F
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Access controls <input type="checkbox"/> Groundwater containment <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (CHECK ALL THAT APPLY)	
1. O&M site manager _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

2. O&M staff _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site at office by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> 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 _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

Agency _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

4. Other interviews (optional) (<input type="checkbox"/> Report attached) _____	

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

2. Site-Specific Health and Safety Plan			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

3. O&M and OSHA Training Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

4. Permits and Service Agreements			
Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Waste disposal	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

5. Gas Generation Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

6. Settlement Monument Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

7. Groundwater Monitoring Records			
	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

8. Leachate Extraction Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

9. Discharge Compliance Records			
Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

10. Daily Access/Security Logs			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Federal facility in-house
- Other _____
- Contractor for State
- Contractor for PRP
- Contractor for federal facility

2. O&M Cost Records

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Not available
- Breakdown attached

Total annual cost by year for review period if available

From _____	To _____			
Date	Date	Total cost		<input type="checkbox"/> Breakdown attached
From _____	To _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	To _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		
From _____	To _____			<input type="checkbox"/> Breakdown attached
Date	Date	Total cost		

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

- Applicable N/A

A. Fencing

- 1. Fencing damaged**
- Location shown on site map
 - Gates secured
 - N/A
- Remarks _____

B. Other Access Restrictions

- 1. Signs and other security measures**
- Location shown on site map
 - N/A
- Remarks _____

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented Yes No N/A
 Site conditions imply ICs not being fully enforced Yes No N/A
 Type of monitoring (e.g. self-reporting, drive-by) _____

Frequency _____

Responsible party/agency 611th CES

Contact Keith Barnack Remediation Mgr 907-552-5160

Name	Title	Date	Phone No.
------	-------	------	-----------

Reporting is up to date Yes No N/A

Reports are verified by the lead agency Yes No N/A

Specific requirements in deed or decision documents have been met Yes No N/A

Violations have been reported Yes No N/A

Other problems or suggestions: (Report attached) _____

2. Adequacy ICs are adequate ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident

Remarks _____

2. Land use changes on the site N/A

Remarks _____

3. Land use changes off of the site N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

1. Roads damaged Location shown on site map Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS
 Applicable 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 _____

VII. LANDFILL COVERS (Continued)	
<p>B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Flows Bypass Bench <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>2. Bench Breached <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>3. Bench Overtopped <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/>	
<p>C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>2. Material Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation</p> <p>Material type _____ Areal extent _____</p> <p>Remarks _____</p> <hr/> <p>3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>4. Undercutting <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>5. Obstructions Type _____ <input type="checkbox"/> No obstructions</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Size _____</p> <p>Remarks _____</p> <hr/> <p>6. Excessive Vegetative Growth Type _____</p> <p><input type="checkbox"/> No evidence of excessive growth</p> <p><input type="checkbox"/> Vegetation in channels does not obstruct flow</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Remarks _____</p>	

VII. LANDFILL COVERS (Continued)

D. Cover Penetrations Applicable N/A

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

Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**

- Good condition Needs maintenance N/A

Remarks _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

- Good condition Needs maintenance N/A

Remarks _____

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

2. Outlet Rock Inspected	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

G. Detention/Sedimentation Ponds		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Siltation	Areal extent _____	Depth _____ N/A
<input type="checkbox"/> Siltation not evident		
Remarks _____		

2. Erosion	Areal extent _____	Depth _____
<input type="checkbox"/> Erosion not evident		
Remarks _____		

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

H. Retaining Walls		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		

2. Degradation	Location shown on site map	Degradation not evident
Remarks _____		

VII. LANDFILL COVERS (Continued)

I. Perimeter Ditches/Offsite 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 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 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 _____

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
C. Treatment System	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Treatment Train (Check components that apply)		
<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers	
<input type="checkbox"/> Filters _____		
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
<input type="checkbox"/> Others _____		
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	
<input type="checkbox"/> Sampling ports properly marked and functional		
<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
<input type="checkbox"/> Equipment properly identified		
<input type="checkbox"/> Quantity of groundwater treated annually _____		
<input type="checkbox"/> Quantity of surface water treated annually _____		
Remarks _____		

2. Electrical Enclosures and Panels (properly rated and functional)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

3. Tanks, Vaults, Storage Vessels		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance	
Remarks _____		

4. Discharge Structure and Appurtenances		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

5. Treatment Building(s)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)	<input type="checkbox"/> Needs repair
<input type="checkbox"/> Chemicals and equipment properly stored		
Remarks _____		

6. Monitoring Wells (pump and treatment remedy)		
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Good condition	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A		
Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

1. Monitoring Data

- Is routinely submitted on time 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)

- Properly secured/locked Functioning Routinely sampled
- Good condition All required wells located Needs maintenance
- N/A

Remarks MW4 should be inspected for proper function.

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.).

Based on observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soils were identified during the inspection.

XI. OVERALL OBSERVATIONS (Continued)

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.

MW4 has experienced frost jacking. It should be inspected for proper function.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Due to the remote nature and approval process required to visit site ST009, optimization of remedies is not necessary at this time.



Five-Year Review Site Inspection Checklist

I. SITE INFORMATION																									
Site name: SS014	Date of Inspection: 20 August 2012																								
Location and Region: Cape Romanzof	EPA ID: AK9572728633																								
Agency, office, or company leading the five-year review: AFCEC	Weather/temperature: Cloudy, ~ 48 F																								
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Access controls <input type="checkbox"/> Groundwater containment <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: _____																									
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached																									
II. INTERVIEWS (CHECK ALL THAT APPLY)																									
1. O&M site manager _____ <table style="width:100%; border:none;"> <tr> <td style="width:35%;"></td> <td style="width:20%; text-align:center;">Name</td> <td style="width:20%; text-align:center;">Title</td> <td style="width:25%; text-align:center;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site <input type="checkbox"/> at office</td> <td colspan="2"><input type="checkbox"/> by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (<input type="checkbox"/>Report attached) _____</td> </tr> </table>			Name	Title	Date	Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)		Problems, suggestions (<input type="checkbox"/> Report attached) _____															
	Name	Title	Date																						
Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)																							
Problems, suggestions (<input type="checkbox"/> Report attached) _____																									
2. O&M staff _____ <table style="width:100%; border:none;"> <tr> <td style="width:35%;"></td> <td style="width:20%; text-align:center;">Name</td> <td style="width:20%; text-align:center;">Title</td> <td style="width:25%; text-align:center;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site at office</td> <td colspan="2">by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (<input type="checkbox"/>Report attached) _____</td> </tr> </table>			Name	Title	Date	Interviewed	<input type="checkbox"/> at site at office	by phone (Phone no. _____)		Problems, suggestions (<input type="checkbox"/> Report attached) _____															
	Name	Title	Date																						
Interviewed	<input type="checkbox"/> at site at office	by phone (Phone no. _____)																							
Problems, suggestions (<input type="checkbox"/> 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 _____ Contact _____ <table style="width:100%; border:none;"> <tr> <td style="width:35%;"></td> <td style="width:20%; text-align:center;">Name</td> <td style="width:20%; text-align:center;">Title</td> <td style="width:25%; text-align:center;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site <input type="checkbox"/> at office</td> <td colspan="2"><input type="checkbox"/> by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (<input type="checkbox"/>Report attached) _____</td> </tr> </table> Agency _____ Contact _____ <table style="width:100%; border:none;"> <tr> <td style="width:35%;"></td> <td style="width:20%; text-align:center;">Name</td> <td style="width:20%; text-align:center;">Title</td> <td style="width:25%; text-align:center;">Date</td> </tr> <tr> <td>Interviewed</td> <td><input type="checkbox"/> at site <input type="checkbox"/> at office</td> <td colspan="2"><input type="checkbox"/> by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (<input type="checkbox"/>Report attached) _____</td> </tr> </table>			Name	Title	Date	Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)		Problems, suggestions (<input type="checkbox"/> Report attached) _____					Name	Title	Date	Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)		Problems, suggestions (<input type="checkbox"/> Report attached) _____			
	Name	Title	Date																						
Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)																							
Problems, suggestions (<input type="checkbox"/> Report attached) _____																									
	Name	Title	Date																						
Interviewed	<input type="checkbox"/> at site <input type="checkbox"/> at office	<input type="checkbox"/> by phone (Phone no. _____)																							
Problems, suggestions (<input type="checkbox"/> Report attached) _____																									
4. Other interviews (optional) (<input type="checkbox"/> Report attached) _____ _____ _____ _____																									

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

2. Site-Specific Health and Safety Plan			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

3. O&M and OSHA Training Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

4. Permits and Service Agreements			
Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Waste disposal	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

5. Gas Generation Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

6. Settlement Monument Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

7. Groundwater Monitoring Records			
	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

8. Leachate Extraction Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

9. Discharge Compliance Records			
Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

10. Daily Access/Security Logs			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Federal facility in-house
- Other _____
- Contractor for State
- Contractor for PRP
- Contractor for federal facility

2. O&M Cost Records

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Not available
- Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

- Applicable N/A

A. Fencing

- 1. Fencing damaged**
- Location shown on site map
 - Gates secured
 - N/A
- Remarks _____
- _____

B. Other Access Restrictions

- 1. Signs and other security measures**
- Location shown on site map
 - N/A
- Remarks _____
- _____
- _____

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented Yes No N/A

Site conditions imply ICs not being fully enforced Yes No N/A

Type of monitoring (e.g. self-reporting, drive-by) _____

Frequency _____

Responsible party/agency 611th CES

Contact Keith Barnack Remediation Mgr 907-552-5160

	Name	Title	Date	Phone No.
Reporting is up to date			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A

Other problems or suggestions: (Report attached) _____

2. Adequacy ICs are adequate ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident

Remarks _____

2. Land use changes on the site N/A

Remarks _____

3. Land use changes off of the site N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

1. Roads damaged Location shown on site map Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS
 Applicable 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 _____

VII. LANDFILL COVERS (Continued)

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 _____

VII. LANDFILL COVERS (Continued)

D. Cover Penetrations Applicable N/A

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

Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**

- Good condition Needs maintenance N/A

Remarks _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

- Good condition Needs maintenance N/A

Remarks _____

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

2. Outlet Rock Inspected	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

G. Detention/Sedimentation Ponds		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Siltation	Areal extent _____	Depth _____ N/A
<input type="checkbox"/> Siltation not evident		
Remarks _____		

2. Erosion	Areal extent _____	Depth _____
<input type="checkbox"/> Erosion not evident		
Remarks _____		

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

H. Retaining Walls		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		

2. Degradation	Location shown on site map	Degradation not evident
Remarks _____		

VII. LANDFILL COVERS (Continued)	
I. Perimeter Ditches/Offsite Discharge <input type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Siltation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Siltation not evident	
Areal extent _____ Depth _____	
Remarks _____	

2. Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A	
<input type="checkbox"/> Vegetation does not impede flow	
Areal extent _____ Type _____	
Remarks _____	

3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident	
Areal extent _____ Depth _____	
Remarks _____	

4. Discharge Structure <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	
Remarks _____	

VIII. VERTICAL BARRIER WALLS	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident	
Areal extent _____ Depth _____	
Remarks: _____	

2. Performance Monitoring	
Type of monitoring _____	
<input type="checkbox"/> Performance not monitored Frequency _____	
<input type="checkbox"/> Evidence of breaching	
Head differential _____	
Remarks: _____	

IX. GROUNDWATER/SURFACE WATER REMEDIES
 Applicable 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 _____

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
C. Treatment System	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Treatment Train (Check components that apply)		
<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers	
<input type="checkbox"/> Filters _____		
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
<input type="checkbox"/> Others _____		
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	
<input type="checkbox"/> Sampling ports properly marked and functional		
<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
<input type="checkbox"/> Equipment properly identified		
<input type="checkbox"/> Quantity of groundwater treated annually _____		
<input type="checkbox"/> Quantity of surface water treated annually _____		
Remarks _____		

2. Electrical Enclosures and Panels (properly rated and functional)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

3. Tanks, Vaults, Storage Vessels		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance	
Remarks _____		

4. Discharge Structure and Appurtenances		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

5. Treatment Building(s)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)	<input type="checkbox"/> Needs repair
<input type="checkbox"/> Chemicals and equipment properly stored		
Remarks _____		

6. Monitoring Wells (pump and treatment remedy)		
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Good condition	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A		
Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

1. Monitoring Data

- Is routinely submitted on time 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)

- Properly secured/locked Functioning Routinely sampled
- Good condition All required wells located Needs maintenance
- N/A

Remarks MW3 and MW1 should be inspected for proper function.

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.).

Based on observations during the inspection, ICs to limit off-site transport to control exposure and protect human health and the environment appear to be effective. No excavations or disturbed soils were identified during the inspection.

XI. OVERALL OBSERVATIONS (Continued)

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.

MW3 and MW1 have experienced frost jacking. They should be inspected for proper function.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Due to the remote nature and approval process required to visit site SS014 optimization of remedies is not necessary at this time.



Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: LF003	Date of Inspection: 21 August 2012
Location and Region: Cape Romanzof	EPA ID:
Agency, office, or company leading the five-year review: AFCEC	Weather/temperature: Foggy, Windy, ~ 45 F
Remedy Includes: (Check all that apply) <input checked="" type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Access controls <input type="checkbox"/> Groundwater containment <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input checked="" type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (CHECK ALL THAT APPLY)	
1. O&M site manager _____ <div style="display: flex; justify-content: space-between;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____) Problems, suggestions (<input type="checkbox"/> Report attached) _____ _____	
2. O&M staff _____ <div style="display: flex; justify-content: space-between;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site at office by phone (Phone no. _____) Problems, suggestions (<input type="checkbox"/> 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 _____ Contact _____ <div style="display: flex; justify-content: space-between;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____) Problems, suggestions (<input type="checkbox"/> Report attached) _____ _____	
Agency _____ Contact _____ <div style="display: flex; justify-content: space-between;"> Name Title Date </div> Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____) Problems, suggestions (<input type="checkbox"/> Report attached) _____ _____	
4. Other interviews (optional) (<input type="checkbox"/> Report attached) _____ _____ _____ _____	

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: <u>Not available during inspection.</u>			
2. Site-Specific Health and Safety Plan			
Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
3. O&M and OSHA Training Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
4. Permits and Service Agreements			
Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Waste disposal	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
5. Gas Generation Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
6. Settlement Monument Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
7. Groundwater Monitoring Records			
	<input checked="" type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
8. Leachate Extraction Records			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
9. Discharge Compliance Records			
Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			
10. Daily Access/Security Logs			
	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____			

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Federal facility in-house
- Other _____
- Contractor for State
- Contractor for PRP
- Contractor for federal facility

2. O&M Cost Records

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Not available
- Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

Applicable N/A

A. Fencing

- 1. Fencing damaged**
- Location shown on site map
 - Gates secured
 - N/A
- Remarks _____

B. Other Access Restrictions

- 1. Signs and other security measures**
- Location shown on site map
 - N/A
- Remarks _____

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented Yes No N/A
 Site conditions imply ICs not being fully enforced Yes No N/A
 Type of monitoring (e.g. self-reporting, drive-by) _____

Frequency _____

Responsible party/agency 611th CES

Contact <u>Keith Barnack</u>	<u>Remediation Mgr</u>	<u>907-552-5160</u>
Name	Title	Phone No.

Reporting is up to date Yes No N/A
 Reports are verified by the lead agency Yes No N/A
 Specific requirements in deed or decision documents have been met Yes No N/A
 Violations have been reported Yes No N/A

Other problems or suggestions: (Report attached) _____

2. Adequacy ICs are adequate ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident

Remarks _____

2. Land use changes on the site N/A

Remarks _____

3. Land use changes off of the site N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

1. Roads damaged Location shown on site map Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS
 Applicable 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 Rocky cover in good condition

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 _____

VII. LANDFILL COVERS (Continued)	
<p>B. Benches <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Flows Bypass Bench <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>2. Bench Breached <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>3. Bench Overtopped <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/>	<p>C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>2. Material Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation</p> <p>Material type _____ Areal extent _____</p> <p>Remarks _____</p> <hr/> <p>3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>4. Undercutting <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>5. Obstructions Type _____ <input type="checkbox"/> No obstructions</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Size _____</p> <p>Remarks _____</p> <hr/> <p>6. Excessive Vegetative Growth Type _____</p> <p><input type="checkbox"/> No evidence of excessive growth</p> <p><input type="checkbox"/> Vegetation in channels does not obstruct flow</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Remarks _____</p>

VII. LANDFILL COVERS (Continued)

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active Passive Properly secured/locked
 Functioning Routinely sampled Good condition
 Needs maintenance Evidence of leakage at penetration
 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 The protective metal casing has exposed the well head at CMW7

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 N/A

Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**

- Good condition Needs maintenance N/A

Remarks _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

- Good condition Needs maintenance N/A

Remarks _____

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks <u>Appears to be in good condition</u>		

1. Outlet Pipes Inspected	<input checked="" type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

2. Outlet Rock Inspected	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

G. Detention/Sedimentation Ponds		
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
Remarks _____		

1. Siltation	Areal extent _____	Depth _____ N/A
<input type="checkbox"/> Siltation not evident		
Remarks _____		

2. Erosion	Areal extent _____	Depth _____
<input type="checkbox"/> Erosion not evident		
Remarks _____		

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

H. Retaining Walls		
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
Remarks _____		

1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		

2. Degradation	Location shown on site map	Degradation not evident
Remarks _____		

VII. LANDFILL COVERS (Continued)

I. Perimeter Ditches/Offsite 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 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 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 _____

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
C. Treatment System	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Treatment Train (Check components that apply)		
<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers	
<input type="checkbox"/> Filters _____		
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
<input type="checkbox"/> Others _____		
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	
<input type="checkbox"/> Sampling ports properly marked and functional		
<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
<input type="checkbox"/> Equipment properly identified		
<input type="checkbox"/> Quantity of groundwater treated annually _____		
<input type="checkbox"/> Quantity of surface water treated annually _____		
Remarks _____		

2. Electrical Enclosures and Panels (properly rated and functional)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

3. Tanks, Vaults, Storage Vessels		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance	
Remarks _____		

4. Discharge Structure and Appurtenances		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

5. Treatment Building(s)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)	<input type="checkbox"/> Needs repair
<input type="checkbox"/> Chemicals and equipment properly stored		
Remarks _____		

6. Monitoring Wells (pump and treatment remedy)		
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Good condition	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A		
Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

1. Monitoring Data

- Is routinely submitted on time
- 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)

- Properly secured/locked
- Functioning
- Routinely sampled
- Good condition
- All required wells located
- Needs maintenance
- N/A

Remarks The protective metal casing at CMW7 has exposed the well head.

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.).

Landfill cap appears to be intact with some minor depressions.

Based on observations during the inspection, ICs to limit unauthorized excavation appear to be effective. No excavations or disturbed soils were identified during the inspection.

XI. OVERALL OBSERVATIONS (Continued)

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.

N/A

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Due to the remote nature and approval process required to visit site LF003, optimization of remedies are not necessary at this time.



Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: SS013	Date of Inspection: 21 August 2012
Location and Region: Cape Romanzof	EPA ID: AK9572728633
Agency, office, or company leading the five-year review: AFCEC	Weather/temperature: Foggy, Windy, ~ 45 F
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Access controls <input type="checkbox"/> Groundwater containment <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (CHECK ALL THAT APPLY)	
1. O&M site manager _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

2. O&M staff _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site at office by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> 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 _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

Agency _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

4. Other interviews (optional) (<input type="checkbox"/> Report attached) _____	

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
2. Site-Specific Health and Safety Plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
3. O&M and OSHA Training Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
4. Permits and Service Agreements			
Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Waste disposal	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
5. Gas Generation Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
6. Settlement Monument Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
7. Groundwater Monitoring Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
8. Leachate Extraction Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
9. Discharge Compliance Records			
Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
10. Daily Access/Security Logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			

IV. O&M COSTS

1. O&M Organization

- State in-house
- PRP in-house
- Federal facility in-house
- Other _____
- Contractor for State
- Contractor for PRP
- Contractor for federal facility

2. O&M Cost Records

- Readily available
- Funding mechanism/agreement in place
- Original O&M cost estimate _____
- Up to date
- Not available
- Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

Applicable N/A

A. Fencing

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

Remarks _____

B. Other Access Restrictions

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

Remarks _____

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented Yes No N/A

Site conditions imply ICs not being fully enforced Yes No N/A

Type of monitoring (e.g. self-reporting, drive-by) _____

Frequency _____

Responsible party/agency 611th CES

Contact Keith Barnack Remediation Mgr 907-552-5160

	Date	Phone No.
Name	Title	

Reporting is up to date Yes No N/A

Reports are verified by the lead agency Yes No N/A

Specific requirements in deed or decision documents have been met Yes No N/A

Violations have been reported Yes No N/A

Other problems or suggestions: (Report attached) _____

2. Adequacy ICs are adequate ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident

Remarks _____

2. Land use changes on the site N/A

Remarks _____

3. Land use changes off of the site N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

1. Roads damaged Location shown on site map Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS
 Applicable 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 _____

VII. LANDFILL COVERS (Continued)	
<p>B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Flows Bypass Bench <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>2. Bench Breached <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>3. Bench Overtopped <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/>	
<p>C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>2. Material Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation</p> <p>Material type _____ Areal extent _____</p> <p>Remarks _____</p> <hr/> <p>3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>4. Undercutting <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>5. Obstructions Type _____ <input type="checkbox"/> No obstructions</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Size _____</p> <p>Remarks _____</p> <hr/> <p>6. Excessive Vegetative Growth Type _____</p> <p><input type="checkbox"/> No evidence of excessive growth</p> <p><input type="checkbox"/> Vegetation in channels does not obstruct flow</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Remarks _____</p>	

VII. LANDFILL COVERS (Continued)

D. Cover Penetrations Applicable N/A

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

Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**

- Good condition Needs maintenance N/A

Remarks _____

3. **Gas Monitoring Facilities** (e.g., gas monitoring of adjacent homes or buildings)

- Good condition Needs maintenance N/A

Remarks _____

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

2. Outlet Rock Inspected	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

G. Detention/Sedimentation Ponds		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Siltation	Areal extent _____	Depth _____ N/A
<input type="checkbox"/> Siltation not evident		
Remarks _____		

2. Erosion	Areal extent _____	Depth _____
<input type="checkbox"/> Erosion not evident		
Remarks _____		

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

H. Retaining Walls		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		

2. Degradation	Location shown on site map	Degradation not evident
Remarks _____		

VII. LANDFILL COVERS (Continued)	
I. Perimeter Ditches/Offsite Discharge <input type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Siltation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Siltation not evident	
Areal extent _____ Depth _____	
Remarks _____	

2. Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A	
<input type="checkbox"/> Vegetation does not impede flow	
Areal extent _____ Type _____	
Remarks _____	

3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident	
Areal extent _____ Depth _____	
Remarks _____	

4. Discharge Structure <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	
Remarks _____	

VIII. VERTICAL BARRIER WALLS	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident	
Areal extent _____ Depth _____	
Remarks: _____	

2. Performance Monitoring	
Type of monitoring _____	
<input type="checkbox"/> Performance not monitored	Frequency _____
<input type="checkbox"/> Evidence of breaching	
Head differential _____	
Remarks: _____	

IX. GROUNDWATER/SURFACE WATER REMEDIES
 Applicable 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 _____

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
C. Treatment System	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Treatment Train (Check components that apply)		
<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers	
<input type="checkbox"/> Filters _____		
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
<input type="checkbox"/> Others _____		
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	
<input type="checkbox"/> Sampling ports properly marked and functional		
<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
<input type="checkbox"/> Equipment properly identified		
<input type="checkbox"/> Quantity of groundwater treated annually _____		
<input type="checkbox"/> Quantity of surface water treated annually _____		
Remarks _____		

2. Electrical Enclosures and Panels (properly rated and functional)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

3. Tanks, Vaults, Storage Vessels		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance	
Remarks _____		

4. Discharge Structure and Appurtenances		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

5. Treatment Building(s)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)	<input type="checkbox"/> Needs repair
<input type="checkbox"/> Chemicals and equipment properly stored		
Remarks _____		

6. Monitoring Wells (pump and treatment remedy)		
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Good condition	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A		
Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

1. Monitoring Data

- Is routinely submitted on time
- 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)

- Properly secured/locked
- Functioning
- Routinely sampled
- Good condition
- All required wells located
- Needs maintenance
- N/A

Remarks No wells located due to lack of visibility and high winds.

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.).

Based on observations during the inspection, ICs to limit off-site transport, control exposure, and protect human health and the environment appear to be effective. No evidence of excavations or disturbed soil was identified during the inspection.

XI. OVERALL OBSERVATIONS (Continued)

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.

N/A

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Due to the remote nature and approval process required to visit site SS013 optimization of
remedies are not necessary at this time.



Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: SS015	Date of Inspection: 21 August 2012
Location and Region: Cape Romanzof	EPA ID: AK9572728633
Agency, office, or company leading the five-year review: AFCEC	Weather/temperature: Foggy, Windy, ~ 45 F
Remedy Includes: (Check all that apply) <input type="checkbox"/> Landfill cover/containment <input checked="" type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Access controls <input type="checkbox"/> Groundwater containment <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Vertical barrier walls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input type="checkbox"/> Other: _____	
Attachments: <input type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached	
II. INTERVIEWS (CHECK ALL THAT APPLY)	
1. O&M site manager _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

2. O&M staff _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site at office by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> 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 _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

Agency _____	
Contact _____	
Name _____ Title _____ Date _____	
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone (Phone no. _____)	
Problems, suggestions (<input type="checkbox"/> Report attached) _____	

4. Other interviews (optional) (<input type="checkbox"/> Report attached) _____	

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
As-built drawings	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Maintenance logs	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
2. Site-Specific Health and Safety Plan			
Contingency plan/emergency response plan	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
3. O&M and OSHA Training Records			
Remarks: _____ _____			
4. Permits and Service Agreements			
Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Waste disposal	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
5. Gas Generation Records			
Remarks: _____ _____			
6. Settlement Monument Records			
Remarks: _____ _____			
7. Groundwater Monitoring Records			
Remarks: _____ _____			
8. Leachate Extraction Records			
Remarks: _____ _____			
9. Discharge Compliance Records			
Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A
Remarks: _____ _____			
10. Daily Access/Security Logs			
Remarks: _____ _____			

IV. O&M COSTS

1. O&M Organization

- | | |
|--|--|
| <input type="checkbox"/> State in-house | <input type="checkbox"/> Contractor for State |
| <input type="checkbox"/> PRP in-house | <input type="checkbox"/> Contractor for PRP |
| <input type="checkbox"/> Federal facility in-house | <input type="checkbox"/> Contractor for federal facility |
| <input type="checkbox"/> Other _____ | |

2. O&M Cost Records

- | | | |
|---|---|--|
| <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input type="checkbox"/> Not available |
| <input type="checkbox"/> Funding mechanism/agreement in place | | |
| Original O&M cost estimate _____ | <input type="checkbox"/> Breakdown attached | |

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

Applicable N/A

A. Fencing

- 1. Fencing damaged** Location shown on site map
- Gates secured
- N/A
- Remarks _____
- _____

B. Other Access Restrictions

- 1. Signs and other security measures** Location shown on site map N/A
- Remarks _____
- _____
- _____
- _____

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented Yes No N/A

Site conditions imply ICs not being fully enforced Yes No N/A

Type of monitoring (e.g. self-reporting, drive-by) _____

Frequency _____

Responsible party/agency 611th CES

Contact Keith Barnack Remediation Mgr 907-552-5160

	Name	Title	Date	Phone No.
Reporting is up to date			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Reports are verified by the lead agency			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Specific requirements in deed or decision documents have been met			<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> N/A
Violations have been reported			<input type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> N/A

Other problems or suggestions: (Report attached) _____

2. Adequacy ICs are adequate ICs are inadequate N/A

Remarks _____

D. General

1. Vandalism/trespassing Location shown on site map No vandalism evident

Remarks _____

2. Land use changes on the site N/A

Remarks _____

3. Land use changes off of the site N/A

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

1. Roads damaged Location shown on site map Roads adequate N/A

Remarks _____

B. Other Site Conditions

Remarks _____

VII. LANDFILL COVERS
 Applicable 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 _____

VII. LANDFILL COVERS (Continued)	
<p>B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Flows Bypass Bench <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>2. Bench Breached <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/> <p>3. Bench Overtopped <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A or okay</p> <p>Remarks _____</p> <hr/>	
<p>C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A</p> <p>(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.)</p> <p>1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of settlement</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>2. Material Degradation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of degradation</p> <p>Material type _____ Areal extent _____</p> <p>Remarks _____</p> <hr/> <p>3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of erosion</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>4. Undercutting <input type="checkbox"/> Location shown on site map <input type="checkbox"/> No evidence of undercutting</p> <p>Areal extent _____ Depth _____</p> <p>Remarks _____</p> <hr/> <p>5. Obstructions Type _____ <input type="checkbox"/> No obstructions</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Size _____</p> <p>Remarks _____</p> <hr/> <p>6. Excessive Vegetative Growth Type _____</p> <p><input type="checkbox"/> No evidence of excessive growth</p> <p><input type="checkbox"/> Vegetation in channels does not obstruct flow</p> <p><input type="checkbox"/> Location shown on site map Areal extent _____</p> <p>Remarks _____</p>	

VII. LANDFILL COVERS (Continued)

D. Cover Penetrations Applicable N/A

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

Remarks _____

2. **Gas Collection Wells, Manifolds and Piping**
 Good condition Needs maintenance N/A

Remarks _____

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

Remarks _____

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

1. Outlet Pipes Inspected	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

2. Outlet Rock Inspected	<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
Remarks _____		

G. Detention/Sedimentation Ponds		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Siltation	Areal extent _____	Depth _____ N/A
<input type="checkbox"/> Siltation not evident		
Remarks _____		

2. Erosion	Areal extent _____	Depth _____
<input type="checkbox"/> Erosion not evident		
Remarks _____		

3. Outlet Works	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

4. Dam	<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
Remarks _____		

H. Retaining Walls		
<input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
Remarks _____		

1. Deformations	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
Horizontal displacement _____ Vertical displacement _____		
Rotational displacement _____		
Remarks _____		

2. Degradation	Location shown on site map	Degradation not evident
Remarks _____		

VII. LANDFILL COVERS (Continued)	
I. Perimeter Ditches/Offsite Discharge <input type="checkbox"/> Applicable <input type="checkbox"/> N/A	
1. Siltation <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Siltation not evident	
Areal extent _____ Depth _____	
Remarks _____	

2. Vegetative Growth <input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A	
<input type="checkbox"/> Vegetation does not impede flow	
Areal extent _____ Type _____	
Remarks _____	

3. Erosion <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident	
Areal extent _____ Depth _____	
Remarks _____	

4. Discharge Structure <input type="checkbox"/> Functioning <input type="checkbox"/> N/A	
Remarks _____	

VIII. VERTICAL BARRIER WALLS	
<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A	
1. Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident	
Areal extent _____ Depth _____	
Remarks: _____	

2. Performance Monitoring	
Type of monitoring _____	
<input type="checkbox"/> Performance not monitored	Frequency _____
<input type="checkbox"/> Evidence of breaching	
Head differential _____	
Remarks: _____	

IX. GROUNDWATER/SURFACE WATER REMEDIES
 Applicable 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 _____

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
C. Treatment System	<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1. Treatment Train (Check components that apply)		
<input type="checkbox"/> Metals removal	<input type="checkbox"/> Oil/water separation	<input type="checkbox"/> Bioremediation
<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers	
<input type="checkbox"/> Filters _____		
<input type="checkbox"/> Additive (e.g., chelation agent, flocculent) _____		
<input type="checkbox"/> Others _____		
<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	
<input type="checkbox"/> Sampling ports properly marked and functional		
<input type="checkbox"/> Sampling/maintenance log displayed and up to date		
<input type="checkbox"/> Equipment properly identified		
<input type="checkbox"/> Quantity of groundwater treated annually _____		
<input type="checkbox"/> Quantity of surface water treated annually _____		
Remarks _____		

2. Electrical Enclosures and Panels (properly rated and functional)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

3. Tanks, Vaults, Storage Vessels		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	
<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance	
Remarks _____		

4. Discharge Structure and Appurtenances		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks _____		

5. Treatment Building(s)		
<input type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)	<input type="checkbox"/> Needs repair
<input type="checkbox"/> Chemicals and equipment properly stored		
Remarks _____		

6. Monitoring Wells (pump and treatment remedy)		
<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
<input type="checkbox"/> Good condition	<input type="checkbox"/> All required wells located	<input type="checkbox"/> Needs maintenance
<input type="checkbox"/> N/A		
Remarks _____		

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

- 1. Monitoring Data**
 - Is routinely submitted on time 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)**
 - Properly secured/locked Functioning Routinely sampled
 - Good condition All required wells located Needs maintenance
 - N/A

Remarks WW03 lock is broken and WW01 is not marked.

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.).

Based on observations during the inspection, ICs to limit off-site transport, control exposure,
and protect human health and the environment appear to be effective. No evidence of
excavations or disturbed soil was identified during the inspection.

XI. OVERALL OBSERVATIONS (Continued)

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.

N/A

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

Due to the remote nature and approval process required to visit site SS015 optimization of remedies are not necessary at this time.

APPENDIX C

Record for Five-Year Review and Periodic Review Interviews

RECORD FOR FIVE-YEAR REVIEW INTERVIEW:

The United States Air Force and Jacobs Engineering Group Inc. are conducting a five-year review of the remedies implemented at Sites SS013 (Diesel Seep Area), SS015, (UST Spill Area), ST009 (Former Truck Fueling Station Near Beach), SS014 (Drum Storage Area), DP011 (Upper Camp Dump Area), LF003 (Landfill No. 2) at the Cape Romanzof LRRS in Cape Romanzof, Alaska. This review is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, the National Contingency Plan - Title 40 of the Code of Federal Regulations, Part 300.430 (0 (4) (ii), and Executive Order 12580 (23 January 1987). The five-year review team is requesting your input as part of the five-year review process.

Please provide answers to the following questions:

BACKGROUND INFORMATION

Date of Interview:	<u>26 October 2012</u>
Project Name/Number:	<u>Cape Romanzof Five-Year Review</u>
Interviewer:	<u>Jacobs Engineering Group Inc.</u>
Description/Property Location:	<u>Cape Romanzof LRRS, Alaska</u>
Owner/Representative Interviewed:	<u>Louis Howard (ADEC)</u>

1. What is your overall impression of the project?

Overall, fairly good.

2. What effects have site operations had on the surrounding community? Are you aware of any community concerns regarding operations and/or administration?

None that I am aware of.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities?

None.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities conducted by your office/personnel regarding the site?

Yes. None by this office.

- 5. Is there any cause to believe that any operation or equipment on or around the facility has been the cause of a spill or release or hazardous waste? Is there any evidence of a hazardous substance release such as stained ground areas, drums, transformers, trash, general disrepair, chemicals, areas where plants refuse to grow, or other indications of hazardous substance contamination (beyond the known history of the site)?**

None that I am aware of other than historical spills and releases.

- 6. Have any problems been encountered which required, or will require, changes to this remedial design or this ROD?**

No.

- 7. Is the remedy functioning as expected? How well is the remedy performing?**

Yes. As intended.

- 8. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?**

None.

RECORD FOR FIVE-YEAR REVIEW INTERVIEW:

The United States Air Force and Jacobs Engineering Group Inc. are conducting a Five-Year Review of the remedies implemented at Sites ST009, SS014, DP011, LF003, SS013, SS015 at the Cape Romanzof LRRS, Alaska. This review is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, the National Contingency Plan - Title 40 of the Code of Federal Regulations, Part 300.430 (0 (4) (ii), and Executive Order 12580 (23 January 1987). The five-year review team is requesting your input as part of the five-year review process.

Please provide answers to the following questions:

BACKGROUND INFORMATION

Date of Interview:	14 December 2012
Project Name/Number:	Cape Romanzof, LRRS Five-Year Review
Interviewer:	Jacobs Engineering Group Inc.
Description/Property Location:	ST009, SS014, DP011, LF003, SS013, SS015
Owner/Representative Interviewed:	Paul Cooley (ARCTEC, Alaska)

1. What is your overall impression of the project?

No impression, no active work has been done at the locations in several years.

2. What effects have site operations had on the surrounding community? Are you aware of any community concerns regarding operations and/or administration?

There has been no significant impact to operations at the site.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities?

No known incidents.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities conducted by your office/personnel regarding the site?

Last correspondence was from 2010 the Proposed Final Remedial action Plan for ERP sites SS013 and SS015.

5. Is there any cause to believe that any operation or equipment on or around the facility has been the cause of a spill or release or hazardous waste? Is there any evidence of a hazardous substance release such as stained ground areas, drums, transformers, trash, general disrepair, chemicals, areas where plants refuse to grow, or other indications of hazardous substance contamination (beyond the known history of the site)?

No.

6. Have any problems been encountered which required, or will require, changes to this remedial design or this ROD?

None to date.

7. Is the remedy functioning as expected? How well is the remedy performing?

Have not been privy to data. No known impact to LRRS operation.

8. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

RECORD FOR FIVE-YEAR REVIEW INTERVIEW:

The United States Air Force and Jacobs Engineering Group Inc. are conducting a five-year review of the remedies implemented at Sites SS013 (Diesel Seep Area), SS015, (UST Spill Area), ST009 (Former Truck Fueling Station Near Beach), SS014 (Drum Storage Area), DP011 (Upper Camp Dump Area), LF003 (Landfill No. 2) at the Cape Romanzof LRRS in Cape Romanzof, Alaska. This review is being conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act Section 121, the National Contingency Plan - Title 40 of the Code of Federal Regulations, Part 300.430 (0 (4) (ii), and Executive Order 12580 (23 January 1987). The five-year review team is requesting your input as part of the five-year review process.

Please provide answers to the following questions:

BACKGROUND INFORMATION

Date of Interview:	31 October 2012
Project Name/Number:	Cape Romanzof Five-Year Review
Interviewer:	Jacobs Engineering Group Inc.
Description/Property Location:	Cape Romanzof LRRS, Alaska
Owner/Representative Interviewed:	Keith Barnack

1. What is your overall impression of the project?

This is being accomplished in accordance with the signed Decision Documents for ST009, SS013, SS014, SS015, and the signed Interim Record of Decision for LF003.

2. What effects have site operations had on the surrounding community? Are you aware of any community concerns regarding operations and/or administration?

I think there has been some animosity and mistrust of the Air Force by local communities over Cape Romanzof LRRS since it was first constructed in the late 1950's.

3. Are you aware of any events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities?

No.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities conducted by your office/personnel regarding the site?

N/A.

5. Is there any cause to believe that any operation or equipment on or around the facility has been the cause of a spill or release or hazardous waste? Is there any evidence of a hazardous substance release such as stained ground areas, drums, transformers, trash, general disrepair, chemicals, areas where plants refuse to

grow, or other indications of hazardous substance contamination (beyond the known history of the site)?

None beyond the known history of each site.

6. Have any problems been encountered which required, or will require, changes to this remedial design or this ROD?

None at this time for Sites ST009, SS013, SS014, and SS015. The final ROD for LF003 is in progress and should be final in early 2013. Additional characterization was accomplished at LF003 resulting in a (future) larger scale remedial action response in the upcoming Final ROD versus the original Interim ROD.

7. Is the remedy functioning as expected? How well is the remedy performing?

See number 6 above for LF003.

8. Do you have any comments, suggestions, or recommendations regarding the site's management or operation?

No.

APPENDIX D
Field Logbook

Location CAPE ROMANZOF Date 8/20/12Project / Client AFCEE 5-YR INSPECTIONSJACK (AAT), STEVE (TS), KIMI (JE), PENNY (JE)ST009 PHOTOS:

MW9 S. FROM S. SIDE

E

MW8 S

W

MW6 N

N/NW

CONEX N

DEBRIS N/NW

MW4 N

MW5 NW

" TOP VIEW

MW7 SW

" NW

SITE 30° W PANNING N, E, S (FROM S. SIDE)

SS014 PHOTOS:

N FROM ST009

RD FROM ST009 TO SS014, N

WATER/CREEK BETWEEN ST009 & ST014, NW

" W

" SW

PUDDLE, S, (FLOODED ROAD)

SW FROM ROAD

N " "

Location CAPE ROMANZOF Date 8/20/12Project / Client AFCEE 5-YR INSPECTIONSSS014 PHOTOS (CONT'D):

MW3, W

" SE

MW2, E

N FROM ~~MW1~~ MW2

STAKE OR SIGNPOST, E

MW1, W

SITE, S FROM MW1

SE FROM MW1

S FROM MW1

PLYWOOD TENT FOUNDATION, S

S FROM W. SIDE OF SITE

CONCRETE SLAB @ W. SIDE OF SITE

LF003 PHOTOSE-W ^(W) FROM S END OF SITE

CMW5, SW,

CMW5, S

CMW5, SE

CMW4

CMW6

CMW7

HOSE NEAR CMW7

DEBRIS @ SW END OF SITE

LOOKING NE FROM SW SIDE OF SITE

Location CAPE ROMANZOF Date 8/20/12Project / Client AFCEE 5-YR REVIEWLF003 PHOTOS (cont'd):

CMW-3, E

CMW-3, E

CMW-3, W

PIPE/TUBING @ S. END OF SITE

CMW-2, S

SOUTH FROM CMW-2

DEBRIS, N FROM CMW-2

TUBING E OF CMW-2

DEBRIS E OF CMW-2

ELECTRICAL LINES S. OF SITE, LOOKING S.

S. FROM N. END OF LF

N " " " " "

Location CAPE ROMANZOF Date 8/20/12Project / Client AFCEE 5-YR REVIEW

1545 LOCATED WELLS CMW-3 & CMW-2
 TRAVELED ON FOOT BACK TO
 BASE CAMP

1610 WARMING UP AND COMPLETING
 REPORTS UNTIL FOG (OBSERVED AT
 LF003 & BASE CAMP) CLEARS

AB

8

Location Cape Komanzot Date 8/21/12Project / Client AFCEERainy, 47°F Foggy, Windy!

0730 Jack (AAT), Steve (TS), PB, KH discuss weather conditions and game plan. Will wait for weather to lift before heading out to sites. Visibility is ~100'.

1000 STEVE (TS), PB & KH EMBARK ON INVESTIGATION OF SITES SSO15 & SSO13 DESPITE NO IMPROVEMENT IN VISIBILITY. SPA DISCUSSING FOG & WIND PRECAUTIONS SSO15 LOCATED. WALKED THROUGHOUT. LOCATED WELL WW-03. PROTECTIVE LOCK & CAP HAD BROKEN OFF, BUT WELL WAS INTACT. LOCATED FOUNDATION/CRADLE OF FORMER STORAGE TANK AND CONCRETE FOUNDATION. LOCATED WELL AT SOUTH SIDE OF SITE, NO IDENTIFICATION ON WELL BUT IS APPROXIMATE LOCATION OF WW01

1045 PROCEEDED TO SSO13. NO WELLS LOCATED. LAND-USE APPEARED TO BE APPROPRIATE

Location CAPE ROMANZOF Date 8/21/12Project / Client AFCEESSO15 PHOTOS:

SITE, S

SITE, E

WW03, TOP VIEW

WW03, BROKEN LOCK, N

CONCRETE FOUNDATION @ SE OF SITE, E

AST FOUNDATION/CRADLE @ SE " " , W

" " " " , S

SOILS @ AST CRADLE, W

PIPE CONNECTION @ AST CRADLE, SW

WELL S OF AST CRADLE, N

" " , TOP VIEW

SSO13 PHOTOS:

SITE, S

ELECTRICAL LINES S. OF SITE, SE

SIGN POST SE OF SITE, S

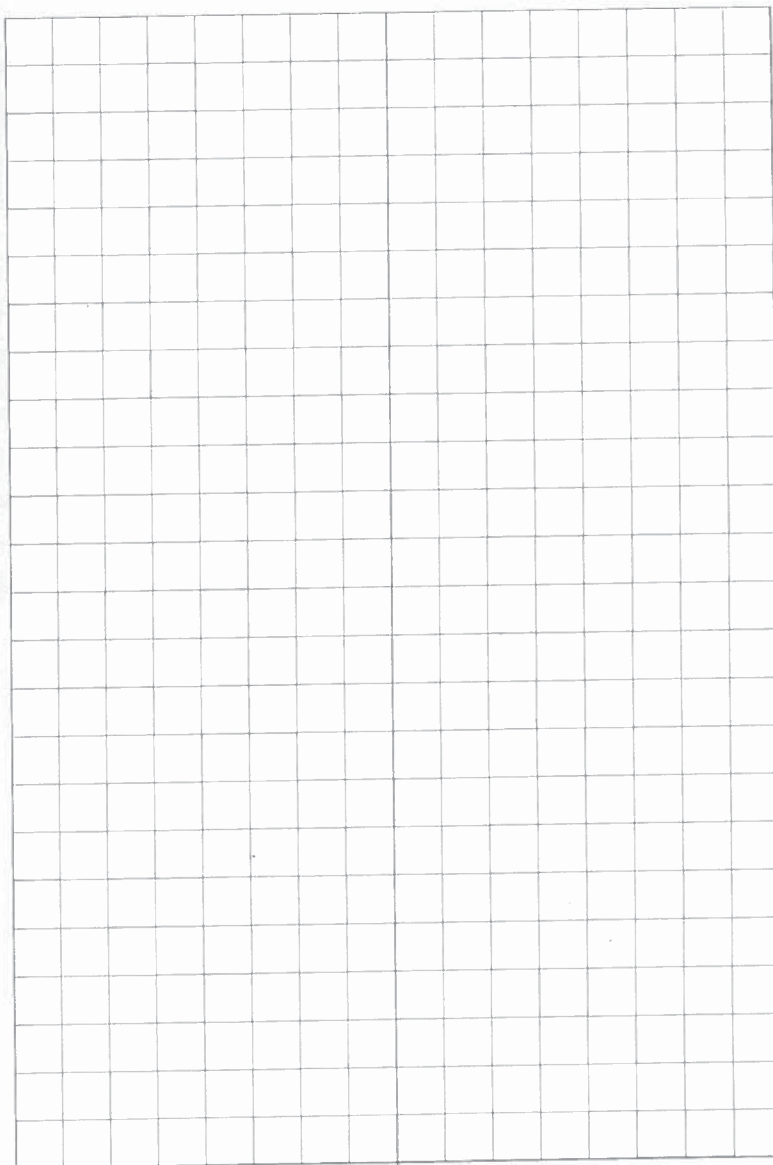
1130 Depart site on foot and return to camp

Location CAPE ROMANZOF Date 8/21/12Project / Client AFCEE

Location _____ Date _____

Project / Client _____

- 1300 DROVE TO DRILL, OBSERVED AS MUCH AS POSSIBLE FROM VEHICLE. GUSTS PREVENTED SAFE TRAVEL ON FOOT. OBSERVED DEBRIS ON CLIFF FACE ON WEST SIDE OF SITE, BUT NO APPARENT EVIDENCE OF ^{RECENT} LAND-USE.
- 1315 DROVE TO RUNWAY TO OBSERVE WEATHER FOR TAKE-OFF. Good visibility, BELOW FOG LINE.
- 1330 RETURNED TO SITE ^{SS015} ~~SS014~~ LOCATED WELLS WNC05 & WNC06.
RETURNED TO SITE SS013. LOCATED WELL
- 1400 RETURNED TO CAMP & PACKED FOR DEPARTURE
- 1530 DEPART



APPENDIX E
Public Notice



PUBLIC NOTICE
Five-Year Review for Cape Romanzof
Long Range Radar Station, Alaska
(ERP Sites LF003, ST009, SS014, DP011, SS013, SS015)



The United States Air Force (USAF) 611th Civil Engineer Squadron (CES) is undergoing a Five-Year Review of remedial actions at Environmental Restoration Program (ERP) Sites LF003 (Landfill No. 2), ST009 (Truck Fueling Station), SS013 (Diesel Seep Area), SS014 (Drum Storage Area), SS015 (UST Spill Area) and DP011 (Dump Area) at the Cape Romanzof Long Range Radar Site (LRRS), Alaska.

Remedial actions were put into place at these sites to address soil contaminated with polychlorinated biphenyls (PCB), diesel-range organics (DRO), residual-range organics (RRO), and/or benzene. These actions include:

LF003	Landfill closure combined with PCB hotspot removal
ST009	Conditional site closure, groundwater/surface water monitoring, and institutional controls (ICs)
SS013	Monitored natural attenuation (MNA)
SS014	Conditional site closure with ICs
DP011	Conditional site closure with ICs
SS015	MNA

Additionally, long term management (LTM) is recommended for LF003, ST009, SS013, and SS015. This includes maintaining ICs, conducting annual visual inspections with reports delivered to ADEC, and sampling of groundwater.

The Record of Decision (ROD) was signed by the USAF and Alaska Department of Environmental Conservation (ADEC) for Site LF003 in 2002, Sites ST009 and SS014 in 2008, and Sites SS013 and SS015 in 2011.

Five-Year Reviews are conducted pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) section 121 and the National Contingency Plan (NCP). Furthermore, these actions are compliant with the Code of Federal Regulations (CFR) Title 40, Section 300.430.

611 CES Contact Information

Documents pertaining to the CERCLA activities performed previously at the installation can be found in the Administrative Record located at:

611 CES/CEAR
10471 20th Street, Suite 329
Joint Base Elmendorf-Richardson, Alaska 99506

and in the Information Repository located at
Cape Romanzof Long Range Radar Station

If you have questions or concerns, please contact Mr. Keith Barnack
611 CES Project Manager
(907) 552-5160
email keith.barnack@elmendorf.af.mil

For questions regarding public participation, please contact Mr. Tommie Baker
611 CES Community Involvement Coordinator
(907) 552-4506 or 1-800-222-4137
email tommie.baker@us.af.mil

APPENDIX F
Responses to Comments

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
1.	Section 1.2, Page 1-10	<p>Authority for Conducting the Five-Year and Periodic Review</p> <p>Add text as the first sentence to the first paragraph: “Executive Order 12580 delegated lead agency status to the Department of Defense for all CERCLA remedial actions. Authority was further delegated to the USAF which is the lead agency for remedial actions at Cape Romanzof Long Range Radar Site (LRRS).”</p>	<p>Concur.</p> <p>The suggested text will be added to the first sentence in Section 1.2.</p>	A
2.	Section 10.1, Pages 10-1 through 10-3	<p>Page 10-1</p> <p>LF003 Landfill No. 2</p> <p>Question A: Is the remedy functioning as intended by the Record of Decision?</p> <p>The question should either be answered: Yes or No. Any discussion on functioning of the remedy or its performance should be discussed under “Remedial Action Performance.” Please address this issue for each source area.</p> <p>Restate the text as follows:</p> <p>Answer: No</p> <p><u>Remedial Action Performance:</u> The remedy is not functioning as intended by the 2002 ROD for Interim Remedial Action. The USAF identified that a new remedy was necessary in the First Five-Year Review (USAF 2008b), and a new ROD was approved and signed by the USAF and ADEC in March 2013.</p> <p>The NOAA Screening Quick Reference Tables (SQuiRTs) have been revised since 1999. Please update to latest version which is 2008. The screening criteria for</p>	<p>Concur.</p> <p>Page 10-1, Question A: The text will be updated as suggested. In addition, the reference to the NOAA SQuiRTs will be revised to 2008 on page 10-2 and in the Section 14.</p> <p>Page 10-2, Question B: The text will be updated as suggested.</p> <p>Page 10-3, Question C: The text will be updated as suggested.</p>	A

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>PCBs in freshwater sediment at 0.0341 mg/kg is still relevant.</p> <p>Page 10-2</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p><u>Changes in Standards to be Considered:</u> The ADEC cleanup level for PCBs in surface water has changed from 0.0005 mg/L to 0.000014 mg/L (ADEC 2012b).</p> <p>The question should either be answered: Yes or No.</p> <p>Restate text as follows:</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> The ADEC cleanup level for PCBs in surface water has changed from 0.0005 mg/L to 0.000014 mg/L¹ (24 hr. average ADEC 2012b).</p> <p>Page 10-3</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Yes. The current remedy is not protective as implemented. The new ROD was approved and signed the USAF and ADEC in March 2013. The protectiveness of the new LF003 site remedy will be evaluated in the next Five-Year Review.</p>		

¹ The 24-hour average is to be applied as an average concentration and not as a criterion to be met instantaneously at any point in the surface water. This criterion applies to total PCBs, (e.g., the sum of all congener or all isomer or homolog or Aroclor analyses.).

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>Restate as follows:</p> <p>Answer: Yes</p> <p>The current remedy is not protective as implemented. The new ROD was approved and signed by the USAF and ADEC in March 2013. The protectiveness of the new LF003 site remedy will be evaluated in the next Five-Year Review.</p>		
3.	Section 10.2, Pages 10.3, 10.5, 10.6	<p>SS013 Diesel Seep Area</p> <p>Page 10-3</p> <p>Question A: Is the remedy functioning as intended by the Decision Document?</p> <p>Remedial Actions: "The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended..."</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Answer: Yes</p> <p><u>Remedial Action Performance:</u> "The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended..."</p> <p>Page 10-5</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p>	<p>Concur.</p> <p>Page 10-3, Question A: The text will be updated as suggested.</p> <p>Page 10-5, Question B: The text will be updated as suggested.</p> <p>Page 10-6, Question C: The text will be updated as suggested.</p>	A

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p><u>Changes in Standards to be Considered:</u> “The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection...”</p> <p>The question should be answered Yes or No.</p> <p>Restate text as follows:</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> “The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection...”</p> <p>Page 10-6</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>No new information is available that would question the protectiveness of the remedy at SS013.</p> <p>Restate as follows:</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Answer: No</p>		
4.	Section 10.3, Pages 10.6, 10.8, 10.9	<p>SS015 Diesel Seep Area</p> <p>Page 10-6</p> <p>Question A: Is the remedy functioning as intended by the Decision Document?</p> <p>Remedial Actions: “The results of the August 2012 site inspection and review of the documents, ARARs, and</p>	<p>Concur.</p> <p>Page 10-6, Question A: The text will be updated as suggested.</p> <p>Page 10-8, Question B: The text will be updated as suggested.</p> <p>Page 10-9, Question C: The text will be updated as suggested.</p>	A

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>risk assumptions indicate that the remedy is functioning as intended..."</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Answer: Yes</p> <p><u>Remedial Action Performance:</u> "The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended..."</p> <p>Page 10-8</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p><u>Changes in Standards to be Considered:</u> "The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection..."</p> <p>The question should be answered Yes or No.</p> <p>Restate text as follows:</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> "The exposure assumptions, toxicity data, cleanup levels, and RAO used at the time of the remedy selection..."</p> <p>Page 10-9</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>No new information is available that would question the</p>		

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>protectiveness of the remedy at SS015.</p> <p>Please restate as follows:</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Answer: No</p>		
5.	Section 10.4, Pages 10-9, 10-10, 10-11	<p>ST009 Spill/Leak 3</p> <p>Page 10-9</p> <p>Question A: Question A: Is the remedy functioning as intended by the Decision Document?</p> <p>Remedial Actions: “The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended...”</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Answer: Yes</p> <p><u>Remedial Action Performance:</u> “The results of the August 2012 site inspection and review of the documents, ARARs, and risk assumptions indicate that the remedy is functioning as intended...”</p> <p>Page 10-10</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p>	<p>Concur.</p> <p>Page 10-9, Question A: The text will be updated as suggested.</p> <p>Page 10-10, Question B: The text will be updated as suggested.</p> <p>Page 10-11, Question C: The text will be updated as suggested.</p>	A

REVIEW
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PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p><u>Changes in Standards to be Considered:</u> "Revisions to the footnotes in ADEC..."</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> "Revisions to the footnotes in ADEC..."</p> <p>Page 10-11</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>No new information is available that would question the protectiveness of the remedy at ST009.</p> <p>Please restate as follows:</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Answer: No</p>		

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Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
6.	Section 10.5, Pages 10-12 through 10-14	<p>SS014 Drum Storage Area</p> <p>Page 10-12</p> <p>Question A: Is the remedy functioning as intended by the Decision Document?</p> <p>Remedial Actions: “The results of the August 2012 site inspection and review...”</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Answer: Yes</p> <p><u>Remedial Action Performance:</u> ““The results of the August 2012 site inspection and review...”</p> <p>Page 10-13</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p><u>Changes in Standards to be Considered:</u> “Revisions to the footnotes in ADEC...”</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> “Revisions to the footnotes in ADEC...”</p>	<p>Concur.</p> <p>Page 10-12, Question A: The text will be updated as suggested.</p> <p>Page 10-13, Question B: The text will be updated as suggested.</p> <p>Page 10-14, Question C: The text will be updated as suggested.</p>	A

REVIEW
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PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>Page 10-14</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>No new information is available that would question the protectiveness of the remedy at SS014.</p> <p>Please restate as follows:</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Answer: No</p>		
7.	Section 10.6, Pages 10-15 through 10-17	<p>DP011 Dump Area</p> <p>Question A: Is the remedy functioning as intended by the Decision Document?</p> <p>Remedial Actions: “The results of the August 2012 site inspection and review...”</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Answer: Yes</p> <p><u>Remedial Action Performance:</u> ““The results of the August 2012 site inspection and review...”</p>	<p>Concur.</p> <p>Page 10-15, Question A: The text will be updated as suggested.</p> <p>Page 10-16, Question B: The text will be updated as suggested.</p> <p>Page 10-17, Question C: The text will be updated as suggested.</p>	A

REVIEW
COMMENTS

PROJECT: DRAFT FIVE-YEAR REVIEW REPORT

LOCATION: CAPE ROMANZOF LRRS, ALASKA

ADEC		DATE: 4 June 2013 REVIEWER: Louis Howard PHONE:	ACTION TAKEN ON COMMENT BY: Jacobs Engineering Group Inc.	
Item No.	Drawing Sheet No., Spec. Para.	COMMENTS	CONTRACTOR RESPONSE	ADEC RESPONSE ACCEPTANCE (A-AGREE) (D-DISAGREE)
		<p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p><u>Changes in Standards to be Considered:</u> "Revisions to the footnotes in ADEC..."</p> <p>The question should be answered Yes or No.</p> <p>Restate as follows:</p> <p>Question B: Are the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?</p> <p>Answer: Yes</p> <p><u>Changes in Standards and To Be Considered:</u> "Revisions to the footnotes in ADEC..."</p> <p>Page 10-17</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>No new information is available that would question the protectiveness of the remedy at DP011.</p> <p>Please restate as follows:</p> <p>Question C: Has any other information come to light that could call into question the protectiveness of the remedy?</p> <p>Answer: No</p>		

From: [Howard, Louis R \(DEC\)](#)
To: [Wehrmann, Jennifer](#)
Cc: [Bullock, Penny](#); [Kelsey, Erika](#); [611th CES - Barnack, Keith](#)
Subject: RE: FA8903-08-D-8773 TO 138 Cape Romanzof Five Year Review Report-responses to ADEC comments
Date: Wednesday, May 29, 2013 4:13:43 PM

Response to ADEC's comments are acceptable. Please finalize the document.

Louis Howard
Alaska Department of Environmental Conservation
SPAR | Contaminated Sites Program
Federal Facility Restoration
555 Cordova Street 2nd Floor, Anchorage AK 99501
Office 907.269.7552 | FAX 907.269.7649

From: Wehrmann, Jennifer [mailto:jennifer.wehrmann@jacobs.com]
Sent: Wednesday, May 29, 2013 1:44 PM
To: Howard, Louis R (DEC)
Cc: Bullock, Penny; Kelsey, Erika; 611th CES - Barnack, Keith
Subject: RE: FA8903-08-D-8773 TO 138 Cape Romanzof Five Year Review Report-responses to ADEC comments

Good afternoon, Louis,
Please see attached for draft responses to your comments on the draft Romanzof 5YR report. Please let us know if we have your approval to proceed with finalizing the report.

Thank you,
Jennifer

From: Howard, Louis R (DEC) [mailto:louis.howard@alaska.gov]
Sent: Tuesday, May 21, 2013 12:02 PM
To: Wehrmann, Jennifer; 611th CES - Barnack, Keith
Cc: Bullock, Penny; Kelsey, Erika; AFCEC - Verplancke, Glen; AFCEC - Godden, Elizabeth; AFCEC-Taylor, Calvin
Subject: RE: FA8903-08-D-8773 TO 138 Cape Romanzof Five Year Review Report-ADEC comments

Attached are ADEC's comments on the draft Five Year Review Report. Hard copy to follow in the mail.

Louis Howard
Alaska Department of Environmental Conservation
SPAR | Contaminated Sites Program
Federal Facility Restoration
555 Cordova Street 2nd Floor, Anchorage AK 99501
Office 907.269.7552 | FAX 907.269.7649