U.S. Army Corps of Engineers
Alaska District

FIRST FIVE-YEAR REVIEW REPORT

NORTHEAST CAPE FUDS
ST. LAWRENCE ISLAND, ALASKA

Formerly Used Defense Site No. F10AK0969-03

FINAL
FEBRUARY 2015

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APPROVED BY: **DATE:**

_______________________________________ ____________________

Christopher D. Lestochi
Colonel, Corps of Engineers
District Commander

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APPENDICES

ACRONYMS AND ABBREVIATIONS

µg/L	micrograms per liter
°F	degrees Fahrenheit
AAC	Alaska Administrative Code
AC&WS	Aircraft Control and Warning System
ACAT	Alaska Community Action on Toxics
ADEC	Alaska Department of Environmental Conservation
ARAR	Applicable or Relevant and Appropriate Requirements
AST	aboveground storage tank
bgs	below ground surface
Bristol	Bristol Environmental Remediation Services, LLC
BTEX	benzene, ethylbenzene, toluene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
CONEX	container express unit
COPC	contaminant of potential concern
DD	Decision Document
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DHHS	U.S. Department of Health and Human Services
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
FRMD	FUDS Record Management Database
FS	Feasibility Study
FUDS	Formerly Used Defense Site
GRO	gasoline-range organics
HPAH	high molecular weight polyaromatic hydrocarbons
HTRW	Hazardous, Toxic, and Radioactive Waste
HWAP	hazardous waste accumulation point
IRIS	Integrated Risk Information System
ISCO	in situ chemical oxidation
Jacobs	Jacobs Engineering Group Inc.
LDU	Lower Decision Unit
LPAH	low molecular weight polycyclic aromatic hydrocarbons
LUC	land-use control

ACRONYMS AND ABBREVIATIONS (Continued)

MDU	Middle Decision Unit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
MOC	Main Operations Complex
NALEMP	Native American Lands Environmental Mitigation Program
ND	nondetect
NFA	No Further Action
NOAA	National Oceanic and Atmospheric Administration
O&M	Operations and Maintenance
OU	Operable Unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCE	tetrachloroethylene
POL	petroleum, oil, and, lubricants
RAB	Restoration Advisory Board
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RecKey	record key
RI	remedial investigation
ROD	Record of Decision
RRO	residual-range organics
SARA	Superfund Amendments and Reauthorization
SQuiRT	Screening Quick Reference Tables
SVOC	semivolatile organic compounds
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbons
TBC	to be considered
TCE	trichloroethene
UDU	Upper Decision Unit
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
UU/UE	unlimited use and unrestricted exposure
UVOST	Ultra Violet Optical Screening Tool
VOC	volatile organic compounds
WACS	White Alice Communications System

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) contracted Jacobs Engineering Group Inc. to conduct the first Five-Year Review of selected remedies for Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites at the Northeast Cape Formerly Used Defense Site (FUDS) on St. Lawrence Island, Alaska, in September 2013. This Report presents the results of the review.

The purpose of this review is to ensure that remedies selected in the Hazardous, Toxic, and Radioactive Waste (HTRW) Decision Document (DD), Project No. F10AK0969-03, have been implemented, are performing effectively, and continue to be protective of human health and the environment. Remedy implementation was ongoing for several sites in 2014. This review evaluates the site remedies as selected in the DD and each remedy's implementation status; this review also makes recommendations for resolving the identified discrepancies and improving remedy performance. At the time of this review, the USACE and the Alaska Department of Environmental Conservation (ADEC) were resolving comments related to the Draft *Northeast Cape HTRW Remedial Actions Report* (USACE 2014c). Final ADEC acceptance of the 2013 Remedial Actions Report and associated data is pending. Data considered during this review includes all sample results available as of May 2014.

Remedial investigations conducted at the Northeast Cape FUDS between 1994 and 2004 divided environmental concerns among 34 separate sites. Two DDs were written and signed in June and September of 2009 that addressed 34 sites (Site 30 is not a contaminated site and did not have a determination in the DDs). The Containerized HTRW DD (USACE 2009a) presented the selected remedy for Site 7. The HTRW DD (USACE 2009b), presented the selected remedies for the remaining 33 Northeast Cape sites. Both 2009 DDs were signed after the effective date of the Superfund Amendments and Reauthorization Act of 1986 (SARA), which requires five-year reviews for CERCLA sites where there are remaining hazardous substances, pollutants, and/or contaminants above levels that allow for unlimited use and unrestricted exposure.

This Five-Year Review summarizes current conditions at 17 sites at the Northeast Cape FUDS as follows:

- Five sites are required to undergo five-year reviews per CERCLA and SARA regulations.

Site 13	Site 21	Site 31
Site 16	Site 28	

- Twelve sites are required to undergo periodic review due to petroleum contamination above cleanup levels, but only 11 are included in this Five-Year Review. Site 7 is addressed under a separate Periodic Review Report (USACE 2014a).

Site 1	Site 8	Site 11	Site 27
Site 3	Site 9	Site 15	Site 32
Site 6	Site 10	Site 19	Site 7 (not included)

- One site (Site 29) was determined to be No Further Action (NFA) in the DD (USACE 2009b), but the DD also described the removal of incidental debris located in the stream channel that poses an inherent hazard. Therefore, Site 29 is included in this Report.

Protectiveness statements for 14 of the 17 sites are summarized in the Five-Year Review Summary form and are presented in Section 10.0. This Five-Year Review recommends NFA for Sites 1 and 31; therefore, protectiveness statements for these two sites have not been included. A protectiveness determination for Site 6 has been deferred due to new contaminants to be addressed.

The remaining sites at Northeast Cape were determined to be NFA in their corresponding DD, indicating that no additional action was required. These sites are not included in this first Five-Year Review with the exception of Site 29, as described above:

Site 2	Site 14	Site 22	Site 26
Site 4	Site 17	Site 23	Site 29
Site 5	Site 18	Site 24	Site 33
Site 12	Site 20	Site 25	Site 34

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Northeast Cape (St. Lawrence Island) **FUDS ID:** F10AK096903		
EPA ID: AK9799F2999		
Region: 10	**State:** Alaska	**City/County:** St. Lawrence Island

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

REVIEW STATUS
Lead agency: Other Federal Agency **If "Other Federal Agency" was selected above, enter Agency name:** USACE
Author name (Federal or State Project Manager): Jacobs Engineering Group Inc. on behalf of USACE, Alaska District Federal Project Manager Valerie Palmer
Author affiliation: Contractor
Review period: September 2009 – May 2014
Date of site inspection: 13 September 2013 – 15 September 2013
Type of review: Statutory; Post-SARA Policy Review
Review number: 1 (one)
Triggering action date: 3 September 2009
Due date ***(five years after triggering action date)*****:** 3 September 2014

<table>
<tr><th colspan="5">ISSUES/RECOMMENDATIONS</th></tr>
<tr><td>Site(s): 1, 28, 29, 31, 32</td><td colspan="4">Site(s) without issues/recommendations identified in the Five-Year Review</td></tr>
<tr><td rowspan="3">Site(s): 3</td><td colspan="4">Issue Category: Remedy Selection</td></tr>
<tr><td colspan="4">Issue: The 2013 site inspection identified a large area of surface water at Site 3 not evaluated as an exposure pathway at the time of the risk assessment.</td></tr>
<tr><td colspan="4">Recommendation: Evaluate surface water as an exposure pathway at Site 3.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): 3</td><td colspan="4">Issue Category: Remedy Completion</td></tr>
<tr><td colspan="4">Issue: An apparent petrogenic sheen, limited in size, was observed in surface water at Site 3. A small plastic motor oil container cap was also observed near the sheen.</td></tr>
<tr><td colspan="4">Recommendation: Determine whether the sheen continues to be present at the Site 3 pond and if non-FUDS activities are a contributing factor. If sheen is observed, collect samples to determine the nature of the sheen.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): 3, 6, 8, 9, 10, 11, 13, 15, 16, 19, 21, 27</td><td colspan="4">Issue Category: Remedy Completion</td></tr>
<tr><td colspan="4">Issue: The following LUCs have not been formally implemented:
• Prevent the use of the aquifer for drinking water purposes until cleanup levels are met at Sites 10, 11, 13, 15, 16, 19, 21, and 27.
• Designate areas unsuitable for drinking water at Sites 3, 6, and 9.
• Prevent construction of buildings on top of landfills at Site 9.
• Designate areas unsuitable for residential land use without additional investigation and/or cleanup at Site 8.</td></tr>
<tr><td colspan="4">Recommendation: Implement LUCs, as described in the Decision Document, following completion of the remedial action fieldwork.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
</table>

<table>
<tr><th colspan="5">ISSUES/RECOMMENDATIONS</th></tr>
<tr><td rowspan="3">Site(s): 6</td><td colspan="4">Issue Category: Remedy Selection</td></tr>
<tr><td colspan="4">Issue: Pre-construction soil samples identified one surface soil sample with a PCB concentration of 2.2 mg/kg. Excavations were performed as part of the remedial action for DRO at the site and may have removed the PCBs. Post-excavation samples were not tested for PCBs. It is not known if PCBs remain onsite at the location of the previous detection.</td></tr>
<tr><td colspan="4">Recommendation: Confirm the presence or absence of PCBs in soil at the location of the previous detection.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): 8</td><td colspan="4">Issue Category: Remedy Implementation</td></tr>
<tr><td colspan="4">Issue: Previous monitoring activities to assess the progress of natural attenuation may not be adequate because of the sampling technique used to collect samples. Current results may not be representative of the sediment concentration within the entire decision unit at Site 8.</td></tr>
<tr><td colspan="4">Recommendation: Establish the average decision unit concentration using an incremental sampling approach.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): 8</td><td colspan="4">Issue Category: Remedy Implementation</td></tr>
<tr><td colspan="4">Issue: Site 8 sediment sampling, composite sampling completed in 2010, 2011, and 2012 identified 2-methylnaphthalene at concentrations greater than the site-specific cleanup level.</td></tr>
<tr><td colspan="4">Recommendation: Continue monitoring natural attenuation in sediment</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
</table>

ISSUES/RECOMMENDATIONS				
Site(s): 8	**Issue Category:** Remedy Implementation			
	Issue: Established Decision Units may not include the most heavily impacted area.			
	Recommendation: Ensure the most heavily impacted area is included within the Decision Unit boundaries.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Regulatory Party**	**Milestone Date**
No	No	USACE	ADEC	2018
Site(s): 8	**Issue Category:** Remedy Implementation			
	Issue: Water quality and natural attenuation parameters are measured in surface water.			
	Recommendation: Evaluation of natural attenuation parameters and water quality should be conducted in pore water to more accurately assess natural attenuation in contaminated sediment.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Regulatory Party**	**Milestone Date**
No	No	USACE	ADEC	2018
Site(s): 10	**Issue Category:** Remedy Implementation			
	Issue: Ethylene glycol was identified and removed to the extent practicable in soil. Currently there is not enough information to evaluate the presence or potential risk presented by the leaching of ethylene glycol to groundwater.			
	Recommendation: Add ethylene glycol to the suite of analytes evaluated in Site 10 groundwater.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Regulatory Party**	**Milestone Date**
No	Yes	USACE	ADEC	2018

<table>
<tr><th colspan="5">ISSUES/RECOMMENDATIONS</th></tr>
<tr><td rowspan="3">Site(s): MOC (10, 11, 13, 15, 19, 27)</td><td colspan="4">Issue Category: Monitoring</td></tr>
<tr><td colspan="4">Issue: As of 2012, elevated levels of DRO and RRO were found in surface water during excavation activities. TAH and TAqH were not included as test parameters.</td></tr>
<tr><td colspan="4">Recommendation: If GRO, DRO, or RRO is suspected, add VOCs and PAHs to surface water samples to allow TAH/TAqH evaluation. These analyses were included in the 2013 Work Plan.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>No</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): MOC (10, 11, 13, 15, 19, 27)</td><td colspan="4">Issue Category: Monitoring</td></tr>
<tr><td colspan="4">Issue: The well network does not provide sufficient downgradient coverage of the site. Existing monitoring wells have been damaged by frost jacking and utilization of locking caps is not currently possible.</td></tr>
<tr><td colspan="4">Recommendation: When the excavation remedy is complete, install new wells, or repair/refurbish existing wells downgradient of MOC Sites 10, 11, 13, 15, 19, and 27. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
<tr><td rowspan="3">Site(s): MOC (10, 11, 13, 15, 19, 27)</td><td colspan="4">Issue Category: Monitoring</td></tr>
<tr><td colspan="4">Issue: The locations of monitoring wells with historic contamination (MW88-10 and MW88-1) appear to be upgradient of source areas identified as part of the MOC. The source of DRO in the wells is unclear.</td></tr>
<tr><td colspan="4">Recommendation: Install a monitoring well upgradient of MW88-10 and MW88-1. The well location should take into account the anticipated hydraulic gradient at the site.</td></tr>
<tr><td>Affect Current Protectiveness</td><td>Affect Future Protectiveness</td><td>Implementing Party</td><td>Regulatory Party</td><td>Milestone Date</td></tr>
<tr><td>No</td><td>Yes</td><td>USACE</td><td>ADEC</td><td>2018</td></tr>
</table>

ISSUES/RECOMMENDATIONS				
Site(s): 21	**Issue Category:** Remedy Implementation			
	Issue: Current remedial activities are focused on arsenic removal around the highest historic result at the utilidor outfall, but are not addressing locations along the former utilidor route with concentrations greater than the cleanup level.			
	Recommendation: Continue remedy implementation at all site locations that exceed the arsenic cleanup level.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Regulatory Party**	**Milestone Date**
No	Yes	USACE	ADEC	2018
Site(s): 27	**Issue Category:** Monitoring			
	Issue: Previous sampling detected the site COC naphthalene in soil above the cleanup level (up to 191 mg/kg) but naphthalene is not included in the analyte list for excavation confirmation sampling. Attainment of soil cleanup levels for naphthalene cannot be confirmed.			
	Recommendation: Collect soil samples to verify that naphthalene does not persist above cleanup levels at this site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Regulatory Party**	**Milestone Date**
No	Yes	USACE	ADEC	2018

PROTECTIVENESS STATEMENT(S)		
Site: Site 3 Fuel Pump House	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 3 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 6 Gravel Pad	*Protectiveness Determination:* Deferred	*Addendum Due Date (if applicable): 2017*
Protectiveness Statement: A protectiveness determination of the remedy at Site 6 cannot be made until further information is obtained by confirming the presence or absence of PCBs in subsurface soil. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.		
Site: Site 8 POL Spill	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 8 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 9 Housing and Operations Landfill	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 9 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 10 Buried Drums	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 10 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		

PROTECTIVENESS STATEMENT(S)		
Site: Site 11 Fuel Tanks	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 11 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 13 Heat and Power Plant	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 13 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 15 Fuel Pipeline	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 15 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 16 Paint and Dope Storage	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 16 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 19 Auto Maintenance	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 19 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		

PROTECTIVENESS STATEMENT(S)		
Site: Site 21 Wastewater Tank	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 21 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 27 Diesel Fuel Pump	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 27 is expected to be protective of human health and the environment upon completion. In the interim, no exposure pathways that could result in unacceptable risks have been noted. Remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 28 Drainage Basin	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 28 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		
Site: Site 32 Lower Tramway	*Protectiveness Determination:* Will be protective	*Addendum Due Date (if applicable):*
Protectiveness Statement: The remedy at Site 32 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.		

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1.0 INTRODUCTION

The U.S. Army Corps of Engineers (USACE) contracted Jacobs Engineering Group Inc. (Jacobs) to conduct the first Five-Year Review of the selected remedies at Northeast Cape on St. Lawrence Island, Alaska (Figure A-1), in September 2013. This Report summarizes the first Five-Year Review for five sites and Periodic Review for 11 sites at Northeast Cape. This Report also summarizes an additional site determined to be No Further Action (NFA) in a 2009 Decision Document (DD).

1.1 PURPOSE OF THIS REVIEW

The purposes of this Five-Year Review are twofold: to evaluate the implementation and performance of the remedial actions selected for 17 of the 34 Northeast Cape sites on St. Lawrence Island, Alaska, and to determine whether these actions are protective of human health and the environment. Table 1-1 presents all 34 Northeast Cape sites with their status. The methods, findings, and conclusions of this Five-Year Review Report identify issues found through an examination of the data collected over the past five years, if any, and provide recommendations to address them. This is the first Five-Year Review for the Northeast Cape sites.

This is a post-Superfund Amendments and Reauthorization Act (SARA) statutory review that is required under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) for the five Northeast Cape sites where hazardous substances, pollutants, or contaminants remain above levels that allow for unlimited use and unrestricted exposure (UU/UE). Eleven additional Northeast Cape sites are included in this Report for periodic review due to petroleum contamination above cleanup levels. An additional site (Site 29) determined to be NFA is included in this Report due to debris described in the 2009 DD (USACE 2009b).

Two DDs were developed and signed for the original 34 sites at the Northeast Cape Formerly Used Defense Site (FUDS): *Decision Document: Hazardous, Toxic, and Radioactive Waste (HTRW) Project #F10AK096903* (USACE 2009b) and *Decision Document: Site 7 Cargo*

Beach Road Landfill, Containerized Hazardous, Toxic, and Radioactive Waste (CON-HTRW) Project #F10AK096905 (USACE 2009a). This review evaluates only the site remedies selected in the HTRW DD (USACE 2009b); Site 7 is evaluated in a separate document (USACE 2014a). The triggering action that began the five-year review process was the signing of the HTRW Northeast Cape FUDS DD on 3 September 2009 (USACE 2009b).

Table 1-1
Individual Site Status

Site Number	Name	Included in this review?	Status
1	Airstrip	Yes	Remedy is not complete. Historical RRO contamination identified in soil could not be re-located in 2010. Confirmation soil samples were collected and RRO was detected at concentrations below cleanup levels. Site is recommended for NFA.
2	Airport Terminal and Landing Strip	No	Site 2 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
3	Fuel Pump House	Yes	Remedy is not complete. Historical RRO contamination identified in sediment was confirmed to be related to biogenic interference in 2010. Historical DRO contamination identified in soil was not re-located in 2010. Confirmation soil samples indicated DRO was detected at concentrations below cleanup levels. Additional DRO contamination not described in the DD was identified in a nearby stockpile and removed in 2010. The LUC to designate areas not suitable for drinking water has not been implemented.
4	Native Fishing and Hunting Camp	No	Site 4 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
5	Cargo Beach	No	Site 5 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
6	Gravel Pad	Yes	Remedy is not complete. Excavation of POL-contaminated soil was completed in 2010. The LUC to designate areas not suitable for drinking water has not been implemented.
7	Cargo Beach Road Landfill	No	Site 7 is not included in this review. Remedy is ongoing. A Periodic Review of Site 7 is provided in a separate document (USACE 2014a).

Table 1-1
Individual Site Status (Continued)

Site Number	Name	Included in this review?	Status
8	POL Spill	Yes	Remedy is not complete. Water quality parameters, surface water samples, and sediment samples were collected in 2010, 2011, and 2012. 2-Methylnaphthalene remains in sediment above cleanup levels. The LUC to designate Site 8 as an area not suitable for residential land use without additional investigation and/or cleanup has not been implemented.
9	Housing and Operations Landfill	Yes	Remedy is not complete. Surface debris was removed and a landfill cap and diversion trench were constructed in 2010. Surface water and groundwater monitoring are ongoing. LUCs (to designate areas not suitable for drinking water and prevent buildings on top of landfills) have not been implemented. Long-term monitoring to evaluate downgradient migration and a steady-state plume is ongoing.
10	Buried Drums	Yes	Remedy is not complete. Four excavations were conducted to remove contaminated soil in 2011, 2012, and 2013. Soil contaminated with DRO, RRO, and arsenic was successfully removed and confirmation samples were below cleanup levels. Ethylene glycol-contaminated soil was removed to the maximum extent practicable. The excavation was terminated at 4 feet below fractured bedrock at a total depth of 12 feet bgs. Soil samples could no longer be collected. Groundwater monitoring for petroleum-related contaminants is ongoing. The LUC to limit future drinking water uses has not been implemented.
11	Fuel Tanks	Yes	Remedy is not complete. Excavation of contaminated soil occurred in 2011 and 2013 and all confirmation samples were below site-specific cleanup levels. Groundwater monitoring is ongoing. The LUC to limit future drinking water uses has not been implemented.
12	Gasoline Tank Area	No	Site 12 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
13	Heat and Power Plant	Yes	Remedy is not complete. Excavation of contaminated soil was conducted from 2010 to 2013. Additional excavations are planned for 2014. Groundwater monitoring for petroleum-related contaminants is ongoing. The LUC to limit future drinking water uses has not been implemented.
14	Emergency Power/Operations Building	No	Site 14 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).

Table 1-1
Individual Site Status (Continued)

Site Number	Name	Included in this review?	Status
15	Fuel Pipeline	Yes	Remedy is not complete. Excavation of contaminated soil began in 2012 and was completed in 2013. Groundwater monitoring is ongoing. The LUC to limit future drinking water uses has not been implemented.
16	Paint and Dope Storage	Yes	PCB-contaminated soil removal was completed in 2010. The LUC to limit future drinking water use has not been implemented.
17	General Supply Warehouse and Mess Hall Warehouse	No	Site 17 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
18	Housing Facilities and Squad Headquarters	No	Site 18 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
19	Auto Maintenance	Yes	Excavation was completed for POL-contaminated soil in 2012 (Area H). Groundwater monitoring is ongoing. The LUC to limit future drinking water uses has not been implemented.
20	Air Force Aircraft Control Warning Building	No	Site 20 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
21	Wastewater Tank	Yes	Remedy is not complete. PCB-contaminated soil removal was completed in 2010. Excavation of arsenic-contaminated soil occurred in 2012 and 2013; additional excavations are planned for 2014. The LUC to limit future drinking water use has not been implemented.
22	Water Wells and Water Supply Building	No	Site 22 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
23	Power and Communication Line Corridors	No	Site 23 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
24	Receiver Building Area	No	Site 24 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
25	Direction Finder Area	No	Site 25 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
26	Former Construction Camp	No	Site 26 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).

Table 1-1
Individual Site Status (Continued)

Site Number	Name	Included in this review?	Status
27	Diesel Fuel Pump	Yes	Remedy is not complete. Excavation of contaminated soil occurred in 2012 and 2013. Groundwater monitoring is ongoing. The LUC to limit future drinking water use has not been implemented.
28	Drainage Basin	Yes	Remedy is not complete. A manhole and culverts were removed or capped in 2010. The extent and nature of sediment contamination was further investigated in 2011 and 2012 and petroleum, metals, and PCB contamination were identified. Sediment removal activities occurred in 2012 and 2013.
29	Suqitughneq River and Estuary	Yes	Remedy is complete. Site was determined to be NFA; however, incidental debris located in the stream channel that poses an inherent hazard was recommended for removal in the 2009 DD (USACE 2009b). Debris was removed in 2010.
30	Site-wide (created to provide site background levels)	No	Site 30 is not included in this review because it is not a contaminated site.
31	White Alice Communications	Yes	Remedy is complete. Excavation of PCB-contaminated soil was conducted in 2010, 2011, 2012, and 2013. All confirmation samples were below cleanup levels. Site is recommended for NFA.
32	Lower Tramway	Yes	Remedy is not complete. DRO-contaminated soil remains onsite.
33	Upper Tram Terminal	No	Site 33 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).
34	Upper Camp	No	Site 34 is not included in this review because it was determined to be NFA in the 2009 DD (USACE 2009b).

1.2 RESPONSIBILITIES

USACE, Alaska District, is the lead agency for remedial actions at the Northeast Cape FUDS. USACE contracted Jacobs to conduct the Five-Year Review and prepare this Five-Year Review Report. The selected final remedial actions for the Northeast Cape sites were chosen in accordance with State of Alaska regulations governing the protection of human health and the environment from hazardous substances (Alaska Administrative Code [AAC], Title 18, Section 75 [18 AAC 75]), Alaska Water Quality Standards (18 AAC 70), Federal Toxic

Substances Control Act, and Resource Conservation and Recovery Act (RCRA), and are generally consistent with procedures set forth by the Federal CERCLA as amended by the SARA of 1986.

Petroleum, oil, and lubricants (POL)-contaminated sites at Northeast Cape fall under the CERCLA petroleum exclusion rule and were therefore addressed under the authority of the Defense Environmental Restoration Program, United States Code, Title 10, Section 2701, et seq. The petroleum contamination remedies were consistent with Alaska's Site Cleanup Rules (18 AAC 75.3).

1.3 AUTHORITY FOR CONDUCTING THE FIVE-YEAR REVIEW

This Report has been prepared in accordance with the following:

- U.S. Environmental Protection Agency (EPA) *Comprehensive Five-Year Review Guidance* (EPA 2001)
- CERCLA Section 121
- EPA Technical Memorandum: *Clarifying the Use of Protectiveness Determinations for CERCLA five-year reviews* (EPA 2012b).

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 Code of Federal Regulations (CFR), Section 40, Part 300.430(f)(4)(ii) [40 CFR 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 the initiation of the selected remedial action.*

1.4 OVERVIEW

This Five-Year Review was conducted with data available as of May 2014. The project team consisted of the USACE Project Manager, technical representatives, and contracted environmental engineering support. This effort included a review of the DD requirements and work that has been done to satisfy those requirements, current and past monitoring data, and the status of the remedies and the physical condition of the sites. The general public was notified of the Five-Year Review with public notices placed in the *Nome Nugget* on 18 and 19 August 2013 (Appendix F). In addition, a flyer containing the same information was mailed to select community members and Alaska Department of Environmental Conservation (ADEC) in September 2013. Visits were made to each active site based on whether an action had been performed, is still in progress, or is planned for future completion. This Five-Year Review addresses 17 of the 34 Northeast Cape sites selected for remedial action under the HTRW DD (USACE 2009b) shown on Figures A-2 and A-3 (Appendix A).

Northeast Cape sites designated as NFA at the time of the DD, with the exception of Site 29 (Suqitughneq River), were not included in this review. Partially submerged debris was removed from streams near Sites 9 and 29 concurrent with other work at Northeast Cape sites (USACE 2009b). A Five-Year Review of Site 29 is not required, but the site will be included to assess recent site work and address community concerns (Section 8.1).

Land-use controls (LUC) are discussed as part of the applicable remedies in additional detail in Section 4.0. Refer to Table 1-1 for a brief description and the status of all 34 Northeast Cape sites.

2.0 SITE CHRONOLOGY

Important events and relevant dates for the Northeast Cape sites covered in this Five-Year Review are shown in Table 2-1.

Table 2-1
Chronology of Site Events

Event	Date
Northeast Cape site acquired by the U.S. Air Force	1952
Aircraft Control and Warning Station constructed	1951 – 1952
White Alice Communications System constructed	1954
Aircraft Control and Warning Station operations terminated	1969
White Alice Communications System operations terminated	1972
Bureau of Land Management obtained ownership of Northeast Cape	August 1975
Alaska Native Claims Settlement Act transferred land ownership to Sivuqaq, Inc. and Kukulget, Inc.	June 1979
Environmental Assessment conducted	1985
Site Assessment conducted	1991 and 1992
Phase I RI conducted	1994
All electrical transformers removed	1994
Phase II RI/FS and Human Health and Ecological Risk Assessment drafted	1996
Remedial Action conducted to remove communications wire and cable on the tundra	1997
Phase II RI/FS finalized	September 1998
Site Assessment conducted	1999
Debris, hazardous waste, ASTs, and fuel pipeline removed	2000
USTs, PCB and POL-contaminated soil removed, buildings demolished	2001
Phase III RI conducted	2001 – 2002
30 buildings and utilidor demolished; drums, communication poles, and wire removed	2003
Human Health and Environmental Risk Assessment finalized	2004
FS prepared	2007
Groundwater Use Determination (18 AAC 350) submitted to ADEC	April 2007
ADEC comments on the NE Cape 350 Determination received	May 2007
DD selecting the remedy for Sites 1 through 6 and 8 through 34 approved by USACE	September 2009
DD selecting the remedy for Site 7 approved by USACE	June 2009
Remedial action began to implement the remedy for Site 7	June 2009
Bristol requested landfill closure by ADEC for Site 7	November 2009

Table 2-1
Chronology of Site Events (Continued)

Event	Date
Site 7 Landfill Cap Construction Report prepared	May 2010
Remedial action began to implement the DD-selected remedies	July 2010
EPA evaluated USACE Cleanup of FUDS at Northeast Cape and Gambell	February 2013
Public notice of Five-Year Review published and public comment period opened	August 2013
Five-Year Review site visit	September 2013
Public comment period closed	February 2014

3.0 BACKGROUND

This is the first Five-Year Review at Northeast Cape. The section below is intended to describe the general conditions of the Northeast Cape site in its entirety; individual site histories, physical characteristics, and land uses are discussed in detail in the sections that follow.

3.1 NORTHEAST CAPE

The Northeast Cape FUDS, project number is F10AK0969-03. The ADEC contaminated sites record key (RecKey) number for the overall Northeast Cape FUDS is 198532X917901. Individual sites within the Northeast Cape FUDS are also tracked with separate RecKey numbers. The EPA site identification number is AK9799F2999. The Northeast Cape FUDS is not listed on the National Priorities List.

3.1.1 Physical Characteristics at Northeast Cape

The Northeast Cape FUDS is located on St. Lawrence Island, Alaska in the western portion of the Bering Sea, approximately 135 air-miles southwest of Nome (Figure A-1). It is 9 miles west of the northeastern cape of St. Lawrence Island at 63°19’ north, 168°58’ west. The Northeast Cape property originally encompassed approximately 4,800 acres (7.5 square miles) and is bound by Kitnagak Bay to the northeast, Kangighsak Point to the northwest, and the Kinipaghulghat Mountains to the south.

The Northeast Cape FUDS consists mainly of rolling tundra, which rises from the Bering Sea toward the base of the Kinipaghulghat Mountains. The Kinipaghulghat Mountains rise abruptly to an elevation of approximately 1,800 feet above sea level roughly 3 miles from the coastline. The Northeast Cape FUDS is not connected to other permanent communities on the island by road and is only accessible by air, water, or all-terrain vehicle trails. The Village of Savoonga, the closest community, is located approximately 60 miles to the northwest (Figure A-1). Savoonga has a subarctic maritime climate with some continental influences during the winter. Summer temperatures average between 40 to 51 degrees Fahrenheit (°F) and winters temperatures average between -7 to 11 °F. Temperature extremes have been recorded at -34 and 67 °F. Average annual precipitation is 10 inches, with 58 inches of snowfall. The island is subject to prevailing winds, averaging 18 miles per hour.

3.1.2 Geology

As presented in the DD (USACE 2009b), St. Lawrence Island consists of isolated bedrock highlands of igneous, metamorphic, and older sedimentary rocks surrounded by unconsolidated surficial deposits overlying a relatively shallow erosional bedrock surface. The main area of operation, known as the Main Operations Complex (MOC) is located at approximately 100 feet in elevation. In the area of the MOC, shallow unconsolidated surficial materials overlie quartz monzonitic rocks of the Kinipaghulghat Pluton (Patton and Csejtey 1980). The pluton forms the mountainous area south of the Northeast Cape FUDS, which includes Kangukhsam Mountain. The Suqitughneq River drainage in the Kinipaghulghat Pluton has created an erosional valley and alluvial fan of unconsolidated sediments. The Northeast Cape FUDS is located on this alluvial fan, which protrudes north from the mountain front toward the Bering Sea. Granitic bedrock materials are exposed at the coast north of the site at Kitnagak Bay, which suggests that the quartz monzonitic bedrock underlies the unconsolidated materials at a relatively shallow depth on a wave-cut erosional platform.

In general, the native soil stratigraphy at Northeast Cape is characterized by silts near the surface, overlying more sand-dominated soils at depth. The silt contains varying quantities of clay/sand/gravel, and varies from zero to 10 feet in thickness. The silt is dark brown to dark green, and sometimes exhibits a mottled texture. In some areas, the silt exhibits an aqua green or blue color. Dark brown silts are observed in outcrops. The sand at depth contains varying degrees of silt/gravel/cobbles that ranges from 2 feet to greater than 20 feet thickness. These deeper, coarse-grained materials are generally unsorted and are likely to be of glaciofluvial origin. The depth to bedrock at the Northeast Cape FUDS is unknown (USACE 2009a, 2009b).

3.1.3 Land and Resource Use at Northeast Cape

St. Lawrence Island residents from the villages of Gambell and Savoonga engage in subsistence fishing, hunting, and gathering in the Northeast Cape FUDS area year-round. Local subsistence hunting camp structures are located adjacent to Site 3 and are occupied seasonally. There are not currently any permanent residents of the Northeast Cape area; however, representatives of the Native Village of Savoonga have indicated a desire to re-establish a permanent residential community at the site in the future.

St. Lawrence Island supports habitats for the following endangered or threatened species: the polar bear (threatened), spectacled eider (endangered), Steller's eider (threatened), and the Western Distinct Population Segment of Stellar sea lion (endangered). Walrus are protected under the Marine Mammal Protection Act. The area of Northeast Cape FUDS is used for the collection of berries and subsistence hunting of reindeer. The Suqitughneq River (Site 29), located within the Northeast Cape FUDS, is used for subsistence fishing. The ocean surrounding the Northeast Cape FUDS is used extensively for subsistence activities including hunting of whales, walrus, seals, and sea birds; and fishing.

3.2 SITE HISTORY

The Northeast Cape FUDS was constructed as an Aircraft Control and Warning Station (AC&WS) during 1950 and 1951 to provide radar coverage and surveillance for the Alaskan Air Command, and later for the North American Air Defense Command, as part of the Alaska Early Warning System. The site was activated in 1952 and a White Alice Communications System (WACS) station was added to the site in 1954. The AC&WS and WACS operations were supported by 212 personnel and terminated in 1969 and 1972, respectively. The majority of military personnel were removed from the site by the end of 1969.

The Northeast Cape FUDS included areas for housing site personnel, power plant facilities, fuel storage tanks, distribution lines, maintenance shops, wastewater treatment facilities, and landfills. The buildings and majority of furnishings and equipment related to the AC&WS were abandoned in place initially due to the high cost of off-island transport.

In 1971, the villages of Gambell and Savoonga opted out of the Alaska Native Claims Settlement Act, which allowed for title to 1.136 million acres of land in the former St. Lawrence Island Reindeer Reserve, which was established in 1903. The Gambell Native Corporation and Savoonga Native Corporation (now known as Sivuqaq, Inc. and Kukulget, Inc. respectively) received titles to all of St. Lawrence Island (except U.S. Surveys 4235, 4237, 4340, 4369, and 3728) by Interim Conveyance No. 203 dated 21 June 1979. In 1982, the Navy obtained approximately 26 acres of land containing the former WACS. The land transfer was later deemed invalid and property ownership was reverted to Sivuqaq, Inc. and Kukulget, Inc.

Demolition of the buildings and the majority of other structures have been completed under multiple USACE contracts. The runway, improved gravel roads, and concrete slabs of some of the former structures remain intact. Investigations have been performed since the early 1990s and are described in further detail in subsequent sections.

3.2.1 History of Contamination at Northeast Cape

The primary sources of contamination at the Northeast Cape FUDS are attributed to spills and leaks of fuel products associated with aboveground storage tanks (AST), underground storage tanks (UST), and associated piping. The largest known spill at Northeast Cape occurred in 1967 when a plow truck accidentally hit POL Tank #2 and released approximately 30,000 gallons of fuel. Interviews with former personnel suggest that there are several undocumented reports of much larger spills from the large ASTs.

Other sources of contamination include electrical transformers; waste stored in 55-gallon drums; metal debris; and organic chemicals from paint, solvents, and other miscellaneous facility activities. Four remedial investigations (RI) were conducted at the Northeast Cape FUDS between 1994 and 2004, during which the environmental concerns at Northeast Cape were divided among 34 individual sites.

3.2.2 Initial Response at Northeast Cape

Initial response actions were conducted at some of the Northeast Cape sites prior to DD preparation and signature; brief descriptions of these response actions are listed below:

- In 1990, transformers, drums, tanks, fire extinguishers, and other containerized hazardous wastes were removed from Site 31.
- In 1996, a radiological survey was conducted and public disclosure of potential asbestos hazards was initiated.
- In 2000, 6,099 fifty-five gallon drums, approximately 60 tons of antenna poles, lines, and other miscellaneous nonhazardous debris, and hazardous wastes from buildings were removed, and 19 ASTs were cleaned and a fuel pipeline was removed.
- During the 2001 field season, 17 additional tanks were cleaned, three USTs were decommissioned, and 3,303 tons of building demolition debris including steel beams, asbestos-containing materials, and Toxic Substances Control Act-regulated materials, was demolished and packaged. Twenty-five tons of polychlorinated biphenyls (PCB)-contaminated soil and 1,643 tons of POL-contaminated soil were excavated and four potable water wells were decommissioned.
- In 2003, the remaining 30 buildings, other structures, and the utilidor system were demolished and removed. Over 300 drums and tanks of hazardous wastes, including a large septic tank at the MOC and 12 ASTs were removed or decommissioned. More than 500 power and communications poles and 60 miles of wires and cables were gathered for disposal; 650 feet of fuel lines were transported off-island. More than 5,000 tons of waste and debris were shipped off-island for disposal.
- In 2005, the tramway towers and wire were demolished and removed. Additionally, more than 200 metal and wooden poles, approximately 25 miles of power and communications wire and cable, 26 tons of debris from two debris fields located on Kangukhsam Mountain, more than 160 tons of PCB-contaminated concrete, and 290 tons of PCB-contaminated soil were removed. Approximately 1,500 tons of waste was sorted and packaged for transport off-island; 370 tons of non-creosote treated and unpainted wood was burned on-island, with the ash removed for disposal off-island.

3.2.3 Basis for Taking Action at Northeast Cape

The primary environmental contaminants remaining at the Northeast Cape sites at the time of the DD were petroleum hydrocarbons, PCBs, volatile organic compounds (VOC), and metals. These contaminants remained in soil, sediment, and groundwater across the installation. The risk assessments performed at the individual sites determined the human and/or ecological risks exceeded EPA's risk range at some of the Northeast Cape sites. Site contaminants of concern (COC) identified at the time of the DD are presented in Table 3-1.

Table 3-1
Chemicals of Concern at the Time of the Decision Document

Northeast Cape Sites																	
Analyte	**Site 1**	**Site 3**	**Site 6**	**Site 8**	**Site 9**	**Site 10**	**Site 11**	**Site 13**	**Site 15**	**Site 16**	**Site 19**	**Site 21**	**Site 27**	**Site 28**	**Site 29**	**Site 31**	**Site 32**
Soil																	
DRO		X	X		X	X	X	X	X		X		X	X			
RRO	X	X												X			
Naphthalene													X				
PCBs								X		X		X		X		X	
Antimony										X							
Arsenic										X		X					
Chromium														X			
Lead										X				X			
Zinc														X			
PAHs														X			
Groundwater																	
DRO		X			X	X[a]	X[a]	X[a]	X[a]		X[a]		X[a]				
RRO		X			X	X[a]	X[a]	X[a]	X[a]		X[a]		X[a]				
GRO						X[a]	X[a]	X[a]	X[a]		X[a]		X[a]				
Benzene						X[a]	X[a]	X[a]	X[a]		X[a]		X[a]				
Arsenic			X														
Barium			X														
Cadmium			X														
Lead			X		X												
Nickel			X									X					
Zinc			X														

Table 3-1
Contaminants Exceeding Cleanup Levels (Continued)

Northeast Cape Sites																	
Analyte	**Site 1**	**Site 3**	**Site 6**	**Site 8**	**Site 9**	**Site 10**	**Site 11**	**Site 13**	**Site 15**	**Site 16**	**Site 19**	**Site 21**	**Site 27**	**Site 28**	**Site 29**	**Site 31**	**Site 32**
Sediment																	
DRO			X	X										X			
RRO		X												X			
Chromium														X			
Lead														X			
Zinc														X			
PCBs														X			
PAHs														X			

Notes:
X = Indicates the presence of contaminant above site-specific cleanup levels at the time of the DD (USACE 2009b).
[a] groundwater is monitored throughout the MOC and recently exceeded the cleanup level in some locations, but not necessarily in a well historically associated with this site.
For definitions, see the Acronyms and Abbreviations section.

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4.0 REMEDIAL ACTIONS

Remedial action objectives (RAO) and selected remedy descriptions associated with each Northeast Cape site included in this review are presented in this section. Details regarding the initial plans, remedy implementation, and status of the remedies are provided for the 17 sites. The selected remedy for groundwater for all MOC sites is discussed in Section 4.9. Costs for operations and maintenance (O&M) are summarized in Section 4.3.

4.1 REMEDY SELECTION

The DD, which addressed 33 Northeast Cape sites, was approved on 3 September 2009 (USACE 2009b). Specific remediation alternatives were developed and evaluated for the identified COCs at the Northeast Cape sites. The RAOs described in the DD are presented in Sections 4.1.1 through 4.1.3.

4.1.1 Site-Wide RAOs

- Prevent current and future exposure to humans by ingestion, inhalation, and dermal contact with contaminated soils at levels above Applicable or Relevant and Appropriate Requirements (ARAR) (for PCBs) or pertinent risk-based standards for petroleum hydrocarbons.
- Prevent exposure to ecological receptors by direct contact with contaminated soils/sediment above risk-based cleanup levels.
- Prevent ingestion of groundwater containing contaminants at levels above state drinking water standards and pertinent risk-based standards for petroleum hydrocarbons.

4.1.2 Main Complex Area (Sites 10, 11, 13, 15, 19, and 27) RAOs

- Prevent ingestion of groundwater containing contaminants at levels above state drinking water standards and pertinent risk-based standards for petroleum hydrocarbons.
- Mitigate potential future risk to human health from the ingestion, inhalation, and dermal contact with soil exposure pathways. Meet risk-based cleanup levels in soils to a depth of 15 feet. Reduce concentrations of petroleum hydrocarbons and other contaminants to below pertinent risk-based standards.

4.1.3 Drainage Basin (Site 28) RAOs

- Mitigate potential future risk to human health from the ingestion, inhalation, and dermal contact with soil/sediment exposure pathways. Meet pertinent risk-based cleanup levels in sediments.
- Prevent migration of contaminants into the Suqitughneq River above risk-based cleanup levels.

Cleanup levels for COCs identified in various media at the Northeast Cape sites were established in the DD and are presented in Table 4-1. Soil cleanup levels were developed based on the Human Health and Ecological Risk Assessment (USACE 2004) to be protective of future residential use of the site. Sediment cleanup levels are only applicable to continuously submerged sediments. Sediments that are intermittently submerged are considered soil. The cleanup levels for continuously submerged sediments are risk-based concentrations that are protective of ecological receptors, and are assumed to be low enough to represent no significant health risk to humans. Groundwater cleanup levels are based on promulgated levels from 18 AAC 75, Table C. Surface water cleanup levels are also based on State of Alaska regulation 18 AAC 70.

Table 4-1
Northeast Cape Cleanup Levels

Contaminant of Concern	Soil (mg/kg)	Sediment (mg/kg)	Groundwater (mg/L)	Surface Water (mg/L)
Inorganics				
Arsenic	11[d]	93[a]	0.01	--
Chromium	--	270[a]	--	--
Lead	--	530[a]	0.015	--
Zinc	--	960[a]	--	--
Benzene	2[g]	--	0.005	--
Ethylbenzene	--	--	0.7	--
PCBs	1[f]	0.7[a,b]	--	--
PAHs				
2-Methylnaphthalene	--	0.6[a]	--	--
Acenaphthene	--	0.5[a]	--	--
Benzo(g,h,i)perylene	--	1.7[a]	--	--
Fluoranthene	--	2.0[a]	--	--
Fluorene	--	0.8[a]	--	--
Indeno(1,2,3-c,d)pyrene	--	3.2[a]	--	--
Naphthalene	120[g]	1.7[a]	--	--
Phenanthrene	--	4.8[a]	--	--
Total LPAH	--	7.8[a]	--	--
Total HPAH	--	9.6[a]	--	--
Petroleum Hydrocarbons				
DRO	9,200[g]	3,500[c]	1.5	no sheen
GRO	--	--	1.3	no sheen
RRO	9,200[g]	3,500[c]	1.1	no sheen
TAH[1]	--	--	--	0.010
TAqH[2]	--	--	--	0.015

Notes:

-- Cleanup level not specified in the DD (USACE 2009b)
[1] TAH is the sum of BTEX.
[2] TAqH is the sum of BTEX and PAHs.
[a] WAC 173-204-520, Table III, Sediment Minimum Cleanup Level (WAC 1995)
[b] MacDonald et al, consensus-based Probable Effects Concentration (EPA 2002)
[c] Protective of human health, based on future residents, incidental ingestion/dermal contact route, exposure frequency 90 days per year, and a target quotient of 0.1
[d] Site-specific background value (USACE 2009b)
[e] 18 AAC 75, Table C (ADEC, as updated 9 October 2008)
[f] 18 AAC 75, Table B1 (ADEC, as updated 9 October 2008)
[g] 18 AAC 75, Method 4, risk-based residential cleanup level (USACE 2007d)

Remedies selected for the Northeast Cape sites include excavation with disposal or treatment, monitored natural attenuation (MNA) with LUCs, capping with LUCs, and chemical oxidation. An overview of the selected remedies for the 17 sites contained in this review is provided in Table 4-2.

Table 4-2
Selected Remedies

Site Number	Site Name	Remedial Actions
1	Airstrip	• Excavate and remove petroleum-contaminated soils to established cleanup levels. • Produce periodic reviews, as necessary.
3	Fuel Pump House	• Excavate and remove petroleum-contaminated soils to established cleanup levels. • Implement an LUC to designate areas not suitable for drinking water. • Produce periodic reviews, as necessary.
6	Gravel Pad	• Excavate and remove petroleum-contaminated soils to established cleanup levels. • Implement an LUC to designate areas not suitable for drinking water. • Produce periodic reviews, as necessary.
8	POL Spill	• MNA of petroleum-contaminated sediment. • Implement LUCs by conducting a survey to delineate the location and extent of sediment contamination, providing a detailed map of the site to the landowner, and recording a deed notice that this area should not be used for residential land use without additional investigation and/or cleanup. • Produce periodic reviews, as necessary.
9	Housing and Operations Landfill	• Capping of the debris with a minimum of 2 feet of fill. • Removal of partially submerged or exposed debris from flowing streams. • Periodic visual monitoring of the cap for settlement and erosion for five years. • Long-term monitoring including three monitoring events to verify that the COCs in shallow groundwater are not migrating downgradient and affecting surface waters. An additional six long-term monitoring events spaced five years apart will be conducted to demonstrate the shallow groundwater meets the RAOs for a non-drinking water source. • Implement LUCs to designate areas not suitable for drinking water and prevent construction of buildings on top of landfills. • Produce periodic reviews, as necessary.
10	Buried Drums[1]	• Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce periodic reviews, as necessary.

Table 4-2
Selected Remedies (Continued)

Site Number	Site Name	Remedial Actions
11	Fuel Tanks[1]	• Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce periodic reviews, as necessary.
13	Heat and Power Plant[1]	• Excavate and remove PCB-contaminated soils to established cleanup levels. • Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce CERCLA five-year reviews, as necessary.
15	Fuel Pipeline[1]	• Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce periodic reviews, as necessary.
16	Paint and Dope Storage[1]	• Excavate and remove PCB-contaminated soils to established cleanup levels. • Implement an LUC to limit future drinking water use. • Produce CERCLA five-year reviews, as necessary.
19	Auto Maintenance	• Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce periodic reviews, as necessary.
21	Wastewater Tank	• Excavate and remove PCB-contaminated soils to established cleanup levels. • Excavate and remove arsenic-contaminated soils to established cleanup levels. • Implement an LUC to limit future drinking water use. • Produce CERCLA five-year reviews, as necessary.
27	Diesel Fuel Pump[1]	• Excavate petroleum-contaminated soil and MNA of groundwater.[2] • Implement an LUC to limit future drinking water use. • Produce periodic reviews, as necessary.
28	Drainage Basin	• Excavate and remove petroleum, metals, and PCB-contaminated sediment to established cleanup levels. • Construction of a sedimentation pond or other appropriate controls. • Produce CERCLA five-year reviews, as necessary.
29	Suqitughneq River	• Removal of partially submerged or exposed debris.
31	White Alice Communications	• Excavate and remove PCB-contaminated soils to established cleanup levels. • Produce CERCLA five-year reviews, as necessary.
32	Lower Tramway	• Excavate and remove petroleum-contaminated soils to established cleanup levels. • Produce periodic reviews, as necessary.

Table 4-2
Selected Remedies (Continued)

Site Number	Site Name	Remedial Actions
Various	Site-wide	• Implement LUCs to limit future drinking water uses for groundwater at the main complex sites (10 through 22, 26, 27), designate areas not suitable for drinking water (Sites 3, 4, 6, 7, 9), prevent construction of buildings on top of landfills, and manage potential future excavation and movement of soils above ADEC cleanup levels[3]. • Remove dangerous poles, wires, and other miscellaneous debris from tundra areas where clearly identified.

Notes:
[1] Site is included as part of the MOC.
[2] Although chemical oxidation was identified as the primary remedy in the DD, it was not implemented. The DD contingency remedy, excavation of soil and MNA of groundwater was implemented (USACE 2009b).
[3] Alternate site-specific risk-based cleanup levels were approved for DRO and RRO at Northeast Cape (USACE 2009b). Please refer to Table 4-1 for specific concentrations.
For definitions, see the Acronyms and Abbreviations section.

4.2 REMEDY IMPLEMENTATION

A brief description of each site, selected remedy, remedy implementation history, status, O&M plans (where applicable), and LUCs are presented by site.

4.3 SYSTEM OPERATIONS AND MAINTENANCE

The selected remedies for the Northeast Cape sites have not been fully implemented, therefore no maintenance funds have been spent to date. Anticipated maintenance costs for monitoring and Five-Year and Periodic Reviews (six events over 30 years) are estimated to be $5,851,587.

4.4 SITE 1 AIRSTRIP

The airstrip (Site 1) is located on a low, flat ridge parallel to the lower Suqitughneq River drainage. An area near the airstrip was reportedly used as a burn pit or for fire training; however, historical sampling has not revealed COCs that would suggest these activities. Diesel-range organics (DRO) were identified at concentrations up to 1,870 milligrams per kilogram (mg/kg), which did not exceed the site-specific cleanup level (USACE 2009b). Two locations (04NE01SS103 and 04NE01SS104) were identified as having residual-range organics (RRO) at concentrations that exceeded site-specific cleanup levels for soil with a maximum concentration of 19,300 mg/kg in 2004 (USACE 2009b).

4.4.1 Site 1 Airstrip Remedy Implementation and Status

The selected remedy to excavate and remove petroleum-contaminated soil was initiated in 2010. Historical sampling locations containing RRO contamination greater than cleanup levels were located by survey and re-sampled at the historical sampling depth of 0.5 and 0.7 feet below ground surface (bgs). The areas surrounding the historical sampling locations were investigated by collecting 21 additional samples on a grid pattern centered over the historical sampling locations. Field-screening samples indicated that contamination was not present above site-specific cleanup levels. Confirmation samples were collected according to ADEC *Field Sampling Guidance* (ADEC 2010) using the calculated square footage of the area around the test pits. Confirmation results indicated all samples were below project-specific cleanup levels (Figure A-4). No soil was excavated from Site 1 and the test pits were backfilled and graded.

4.4.2 Site 1 Airstrip Systems Operations and Maintenance

The remedy is considered complete and Site 1 is recommended for NFA.

4.5 SITE 3 FUEL PUMP HOUSE

The Fuel Pump House (Site 3) is located just south of Cargo Beach on Kitnagak Bay. Site 3 is located immediately adjacent to local subsistence hunting camp structures; it is occupied seasonally by individuals from Savoonga and Gambell (Figure A-5).

The former Fuel Pump House was situated on a gravel pad. The topography slopes toward the beach to the north-northeast. The area to the south of the Fuel Pump House contains unconsolidated deposits with a thick tundra mat cover underlain by permafrost and ice-rich soil. Site 3 was historically used to transfer diesel fuel across the Northeast Cape FUDS to the bulk storage facilities (Site 11) via a 4-inch welded fuel pipeline. The fuel pipeline route followed Cargo Beach Road to the west and turned south at the intersection of the Airport Access Road. A major break in the pipeline is known to have occurred and is the location of the POL Spill (Site 8) described in Section 4.7.

Identified COCs at Site 3 include DRO in soil near the former pump house, RRO in outlying sediments, and DRO and RRO in shallow groundwater downgradient of the pump house along the former fuel pipeline (USACE 2009b). Sampling in 2004 identified DRO concentrations exceeding cleanup levels in soil at the former pump house at 20,500 mg/kg and RRO concentration in tundra soil/sediment near the former pump house at 28,500 mg/kg. Sediment from the area was noted in the DD as being highly organic and suggests RRO exceedances may have been attributed to naturally occurring organic compounds. Shallow groundwater sampled in 2004 contained concentrations of DRO up to 3.4 milligrams per liter (mg/L) and RRO up to 3.4 mg/L. Groundwater remediation was not included in the selected remedy because groundwater at Site 3 was not considered a current or reasonably expected future drinking water source in the DD (USACE 2009b).

4.5.1 Site 3 Fuel Pump House Remedy Implementation and Status

The selected remedy for Site 3 is excavating and removing petroleum-contaminated soil, re-sampling sediment to evaluate biogenic interference from natural organic material, and implementing an LUC to designate areas not suitable for drinking water. The selected remedy was initiated in 2010. The historical soil sample location containing DRO concentrations greater than cleanup levels was located by survey and investigated in 2010 (USACE 2011). Results from the field laboratory following silica gel cleanup procedures indicated petroleum hydrocarbon concentrations below site-specific cleanup levels. Four test pits measuring approximately 5 feet by 5 feet were excavated at the location of the historical samples and a confirmation sample was collected from the floor and sidewall of each test pit for analysis of DRO and RRO. Confirmation samples submitted to an analytical laboratory indicated that DRO and RRO were below site-specific cleanup levels (Figure A-4) and the test pits were backfilled and graded.

A mound of soil adjacent to the soil test pits, believed to have originated as the pump house gravel pad, was suspected to contain POL contamination. In 2010, soil samples were collected from the mound and the presence of DRO above cleanup levels was confirmed. The onsite quality assurance representative was notified and field efforts at Site 3 shifted to the mound. Soil from the mound was transported to a mechanical screen plant at Site 6, where it was screened and loaded into container express units (CONEX) and bulk bags for shipment offsite. Approximately 197 tons of DRO-contaminated soil was removed from the mound at Site 3 in 2010 (USACE 2011). Confirmation soil samples collected from beneath the location of the former mound were confirmed below site-specific cleanup levels. The extent of the removal effort and the subsequent confirmation sample locations are shown on Figure A-5.

Historical sediment sample locations were identified by survey and re-sampled (Figure A-4). At the time of sampling, no water was present and samples were subject to silica gel cleanup according to the ADEC Technical Memorandum 06-001, *Biogenic Interference and Silica Gel Cleanup* (ADEC 2006). Sediment samples were submitted to an analytical laboratory for analysis. RRO concentrations exceeding site-specific cleanup levels in sediment were confirmed to be attributed to biogenic interference and no additional excavation and/or sampling was required to address RRO in sediment at Site 3.

At the time of this review, the LUC at Site 3 to designate the area as not suitable for drinking water had not been implemented.

4.5.2 Site 3 Fuel Pump House Operations and Maintenance

Site 3 has not reached construction completion. O&M activities are not yet applicable.

4.6 SITE 6 GRAVEL PAD

Gravel Pad (Site 6) is also known as the Cargo Beach Road Drum Field site is located west of Cargo Beach Road, approximately 0.6 miles south of Site 3 (Figure A-2). Site 6 consists of relatively fine-grained soils with exposed cobbles. During facility operation, Site 6 was used to dispose of empty drums containing POL products. More than 1,500 drums, an empty

500-gallon water storage tank, battery, and miscellaneous metal debris were removed in 2000 and 2001 (USACE 2009b).

Several metals including arsenic, lead, nickel, and zinc were detected in unfiltered groundwater samples to the west and northwest of the gravel pad in 2001. Groundwater remediation was not included in the remedy at Site 6 because shallow groundwater was not considered a current or reasonably expected future drinking water source in the DD (USACE 2009b).

Sediment samples contained DRO at a maximum concentration of 4,660 mg/kg due west of the gravel pad in 1994 (as explained in the Feasibility Study (FS) [USACE 2007d]).

The FS (USACE 2007d) identified DRO, RRO, and arsenic as contaminants of potential concern (COPC) in soil at Site 6. The primary COC identified in the DD (USACE 2009b) is DRO in surface soil (0 to 2 feet) with a maximum concentration of 102,000 mg/kg. Sampling in 1994 identified two areas of DRO-contaminated soil. One area is approximately 400 square feet and is located at the eastern edge of the gravel pad. The larger area is located on the western portion of the pad.

As described in the DD (USACE 2009b), RRO and arsenic were eliminated as COCs. RRO was detected below the cleanup level of 9,200 mg/kg with a maximum concentration of 8,500 mg/kg in 2001. Arsenic was detected below site-specific background levels with a maximum concentration of 9.9 mg/kg in 2004.

4.6.1 Site 6 Gravel Pad Remedy Implementation and Status

The selected remedy for Site 6 is excavating and removing petroleum-contaminated soil and implementing an LUC to designate areas not suitable for drinking water. Approximately 2,514 tons of contaminated soil was excavated and removed from Site 6 in 2010. Historical soil sampling locations from 1994 were located by survey and investigated by excavating trenches and test pits to delineate the outermost extent of contamination. Although the DD specified DRO as the primary COC, initial sampling efforts in 2010 indicated that RRO was the predominant COC at Site 6. Excavation efforts were guided by RRO contamination and continued until field laboratory results indicated that both RRO and DRO concentrations were below cleanup levels or until groundwater was encountered (USACE 2011).

Following initial excavation efforts, confirmation soil samples were collected from soil above the groundwater table. Two areas were identified to contain RRO concentrations above cleanup levels and were further excavated. Confirmation results indicated that cleanup levels had been achieved for one of the two identified areas within the excavation (USACE 2011). The second area of contamination encountered groundwater during excavation efforts and was therefore not re-sampled. Excavation pits were backfilled and graded with clean fill obtained from the borrow area located south of Site 31. Excavation extents and confirmation sample locations are shown on Figure A-6.

Excavation efforts extended west to a nearby surface water body. To further characterize Site 6, two sediment samples and two surface water samples were collected in 2010 from a pond adjacent to the excavation activities. Samples were analyzed for gasoline-range organics (GRO); DRO/RRO; benzene, toluene, ethylbenzene, and xylenes (BTEX); and polycyclic aromatic hydrocarbons (PAH). Contaminant concentrations in sediment samples were below site-specific cleanup levels for all analyses. DRO was detected at a concentration of 160 mg/kg in sediment, which is well below the established site-specific sediment cleanup level.

Surface water did not exhibit a sheen and sample results were below site-specific cleanup levels for total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) established in the DD (USACE 2009b). DRO and RRO were detected in the surface water sample with a maximum concentration of 1.5 mg/L and 1.3 mg/L, respectively; however, the DD did not establish a cleanup concentration for DRO and RRO in surface water, and no further action was taken (USACE 2011). Sediment and surface water sampling locations are shown on Figure A-6.

At the time of this review, the LUC at Site 6 to designate areas not suitable for drinking water had not been implemented.

4.6.2 Site 6 Gravel Pad House Operations and Maintenance

Site 6 has not reached construction completion. O&M activities are not yet applicable.

4.7 SITE 8 POL SPILL

POL Spill (Site 8), also known as the Pipeline Break Site, is located southwest of the intersection of Cargo Beach Road and the Airport Access Road (Figure A-2). The site is a wetland with thick surface vegetation that slopes southward toward the Suqitughneq River. The wetland is approximately 40 feet wide and narrows as it approaches the river.

Contamination at Site 8 is believed to have resulted from a reported break in the fuel pipeline that previously extended from the pump house at Site 3 to the bulk storage tanks at Site 11. The fuel pipeline was drained and removed in 2000 (USACE 2009b).

In 2004, two sediment samples and one surface water sample were collected at Site 8 to assess the potential fuel impacts to the area. Sediment samples were collected at locations 50 and 100 feet downgradient of the reported pipeline break. DRO was identified above cleanup levels in sediment (at concentrations of 6,700 and 19,500 mg/kg) and no exceedances were identified in surface water (USACE 2009b). The potential for significant adverse effects to human and ecological receptors at Site 8 is considered low because of the high organic content of the sediment, which promotes fuel component binding minimizing the potential for contaminant migration (USACE 2009b).

4.7.1 Site 8 POL Spill Remedy Implementation and Status

The selected remedy for Site 8 is MNA of petroleum-contaminated sediment for a period of three years and implementation of LUCs by conducting a survey to delineate the location and extent of sediment contamination, providing a detailed map of the site to the landowner, and recording a deed notice that this area should not be used for residential land use without additional investigation and/or cleanup (USACE 2009b). The selected remedy also includes additional monitoring at five-year intervals for a period of up to 30 years or until cleanup levels are achieved. The landowner will be requested to provide confirmation of existing land use at the time of monitoring, and any change in land use will trigger a review of the remedy protectiveness (USACE 2009b).

Annual monitoring of contaminant levels in sediment occurred in 2010, 2011, and 2012. The MNA remedy was initiated in 2010 by creating three decision units based on field observations and the approximate location of the pipeline break (Figure A-7). During each monitoring event, water quality parameters were evaluated in surface water. Field results for manganese, ferrous iron, sulfate, and nitrate were near or less than the method detection limits stated by the manufacturer; therefore, the results for these parameters were not definitive for assessing MNA. The dissolved oxygen and oxygen-reduction potential levels measured suggest that conditions are amenable for oxidative degradation of hydrocarbons and natural organic materials at the site.

In 2010, 2011, and 2012, composited sediment samples were collected from each decision unit to establish site trends and possibly degradation rates. In 2010, DRO, RRO, 2-methylnaphthalene, and fluorene were detected at concentrations greater than site-specific cleanup levels. In 2011, no analytes were identified at concentrations greater than site-specific cleanup levels. In 2012, 2-methylnaphthalene was identified above site-specific cleanup levels within the lower decision unit (USACE 2013b).

During each monitoring event, sediment samples were composited from eight different locations within each decision unit. However, composited samples were not collected from the same locations each year, and are therefore not able to accurately establish contaminant degradation trends. Results indicate contaminated sediment continues to persist at concentrations above site-specific cleanup levels. Figure A-7 presents the locations of composited samples for each decision unit by year.

At the time of this review, the LUC to designate areas not suitable for residential land use without additional investigation and/or cleanup had not been implemented.

4.7.2 Site 8 POL Spill Operations and Maintenance

Site 8 has not reached construction completion. O&M activities are not yet applicable.

4.8 SITE 9 HOUSING AND OPERATIONS LANDFILL

The Housing and Operations Landfill (Site 9) is located approximately 500 feet northeast of the MOC in a marshy area east of Cargo Beach Road (Figure A-2). The site covers an estimated 1.9 acres and contains several surface water drainages that enter the Suqitughneq River approximately 0.25 miles to the north. Between 1952 and 1965, Site 9 served as a waste disposal area for miscellaneous metal debris, drums, and other trash.

Metals and DRO were initially identified as soil COPCs at Site 9. The maximum concentration of DRO in soil was 375 mg/kg, which did not exceed site-specific cleanup levels. Arsenic was detected in site soil between 3.6 and 30 mg/kg, and the 95 percent upper confidence limit was determined to be 17 mg/kg. Therefore, the arsenic detections were determined to be within the range of ambient arsenic concentrations in Alaska soils, and arsenic was eliminated as a COC in soil (USACE 2009b).

Shallow groundwater COCs at Site 9 include DRO, RRO, and lead. In 1994 and 1998, elevated levels of DRO were detected in monitoring well MW9-3 ranging between 0.51 to 7.7 mg/L. In 2001, re-sampling of MW9-3 did not detect fuels in shallow groundwater. In 2001, RRO was detected at 4.2 mg/L in monitoring well WP102 and lead was detected above cleanup at all Site 9 groundwater sampling locations. Lead contamination ranged between 0.019 to 0.30 mg/L (USACE 2009b). Groundwater remediation was not included in the remedy at Site 9 because shallow groundwater was not considered a current or reasonably expected future drinking water source in the DD (USACE 2009b).

Surface water samples collected at Site 9 did not detect COCs above cleanup levels. All exposed drums, debris, and batteries were removed from the site in 2001 and 2005 (USACE 2009b).

4.8.1 Site 9 Housing and Operations Landfill Remedy Implementation and Status

The selected remedy for Site 9 included the following activities:

- Removing remaining submerged debris in active stream channels
- Installing a 2-foot minimum landfill cap
- Periodic visual monitoring of the cap for settlement and erosion over five years
- Long-term monitoring
  - Three events to verify COCs in shallow groundwater are not migrating downgradient and impacting surface waters
  - Six monitoring events spaced five years apart to demonstrate the shallow groundwater meets RAOs for a non-drinking water source
- Implementing LUCs to designate areas not suitable for drinking water and to prevent construction of buildings on top of landfills

Remedy implementation at Site 9 began in 2010 (USACE 2011). One of the primary features considered while designing the landfill cap for Site 9 was a pond located on the southeast side of the landfill (USACE 2011). The outflow from this pond travelled to the north-northwest directly across the surface of the landfill. To minimize the flow of water through the landfill, a diversion trench was incorporated into the landfill cap design to create a preferential pathway for the pond. Three locations for the diversion trench were proposed during the application for Nationwide Permit No. 38 authorization. The selected diversion trench was constructed during the 2010 field season using a track hoe and working from the northeast to the southwest. The trench is approximately 15 feet wide by 160 feet long and is lined with rocks larger than 2 inches in diameter (Figure A-8). The lower elevation of the trench is approximately 25 feet from an adjacent native stream channel. Water from the pond diverted through the trench is required to flow over land to connect to the adjacent stream channel. As an erosion control measure, straw wattles were placed at the end of the trench to reduce water flow (USACE 2011).

Construction of the landfill cap was initiated by determining the outer boundaries of the historical landfill using test pits in areas of visible debris. If the test pits did not encounter additional underground debris, the surface debris was considered an anomaly and re-located to a central location within the landfill. More than 30 test pits were advanced in 2010 to establish the landfill boundaries (USACE 2011). Approximately 9,960 cubic yards of borrow material was spread over the delineated landfill to achieve the minimum 2-foot cap. A surface grade was established to promote surface runoff and prevent erosion. Approximately 90 linear feet of fill on the northern edge and 250 feet on the eastern edge of the landfill cap were placed into water bodies in accordance with Nationwide Permit 38, *Cleanup of Hazardous and Toxic Waste* (EPA 2012c). Figure A-8 presents the location of the landfill cap at Site 9.

The additional component of the remedy including periodic visual monitoring of the cap for settling and erosion was initiated in 2011 following the construction of the landfill cap. In 2011, the landfill cap was re-seeded and fertilized (USACE 2012). A stabilization analysis was conducted by Bristol Environmental Remediation Services, LLC (Bristol) and determined that the landfill cap met non-vegetative permanent stabilization requirements established in the 2011 Alaska Construction General Permit (USACE 2012). Visual monitoring of the landfill cap was also conducted by a USACE quality assurance representative in September 2011, July 2012, and August 2013. Observations were noted on the 2011, 2012, and 2013 site inspection checklists (USACE 2011, 2012, 2013b). During all site inspections, ponded water was observed against the north and east sides of the landfill cap. Vegetative cover was estimated at 70 to 80 percent on the cap surface and on the side slopes. Vegetative cover was noted as being short but with good coverage. The cap appeared structurally sound and stable with no evidence of leaching or erosion (USACE 2011, 2012, 2013b).

Long-term monitoring to evaluate downgradient migration of contaminants and a steady-state plume was performed in 2010 and again as part of this Five-Year Review in 2013 (USACE 2011, 2014b). Three surface water sampling events occurred at the drainage that flowed through the landfill in 2010. Samples were analyzed for GRO, DRO/RRO, VOCs, PAHs, PCBs, and metals. During the third sampling event, laboratory error resulted in VOC analyses outside of the required holding time. Additional sampling was conducted in 2011 to fill this data gap. No contaminants were detected above the site-specific TAH and TAqH cleanup levels established in the DD (USACE 2012).

In 2013, surface water was collected from three locations adjacent to the landfill cap and submitted to an offsite analytical laboratory for analysis of GRO, DRO, RRO, BTEX, PAH, PCBs, and both dissolved phase and total RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) plus zinc. A single groundwater grab sample was also collected east of the landfill cap. Sufficient volume of groundwater was obtained for analysis of GRO, BTEX, and dissolved RCRA metals plus zinc. All sample results were compared to the cleanup levels established in the DD (USACE 2009b) and no exceedances were identified (USACE 2014b).

At the time of this review, LUCs to designate areas not suitable for drinking water and prevent construction of buildings on top of the landfill have not been implemented.

4.8.2 Site 9 Housing and Operations Landfill Operations and Maintenance

Site 9 has not reached construction completion. O&M activities are not yet applicable.

4.9 MAIN OPERATIONS COMPLEX

During operation of the Northeast Cape installation, the MOC encompassed the majority of the site infrastructure including buildings, heat and power supply, fuel storage tanks, maintenance, and housing quarters. Six sites (Sites 10, 11, 13, 15, 19, and 27) on the northeast portion of the MOC gravel pad were grouped together to evaluate an overall response action for known contamination.

RIs were conducted at the MOC in 1994, 1996, 1998, 2001, 2002 and 2004 and are summarized in the DD and site-specific descriptions (USACE 2009b). Sampling results indicated that soil and groundwater contained petroleum compounds at elevated levels. At Site 13, PCBs were also found in the soil. The remedy for fuel-contaminated soil at these sites included chemical oxidation to achieve the cleanup levels and treat soil and groundwater contamination in the short-term. In the event chemical oxidation was determined to be ineffective at these sites, a contingency remedy of MNA for groundwater and excavation of soils was planned. The remedy for the PCB-contaminated soils at Site 13 was excavation and removal.

In 2009, in situ chemical oxidation (ISCO) field and bench testing was conducted (USACE 2010a). One finding of the field investigation was that a shallow water-bearing zone (approximately 3 to 8 feet bgs) contained higher groundwater concentrations of DRO than a deeper water-bearing zone (approximately 13 to 14 feet bgs). Test pitting and soil boring results indicated that contaminated soils in the shallow water-bearing zones contained fill material along with peat and/or organic silt layers underlain by intermittent frozen soil layers. The relatively shallow depth, high organic carbon content, and porosity of these materials means that these soils would likely serve as an ongoing source of groundwater contamination.

The bench testing consisted of two parts: a total oxidant demand test conducted prior to the ISCO injections, and a treatability study using additional oxidant and activator combinations not tested in the field. Due to project schedules and limitations on the ability to collect representative samples prior to the summer field season, bench testing was performed while ISCO-related site characterization and baseline sampling was underway (USACE 2010a). The total oxidant demand test used three different soil/groundwater combinations and three different treatment combinations for a total of nine test vessels. The oxidant demand results were used to inform the treatability study as well as the field ISCO application. The subsequent bench-scale treatability study was performed on two different chemical oxidation approaches: activated sodium persulfate and catalyzed hydrogen peroxide. Overall results showed that the naturally occurring organic compounds present in the soil competed with the oxidation of the target contamination and contaminants showed increased short-term mobilization into water. In the field, a pilot study was conducted by injecting hydrogen peroxide and iron-activated sodium persulfate into injection wells, but the target volume could not be injected due to preferential pathways in soil leading to surface releases of the oxidant materials (USACE 2010a). Field-testing could not confirm a decrease in overall fuel-related contamination and groundwater contaminant concentrations appeared to stabilize back to original concentrations toward the end of the 28-day monitoring period. Due to the peat and organic silts in the soil, the presence of permafrost and/or frozen zones, and the observation of preferential flow zones, the primary selected remedy did not appear capable of meeting target cleanup levels for COCs.

In order to implement the contingency remedy of excavation, soil contamination was further delineated through direct-sensing Ultra Violet Optical Screening Tool (UVOST) technology in 2010 (USACE 2011). A total of 198 probe locations were advanced around the MOC to final depths between 10 and 24 feet. The areas corresponding to DRO concentrations of 9,200 mg/kg or greater were mapped and ten plumes were labeled A through J across the MOC (Figure A-9). These plume locations correspond with site contamination identified in previous investigations for Sites 13, 15, 19, 27, and an additional subsurface location to the west (A1 plume). Plume locations were used to guide subsequent soil excavations to the extent practicable.

Site 11 had surface staining in addition to the subsurface J1A plume delineated by the UVOST. A contaminant plume at Site 10 was not included in the delineation by UVOST, but soil at this site was excavated based on discovery of additional drums and is described in further detail in Section 4.11.

MNA of the groundwater is ongoing at the MOC. However, the well network does not sufficiently cover all areas of the site. The monitoring well network is planned for revision during the 2014 field season following completion of the excavation portion of the remedy (USACE 2014d).

4.9.1 Soil at A1 Plume Remedy Implementation and Status

The 2010 UVOST investigation delineated the A1 plume from 12 to 15 feet bgs on the western portion of the MOC. The location of A1 plume is beneath Site 17 (not included in this review), which encompasses the General Supply and Mess Hall Warehouses (Buildings 107 and 111). During previous RIs, no source of contamination was found and Site 17 was determined to be NFA (USACE 2009b). The depth of contamination found by the UVOST indicated that the buildings at Site 17 were unlikely to be the source of contamination found at 12 feet bgs.

Subsurface contamination delineated by the UVOST investigation was subject to the contingency remedy of soil excavation. Excavation was initiated in 2011 and completed in 2012.

- In 2011, 8 feet of overburden was removed and excavation proceeded to 15 feet, the approximate depth to groundwater. The excavation was guided by field-screening results and, when these results indicated the boundary had been reached, excavation confirmation samples were collected.
- All results were less than the site-specific cleanup level of 9,200 mg/kg for DRO except one sidewall sample in the northwest portion with a concentration of 12,000 mg/kg.
- This location was excavated in 2012 where the sidewall was extended another 20 to 25 feet. Excavation proceeded to the target depth of 15 feet and confirmation samples were collected.

The maximum remaining contaminant concentrations at the A1 plume are 8,200 mg/kg DRO and 1,700 mg/kg RRO, which is below the site-specific cleanup levels. Figure A-9 provides the lateral extent of excavation associated with the A1 plume. The excavation remedy is considered complete in this portion of the plume.

4.9.2 I1 Plume

The 2010 UVOST investigation delineated the I1 plume from 10 to 15 feet bgs on the eastern portion of the MOC. The location of the I1 plume is within Site 28 and adjacent to Site 11. Subsurface contamination delineated by the UVOST investigation was subject to the contingency remedy of soil excavation.

Excavation of POL-contaminated soil within the I1 plume was initiated in 2013 (USACE 2014c). To mitigate impact to the Site 28 wetland, USACE and Bristol determined that the northern boundary of the I1 plume would be the limit of excavation. Because the I1 plume is located on the slope of the MOC pad and the adjacent wetland, to reach the target elevation of 10 feet bgs, a range of 5 to 10 feet of clean overburden was excavated and stockpiled on a liner. Soil was further excavated to a final depth of 15 feet bgs on the south wall and 9 feet bgs on the north wall. Field laboratory screening samples guided the lateral extent of the excavation. Once screening samples indicated DRO and RRO concentrations below 80 percent of the site-specific cleanup level confirmation samples were collected from the excavation floor and sidewalls.

One floor sample (13MNMOCSS067) and two sidewall samples (13NCMOCSS060 and 13NCMOCSS089) contained DRO concentrations greater than the site-specific cleanup level with concentrations between 9,900 and 13,000 mg/kg (USACE 2014c). The location of floor sample exceedance was submerged in greater than 2 feet of water and thus no additional excavation will need to be conducted at this location.

Sidewall samples 13NCMOCSS060 and 13NCMOCSS089 contained DRO at concentrations of 10,000 mg/kg and 13,000 mg/kg respectively (USACE 2014c). Sample 13NCMOCSS060 is located at the boundary of the Site 28 wetland, so no further excavation is planned (USACE 2014c). Sidewall sample 13NCMOCSS089 is located on the south side of the excavation, adjacent to Site 11, and will require removal (USACE 2014c).

4.9.3 Roofing Tar South of the MOC

During site work in 2010, an area covered in apparent roofing tar was encountered 700 feet south of the MOC perimeter road covering approximately 5000 square feet (Figure A-2). All of the visible tar was removed in 2011 (USACE 2012). One bulk tar sample and 22 soil confirmation samples were collected from the removal area. The bulk tar sample was analyzed for semivolatile organic compounds (SVOC) and none were detected. Confirmation soil samples were analyzed for PAHs and none of the samples exceeded the site-specific cleanup level for naphthalene (USACE 2009b). No additional action is planned for this area (USACE 2012).

4.9.4 MOC Groundwater Remedy Implementation and Status

MNA of the groundwater at the MOC began in 2010 and is ongoing. Nine wells were selected for inclusion in the monitoring program based on historical results, their physical proximity to the MOC, and their ability to monitor groundwater that passes under the MOC and other known contaminant areas. These monitoring wells are MW88-1, MW88-4, MW88-5, MW88-10, MW10-1, 17MW1, 22MW2, 20MW1, and 26MW1 (USACE 2013b). Samples are collected annually and analyzed for BTEX, PCBs, GRO, DRO, RRO, metals (total and dissolved), PAHs, and methane, although not all of those parameters were included in the 2010 monitoring event. Additional MNA parameters (manganese, ferrous iron, sulfate, nitrate, and alkalinity) were analyzed using field kits. Water quality parameters (temperature, pH, dissolved oxygen, conductivity, oxygen-reduction potential, and turbidity) were collected using field instruments. In 2012, two of the wells (MW88-4 and MW88-5) were abandoned due to their locations within POL-contaminated soil removal areas. The seven remaining wells were sampled in 2013 (USACE 2014c). Figure A-10 presents the location of the nine monitoring wells and select sample results.

COCs have exceeded cleanup levels for DRO, RRO, benzene, and arsenic at times over the four-year monitoring period. The contaminant concentrations have not all exhibited the same trend over time. In general, DRO and RRO appear to show a decrease in contaminant concentration in wells MW88-4, MW88-5, and MW88-10 since 2002, but benzene concentrations have been variable. The higher groundwater elevation in 2011 appeared to influence the benzene results, but there are too few data points to confirm a correlation. In MW88-1, DRO exceeded the cleanup level in 2012 for the first time. However, the concentration of DRO in MW88-1 was significantly below the cleanup level in 2013 (USACE 2014b). The source of the DRO single exceedance at MW88-1 is unclear. Arsenic exceeds the cleanup level only in well MW88-4.

Prior to well abandonment in 2012, MNA appeared to be occurring in MW88-4 and MW88-5. Geochemical parameters collected until 2012 indicated these two wells exhibited low dissolved oxygen; reducing conditions; and increased levels of ferrous iron, manganese, and methane as compared to other wells in the area. These geochemical parameters indicated anaerobic biodegradation was occurring within this plume.

In 2013, MW88-1 contained the highest concentrations of ferrous iron, manganese, alkalinity, and methane. In addition, the wells with the lowest contaminant concentrations tended to have comparatively high dissolved oxygen, suggesting aerobic biodegradation may be occurring to degrade DRO.

Excavation activities are still underway at the MOC, so the final effect on contaminant levels cannot be evaluated at this time. The two distinct groundwater-bearing zones found during the chemical oxidation testing may be contaminated at different concentrations. MW88-5 was screened across both zones. The well network does not sufficiently cover all areas of the site and seasonal groundwater flow direction is not well defined in the areas of the MOC. Current locations with insufficient monitoring well placement include the downgradient portion of the western end of the site, the central portion where MW88-4 and MW88-5 were decommissioned, and near MW10-1, which is slightly crossgradient and may not be in a location adequate to capture groundwater downgradient of the buried drum excavation at Site 10. In addition, the source of contamination in MW88-1 and MW88-10 is unclear and a monitoring well southeast of these wells may be necessary. Seven additional monitoring wells are planned for installation during the 2014 field season following excavation removal activities (USACE 2014d). The locations of the proposed monitoring wells are depicted on Figure A-10 and appear to provide adequate coverage of the site.

4.10 SITE 10 BURIED DRUMS

Site 10 Buried Drums consists of a wide gravel area along the access road directly east of the former ASTs at Site 11 (Figure A-9). An area of surface soil contamination was documented in 1994 along the western edge of the gravel pad when the maximum concentration of DRO was 26,500 mg/kg. Additional surface soil samples were collected in 1996 when the maximum DRO result was 17,000 mg/kg. Soil borings completed in 2004 demonstrated that subsurface soils were not significantly affected; the maximum DRO result was 619 mg/kg.

4.10.1 Site 10 Buried Drums Remedy Implementation and Status

The contingency remedy for Site 10 is excavating petroleum-contaminated soil, MNA of groundwater (described in Section 4.9.4), and implementing an LUC to limit future drinking water use. The contingency remedy of soil excavation was initiated in 2011 (USACE 2012). The 2010 UVOST investigation delineated the J plume adjacent to Site 10 (J1 through J5), but did not indicate DRO contamination exceeded the site-specific cleanup level of 9,200 mg/kg within Site 10. During the 2011 excavation at the J1A plume, approximately 10 drums were encountered on the excavation border with Site 10. These drums and their respective contents were removed and disposed of (USACE 2012).

In 2012, a metal detector was used to delineate the extent of buried drums, and the locations appeared to coincide with the magnetometer survey and electromagnetic data (EM-31) acquired at the site during the RI/FS (USACE 2007d). Some of the drums recovered from the site contained liquids classified as hazardous (USACE 2013b). Contaminated soil was excavated and the soil confirmation sampling suite was expanded to include GRO, DRO, RRO, PCBs, VOCs, SVOCs, glycols, and RCRA metals plus nickel, vanadium, and zinc. Results indicate that arsenic, ethylene glycol, tetrachloroethylene (PCE), and DRO exceeded cleanup levels in 2012.

In 2013, four excavations were opened to address the 2012 confirmation sample locations where concentrations of arsenic, ethylene glycol, PCE, and DRO exceeded cleanup levels. PCE was not an identified COC in the DD and therefore, the cleanup level of 0.024 mg/kg defined in the ARAR for soil (18 AAC 75.341) was used. Areas surrounding arsenic, PCE, and DRO were excavated and subsequent confirmation samples were below cleanup levels (USACE 2014c). The location of the historic ethylene glycol exceedances was excavated and the lateral extent of contamination was identified. Confirmation samples collected from the excavation floor continued to exceed cleanup levels. Excavation and sampling continued until bedrock was encountered and the excavation was terminated at 4 feet below fractured bedrock at a total depth of 12 feet bgs. Excavation sidewalls did not exceed the cleanup level for ethylene glycol (USACE 2014c). An area of identified metallic anomalies was excavated and approximately 0.29 tons of empty drums and metal debris were removed. All confirmation samples indicated analytes were below the site-specific cleanup level (USACE 2014c).

There is no indication that stained surface soils or the five locations of the highest surface soil samples indicated in the DD (up to 26,500 mg/kg DRO in 1994) were removed, as these locations are further north and east than the excavations completed in 2011, 2012, or 2013 as depicted on Figure A-9. Excavation of DRO-contaminated soil is planned for 2014. At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.10.2 Site 10 Buried Drums Operations and Maintenance

Site 10 has not reached construction completion. O&M activities are not yet applicable.

4.11 SITE 11 FUEL TANKS

Site 11 included three large ASTs located between the perimeter access road and Site 10 (Figure A-9). The tanks were on a constructed gravel pad, which drops to shallow tundra drainage to the northeast (the eastern drainage of Site 28). The center tank released a large amount of fuel in the 1960s. The tanks were removed in 2000 and the area was re-seeded with grass in 2005 (USACE 2009b). Visibly stained soils existed within the footprint of each of the ASTs in a circle approximately 50 feet in diameter. Outside of the tank footprints, DRO contamination ranged from 358 mg/kg at 4 feet bgs to 22,000 mg/kg at 11.5 feet bgs. Downgradient of the tank footprints, DRO was detected in surface soils up to 69,100 mg/kg.

4.11.1 Site 11 Fuel Tanks Remedy Implementation and Status

The contingency remedy for Site 11 is excavating petroleum-contaminated soil, MNA of groundwater (described in Section 4.9.4), and implementing an LUC to limit future drinking water use. The contingency remedy of soil excavation was initiated in 2011 after the 2010 UVOST investigation delineated the J and I plumes downgradient from Site 11 (USACE 2012).

Although the 2010 UVOST investigation did not indicate DRO contamination exceeded 9,200 mg/kg within the tank footprint area of Site 11. In 2011, visibly stained soil was removed to a depth of approximately 1.5 feet bgs from each of the tank footprints. The waste characterization sample for the excavated soil did not exceed the site-specific cleanup level for DRO or RRO. The soil remaining in the tank footprints was screened using the field laboratory, and no additional excavation was completed (USACE 2012). The approximate extents of excavation at the tank footprints are shown in Figure A-9.

The location of the J1A plume coincides with the highest surface contamination indicated in the DD (up to 69,000 mg/kg DRO) (USACE 2009b). The J1A plume was excavated to 2 feet below the groundwater surface, which was encountered at approximately 8 feet bgs (USACE 2012). In order to avoid the migration of materials into the Site 28 wetland, a silt fence was erected at the northern boundary of the planned excavation. The excavation was guided by field-screening results and when these results indicated the boundary had been reached, excavation confirmation samples were collected. Five sidewall samples on the northern boundary exceeded the site-specific cleanup level for DRO with results ranging from 9,200 to 29,000 mg/kg (USACE 2012). The maximum RRO result was 800 mg/kg, which does not exceed the cleanup level. The northern boundary of the J1A plume is adjacent to the Site 28 wetland and no further excavation is planned. The extents of excavation at the J1A plume and the five sidewall samples exceeding site-specific cleanup levels are shown on Figure A-9.

At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.11.2 Site 11 Fuel Tanks Operations and Maintenance

Site 11 has not reached construction completion. O&M activities are not yet applicable.

4.12 SITE 13 HEAT AND POWER PLANT

Site 13, which encompasses former Building 110, historically contained the heat and power facilities for the installation (Figure A-9). Sources of contamination from this site consist of transformers, diesel generators, ASTs, USTs, and piping. The site was investigated and sampled multiple times since 1994 and contained DRO and PCBs in subsurface soils with concentrations that exceeded cleanup levels. The maximum DRO concentration in subsurface soils was 13,000 mg/kg. GRO, RRO, benzene, and naphthalene concentrations were elevated but did not exceed site-specific cleanup levels. PCBs were detected at concentrations up to 37.1 mg/kg near the building (USACE 2009b).

4.12.1 Site 13 Heat and Power Plant Remedy Implementation and Status

The selected remedy for PCB-contaminated soil at Site 13 is excavation and removal. The selected remedy for petroleum-contaminated soil is excavating and removing contaminated soil to 15 feet bgs, MNA of groundwater (described in Section 4.9.4), and implementing an LUC to limit future drinking water use.

PCB-Contaminated Soil

The remedy was initiated in 2010 by excavating PCB-contaminated soil. PCB field sampling and laboratory analysis on confirmation samples guided the excavation; groundwater was not encountered. The PCB excavation expanded over the location of the petroleum-contaminated B1 plume, B2 plume, and part of A2 plume, which were identified during the UVOST investigation (Figure A-9). One location above the PCB cleanup level remained at the end of 2012 (USACE 2013b). In 2013, sample 12NC13SS231 was located by survey and excavated. The excavation extended to approximately 1.5 to 2.0 feet bgs and confirmation samples were collected. All confirmation samples results were below the cleanup level for PCBs (USACE 2014c).

In 2011, a stockpile was constructed south of the Site 13 excavations. Prior to stockpile construction, the area was sampled and locations containing PCB concentrations above cleanup levels were excavated, then the stockpile with a liner was constructed. In 2013, post-construction samples were collected following stockpile decommissioning. Results indicated that PCBs existed in the soil at concentrations exceeding the cleanup level. Excavation efforts were guided by field laboratory screening samples. When field-screening samples indicated samples results below 0.8 mg/kg, confirmation samples were collected. All analytical samples results were below the cleanup level for PCBs (USACE 2014c).

POL-Contaminated Soil Within the B1 and B2 Plumes

Excavation of petroleum-contaminated soil within the B1 and B2 plumes was initiated in 2013 (USACE 2014c). Clean overburden was removed to a depth of 11 feet at B1 and 7 feet at B2 and stockpiled on a liner. Soil was excavated to a final depth of 15 feet bgs; 80 percent of the floor of the excavation was submerged in water. The lateral extent of the excavation was guided by field laboratory screening samples; when screening results indicated that DRO and RRO concentrations were less than site-specific cleanup levels, confirmation samples were collected from the floor and sidewalls of the excavation. One confirmation sample (13NCMOCSS094) exceeded the cleanup level for DRO and was excavated and re-sampled. All analytical samples were below the site-specific cleanup levels for DRO and RRO (USACE 2014c). The excavation was backfilled and compacted. Contaminated soil removal at the B plume is considered complete.

POL-Contaminated Soil Within the A2 Plume

Excavation of petroleum-contaminated soil within the A2 plume was initiated in 2013 (USACE 2014c). Clean overburden was removed to a depth of 8 feet bgs and stockpiled on a liner. Soil was further excavated to a depth of 15 feet bgs; 90 percent of the floor of the excavation was submerged with water. The lateral extent of the excavation was guided by field laboratory results for DRO and RRO. The excavation extended southwest into the former 2011 and 2012 A1 plume excavations and was considered complete in all areas where liner and backfill from the historical A1 plume excavation was visible (USACE 2014c). Confirmation samples were collected from the excavation floor and sidewalls. All analytical samples were below site-specific cleanup levels for DRO and RRO (USACE 2014c). The excavation was backfilled and compacted. Contaminated soil removal at the A2 plume is considered complete.

At the time of this review, an LUC to limit future drinking water use had not been implemented.

4.12.2 Site 13 Heat and Power Plant Operations and Maintenance

Site 13 has not reached construction completion. O&M activities are not yet applicable.

4.13 SITE 15 FUEL PIPELINE

Site 15 is adjacent to Site 13 and included the pipeline corridor connecting to the diesel fuel pump island at Site 27 (Figure A-9). A break in this fuel line resulted in a diesel fuel spill (USACE 2009b). A 2,000-gallon UST, the pipeline, and surrounding stained soil were removed in 2001 (USACE 2009b). Investigation in 2002 detected DRO at a maximum concentration of 16,000 mg/kg at 6 to 8 feet bgs.

4.13.1 Site 15 Fuel Pipeline Remedy Implementation and Status

The contingency remedy at Site 15 is excavating and removing petroleum-contaminated soil, MNA of groundwater (described in Section 4.9.4), and implementing a LUC to limit future drinking water use. The contingency remedy of soil excavation was initiated in 2011 after the 2010 UVOST investigation delineated the F and G plumes near historic contamination at Site 15. The locations of the F and G plumes coincide with the highest DRO contamination indicated in the DD (USACE 2009b) and FS (USACE 2007d). The DD and the UVOST investigation stated the contamination was expected to be 8 to 15 feet bgs in this area.

In 2011, an attempt to excavate the G plume was unsuccessful when groundwater was encountered at 7 feet bgs before the excavation could advance to the target depth of contamination at 8 to 9 feet bgs. No contaminated soil was excavated in 2011 (USACE 2012). In 2012, groundwater levels were lower and soil was excavated in the F and G plumes to a depth of approximately 12 feet bgs, which was 2 feet below the groundwater surface. The excavation was guided by field-screening results; when these results indicated that the boundary had been reached, excavation confirmation samples were collected. The location of three confirmation samples below the groundwater surface that contained DRO concentrations ranging from 10,000 to 40,000 mg/kg will not be excavated (USACE 2013b).

At the conclusion of the 2012 field season, three locations in the sidewall at the G excavation exceeded the site-specific cleanup level for DRO with concentrations ranging from 9,200 to 12,000 mg/kg. In 2013, the clean overburden was removed and the locations of the three confirmation sample exceedances were located by survey. DRO-contaminated soil was excavated from approximately 8 feet bgs to the target depth of 15 feet bgs. The excavation extended to the west and south into the footprint of the F plume along the southern sidewall. The excavation also extended east 10 to 12 feet. Confirmation samples were collected and submitted to an analytical laboratory for analysis. All confirmation samples were below the site-specific cleanup level of 9,200 mg/kg (USACE 2014c).

At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.13.2 Site 15 Fuel Pipeline Operations and Maintenance

Site 15 has not reached construction completion. O&M activities are not yet applicable.

4.14 SITE 16 PAINT AND DOPE STORAGE

This site consisted of a wood-framed building located on the north side of the perimeter access road surrounding the MOC (Figure A-9). The site was originally a flammable liquids storage facility. The building, miscellaneous debris, 3 tons of stained soil, and an AST were removed in 2001 (USACE 2009b).

Soil samples from 1994, 2001, and 2007 indicated that arsenic, antimony, lead, and PCBs were contaminants of concern in soil for this site:

- Arsenic was detected at concentrations ranging from 3.4 to 12 mg/kg and was the primary risk driver in the human health risk estimates (USACE 2007d). However, ADEC has agreed that the arsenic is attributable to naturally occurring background levels (USACE 2009b).

- Antimony concentrations ranged from nondetect (ND) to 21 mg/kg, which exceeds the ADEC migration to groundwater cleanup level of 3.6 mg/kg but not the direct contact level of 33 mg/kg. Antimony was not detected in groundwater and no additional action was planned to address antimony in soil.
- Lead in soil ranged from 18 to 822 mg/kg in eight surface soil samples and exceeded the cleanup level (400 mg/kg) in two locations in 1994 immediately adjacent to the building. These locations were presumed to have been removed with the stained soils in 2001 (as cited in the DD [USACE 2009b]). Subsurface soil samples collected from three locations ranged from 18 to 157 mg/kg in 1994. Additional surface samples collected in 2001 detected lead at 42 mg/kg and 240 mg/kg, which does not exceed the cleanup level.
- PCBs were detected at 1.4 mg/kg in one surface soil location adjacent to the building foundation in 1994; all seven other sampling results were less than 1 mg/kg (USACE 2009b).

The primary COCs in groundwater in 1994 were cadmium (0.06 mg/L) and trichloroethene (TCE) (0.0033 mg/L). However, metals were not detected in the dissolved phase so metals were attributed to suspended particles in the water column and were not retained as COCs for groundwater. During follow-up sampling in 1998, TCE was not detected (USACE 2009b). In 2004, additional groundwater sampling was attempted but insufficient water was in the monitoring wells (USACE 2009b). Because TCE was not detected in follow-up sampling and the groundwater is intermittent at this location, no groundwater COCs were included in the DD for this site.

4.14.1 Site 16 Paint and Dope Storage Remedy Implementation and Status

The selected remedy for soil at Site 16 is excavating and removing PCB-contaminated soil and implementing an LUC to limit future drinking water use. Excavation of PCB-contaminated soil was initiated and completed in 2010 when 5 tons of soil were excavated and removed for disposal (USACE 2011). Final excavation sample results are included in Figure A-11.

At the time of this review, the LUC to limit limiting future drinking water use had not been implemented.

4.14.2 Site 16 Paint and Dope Storage Operations and Maintenance

Site 16 has not reached construction completion. O&M activities are not yet applicable.

4.15 SITE 19 AUTO MAINTENANCE

Site 19 consisted of the Auto Maintenance and Auto Storage buildings within the MOC (Figure A-9). The buildings were constructed with concrete floors and floor drains; the buildings were demolished in 2003 (USACE 2007d, 2009b). Previous remedial actions at this site removed PCB-contaminated concrete from the building floors and no PCB contamination was detected in the underlying concrete or soil (USACE 2007d). DRO was detected at a maximum concentration of 1,240 mg/kg in surface soils and 13,300 mg/kg in subsurface soils (9.5 to 11.5 feet bgs). One soil boring also contained GRO at a maximum concentration of 6,650 mg/kg at 4 to 6 feet bgs; no GRO cleanup level for Site 19 soil was specified in the DD (USACE 2009b).

4.15.1 Site 19 Auto Maintenance Remedy Implementation and Status

The contingency remedy at Site 19 is excavating and removing petroleum-contaminated soils, MNA of groundwater (described in Section 4.9.4), and implementing an LUC to limit future drinking water use. The contingency remedy of soil excavation was initiated in 2011 after the 2010 UVOST investigation delineated the H plume near historic contamination at Site 19 (USACE 2012).

In 2011, an attempt to excavate the H plume was unsuccessful when groundwater was encountered at 5 feet bgs before the excavation could advance to the target depth of 7.5 feet bgs. No soil was excavated in 2011 (USACE 2012). In 2012, groundwater levels were lower and soil was excavated in the H plume to depths ranging from 11 to 14 feet bgs, which was 2 feet below the groundwater surface. The excavation was guided by field-screening results; when these results indicated the boundary had been reached, excavation confirmation samples were collected. All final sidewall and floor confirmation samples were less than the site-specific cleanup levels for DRO and RRO (USACE 2013b).

At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.15.2 Site 19 Auto Maintenance Operations and Maintenance

Site 19 has not reached construction completion. O&M activities are not yet applicable.

4.16 SITE 21 WASTEWATER TANK

Site 21 is located west of the MOC perimeter road and contained the wastewater treatment system for the main housing and operations complex (Figure A-9). The infrastructure consisted of a concrete septic settling tank and attached piping enclosed in a wooden utilidor that discharged to the wetland area approximately 450 feet west (Figure A-12). The tank compartments, utility corridor from the main complex, and the wooden utilidor outfall line were removed in 2003 (USACE 2009b).

Soil, sediment, and groundwater samples were collected at Site 21. PCBs and arsenic were identified as COCs for soil (USACE 2009b). PCBs were found in the sludge from the septic tank at a concentration of 120 mg/kg, but the maximum concentration found in soil was 4.2 mg/kg (USACE 2009b). Confirmation sampling after the 2003 decommissioning work confirmed that PCBs had not migrated through the concrete. PCBs were detected at one additional location immediately beneath the outfall piping adjacent to the septic tank at a concentration of 1.7 mg/kg (USACE 2009b).

Arsenic in surface and subsurface soils was detected at concentrations generally ranging from 2.8 to 39 mg/kg with one location of 170 mg/kg in surface soil downgradient of the septic tank outfall. Additional samples collected in 2001 detected arsenic ranging from 4.5 to 11.5 mg/kg in soils and 12.1 to 14.7 mg/kg in sediment. Following the removal of the utility corridor, confirmation samples ranged from 11.4 to 35.2 mg/kg (USACE 2009b).

Arsenic was detected in groundwater in 1994 at concentrations up to 0.072 mg/L, which exceeded the cleanup level of 0.01 mg/L, but dissolved samples from the same well did not exceed the cleanup level. Arsenic was subsequently eliminated as a COC in groundwater (USACE 2009b).

4.16.1 Site 21 Wastewater Tank Remedy Implementation and Status

The selected remedy for soil at Site 21 was excavating and removing PCB- and arsenic-contaminated soils and implementing an LUC to limit future drinking water use. Excavation of PCB-contaminated soil was initiated in 2010 when approximately 10.4 tons of soil were excavated and removed for disposal (USACE 2011). Final excavation sample results confirmed that PCB concentrations for all Aroclors were less than 1 mg/kg (Figure A-12).

Excavation of arsenic-contaminated soil near the highest exceedance (170 mg/kg) began in 2010. From 2010 to 2012, approximately 135 tons of arsenic-contaminated soil above the site-specific cleanup level of 11 mg/kg was removed (Figure A-12).

In 2011, nine additional background samples were collected with results ranging from 2.9 to 22 mg/kg. The 95-percent upper confidence limit was calculated to be 11.49 mg/kg. Arsenic concentrations up to 320 mg/kg have been encountered in soil during excavation. At the conclusion of the 2012 excavation, samples from four sidewall locations exceeded the cleanup level of 11 mg/kg established in the DD (USACE 2012).

In 2013, 19 soil borings were advanced to delineate the vertical and horizontal extent of arsenic contamination at Site 21. Three soil samples were collected per boring at depths of approximately 0.5, 2.0, and 3.0 feet bgs. Thirteen of the 19 soil borings contained arsenic at concentrations exceeding site-specific cleanup levels (USACE 2014c). Soil boring results were used to guide initial excavation efforts. Soil boring location 21SB17, which contained an arsenic concentration of 14 mg/kg at 0.5 feet bgs, was not included as a removal due to active water flow. Confirmation samples were collected and arsenic continued to exceed the site-specific cleanup level at ten locations. The second round of excavation efforts proceeded at seven of the ten locations. At the conclusion of the 2013 field season, 305.13 tons of arsenic-contaminated soil was removed and arsenic remained at 14 locations at concentrations that exceed the site-specific cleanup level of 11 mg/kg. Remaining arsenic concentrations in the area of the 2013 excavation range between 17 mg/kg and 79 mg/kg (USACE 2014c). The source of the arsenic at Site 21 is unclear, but additional historical sample locations exceeding 11 mg/kg also exist along the utility corridor (Figure A-12).

At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.16.2 Site 21 Wastewater Tank Operations and Maintenance

Site 21 has not reached construction completion. O&M activities are not yet applicable.

4.17 SITE 27 DIESEL FUEL PUMP

Site 27 includes the diesel fuel pump island originally used to refuel heavy equipment and vehicles (Figure A-9). The site comprised a small shed and cement valve box and a buried pipeline from the bulk fuel storage tanks at Site 11. The pump house shed, pipeline, and surrounding stained soils were removed in 2001 (USACE 2009b).

As discussed in the DD, surface soil sampling in 1994 indicated DRO was present at a maximum concentration of 37,900 mg/kg (USACE 2009b). In 2001, confirmation samples collected from the bottom of the tank and piping excavations indicated petroleum contamination remained in the subsurface where concentrations of DRO (up to 36,500 mg/kg) and naphthalene (191 mg/kg) exceeded the site-specific cleanup level. In 2002, soil borings found DRO at concentrations up to 51,000 mg/kg at 7 to 9 feet bgs, but the maximum naphthalene concentration of 81 mg/kg did not exceed the cleanup level (USACE 2009b).

4.17.1 Site 27 Diesel Fuel Pump Remedy Implementation and Status

The contingency remedy at Site 27 is excavating and removing petroleum-contaminated soils, MNA of groundwater (described in Section 4.9.4), and implementing an LUC to limit future drinking water use. The contingency remedy of soil excavation was initiated in 2012 after the

2010 UVOST investigation delineated the E plume near historic contamination at Site 27. The E plume (E1 through E4) was one of the larger plumes delineated by the UVOST in 2010, with an estimated area of 17,500 square feet and contamination depths ranging from 2 to 15 feet bgs (USACE 2011).

Excavation activities began in the northern portion of the E plume (E4) where it is adjacent to downgradient Site 28. Excavation then progressed south into E3 and portions of E2 and E1 before the 2012 season ended (USACE 2013b). The excavation was guided by field-screening results, but groundwater dictated the ultimate depth of excavation. When field results or groundwater indicated the boundary had been reached, excavation confirmation samples were collected. Excavation reached the target of 2 feet below groundwater across the entirety of the E4 and E3 plumes, and equated to depths ranging from approximately 3 feet bgs to 10 feet bgs (USACE 2013b). The E2 area was excavated to depths ranging from 7 to 11 feet bgs and was 2 feet below groundwater in all areas except the dry southeast portion where excavation stopped at 8 feet bgs when the limit of contamination was reached (USACE 2013b).

At the conclusion of 2012 excavation activities, DRO concentrations at five locations on the excavation floor exceeded the cleanup level with results ranging from 13,000 to 110,000 mg/kg. In 2013, the location of three of the five confirmation samples were excavated as water levels dropped in the E4 plume (USACE 2014c). The excavation extents of the E4 plume expanded into the D2 plume and proceeded westward. Along the northern sidewall, nine confirmation samples were collected, four of which contained DRO at concentrations exceeding the site-specific cleanup level. No further excavation occurred at these sample locations due to their proximity to the Site 28 wetland (USACE 2014c).

The excavation of the western portion of the E3 plume was expanded in 2013. Three confirmation samples were collected, while the western extent was not defined (USACE 2014c). Sample 13NCMOCSS077 exceeded the site-specific cleanup level for DRO with a concentration of 29,000 mg/kg (USACE 2014c). Confirmation samples from the E plume have not been analyzed for naphthalene, so the removal cannot be confirmed. The majority of the E1 plume has not been excavated and is planned for excavation in 2014 (USACE 2014d).

At the time of this review, the LUC to limit future drinking water use had not been implemented.

4.17.2 Site 27 Diesel Fuel Pump Operations and Maintenance

Site 27 has not reached construction completion. O&M activities are not yet applicable.

4.18 SITE 28 DRAINAGE BASIN

The Site 28 Drainage Basin is located north of the MOC and drains north into the Suqitughneq River (Figure A-2). The site has been affected by fuel releases from the bulk fuel storage tanks (Site 11) and other spills and releases discussed in the DD (USACE 2009b). The site contains wetlands, rolling tundra, ponds, and flowing streams.

Water in the Site 28 Drainage Basin originates from surface water runoff (overland flow) from the MOC, three drainages at the head of the site near the MOC, and two sub-drainages further north. Overland flow can contribute significant amounts of water to the basin during rainfall events. The two distinct sub-drainages contain feeder streams originating as seeps and drain into the main stream approximately one-quarter of the way down the drainage (USACE 2013d). Three distinct headwater drainages originate from the upgradient MOC gravel pad and contribute flow to Site 28 (USACE 2009b). The eastern drainage flows from the vegetated area adjacent to Sites 10 and 11, which are located north of the former fuel tanks; the middle drainage originates from a small swale where a culvert directed flow from Site 27, and the western drainage is located downgradient of Site 13 (USACE 2013d). The western drainage originated from a manhole and a small, concrete supporting structure just north of the perimeter access road, which emptied into an artificially created swale. The manhole likely served as the drain leading from Building 110 (Heat and Electrical Power Building) at the MOC (USACE 2009b). Sediment, soil, surface water, and shallow groundwater samples have been collected and analyzed beginning in 1994.

Soil/Sediment

Stained soil and/or sediments were observed in each of the three main drainage basins, and they produce sheen when disturbed (USACE 2009b). The primary COCs in soil and sediment at the time of the DD were chromium, lead, zinc, PCBs, PAHs, DRO, and RRO (USACE 2009b). The highest concentrations of contaminants are located near the edge of the MOC gravel pad.

Surface Water

As summarized by the DD (USACE 2009b), surface water samples were collected from the drainage basin in 1994, 1996, and 2001. Concentrations of DRO, total recoverable petroleum hydrocarbons, PCBs, and lead exceeded surface water cleanup levels in 1994. In 2001, DRO was detected at concentrations ranging from 0.39 to 2.3 mg/L. PCBs and RRO were not detected and lead samples were not collected. The most heavily contaminated surface waters of the drainage basin were found at the head of the western and middle drainages, located at the terminus of the former culverts.

Groundwater

Groundwater samples collected in 1994 indicated the potential for DRO and lead contamination, but subsequent sampling in 2001 demonstrated the concentrations were below cleanup levels. No groundwater COCs were retained for Site 28 (USACE 2009b).

4.18.1 Site 28 Drainage Basin Remedy Implementation and Status

The selected remedy for Site 28 consisted of two components: (1) excavation and removal of petroleum-, metals- and PCB-contaminated sediment, including the removal of near-surface sediments from the narrow channel upgradient of the Suqitughneq River; and (2) construction of a sedimentation pond or other appropriate controls. The ends of the culverts would also be cleaned out and removed or plugged to prevent direct outflows of upgradient residual sources of contamination (USACE 2009b).

In 2010, approximately 95 feet of culvert was removed and one culvert was capped (USACE 2011). The concrete manhole structure in the western drainage was also cleaned and removed. Sludge inside the manhole contained concentrations of lead up to 5,000 mg/kg, mercury up to 15 mg/kg; arsenic at 41 mg/kg, barium 820 mg/kg, cadmium at 18 mg/kg, silver up to 16 mg/kg, PCB Aroclor 1254 up to 20 mg/kg, and DRO up to 68,000 mg/kg (USACE 2011). A 12-inch corrugated metal pipe that attached to the manhole and continued upgradient toward the MOC was cut, and 63 feet of the pipe was removed. The open end of the pipe was then filled with bentonite and welded shut. In the middle drainage, another 12-inch corrugated metal pipe measuring 32 feet in length was completely removed (USACE 2011).

In 2011, sediment and soil sampling was conducted to further delineate the extent and magnitude of contamination at Site 28 (Figure A-13). Transects were located between the upper end of Site 28 and its confluence with the Suqitughneq River; to include areas where contamination was noted in the DD (USACE 2009b) to gain a better understanding of contaminant distribution throughout the drainage. Sediment results were compared to the criteria specified in the DD when applicable. If sediment criteria were not listed in the DD for a particular analyte, evaluation criteria were based on the National Oceanic and Atmospheric Administration (NOAA) Screening Quick Reference Tables (SQuiRT) for freshwater sediment at the probable effect level. Some of the samples collected in 2011 did not meet the project definition of sediment, so soil cleanup levels were used for screening purposes. The results indicated that five additional contaminants were of potential concern: toluene, ethylbenzene, total xylenes, cadmium, and selenium (USACE 2013d).

In 2012, additional sediment mapping and sampling was conducted. Streams and ponds in the drainage basin were inspected to define the horizontal boundaries of the sediment accumulation areas and probing was conducted to determine the thickness of the sediment (USACE 2013c). The mapping efforts identified approximately 400 cubic yards of sediment in 22 locations along the drainage (USACE 2013c). Sediment samples collected in 2012 that exceeded cleanup levels for one or more analytes are shown in Figure A-13.

In September 2012, following the mapping and sampling effort, Phase I of the sediment removal remedy was initiated in three areas (Figure A-13). Two removal methods were evaluated for efficacy and implementability: excavation and a combination of a Venturi dredge and geotextile dewatering tube:

- An excavator removed sediment in Areas 1 and 2, just north of the MOC gravel pad. This method allowed removed sediment to be dewatered in place, but is limited to areas with firm ground such as the MOC gravel pad or a road. The excavator removed approximately 5 cubic yards of sediment from Area 1 in the western drainage and 16 cubic yards from Area 2 near the middle drainage. In Area 1, DRO, naphthalene, acenaphthylene and 2-methylnaphthalene exceeded cleanup criteria in both confirmation samples. In Area 2, the same analytes plus RRO, acenaphthene, fluorene, and phenanthrene exceeded cleanup levels.
- The Venturi dredge was used in Area 4 located in the main channel of the drainage. This method can be used where the excavator cannot travel but requires large volumes of water to remove the sediment. Following removal, the sediment must be separated from the water and the water must be confirmed to meet discharge requirements before release. The dredge removed approximately 18 cubic yards of sediment from Area 4 in 2012. No confirmation samples were collected from Area 4. Approximately 135 cubic yards of contaminated sediment remained at Area 4 at the conclusion of 2012 field season (USACE 2013c).

In 2013, sediment removal continued within Areas 3 through 11 (USACE 2014c).

- At Areas 5, 6, and 7, vegetative material routinely clogged the in-line pumps. Sediment and vegetative material was removed by hand instead of using the dredge. Personnel donned dry suits, entered the shallow ponds, and rolled/scooped up the sediment/decaying plant material in large pieces. Material was placed at the edge of each pond and an excavator was used to place the material in bulk bags for disposal (USACE 2014c).
- Removal Area 8 was a small pond in 2012 however; it was dry in 2013. Material from this area was removed by excavator and placed directly into a bulk bag for disposal.
- Sediment was removed from Areas 3, 4, 7, 9, 10, and 11 using the Venturi dredge and geotextile dewatering system.
- At the conclusion of the 2013 field season, several analytes including arsenic, chromium, 2-methylnaphthalene, acenaphthene, fluorene, naphthalene, phenanthrene, low molecular weight polycyclic aromatic hydrocarbons (LPAH), DRO, and RRO remained at concentrations greater than cleanup levels. Analytes exceeding cleanup levels remained within all 11 sediment removal areas. In addition, acenaphthylene, 1-methylnaphthalene, and selenium were identified in sediment.
- At the conclusion of the 2013 field season, the geotextile sediment dewatering tubes remained onsite and will require containerization, transportation, and disposal.

Water Treatment

Water and sediment removed using the dredge system was moved to a water processing area west of Site 28. The processing area consisted of two 20,000-gallon-capacity lined containment cells approximately 60 by 30 feet and 1.5 feet deep. The primary containment area consisted of a geotextile dewatering tube for sediment dewatering designed to contain the sediment while allowing water to pass through the pore spaces. The pore size ranged from 59 to 350 microns. Water was then treated through a scrubber – a natural cellulose fiber that selectively absorbs hydrocarbons inside high-density polyethylene containers with an inlet at the top. Water then flows to the second set of containment cells to await analytical results prior to discharge. In 2012, samples collected from the treated water did not meet discharge criteria for TAH and TAqH identified in the State of Alaska Wastewater General Permit 2009DB0004-0216 (USACE 2013c). No water was discharged. Excavated sediment and treated water from Area 4 remained within the lined containments over the winter of 2012/2013.

Following the 2012 field activities, changes to the sediment/water treatment system were made in order to implement this remedy effectively. In 2013, a SPINPRO HydroMizer polymer feed system with injection pump was introduced into the piping line prior to sediment capture in the geotextile tube to facilitate coagulation and settling (USACE 2013c). The water filtration system was modified to consist of two sock filters (water first flowed through a 25-micron-filter, and then through a 5-micron-filter), followed by a scrubber containing hydrocarbon-absorbent cellulose fibers (USACE 2014c). After the first batch of water was processed in 2013, analytical results indicated water was still above TAqH criteria (USACE 2014c). A granular-activated carbon system was added as the last treatment step and the hydrocarbon scrubber was eliminated. Analytical results from the first batch using the modified treatment system were below discharge criteria presented in the State of Alaska Wastewater General Permit 2009DB0004-0216 and 18 AAC 70. ADEC and USACE agreed that pre-treated water containment samples were no longer needed and treated water was discharged to the ground (USACE 2014c).

Control Measures

Two methods were used to control and minimize downstream sediment migration during removal activities: silt fencing and an in-stream sediment trap. Silt fencing was used where there is no direct flow to the main channel of the Suqitughneq River and was placed on the north side of the ponded area. The sediment trap was placed downstream of sediment removal area 4. The trap was a steel box 8 feet wide by 4 feet deep with the rear (downstream) height extending approximately 6 feet high and tapering to a front section approximately 4 feet high. Rectangular slots allowed water to flow down and through the box. Unrolled jute mats were placed inside the trap, upstream, and downstream of the trap (USACE 2013c).

Following completion of contaminated sediment removal, a permanent sedimentation pond or other appropriate controls will be needed to prevent any migration of contaminated sediment downgradient of the site and reach a status of construction complete.

Surface Water Sampling

Surface water samples were collected at three locations before, during, and after sediment removal and at one location downstream of the sediment trap. Samples were analyzed for BTEX, DRO, RRO, PAHs, PCBs, and total and dissolved metals (RCRA metals plus nickel, vanadium, and zinc). All surface water samples were below applicable surface water criteria and no sheen was observed (USACE 2014c).

4.18.2 Site 28 Drainage Basin Operations and Maintenance

Site 28 has not reached construction completion. O&M activities are not yet applicable.

4.19 SITE 29 SUQITUGHNEQ RIVER

The Suqitughneq River (Site 29) flows north from the Kinipaghulghat Mountains through tundra to a lagoon and estuary located east of the Northeast Cape airstrip where it drains into the Bering Sea (Figure A-2). The lagoon and estuary are separated from the Bering Sea by a sand berm that forms at the beach and occasionally breaches. Several smaller tributaries, including the drainage basin (Site 28), contribute flow to the Sugitughneq River.

RIs conducted at Site 29 between 1996 and 2004 identified DRO as the only COC. These investigations are summarized in the DD as follows (USACE 2009b):

- In 1996, DRO was detected in sediment at 25,000 mg/kg approximately 850 feet downgradient of Site 28. Subsequent sampling efforts in this area could not duplicate this level of DRO contamination.
- Sampling in 1998 identified DRO concentrations in sediment between 11 and 2,200 mg/kg.
- In 2001, sediment samples contained DRO concentrations between 15 to 1,400 mg/kg.
- In 2004, DRO was detected in sediment between 157 to 988 mg/kg. No other COCs have been identified in sediment above site-specific cleanup levels.
- Surface water samples were collected from Site 29 between 1994 and 2004 and did not detect COCs above drinking water cleanup levels.

A risk assessment was conducted at Site 29 to evaluate the carcinogenic risk of fish consumption from the vicinity of the Suqitughneq River. The risk assessment evaluated the carcinogenic risks associated with arsenic, PCBs, and PAHs. Evaluation by the Agency for Toxic Substances and Disease Registry in a health consultation concluded that consumption of fish from water of Northeast Cape is not likely to result in adverse health effects.

4.19.1 Site 29 Suqitughneq River Remedy Implementation and Status

Although NFA was selected for Site 29, the removal of incidental debris located in the stream channel that poses an inherent hazard was described in the 2009 DD (USACE 2009b). Incidental debris located in the stream channel of the Suqitughneq River was removed as part of the site-wide cleanup in 2010 (USACE 2011). Debris removed from Site 29 was comingled and weighed with miscellaneous debris removed from Site 9. Approximately 12.1 tons of debris from Sites 9 and 29 were removed in 2010; an estimate of debris removed from Site 29 alone was not reported.

The site inspection conducted on 14 September 2013 by Jacobs identified minimal debris located within a pond of the Suqitughneq River (Figure A-14). The site inspection is described in Section 6.5 and on the Inspection Checklist in Appendix C.

4.19.2 Site 29 Suqitughneq River Operations and Maintenance

No operations or maintenance activities are planned for this site in accordance with the DD. The USACE and the Savoonga community are discussing additional sampling of the Suqitughneq River following the completion of remedial efforts at the MOC and Site 28 (Restoration Advisory Board [RAB] 2012a).

4.20 SITE 31 WHITE ALICE COMMUNICATIONS

The While Alice Communications (Site 31) is located southeast and uphill from the MOC in a glacial valley at the base of Kangukhsam Mountain (Figure A-2). While active, the site contained four large billboard antennas, a central main electronics building, other supporting structures, and seven ASTs. Soil samples were collected from Site 31 in 2001, 2003, and 2004 from beneath fuel pipeline, fuel tanks, and tank impoundments (USACE 2009b). Sampling near the former fuel pipeline corridor indicated DRO at concentrations between 42.9 to 5,400 mg/kg. RRO was detected at 11,000 mg/kg in one location beneath a former fuel tank valve (USACE 2009b).

The antennas, buildings, and ASTs were demolished and removed in 2003. Approximately 79 tons of PCB-contaminated concrete was also removed from portions of the Main Electronics Building foundation. PCB contamination was also identified at a possible sewage outfall area, west of the main electronics building, and adjacent to the former transformer pad (USACE 2009b). In 2005, approximately 118 tons of PCB-contaminated soil was excavated from the three identified areas within Site 31. Excavations at the septic tank outfall and west of the building successfully removed all PCB contamination to concentrations below 1 mg/kg. Confirmation samples collected in 2005 from the former transformer pad excavation indicate PCBs remain between 1.53 to 7.09 mg/kg in approximately 110 cubic yards of soil (USACE 2009b).

4.20.1 Remedy Implementation and Status

The selected remedy of excavation and disposal of PCB-contaminated soil was initiated at Site 31 in 2010 and continued through the 2013 field season (Figure A-15). In 2010, the liner placed at approximately 2 feet bgs in 2005 was used as a guide to begin excavation activities. Soil from above the liner was removed and stockpiled. The stockpiled soil removed from the upper 1.5 feet of soil was field screened and confirmed to contain PCB concentrations above cleanup levels. Soil from the stockpile was loaded into bulk bags for disposal (USACE 2011).

In 2010, three of the four historical exceedances were located by survey and investigated (Figure A-15). Field-screening samples were collected from beneath the liner and were used to guide the excavation efforts. Excavation expansion continued until field-screening samples were identified below cleanup levels (USACE 2011).

Once field-screening samples indicated soil concentrations were below cleanup levels, discrete confirmation samples were collected at 5-foot intervals and composited into 19 sample groups. Composited samples were submitted to an analytical laboratory for analysis of PCBs. Composited sample results were compared to 1/n the cleanup level established in the DD, where 'n' represents the quantity of samples composited. Seven composite groups contained PCB concentrations above cleanup levels, with PCB concentrations ranging from 1.3 mg/kg to 5 mg/kg. Eleven composite groups exceeded the 1/n threshold, suggesting that some of the discrete sample locations representing these groups may be above the cleanup level for PCBs. One composite group contained PCB concentrations below the 1/n threshold. A total of 638 tons of PCB-contaminated soil was excavated and 59 bulk bags were filled for disposal in 2010. Excavation extents and sample locations were surveyed, and the excavation floor was covered with 30-mil black plastic liner as a visual marker for excavation activities in 2011 (USACE 2011).

In 2011, the clean overburden was removed to the 30-mil black plastic liner and temporarily stored on a lined stockpile area. Field-screening samples were collected and used to guide the excavation efforts, which expanded in all directions (USACE 2012). Although field-screening results continued to indicate PCB concentrations greater than site-specific cleanup levels, confirmation samples were collected and submitted to the analytical laboratory to prepare the site for over-wintering. A total of 178 discrete and 70 composite confirmation samples were collected and indicate that PCB contamination remained throughout the site at concentrations between 1 and 250 mg/kg (USACE 2012). The excavation boundary was adjacent to a concrete foundation. Seventeen wipe-samples were collected and analyzed for PCBs, none of which contained PCB concentrations in excess of cleanup levels. The excavation was lined with TYPAR liner and covered with backfill.

In 2012, excavation of PCB-contaminated soil continued at Site 31. Excavations removed a 25-square foot area of soil approximately 1.5 to 2.0 feet deep. Discrete soil samples were collected every 5 feet and used to guide the excavation efforts. Approximately 2,700 tons of PCB-contaminated soil was removed from Site 31 in 2012. At the end of the 2012 field season, only one confirmation sample contained PCB concentrations in excess of site-specific cleanup levels with a concentration of 1.3 mg/kg (USACE 2013b).

In 2013, the location of the 2012 exceedance was located by survey and excavated to approximately 1.5 to 2.0 feet bgs (USACE 2014c). A total of 9.85 tons of PCB-contaminated soil was loaded directly into bulk bags and staged at one of the bulk bag staging areas. Soil removal was followed by sample collection and field laboratory analysis. Following the first round of excavation, the field laboratory sample results indicated a PCB concentration of less than 0.8 mg/kg. One confirmation sample and one duplicate sample was collected and submitted to an analytical laboratory for analysis. Confirmation samples indicated a PCB concentration of 0.44 mg/kg. The excavation was backfilled and contoured to blend with surrounding topography. Figure A-14 presents the approximate excavation boundaries for 2010, 2011, 2012, and 2013.

4.20.2 Site 31 White Alice Communications Operations and Maintenance

The remedy at Site 31 is considered complete. No ongoing O&M are planned.

4.21 SITE 32 LOWER TRAMWAY

The Lower Tramway (Site 32) is located south of Site 31 at the northern base of Kangukhsam Mountain (Figure A-2). Site 32 consisted of a tram terminal building, substation transformer bank, two ASTs, a water well, and an anchor pit for the aerial tramline. In 2001, soil samples collected from Site 32 identified DRO as the primary COC. DRO concentrations ranged between 230 and 13,000 mg/kg. RRO concentrations were not detected above site-specific cleanup levels; the maximum RRO concentration detected was 3,600 mg/kg (USACE 2009b).

The buildings, ASTs, and tram structures at Site 32 were demolished and removed in 2003 and 2005. Additional soil samples were collected in 2003 following the building demolition activities. DRO concentrations ranged between 1,150 and 10,400 mg/kg in the area near the former AST. No other contaminants were identified above cleanup levels (USACE 2009b).

4.21.1 Site 32 Lower Tramway Remedy Implementation and Status

The selected remedy for Site 32 was to excavate and dispose of or treat petroleum-contaminated soil. In 2010, approximately 20 tons of soil was excavated from Site 32 (USACE 2011). Field-screening samples were collected from the excavation floor and sidewalls and indicated that DRO contamination was not present above cleanup levels. Sixteen confirmation samples were collected from the excavations at Site 32 for DRO/RRO analyses and all were found to be below cleanup levels. The excavation pits were backfilled and graded with clean fill obtained from the borrow source.

The remedy for Site 32 is not complete. Excavation efforts in 2010 (USACE 2011) were conducted north of the DRO-contaminated area identified in the DD. The two areas identified in the DD containing DRO concentrations above cleanup levels currently remain onsite (Figure A-16).

4.21.2 Site 32 Lower Tramway Operations and Maintenance

Site 32 has not reached construction completion. O&M activities are not yet applicable.

4.22 ADDITIONAL AREAS OF CONCERN

Two additional areas of concern were identified by community members during an RAB meeting in December 2012 (RAB 2012a). In response to the concerns, an RI was conducted at the area of a suspected pipeline break and along the roadway.

4.22.3 Suspected Pipeline Break Location

A pipeline used to deliver fuel to the storage tanks at the MOC formerly ran between Cargo Beach and the MOC. St. Lawrence Island resident Bryan Rookok, Jr. stated during the 2012 RAB meeting that during historic pipeline removal work, he observed a break in the pipeline between Sites 3 and 7 (RAB 2012a). The location of the break was immediately adjacent to the northwest side of Cargo Beach Road, in a relative low-lying area where the pipeline crossed beneath the roadway via a culvert (Figure A-2). It was unclear when the break may have occurred. Mr. Rookok did not recall observing any indications of petroleum contamination at the location of the break, indicating the break may have occurred after petroleum was drained from the pipeline (RAB 2012a).

In 2013, the location of the reported pipeline break was located and four soil borings were advanced to 2 feet bgs within a 15-foot-by-15-foot area (USACE 2014c). Two samples were collected from each boring at depths of approximately 1 and 2 feet bgs and submitted for analysis of DRO, GRO, RRO, and BTEX. Benzene, DRO, and RRO were detected in soil at concentrations below the site-specific cleanup levels established in the DD. All other analytes were below regulatory cleanup levels (USACE 2014c).

4.22.4 Roadway Sampling

The current road network maintained at Northeast Cape is the historic roadbed from the Northeast Cape installation. The road network is currently used during removal activities to transport equipment, fuel, and bulk bags containing contaminated soil. During a RAB meeting in December 2012, a community member indicated that he was aware of historical spreading of “drain oil” along the roadbed for dust suppression (RAB 2012b).

In 2013, four different segments of the road network were selected for investigation: between Cargo Beach and Site 6, between the airstrip and Site 8, between Site 8 and the MOC, and between the MOC and Site 31 (Figure A-2). A test pit was advanced to a depth of 2 feet bgs at each of the locations and analytical samples were collected at depths of 1 foot and 2 feet bgs for analysis of GRO, BTEX, DRO, RRO, PAHs, PCBs, RCRA metals, and zinc. Arsenic, PCBs, benzene, naphthalene, DRO, and RRO were detected at concentrations below the cleanup levels established in the DD. All other analytes were below regulatory cleanup levels. Test pits were backfilled and re-graded (USACE 2014c).

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5.0 PROGRESS SINCE THE LAST REVIEW

This is the first Five-Year Review for the Northeast Cape FUDS.

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6.0 FIVE-YEAR REVIEW PROCESS

This Five-Year Review was conducted using the following EPA guidelines:

- EPA *Comprehensive Five-Year Review Guidance* (EPA 2001)
- *Clarifying the Use of Protectiveness Determinations for CERCLA Five-Year Reviews* (EPA 2012b)
- EPA Five-Year Review Summary Form Template (EPA 2001)

6.1 ADMINISTRATIVE COMPONENTS OF THE FIVE-YEAR REVIEW PROCESS

USACE notified potentially interested parties to the occurrence of the review using newspaper notices, emails, and distribution of a fact sheet (described in Section 6.2) in the fall of 2013.

The Five-Year Review team consisted of individuals from USACE with technical support provided by Jacobs. The Five-Year Review included the following components: document reviews, site inspection, interviews with the state regulatory agency and community members, an assessment of protectiveness of the remedies, community notification and involvement, and development of this Five-Year and Periodic Review Report. Documentation of the site inspections is located in Appendix C and D. Interview documentation is included in Appendix E.

6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

Public participation has been an important component of the CERCLA process at the Northeast Cape FUDS. A RAB, comprised of community members and other interested parties, was established in January of 2000. RAB meetings are held two times per year to keep the public informed of ongoing project activities. In the past, RAB meetings were held more frequently, as needed. Detailed meeting minutes are recorded and distributed after each meeting. Under the Technical Assistance for Public Participation program, the RAB is served by a technical advisor to provide technical guidance and comments on work plans, reports, proposed remedies, and potential environmental and human health impacts.

The community was notified of, and given opportunity to have input on, the Five-Year Review. The general public was notified of the Five-Year Review with public notices placed in the *Nome Nugget* on 18 and 19 August 2013. In addition, a flyer containing the same information was mailed to select community members and ADEC in September 2013 (Appendix F).

Community interviews for this Five-Year Review were conducted by Jacobs personnel at the January RAB meeting on 15 and 16 January 2014. Additional phone interviews were conducted by Jacobs personnel on 4 and 6 February 2014. The interviews are summarized in Section 6.6. The complete interview record, public notice, and flyer are provided in Appendices E and F.

Following USACE signature of the final review, a second fact sheet describing the findings of the review will be distributed in combination with the results of this Five-Year Review, following distribution of the final report. A copy of this Five-Year Review Report will be added to the official Administrative Record.

The DD indicated project documentation, reports, and other materials are available at four Information Repositories: the Sivuqaq Lodge in Gambell, the Savoonga City Hall in Savoonga, the University of Alaska Fairbanks Northwest Campus Library in Nome, and the Alaska Resource Library and Information Services in Anchorage. The Information Repository at the University of Alaska Fairbanks Northwest Campus Library in Nome is no longer maintained.

6.3 DOCUMENT REVIEW

The DD (USACE 2009b) associated with 33 of the Northeast Cape sites was reviewed for site histories and to identify RAOs, COPCs, COCs, and cleanup levels. The potential for changes to standards identified as ARARs in the DD and/or newly promulgated standards which may affect the protectiveness of the remedies are evaluated in Appendix B and discussed for each site in Section 7.0. The following documents were reviewed for updates to ARARs and new toxicity information:

- ADEC 18 AAC 70, *Water Quality Standards*, amended as of 8 April 2012
- ADEC 18 AAC 75, *Oil and Other Hazardous Substances Pollution Control*, amended as of 8 April 2012
- ADEC *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances*, amended as of 12 December 2008
- ADEC *Cleanup Levels Guidance*, effective June 2008
- EPA Integrated Risk Information System (IRIS) (EPA 2013)
- Washington Administrative Code (WAC) 1995 Chapter 173-204 (WAC 1995)
- WAC Sediment Management Standards (WAC 1995)

In addition to the documents mentioned above, the following documents were also reviewed to assess the protectiveness of the remedies:

- RI/FS reports (when necessary to clarify information in the DDs)
- The Human Health and Ecological Risk Assessment (USACE 2004)
- Remedial action reports
- Annual remedial action and monitoring reports

Key documents utilized during this Five-Year Review are listed in Section 12.0 of this Report.

6.4 DATA REVIEW

Contaminant confirmation sample and monitoring results from soil/sediment samples, groundwater monitoring wells, and surface water sampling locations were reviewed for this Five-Year Review. Natural attenuation-indicator parameter results were also reviewed when available. Data collected and reported was the primary source of information utilized in the data review.

6.4.1 Site 1 Airstrip

The remedy at Site 1 is excavation and removal of petroleum-contaminated soil. The excavation was initiated and completed in 2010 (USACE 2011). Confirmation samples collected from the bottom of the test pits did not identify contaminants above cleanup levels. Soil confirmation samples from the excavation test pits were reviewed for expectations of meeting cleanup levels and RAOs.

Historical sampling locations 04NE01SS103 and 04NE01SS104 (Figure A-4) were located by survey and re-sampled at the historical sampling depth of 0.5 and 0.7 feet bgs (USACE 2011). In addition, test pits were excavated centered over the historical sampling locations and 21 additional field-screening samples were collected. Confirmation samples were collected according to ADEC *Field Sampling Guidance* (ADEC 2010) using the calculated square footage of the area around the test pits, and results indicated that all samples were below cleanup levels. The maximum soil confirmation results are listed in Table 6-1.

Table 6-1
Site 1 Confirmation Soil Sample Results

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2010 Maximum Concentration
RRO	9,200[a]	mg/kg	**19,300**	4,200 M

Notes:
BOLD = Sample result exceeds cleanup level
[a] Cleanup level recorded in the DD (USACE 2009b).
M = a matrix effect was present

The highest concentration of RRO identified during confirmation sampling was 4,200 mg/kg, which is well below the 9,200 mg/kg cleanup level. No soil was removed from Site 1 and test pits were backfilled and graded.

The remedy at Site 1 is considered complete. No further action is required at Site 1. A technical assessment and protectiveness statement are not required or necessary.

6.4.2 Site 3 Fuel Pump House

The remedy at Site 3 is excavating and removing petroleum-contaminated soils, re-sampling two historical sediment sample locations according to the ADEC Technical Memorandum 06:001: *Biogenic Interference and Silica Gel Cleanup* (ADEC 2006) to evaluate biogenic interference, and implementing LUCs. Excavation efforts and sediment sampling was initiated and completed in 2010. Soil confirmation samples from the excavation test pits, sediment sample results before and after silica treatment, and soil confirmation samples from beneath the former mound were reviewed for expectations of meeting cleanup levels and RAOs.

Soil

The historical soil sample location from 2004 (04NE03SB105/04NE03SB106) containing DRO concentrations greater than cleanup levels (shown on Figure A-5) were located by survey and investigated in 2010 (USACE 2011). Four test pits measuring approximately 5 feet by 5 feet were excavated at the location of the historical samples and a confirmation sample was collected from the floor and sidewall of each test pit for analysis of DRO and RRO. Results before and after silica treatment indicated DRO and RRO concentrations were below site-specific cleanup levels. No soil was removed from site and the test pits were backfilled and graded. The maximum confirmation soil sample results from the test pits are presented in Table 6-2.

Table 6-2
Site 3 Soil Sample Test Pit Results

Analyte	Cleanup Level[a]	Unit	DD Maximum Concentration	2010 Maximum Concentration
DRO	9,200	mg/kg	**20,500**	3,700 M,J
DRO (Silica Gel)	9,200	mg/kg	--	3,400 J
RRO	9,200	mg/kg	6,120	7,000 QH,J
RRO (Silica Gel)	9,200	mg/kg	--	2,300 J

Notes:
BOLD = Sample result exceeds cleanup level
[a] Cleanup level recorded in the DD (USACE 2009b)
-- = Data not reported in the DD (USACE 2009b)
J = The analyte was positively identified; the quantitation is an estimate.
M = A matrix effect was present.
QH = Estimated with a high bias.

Sediment

Two historical sediment sample locations (04NE03SD107 and 04NE03SD108) were re-sampled according to the ADEC Technical Memorandum 06:001: *Biogenic Interference and Silica Gel Cleanup* (ADEC 2006). Samples were collected to evaluate biogenic interference from natural organic material at the site. The maximum detected results in sediment are presented in Table 6-3.

Table 6-3
Site 3 Sediment Sample Results

Analyte	Cleanup Level[a]	Unit	Maximum DD Concentration	Maximum 2010 Concentration	Corresponding 2010 Concentration after Silica Gel
DRO	3,500	mg/kg	**3,720**	550 J	300 J
RRO	3,500	mg/kg	**28,500**	**5,000 QH,J**	2,100 J

Notes:
BOLD = Sample exceeds cleanup level
[a] Cleanup level reported in the DD (USACE 2009b)
J = The analyte was positively identified; the quantitation is an estimate.
QH = Estimated with a high bias.

In 2010, sediment sample 10NC01SB02 exceeded the site-specific sediment cleanup level for RRO however, following silica gel treatment sediment concentrations at Site 3 were reduced by approximately 60 percent from 5000 mg/kg to 2100 mg/kg. RRO contamination exceeding the cleanup level in sediment was confirmed to be attributed to biogenic interference. All other sediment sample results were below site-specific cleanup levels and no additional excavation and/or sampling was required to address sediment contamination at Site 3.

Gravel Pad

A mound of soil at Site 3, believed to have originated as the pump house gravel pad, was identified at the site and suspected to contain POL contamination in 2010 (USACE 2011). Soil samples collected from the mound confirmed the presence of DRO above site-specific cleanup levels. Soil from the mound was excavated and prepped for disposal offsite. The maximum confirmation soil sample results from beneath the former mound are presented in Table 6-4.

Table 6-4
Site 3 Mound Confirmation Results

Analyte	Cleanup Level[a]	Unit	DD Maximum Concentration	2010 Maximum Concentration
DRO	9,200	mg/kg	--	6,100 M,J
RRO	9,200	mg/kg	--	3,900 QH,M,J

Notes:
[a] Cleanup level recorded in the DD (USACE 2009b)
-- = Data not reported in the DD (USACE 2009b)
J = The analyte was positively identified; the quantitation is an estimate.
M = A matrix effect was present.
QH = Estimated with a high bias.

Groundwater

DRO and RRO have previously been detected in shallow groundwater above ADEC drinking water standards as documented in the DD. The maximum concentrations of DRO and RRO were 14.0 mg/L and 8.1 mg/L in 1998 (USACE 2009b). The DD did not include a remedy for groundwater contamination at Site 3 because shallow groundwater within Site 3 was not a current or reasonably expected potential future drinking water source (USACE 2009b). At the time of this Report, the LUC designating areas not suitable for drinking water had not been implemented. No additional groundwater data for Site 3 was available for review.

Recommendation for Site 3

- Evaluate surface water as an exposure pathway at Site 3.
- Implement the LUC to designate areas not suitable for drinking water.

6.4.3 Site 6 Gravel Pad

The remedy at Site 6 is excavating and removing petroleum-contaminated soils and implementing LUCs. Prior to initiation of the remedy Site 6 was used as a hazardous waste accumulation point (HWAP) in 2009 for contaminants encountered during Site 7 drum removal (described in Section 6.4.3). Pre- and post-construction samples were collected from the gravel pad at Site 6 in 2009 (USACE 2009b). In 2010, the selected remedy for Site 6 was initiated and considered complete (USACE 2011). In 2011, the gravel pad at Site 6 was used to store bulk bags filled with contaminated soil. To ensure the contaminants from the bulk bags were not being spread to the site, pre- and post-construction *MULTI INCREMENT*[1] sampling was conducted in 2011 and 2013 (USACE 2012, 2014c).

Pre- and post-construction samples from 2009, soil confirmation samples from 2010, and pre- and post-construction *MULTI INCREMENT* samples from 2011 and 2013 were reviewed for expectations of meeting cleanup levels and RAOs.

Hazardous Waste Accumulation Point

During drum removal activities at Site 7 in 2009, Site 6 was used as a HWAP for oil transfer, drum cleaning, and waste consolidation. Pre- and post-construction soil samples were collected from the area beneath HWAP activities. Maximum detected concentrations are presented in Table 6-5.

[1] MULTI INCREMENT® is a registered trademark of EnviroStat, Inc.

Table 6-5
Site 6 Maximum Pre- and Post-Construction Sample Results in 2009

Analyte	Cleanup Level	Unit	Maximum Pre-Construction Concentration	Maximum Post-Construction Concentration
Benzene	2,000[a]	µg/kg	ND [2.8]	ND [2.9]
Toluene	220,000[b]	µg/kg	4.8 J	16 B
Ethylbenzene	110,000[b]	µg/kg	ND [4.2]	ND [4.8]
Total Xylenes	63,000[b]	µg/kg	12 J	ND [10]
Methyl tert-butyl ether (MTBE)	290,000[b]	µg/kg	ND [2.0]	--
All other Aroclors	1[a]	mg/kg	ND [0.0084]	ND [0.0084]
Aroclor 1254	1[a]	mg/kg	**2.2**	0.026
GRO	1,400[c]	mg/kg	20 J	94
DRO	9,200[a]	mg/kg	**14,000 J,H**	**9,500**
RRO	9,200[a]	mg/kg	**130,000**	**80,000**
Arsenic	11[a]	mg/kg	**--**	6
Barium	20,300[d]	mg/kg	91	63
Cadmium	79[d]	mg/kg	ND [0.086]	ND [0.085]
Chromium	300[d]	mg/kg	12	9.5
Lead	400[d]	mg/kg	22 J	19
Selenium	510[d]	mg/kg	21	19
Silver	510[d]	mg/kg	ND [0.049]	ND [0.048]
Mercury	18[b]	mg/kg	0.015 J	0.017 J

Notes:
[a] Cleanup level reported in the DD (USACE 2009b)
[b] 18 AAC 75, Table B1 Method Two, Under 40 inch Zone, Outdoor Inhalation cleanup level (ADEC 2012)
[c] 18 AAC 75, Table B2 Method Two, Under 40 Inch Zone, Ingestion cleanup level (ADEC 2012)
[d] 18 AAC 75, Table B1 Method Two, Under 40 Inch Zone, Direct Contact cleanup level (ADEC 2012)
-- = Data not reported in the Site 7 *Landfill Cap Construction Completion Report* (USACE 2010d)
ND = The analyte was not detected; the limit of detection is presented in brackets
J = the analyte was identified; the quantitation is an estimate
H = Result has a potential high bias.

Post-construction samples in 2009 verify that HWAP activities did not contribute to contaminants at Site 6 however; pre-construction samples indicate the presence of DRO, RRO, and PCB Aroclor 1254 above site-specific cleanup levels at Site 6 (USACE 2011). DRO and RRO are known COCs in soil at Site 6 (USACE 2009b). Pre-construction sample results indicate that RRO concentrations are higher than previously detected (8,500 mg/kg vs. 130,000 mg/kg). The presence of PCBs in soil at Site 6 had not previously been reported and was therefore not included as a COC in the DD (USACE 2009b). The PCBs exceedance was not replicated in post-construction samples and excavation efforts conducted in 2010 (described below) did not collect samples for analysis of PCBs. The approximate location of the 2009 PCB exceedance is shown on Figure A-6.

Petroleum-Contaminated Soil

In 2010, approximately 2,513 tons of petroleum-contaminated soil was excavated from Site 6 (USACE 2011). Excavation efforts were guided by RRO concentrations and continued until field laboratory results indicated analyte concentrations below cleanup levels or until groundwater was encountered. Confirmation samples were collected from soil that was above the groundwater table and submitted for analysis of DRO and RRO. Maximum detected concentrations in confirmation samples at Site 6 are presented in Table 6-6.

Table 6-6
Site 6 Soil Confirmation Results

Analyte	Cleanup Level[a]	Unit	DD Maximum Concentration	2010 Maximum Concentration
DRO	9,200	mg/kg	**102,000**	3,300
RRO	9,200	mg/kg	--	8,800

Notes:
[a] Cleanup level reported in the DD (USACE 2009b)
-- = Data not reported in the DD (USACE 2009b)
BOLD = Sample concentration exceeded the cleanup level

During excavation efforts, two confirmation samples (10NC06SB26 and 10NC06SB41) contained RRO concentrations above cleanup levels (10,000 and 15,000 mg/kg, respectively). The location of sample 10NC06SB41 was re-excavated, and an additional confirmation sample was collected. Subsequent confirmation sample (10NC06SB55) indicated the location was below cleanup levels at 540 mg/kg. Further excavation at the location of sample 10NC06SB26 encountered groundwater and therefore a second confirmation sample was not collected (USACE 2011).

Sediment

The excavation efforts at Site 6 extended west to a nearby pond. Two sediment samples were collected and analyzed for GRO, DRO, RRO, BTEX, and PAHs. Results indicate that concentrations in sediment were below cleanup levels for all analyses (USACE 2011).

Surface Water

Two surface water samples were collected from the same location as the sediment samples and were submitted for analysis of GRO, DRO, RRO, BTEX, and PAHs. Cleanup levels for surface water at Northeast Cape have only been established for TAH and TAqH. The maximum detected concentrations in surface water are presented in Table 6-7.

Table 6-7
Site 6 Surface Water Confirmation Results

Analyte	Cleanup Level [a]	Unit	DD Maximum Concentration	2010 Maximum Concentration
Benzene	--	µg/L	--	ND [0.45]
Ethylbenzene	--	µg/L	--	ND [0.45]
Total Xylenes	--	µg/L	--	ND [1.35]
Toluene	--	µg/L	--	0.098 J
TAH	10[b]	µg/L	--	2.348
1-Methylnaphthalene	--	µg/L	--	0.022 J
2-Methylnaphthalene	--	µg/L	--	ND [0.049]
Acenaphthene	--	µg/L	--	ND [0.049]
Acenaphthylene	--	µg/L	--	0.019 J
Anthracene	--	µg/L	--	0.019 J
Benzo[a]anthracene	--	µg/L	--	ND [0.049]
Benzo[a]pyrene	--	µg/L	--	ND [0.049]
Benzo[b]fluoranthene	--	µg/L	--	ND [0.049]
Benzo[g,h,i]perylene	--	µg/L	--	0.13 J
Benzo[k]fluoranthene	--	µg/L	--	ND [0.049]
Chrysene	--	µg/L	--	ND [0.049]
Dibenz(a,h)anthracene	--	µg/L	--	0.025 J
Fluoranthene	--	µg/L	--	ND [0.049]
Fluorene	--	µg/L	--	ND [0.049]
Indeno[1,2,3-cd]pyrene	--	µg/L	--	0.052 J
Naphthalene	--	µg/L	--	ND [0.049]
Phenanthrene	--	µg/L	--	ND [0.02]
Pyrene	--	µg/L	--	ND [0.049]
TAqH	15[a]	µg/L	--	3.44
GRO	--	mg/L	--	ND [0.44]
DRO	no sheen	mg/L	--	1.5 M
RRO	no sheen	mg/L	--	1.3 QH

Notes:
-- = Data not reported in the DD (USACE 2009b)
[a] Cleanup level reported in the DD (USACE 2009b)
J = the analyte was identified; the quantitation is an estimate
M = One or more matrix effect was present
QH = Estimated with a high bias

Surface water must meet water quality standards as promulgated by the State of Alaska in 18 AAC 70. Water quality criteria for petroleum hydrocarbons, oil, and grease stipulate these compounds may not cause a visible sheen upon the surface of the water [18 AAC 70.020(b)]. In addition, as described in the DD, surface water quality levels of 0.010 mg/L TAH and 0.015 mg/L TAqH must be met. Surface water samples did not show any indications of sheen and contained concentrations below established cleanup levels of TAH or TAqH.

MULTI INCREMENT Sampling

In 2011, loaded bulk bags were stored at Site 6. To ensure that contaminants from the bulk bags were not being spread to the site, *MULTI INCREMENT* sampling was conducted at four decision units within Site 6 in 2012 (Figure A-17). The decision units covered an area of approximately 28,700 square feet. *MULTI INCREMENT* samples were collected from surface soil in cells measuring 12 feet wide by 12 feet long. One sample was analyzed per decision unit for DRO and PCBs, for a total of four samples. No samples exceeded site-specific cleanup levels for either analyte. The maximum PCB detection from *MULTI INCREMENT* samples was 0.034 mg/kg and the maximum DRO detection was 60 mg/kg (USACE 2013b).

In 2013, the decision units were re-sampled and four *MULTI INCREMENT* samples were collected from surface soil and submitted for analysis of DRO, RRO, and PCBs. No samples exceeded site-specific cleanup levels. The maximum PCB, DRO, and RRO detections were 0.034 mg/kg, 34 mg/kg, and 250 mg/kg, respectively (USACE 2014c).

Groundwater

DRO, aluminum, arsenic, lead, nickel, and zinc have previously been detected in shallow groundwater above ADEC drinking water standards at Site 6. The DD did not include a remedy for groundwater contamination at Site 6 because shallow groundwater at Site 6 was not a current or reasonably expected potential future drinking water source (USACE 2009b). At the time of this Report, the LUC designating areas not suitable for drinking water had not been implemented.

Recommendations for Site 6

- Confirm the presence or absence of PCBs in subsurface soil at the location of the 2009 detection.
- Implement the LUC to designate areas not suitable for drinking water.

6.4.4 Site 8 POL Spill

The remedy at Site 8 is MNA of petroleum-contaminated sediment and implementing LUCs. MNA was initiated in 2010 and continued in 2011 and 2012. Natural attenuation parameters, sediment confirmation samples, and surface water samples were reviewed for expectations of meeting cleanup levels and RAOs.

Decision Units and Sampling Methods

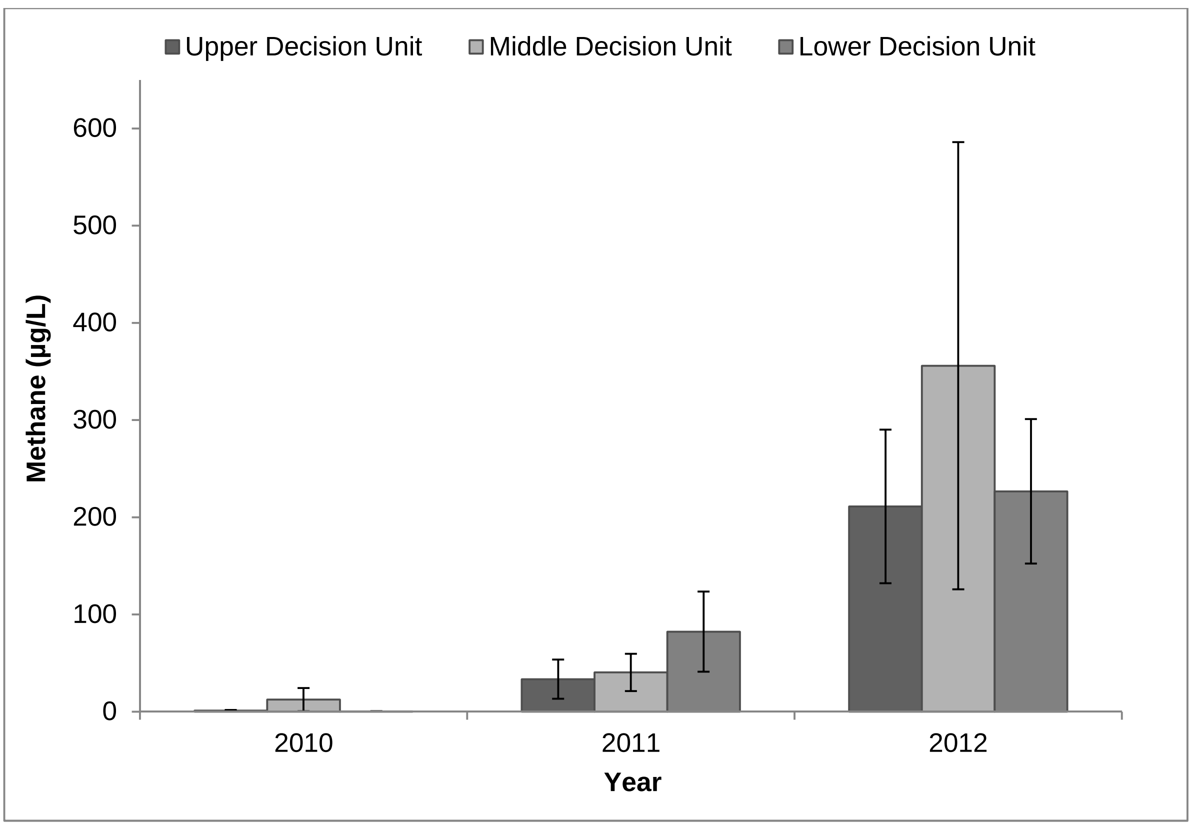
Three decision units were created in 2010 to monitor the natural attenuation at Site 8 (USACE 2011). The upper decision unit (UDU) is upgradient of the reported pipeline break and was intended to provide background information. The middle decision unit (MDU) encompasses the area of the pipeline break, and the lower decision unit (LDU) is downgradient of the break. Each decision unit was divided into 40 grid squares (four sections wide by ten sections long) measuring approximately 10 feet by 10 feet (Figure A-7). In 2010, 2011, and 2012, a random number generator was used to select eight grid squares from each decision unit for collection of water and sediment samples. If a randomly selected grid square did not contain surface water, the next randomly selected grid square was used (USACE 2011, 2012, 2013b).

Two locations (04NE08SD102 and 04NE08SD103) were identified in the DD (USACE 2009b) as containing DRO concentrations in sediment above cleanup levels. The historical sampling location 04NE08SD103 appears to be located several feet outside the perimeters of the three decision units established to monitor the natural attenuation rate (Figure A-7). It is recommended that future sampling efforts adjust the position of the decision units to include the area of known contamination (sample 04NE08SD103).

Monitored Natural Attenuation Parameters

In 2010, 2011, and 2012, surface water samples were collected from eight locations within each decision unit using a peristaltic pump. Samples were analyzed onsite for water quality using a YSI 556 multi-parameter meter and a Hach portable spectrophotometer. Methane water samples were simultaneously collected and shipped to an analytical laboratory for analysis.

Water quality parameters obtained in 2010, 2011, 2012 did not reveal any apparent trends. Several parameters collected for analysis of anaerobic respiration (manganese and ferrous iron) were near or below the method detection limits stated by the manufacturer. These parameters are therefore not definitive for assessing MNA at Site 8. Methane analysis completed during each monitoring event provided data with high variability. The average concentration of methane in surface water samples from each decision unit are presented below as the average concentration plus and minus the standard error margin by year.



<u>Note:</u>
Results are presented as average methane (± standard error margin).

The limited data available for analysis of methane trends suggests that within each monitoring event, there were no significant differences in methane concentrations between decision units. The data also suggests that on average, methane concentrations are increasing in all three decision units at Site 8. The presence of methane may support activity by methanogenic archaea; however, current data is insufficient to accurately determine the level or presence of biological activity.

In general, surface water sampling has not provided sufficient data to assess MNA of sediment at Site 8. Because known POL contamination is within the sediment layer at Site 8, future sampling of water quality parameters to assess MNA in sediment may benefit from sampling pore water, which is located within the sediment layer.

Sediment

Historical sample exceedances identified in the DD included two discrete sediment samples that were not bounded by samples below the cleanup level. The selected remedy of MNA was implemented through the collection of composite samples in 2010, 2011, and 2012. As described previously, each decision unit was divided into 40 grid squares and a random number generator was used to select eight grid squares from each decision unit for sample collection. Eight subsamples were collected from each decision unit, placed in a stainless-steel bowl, and composited by hand prior to analysis. Composite samples were intended to evaluate the average contaminant concentration within each decision unit; however, current results may be underestimating the level of contamination in sediment due to the limited number of subsamples per decision unit and potential bias introduced by composite sampling. An incremental sampling approach using ADEC recommended subsampling procedures would provide a superior basis for monitoring remedy performance. Incremental sampling would incorporate the entire area covered by each decision unit during each sampling event and can account for contaminant variability within each decision unit.

Sediment results from the 2010, 2011, and 2012 sampling events are shown in Table 6-8 and Figure A-7.

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Table 6-8
Site 8 Maximum Concentration Detected in Sediment

Analyte	Cleanup Level	Unit	Lower Decision Unit			Middle Decision Unit			Upper Decision Unit		
			2010[a]	2011[b]	2012[c]	2010[a]	2011[b]	2012[c]	2010[a]	2011[b]	2012[c]
1-Methylnaphthalene	--	mg/kg	1.200	0.300 QN	2.400	5.100	0.300	0.330	0.004 J	0.0023 J	ND [0.0039]
2-Methylnaphthalene	**0.600**	mg/kg	**1.200**	0.210 QN	**1.900**	**7.600**	0.150	0.300	0.0068 J	0.0035 J	ND [0.0039]
Acenaphthene	0.500	mg/kg	0.072	0.020	0.130	0.240	ND [0.0042]	ND [0.0042]	ND [0.0017]	ND [0.0034]	ND [0.0039]
Acenaphthylene	--	mg/kg	0.056 J QN	0.0089 J	ND [0.0047]	.100 J	ND [0.0042]	ND [0.0042]	0.0034 J	ND [0.0034]	ND [0.0039]
Anthracene	--	mg/kg	ND [0.0017] J	0.006 J	0.027 QH,QN	0.180 J	0.0052 J	ND [0.0042]	ND[0.0068] J	ND [0.0034]	ND [0.0039]
Benzo(a)anthracene	--	mg/kg	ND [0.0043]	ND [0.0047]	0.0083 J	0.0071 J	ND [0.0042]	ND [0.0042]	0.0024 J	ND [0.0034]	ND [0.0039]
Benzo(a)pyrene	--	mg/kg	ND [0.0417] J	ND [0.0047]	0.0066 J	0.0066 J	ND [0.0042]	ND [0.0042]	ND [0.0068] J	ND [0.0034]	ND [0.0039]
Benzo(b)fluoranthene	--	mg/kg	ND [0.0043]	ND [0.0047]	0.0082 J	0.013	ND [0.0042]	ND [0.0042]	ND [0.0017]	ND [0.0034]	ND [0.0039]
Benzo(g,h,i)perylene	1.700	mg/kg	ND [0.0043]	ND [0.0047]	0.0046 J	ND [0.002]	ND [0.0042]	ND [0.0042]	ND [0.0017]	ND [0.0034]	0.0031 J
Benzo[k]fluoranthene	--	mg/kg	ND [0.0043]	ND [0.0047]	ND [0.0047]	0.014	ND [0.0042]	ND [0.0042]	ND [0.0017]	ND [0.0034]	ND [0.0039]
Chrysene	--	mg/kg	ND [0.0043]	0.010	0.019	0.026	0.011	ND [0.0042]	0.0064 J	ND [0.0034]	ND [0.0039]
Dibenz(a,h)anthracene	--	mg/kg	ND [0.0043]	ND [0.0047]	ND [0.0047]	ND [0.002]	ND [0.0042]	ND [0.0042]	ND [0.0017]	ND [0.0034]	ND [0.0039]
Fluoranthene	2.000	mg/kg	0.011 J	0.009	0.011	0.037	0.012	ND [0.0042]	0.0032 J	ND [0.0034]	ND [0.0039]
Fluorene	**0.800**	mg/kg	0.200	0.053	0.230	**0.820**	0.048	ND [0.0042]	0.013	0.0061 J	0.0054 J
Indeno(1,2,3-cd)pyrene	3.200	mg/kg	ND [0.0043]	ND [0.0047]	ND [0.0047]	0.0029 J	ND [0.0042]	ND [0.0042]	0.0018 J	ND [0.0034]	ND [0.0039]
Naphthalene	1.700	mg/kg	0.340	0.240 QN	0.710	1.600	0.046	0.140	ND [0.0085]	ND [0.0034]	ND [0.0039]
Phenanthrene	4.800	mg/kg	0.120	0.042	0.180	0.520	0.045	ND [0.0042]	ND [0.0017]	0.0035 J	0.0038 J
Pyrene	--	mg/kg	0.019 J	0.011 B,QN	0.018	0.042	0.013 B	ND [0.0042]	0.0039 J	0.0032 JB	ND [0.0039]
Total LPAH	7.800	mg/kg	0.788	0.364	1.240	3.220	0.144	0.140	0.016	0.010	0.009
Total HPAH	9.600	mg/kg	0.030	0.030	0.068	0.140	0.036	ND [0.0042]	0.018	0.003	0.003
Total Organic Carbon	--	mg/kg	130,000	140,000	120,000	100,000	110,000	80,000	100,000	81,000 J	63,000
DRO	**3,500**	mg/kg	2,800	1,500 QN	2,900	**9,300**	1,800	960 MH	660	58	290
RRO	**3,500**	mg/kg	1,600	820	2,400	**5,300 QH**	1,100 MH	2,100 J,MH	**6,300 QH**	380	2,700 QH
DRO with Silica Gel	**3,500**	mg/kg	3,100 QL	1,600 QN	2,700	**8,500 QL**	1,800	940 J,MH	310 QL	36	220
RRO with Silica Gel	3,500	mg/kg	1,000 QL	1,300 MH	680	2,100 QL	1,800 MH	1,500 J	3,000 QH,QL	320 J,MH	1,900

Notes:
-- = Cleanup level not established in the DD (USACE 2009b)
[a] Maximum concentration detected during the 2010 field season (USACE 2011)
[b] Maximum concentration detected during the 2011 field season (USACE 2012)
[c] Maximum concentration detected during the 2012 field season (USACE 2013b)
Bold = Concentration exceeds the site-specific cleanup levels established in the DD (USACE 2009b)
HPAHs include: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, and pyrene.
LPAHs include: acenaphthene, acenaphthylene, anthracene, fluorene, naphthalene, and phenanthrene
J = the analyte was positively identified the quantitation is an estimate
MH = result is an estimate with potential high bias due to matrix interference
ND = analyte was not detected; limit of detection is presented in brackets.
QH = One of more quality control parameters were outside of control limits, result is estimated with a potentially high bias
QN = One of more quality control parameters were outside of control limits, result is estimated with no directional bias
QL = One of more quality control parameters were outside of control limits, result is estimated with a potentially low bias

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Results from the analytical laboratory in 2010 identified analytes as exceeding cleanup levels in the LDU and MDU. In the LDU and MDU, 2-methylnaphthalene was detected above site-specific cleanup levels. In the MDU, 2-methylnaphthalene, DRO following silica treatment, and fluorene were detected above site-specific cleanup levels (USACE 2011). Contaminants exceeding cleanup levels in the MDU and LDU were consistent with the location of the reported pipeline break. In 2011, no exceedances were detected in any of the decision units at Site 8 (USACE 2012). In 2012, 2-methylnaphthalene was detected at a concentration of 1.9 mg/kg with the LDU, which is above the site-specific cleanup level of 0.6 mg/kg (USACE 2013b).

Composite samples collected in 2010, 2011, and 2012 may not be representative of each exposure area, and may not be sufficient for monitoring natural attenuation. Results from 2010, 2011, and 2012 indicate additional petroleum-related contaminants persist in sediment at Site 8. Current data is variable between sampling years and is not sufficient to establish degradation trends.

Surface Water Analytical Results

Surface water samples were collected in 2010, 2011, and 2012 and submitted to an analytical laboratory for analysis of DRO, RRO, and PAHs. The maximum concentrations detected during each sampling event are provided in Table 6-9.

Table 6-9
Site 8 Analytes Detected in Surface Water

Analyte	Cleanup Level	Unit	2010 Maximum Concentration [a]	2011 Maximum Concentration [b]	2012 Maximum Concentration [c]
1-Methylnaphthalene	--	µg/L	ND [0.019]	ND [0.075]	1.7
2-Methylnaphthalene	--	µg/L	ND [0.049]	ND [0.075]	1.0 QN
Acenaphthene	--	µg/L	ND [0.049]	ND [0.075]	0.074 J
Acenaphthylene	--	µg/L	ND [0.019]	ND [0.075]	0.033 J
Anthracene	--	µg/L	ND [0.019]	ND [0.075]	ND [0.072]
Benzo(a)anthracene	--	µg/L	0.029 J	ND [0.075]	ND [0.072]
Benzo(a)pyrene	--	µg/L	0.037 J	ND [0.075]	ND [0.072]
Benzo(b)fluoranthene	--	µg/L	0.039 J	ND [0.075]	ND [0.072]
Benzo(g,h,i)perylene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
Benzo(k)fluoranthene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
Chrysene	--	µg/L	0.036 J	ND [0.075]	ND [0.072]
Dibenzo(a,h)anthracene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
Fluoranthene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
Fluorene	--	µg/L	ND [0.049]	ND [0.075]	0.19 QN
Ideno(1,2,3-cd)pyrene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
Naphthalene	--	µg/L	ND [0.049]	ND [0.075]	0.82 QN
Phenanthrene	--	µg/L	ND [0.019]	ND [0.075]	ND [0.072]
Pyrene	--	µg/L	ND [0.049]	ND [0.075]	ND [0.072]
TAH	0.01	mg/L	*	*	*
TAqH	0.015	mg/L	*	*	*
DRO	no sheen	mg/L	0.44	0.28	0.37
RRO	no sheen	mg/L	0.56	0.44	0.48

Notes:
-- = Cleanup level was not established in the 2009 DD (USACE 2009b).
[a] Maximum concentration detected during the 2010 field season (USACE 2011).
[b] Maximum concentration detected during the 2011 field season (USACE 2012).
c Maximum concentration detected during the 2012 field season (USACE 2013b).
* = TAH and TAqH calculations could not be performed because BTEX results were not available.
J = The analyte was positively identified, the quantitation is an estimate.
QN = Quality control failure with no directional bias.
For additional definitions, see the Acronyms and Abbreviations section.

The intent of surface water sampling was to determine if natural attenuation was occurring in sediment. Specific parameters evaluated in surface water were discussed previously. Surface water analytical results could not be compared to established cleanup levels for TAH and TAqH; however, surface water is not a media of concern at Site 8. In 2004, TAH and TAqH was evaluated in surface water and detected at concentrations of 2.7 micrograms per liter (µg/L) and 3.2 µg/L, respectively, which are well below the surface water cleanup levels.

Recommendations for Site 8

- Evaluate the appropriateness of the decision unit locations. Adjust the location of decision units if necessary to efficiently evaluate natural attenuation.
- Evaluate contaminant concentrations within each Decision Unit using the ADEC-approved incremental sampling approach.
- Replace the use of surface water for pore water during future monitoring efforts to assess MNA parameters within the area of contaminated sediment.
- Implement the following LUCs as described in the DD (USACE 2009b):
    - Conduct a survey to delineate the location and extent of sediment contamination
    - Provide a detailed map of the site to the landowner
    - Record a deed notice that this area should not be used for residential land use without additional investigation and/or cleanup.
- Continue conducting periodic reviews until RAOs are met. Any change in land use will trigger a review.

6.4.5 Site 9 Housing and Operations Landfill:

The selected remedy at Site 9 is as follows:

- Capping the landfill
- Conducting long-term monitoring
    - Three monitoring events to verify that the COCs in shallow groundwater are not migrating downgradient and impacting surface waters
    - Six long-term monitoring events spaced five years apart to demonstrate the shallow groundwater meets the RAOs for a non-drinking water source
- Implement the following LUCs (USACE 2009b):
    - Designate areas not suitable for drinking water
    - Prevent construction of buildings on top of landfills

The first surface water monitoring event was conducted in 2010 to verify that the COCs in shallow groundwater were not migrating downgradient and affecting surface waters (USACE 2011). Surface water samples collected from ponds adjacent to the landfill cap were reviewed for expectations of meeting cleanup levels and RAOs (Figure A-8). Samples were analyzed for GRO, DRO, RRO, VOCs, PAHs, PCBs, and metals; no analytes were detected above the cleanup levels established for surface water in the DD (USACE 2009b).

The second surface water monitoring event occurred in 2013. Surface water was collected from three locations adjacent to the landfill cap (Figure A-8) and submitted to an offsite analytical laboratory for analysis of GRO, DRO, RRO, BTEX, PAH, PCBs, and both dissolved phase and total RCRA metals plus zinc. No contaminants were detected at concentrations greater than cleanup levels in groundwater at Site 9 (USACE 2014c).

The maximum detected concentrations in surface water at Site 9 are presented in Table 6-10.

Table 6-10
Site 9 Maximum Surface Water Results

Analyte	Cleanup Level (mg/L)[1]	2010 Maximum Concentration Detected (mg/L)	2013 Maximum Concentration Detected (mg/L)
Arsenic-dissolved	--	ND [0.0004]	0.0018 J
Barium-dissolved	--	0.018	0.0132
Cadmium-dissolved	--	ND [0.0004]	0.000101
Chromium-dissolved	--	ND [0.0004]	0.0002
Lead-dissolved	--	0.0004	0.000051 QN
Selenium-dissolved	--	ND [0.0004]	ND [0.0005]
Silver-dissolved	--	ND [0.0004]	0.00001 J
Mercury-dissolved	--	ND [0.0001]	ND [0.00005]
Arsenic-total	--	0.00086	0.00032 J
Barium-total	--	0.018	0.0127
Cadmium-total	--	ND [0.0004]	0.000042
Chromium-total	--	0.00056	0.00022
Lead-total	--	0.00076	0.000211
Selenium-total	--	ND [0.0004]	ND [0.0005]
Silver-total	--	ND [0.0004]	0.000009 J
Mercury-total	--	ND [0.0001]	ND [0.00005]
Aroclor 1016	--	ND [0.000077]	ND [0.000002]
Aroclor 1221	--	ND [0.00006]	ND [0.000008]
Aroclor 1232	--	ND [0.000048]	ND [0.000002]
Aroclor 1242	--	ND [0.000058]	ND [0.000002]
Aroclor 1248	--	ND [0.000058]	ND [0.000002]
Aroclor 1254	--	ND [0.000058]	ND [0.000002]
Aroclor 1260	--	ND [0.000077]	0.0000015 J
Benzene	--	ND [0.00015]	ND [0.0001]
Ethylbenzene	--	ND [0.00015]	ND [0.0001]
Total Xylenes	--	ND [0.0005]	ND [0.0001]

Table 6-10
Site 9 Maximum Surface Water Results (Continued)

Analyte	Cleanup Level (mg/L)[1]	2010 Maximum Concentration Detected (mg/L)	2013 Maximum Concentration Detected (mg/L)
Toluene	--	ND [0.0002]	0.00018 J
TAH	0.01	0.001	0.00048
1-Methylnaphthalene	--	ND [0.00002]	0.0000048 J
2-Methylnaphthalene	--	ND [0.000049]	0.0000026 J
Acenaphthene	--	ND [0.000049]	0.0000053 J
Acenaphthylene	--	ND [0.00002]	0.0000059 J
Anthracene	--	ND [0.00002]	ND [0.000005]
Benzo[a]anthracene	--	ND [0.000049]	0.0000038 J
Benzo[b]fluoranthene	--	ND [0.000049]	0.0000026 J, QN
Benzo[g,h,i]perylene	--	ND [0.000049]	0.0000059 J
Benzo[k]fluoranthene	--	ND [0.000049]	ND [0.000005]
Chrysene	--	ND [0.000095]	ND [0.000005]
Dibenz[a,h]anthracene	--	ND [0.000049]	0.0000027 J, QN
Fluoranthene	--	ND [0.000049]	ND [0.000005]
Fluorene	--	ND [0.000049]	0.0000087 J, QN
Indeno[1,2,3-cd]pyrene	--	ND [0.000049]	0.0000052 J
Naphthalene	--	ND [0.000049]	0.000094 QN
Phenanthrene	--	ND [0.00002]	0.0000087 J, QN
Pyrene	--	ND [0.000049]	ND [0.000005]
TAqH	0.015	0.0017	0.000179
GRO	--	ND [0.044]	ND [0.025]
DRO	--	0.12	0.031 J
RRO	--	0.13 QH	0.057 J,B

Notes:
-- = Cleanup level not established in the DD (USACE 2009b)
[1] Cleanup level established for surface water in the 2009 DD (USACE 2009b)
B = Analyte detected in the associated blank. Result may be biased high.
J = Analyte result is considered an estimated value because the reported result is below the limit of quantitation but above the detection limit.
QN = Analyte result is considered estimated value with bias uncertain due to a laboratory quality control failure.

Groundwater

DRO, RRO, and lead have previously been detected in shallow groundwater above ADEC drinking water standards at Site 9. The remedy to monitor groundwater to demonstrate shallow groundwater meets RAOs for a non-drinking water source was initiated in 2013 in conjunction with this Five-Year Review. One groundwater sample was collected east of the landfill cap. Groundwater sampling efforts conducted in 2013 experienced refusal northeast of the cap at approximately 48 inches bgs. Limited water was collected from approximately 33 inches bgs (USACE 2014b). Sufficient volume of groundwater was obtained for analysis of GRO, BTEX, and dissolved RCRA metals plus zinc. No contaminants were detected at concentrations greater than cleanup levels in groundwater at Site 9 (USACE 2014c). Future monitoring efforts may benefit from sampling near the 2001 locations that produced sufficient quantities of groundwater and contained contaminants at levels greater than cleanup levels (USACE 2014b).

Shallow groundwater at Site 9 was not considered a current or reasonably expected future drinking water source in the DD (USACE 2009b). At the time of this Report, LUCs (defined as designating areas not suitable for drinking water and preventing construction of buildings on top of landfills) have not been implemented.

Recommendations for Site 9

- Implement the following LUCs
  - Designate areas not suitable for drinking water
  - Prevent construction of building on top of landfills
- Continue monitoring landfill cap on a five-year basis for signs of erosion.
- Continue monitoring shallow groundwater (six long-term monitoring events spaced five years apart) to demonstrate the groundwater meets the RAOs for a non-drinking water source.
- Continue conducting periodic reviews until LUCs are implemented and all monitoring events and visual inspections have been completed.

6.4.6 MOC Groundwater

The contingency remedy for groundwater at the MOC is MNA and implementing an LUC to limit future drinking water use. Annual monitoring began in 2010 in nine onsite wells. In 2012, two of the wells (MW88-4 and MW88-5) were abandoned due to their locations within POL-contaminated soil removal areas. The seven remaining wells were sampled in 2013 (USACE 2014c). Groundwater data were reviewed for expectations of meeting cleanup levels and RAOs.

Samples are collected annually and analyzed for BTEX, PCBs, GRO, DRO, RRO, metals (total and dissolved), PAHs, and methane, although not all of those parameters were included in the 2010 monitoring event. Additional MNA parameters (manganese, ferrous iron, sulfate, nitrate, and alkalinity) and water quality parameters (temperature, pH, dissolved oxygen, conductivity, oxygen-reduction potential, and turbidity) are collected in the field.

COCs have exceeded cleanup levels for DRO, RRO, benzene, and arsenic at times over the four-year monitoring period. The results are presented on Figure A-10. For some wells, additional results from historic sampling events are presented for comparison. The contaminant concentrations have not all exhibited the same trend over time.

Three wells that historically contained concentrations of DRO exceeding cleanup levels (MW88-4, MW88-5, and MW88-10) exhibited lower concentrations of DRO and RRO during the 2012 sampling event than in previous years (USACE 2013b) (Table 6-11).

Table 6-11
MOC Groundwater Results from Select Monitoring Wells

Monitoring Well	Analyte	Benzene	DRO	RRO	Arsenic	Dissolved Arsenic
	Cleanup Level	0.005 mg/L	1.5 mg/L	1.1 mg/L	0.010 mg/L	0.010 mg/L
MW88-1	2002	0.0006	1.2	0.43	NS	NS
	2004	ND (0.0004)	ND (0.345)	0.168 J	NS	NS
	8/15/2010	ND (0.00015)	0.75	0.037 J	NS	ND (0.0004)
	7/18/2011	ND (0.00045)	0.74	0.26	ND (0.0038)	ND (0.0038)
	7/9/2012	ND (0.00045)	**1.9**	0.15	ND (0.0040)	ND (0.0040)
	7/21/2013	ND (0.00045)	0.22	0.05 J	ND (0.004)	ND (0.004)
MW88-4	2002	**0.03**	**72**	**1.9**	NS	NS
	2004	**0.033**	**3.89**	**1.46**	NS	NS
	8/3/2010	0.0024	**3.3**	NS	NS	0.0085
	8/3/2010†	0.0022	**3.2**	NS	NS	--
	7/17/2011	**0.0094**	**2.3**	0.55	**0.01**	**0.011**
	7/10/2012	0.0042	**1.8**	0.21	**0.011**	**0.011**
	7/10/2012†	0.0048	**2**	0.24	**0.011**	0.0038 J
MW88-5	2002	**0.019**	**9.8**	**2.3**	NS	NS
	2004	**0.0297**	**11.3**	**2.28**	NS	NS
	8/15/2010	**0.0093**	**12**	**1.6**	NS	0.0028
	7/17/2011	**0.02**	**7.2**	**1.8**	0.0057	0.0052
	7/17/2011†	**0.016**	**7.5**	**2**	0.0058	0.0049 J
	7/10/2012	**0.0064**	**4.6**	0.58	0.007	0.0055
MW88-10	2002	0.0027	**55**	**1.3**	NS	NS
	2004	ND (0.0004)	1.38	ND (0.549)	NS	NS
	8/15/2010	ND (0.00015)	**1.6**	0.036 J	NS	ND (0.0004)
	7/18/2011	ND (0.00045)	0.54	0.15	ND (0.0038)	ND (0.0038)
	7/10/2012	ND (0.00045)	0.5	0.064 J	ND (0.0040)	ND (0.0040)
	7/21/2013	ND (0.00045)	0.97	0.043 J	ND (0.004)	ND (0.004)
	7/21/2013†	ND (0.00045)	0.94	0.042 J	ND (0.004)	ND (0.004)

Notes:
-- = Data was not reported
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
† indicates duplicate sample results
J – Analyte was identified; quantitation is an estimate
ND – not detected
NS – not sampled

In MW88-1, DRO had been detected in past sampling events but exceeded the cleanup level for the first time in 2012 with a concentration of 1.9 mg/L (USACE 2013b). In 2013, DRO concentrations fell below the cleanup level to 0.22 mg/L (USACE 2014c). Changes in sampling methodology, water column elevation, purge volume, and turbidity in 2012 do not present a clear cause of the change in DRO concentrations. Soil excavation in downgradient H plume was not initiated until after the 2012 groundwater samples were collected from this well, so excavation activities cannot explain the increase in DRO, either. Dissolved oxygen concentrations are low (1.26 to 2.09 mg/L) in MW88-1, but no other indicators of anaerobic degradation are elevated as compared to other groundwater in the area or the three wells historically containing contamination.

The benzene concentration in MW88-4 and MW88-5 appeared to correlate with water elevation; higher benzene concentrations in 2002 and 2011 coincided with higher water elevations as displayed on Table 6-11 (USACE 2013b). In 2012, the water elevation was 1.2 feet lower in MW88-5 and 0.7 feet lower in MW88-4 than in 2011, and the benzene concentrations returned to levels more comparable to those in 2010. Arsenic concentrations exceed the cleanup level in only MW88-4.

MNA appeared to be occurring in MW88-4 and MW88-5 prior to well abandonment in 2012. In situ conditions indicate that these two wells exhibited low dissolved oxygen, reducing conditions and increased levels of ferrous iron, manganese, and methane as compared to other wells in the area. Dissolved oxygen concentrations in well MW88-4 and MW88-5 ranged from 0.27 to 0.81 mg/L and concentrations in wells MW88-1 and MW88-10 ranged from 0.8 to 2.09 mg/L, while wells that do not exhibit DRO concentrations exceeding cleanup levels range from 2.93 to 12.63 mg/L. This suggests that microbial activity is depleting oxygen to degrade DRO. Additionally, MW88-4 and MW88-5 contained the highest concentrations of ferrous iron, alkalinity, and methane, which are metabolic by-products of anaerobic microbial respiration. The high concentrations of methane in MW88-4 (1.9 to 2.3 mg/L) and MW88-5 (0.099 to 0.63 mg/L) indicate ongoing anaerobic degradation of DRO by methanogenic microbes. Although reducing conditions are not as favorable for MNA as oxidizing conditions, these geochemical parameters indicate biodegradation is occurring within this plume.

MNA data for MW88-10 is not as conclusive but appear to indicate that MNA has been effective and may still be occurring. As the DRO concentrations decreased between 2010 and 2012, the dissolved oxygen concentrations remained low (0.8 to 1.5 mg/L) and the ferrous iron, sulfate, and methane concentrations increased. MW88-10 exhibited a higher concentration of DRO (0.97 mg/L) during the 2013 sampling event than in the previous two years. However, contaminant concentrations at MW88-10 did not exceed cleanup levels in 2013. The increase in DRO at MW-10 is not fully understood, but removal activities at the MOC may contribute to the disturbance in subsurface groundwater flows. DRO, RRO, and benzene concentrations have not exceeded cleanup levels at MW-10 since 2010.

While there appears to be a general decrease in COCs across the monitoring wells, potential issues for the remedy include the potential for multiple groundwater-bearing zones with different contaminant concentrations, an insufficient well monitoring network, and a potential unknown upgradient source of groundwater contamination.

The two groundwater-bearing zones found during the 2009 chemical oxidation testing may be contaminated at different concentrations. In 2009, screening samples indicated that the shallow water-bearing zone (ICOMW02 screened from 3.5 to 8.5 feet bgs) measured 32.8 mg/L DRO while DRO concentrations in the lower zone (ICOMW01 screened from 12 to 17 feet bgs) were measured at 1.18 mg/L. The DRO concentrations in groundwater at MW88-5 measured 7.53 mg/L at that time, which falls between the values observed in the shallow and deep zone, respectively. Well MW88-5 was discovered to have a sand pack across both water-bearing zones. This well was screened from 6.5 to 16.5 feet bgs with a sand pack from 4.5 to 16.5 feet bgs.

The well network does not sufficiently cover all areas of the MOC sites and seasonal groundwater flow direction is not well defined in the areas of the MOC. Current locations with insufficient monitoring well placement include the downgradient portion of the western end of the site, the central portion where MW88-4 and MW88-5 were decommissioned, and near MW10-1, which is slightly crossgradient and may not be in a location adequate to capture groundwater downgradient of the buried drum excavation at Site 10. In addition, the source of contamination in MW88-1 and MW88-10 is unclear and a monitoring well southeast of these wells may be necessary. Seven additional monitoring wells are planned for installation during the 2014 field season following excavation removal activities (USACE 2014c). The locations of the proposed monitoring wells are depicted on Figure A-10 and appear to provide adequate coverage of the site.

At the time of this review, the LUC to limit future drinking water uses had not been implemented.

Recommendations for MOC Groundwater

- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Implement the LUC to limit future drinking water use.

6.4.7 Site 10 Buried Drums

The contingency remedy at Site 10 is excavating and removing petroleum-contaminated soils, MNA of groundwater, and implementing an LUC to limit future drinking water use. The excavation portion of the remedy was initiated in 2011 and buried drums with liquid product were encountered. The excavation remedy is not yet complete. Groundwater monitoring is ongoing. Soil, groundwater, and drum waste characterization data were reviewed for expectations of meeting cleanup levels and RAOs.

The only soil COC exceeding cleanup levels at Site 10 at the time of the DD was DRO (USACE 2009b). As implementation of the remedy began in 2011 with the excavation of the J1A plume adjacent to Site 10, soil confirmation samples were collected for DRO and RRO only (USACE 2012). The excavation encountered water at 8 feet bgs and continued 2 feet below groundwater across the excavation. Samples collected in the excavation near Site 10 contained 11,000 and 16,000 mg/kg DRO and were subsequently excavated. Drums exposed during the excavation led to additional sampling and characterization in 2012.

In 2012, 27 drums were removed from two excavations in Site 10. Sixteen of the drums contained liquids classified as hazardous (USACE 2013b). Due to the varied drum contents, the soil confirmation sampling suite was expanded to include GRO, DRO, RRO, PCBs, VOCs, SVOCs, glycols, and RCRA metals plus nickel, vanadium, and zinc. Results indicate that arsenic, ethylene glycol, PCE, and DRO exceeded cleanup levels in 2012. The maximum detected soil confirmation results are listed in Table 6-12.

In multiple samples, the detection limit for some VOCs exceeded the migration to groundwater cleanup level. These VOCs were not evaluated as part of the site-specific risk assessment because they were not detected at the time. The excavations were 5.5 to 6 feet bgs at the conclusion of the 2012 fieldwork.

In 2013, approximately 330 tons of ethylene glycol-, POL-, and arsenic-contaminated soils were removed from Site 10 (USACE 2014c). Four excavations were opened to address the 2012 confirmation sample locations where concentrations of arsenic, ethylene glycol, PCE, and DRO exceeded cleanup levels. Two excavations were initiated at the areas surrounding the DRO and arsenic exceedances from 2012. Subsequent confirmation samples were below cleanup levels for the expanded suite of analytes (USACE 2014c). The location of the 2012 ethylene glycol exceedance was excavated and sampled. Although the lateral extent of contamination was identified, confirmation samples collected from the excavation floor continued to exceed cleanup levels until bedrock was encountered and soil samples could no longer be collected (USACE 2014c). The excavation was terminated at 4 feet below fractured bedrock at a total depth of 12 feet bgs. Excavation sidewalls did not exceed the cleanup level for ethylene glycol (USACE 2014c).

Ethylene glycol, methylene chloride, and tetrachloroethylene were not identified as COCs at Site 10 at the time of the DD. The maximum concentrations detected during the most recent sampling events were used to determine if a new risk evaluation was required. Because methylene chloride and tetrachloroethylene were not detected in following excavation efforts, only ethylene glycol was further evaluated (Appendix B). The maximum concentration of 890 mg/kg, which was later excavated to bedrock as described above) results in a hazard quotient level less than 1 (calculated at 0.01). Ethylene glycol was determined to not significantly affect the human health risk (Appendix B).

A fourth excavation was opened in 2013 where a metal detector indicated the presence of metallic anomalies beneath the ground surface. Approximately 0.29 tons of empty drums and metal debris were removed from the excavation and loaded into a CONEX for shipping and disposal. Confirmation samples were collected from the excavation and indicated the presence of RRO at concentrations exceeding the site-specific cleanup level. Field laboratory sample results guided the excavation and when results indicated cleanup levels had been achieved, confirmation samples were collected and submitted for analysis. All confirmation samples indicated DRO and RRO were below the site-specific cleanup level (USACE 2014c).

Table 6-12
Site 10 Analytes Exceeding Cleanup Levels in Soil

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2012 Maximum Concentration	2013 Maximum Concentration
DRO	9,200[a]	mg/kg	**26,500**[b]	**11,000**	4,700
Arsenic	11[a]	mg/kg	--	**14**	10
Methylene chloride	16	µg/kg	--	**28**	ND (0.02)
Tetrachloroethene	24	µg/kg	--	**25**[c]	ND (0.014)
Ethylene glycol	190	mg/kg	--	**16,000**[c]	**2,700**[d]

Notes:
-- Data not reported in the DD (USACE 2009b)
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] Surface concentration detected during the 1994 or 1996 field season (USACE 2009b).
[c] The highest concentrations of tetrachloroethene (160 µg/kg) and ethylene glycol (40,000 mg/kg) were found in stockpiled soil.
[d] Sample exceedance location was excavated until bedrock was encountered; additional soil samples could not be collected (USACE 2014c).

One of the drum waste characterization samples from 2012 (12NCDRUMO10) contained high levels of total halogens (2,800 mg/kg) but no detected concentrations of PCBs or halogenated VOCs (USACE 2013b). The elevated total halogen level was unable to be explained by the laboratory and the cause is unclear. Pesticides could be a possible cause of this kind of result. Soil, sediment, groundwater, and surface water samples collected at Site 10 and adjacent Sites 11 and 28 did not detect any pesticides in 1994. In 2001, the pesticide

4,4’DDD was detected at six locations in the sediment in the eastern drainage of Site 28 at concentrations ranging from 0.007 to 1.5 mg/kg. The maximum concentration is less than one-tenth of the most conservative criteria for direct contact to humans (30 mg/kg), does not exceed the migration to groundwater criterion of 7.2 mg/kg, and was determined to present no risk to humans or the glaucous-winged gull evaluated in the risk assessment (USACE 2004). The analytes 4,4-dichlordiphenyldichloroethene (4,4’DDE) and 4,4-dichlorodiphenyltri-chloroethane (4,4’DDT) were not detected in any samples and therefore, pesticides do not appear to be a new concern at this site.

Groundwater samples have been collected from well MW10-1 downgradient of Site 10 and analyzed for a changing list of analytes over the years. In 2010, samples were analyzed only for Aroclor 1260, benzene, DRO, GRO, and RRO with no analytes exceeding cleanup levels. In 2011, groundwater from this well was analyzed for RCRA metals plus nickel and vanadium, total PCBs, BTEX, PAHs, DRO, GRO, and RRO with very few detections and no analytes above the cleanup levels. In 2012 and 2013, groundwater was analyzed for RCRA metals plus nickel, vanadium, and zinc, seven PCB Aroclors, BTEX, PAHs, DRO, GRO, and RRO and again had very few detections and no analytes above the cleanup level. Refer to Section 6.4.6 for a data review of groundwater at the MOC.

There is no indication that surface-stained soils or the five locations of the highest surface soil samples (up to 26,500 mg/kg DRO in 1994) were removed. These locations are shown on Figure A-9 and are further north and east than the excavations completed in 2011, 2012, or 2013.

Recommendations for Site 10

- Excavate the location of surface-stained soil and previous sample results exceeding DRO cleanup levels.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Add ethylene glycol to the suite of analytes evaluated in Site 10 groundwater.

- Implement the LUC to limit future drinking water uses.
- Continue conducting periodic reviews until RAOs are met.

6.4.8 Site 11 Fuel Tanks

The contingency remedy at Site 11 is excavating and removing petroleum-contaminated soils to a depth of 15 feet bgs, MNA of groundwater, and implementing an LUC to limit future drinking water use. The excavation portion of the remedy was initiated in 2011. Groundwater monitoring is ongoing. Soil data were reviewed for expectations of meeting cleanup levels and RAOs.

The only COC exceeding cleanup levels in soil at Site 11 at the time of the DD was DRO (USACE 2009b). In 2011, contaminated soil was removed from Site 11 to a depth of 2 feet below the groundwater surface, which occurred at 8 feet bgs (USACE 2012). Excavation efforts were conducted to the maximum extent practicable taking into consideration existing technology, site location, and logistics in light of overall project purposes. The location of the highest surface contamination noted in the DD was removed through the J1A excavation activities. The stained surface soil in the tank footprints was also removed from this site.

To the north, soil was removed as far as practicable without entering the wetland at Site 28. Confirmation sampling was conducted immediately above the groundwater table and indicated that five sidewall samples on the northern boundary of the excavation exceeded the site-specific cleanup level for DRO with results ranging from 9,200 to 29,000 mg/kg for DRO (USACE 2012). Maximum concentrations of DRO at Site 11 are presented in Table 6-13.

Table 6-13
Site 11 Analytes Exceeding Cleanup Levels in Soil

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2011 Maximum Remaining Concentration
DRO	9,200[a]	mg/kg	**69,100**	**29,000**

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).

There are no downgradient- or onsite-groundwater monitoring wells for this location. Wells previously located on this site were sampled 1994, 1998, and 2004 with DRO results up to 45 mg/L with the most recent results in 2004 at 15.1 mg/L (USACE 2007d). Refer to Section 6.4.6 for the data review of MOC groundwater.

Recommendations for Site 11

- Implement the LUC to limit future drinking water use.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Continue conducting periodic reviews until RAOs are met.

6.4.9 Site 13 Heat and Power Plant

The selected remedy at Site 13 is excavating and removing PCB-contaminated soils and implementing an LUC to limit future drinking water use. The remedy for petroleum-contaminated soils at the MOC also applies to this site. The contingency remedy of MNA for groundwater and excavation and disposal of soils to 15 feet bgs followed the removal of PCB-contaminated soils. The excavation portion of the remedy was initiated in 2010. Groundwater monitoring is ongoing. Soil data were reviewed for expectations of meeting cleanup levels and RAOs.

Soil COCs at Site 13 at the time of the DD were PCBs and DRO (USACE 2009b). In 2010, 2011, 2012, and 2013, PCB-contaminated soil at Site 13 was excavated to depths up to 9.8 feet bgs. Confirmation samples were collected from the excavation floor and sidewalls and were below cleanup levels. Following complete removal of PCB-contaminated soil, petroleum-contaminated soil at Site 13 was excavated to a depth of 15 feet bgs within the A2, B1, and B2 plumes (Figure A-9). At 15 feet bgs, 80 to 90 percent of the excavation floor was submerged with groundwater. Confirmation samples were collected from the excavation floor and sidewalls and were below site-specific cleanup levels (USACE 2014c).

At the time of the DD, the maximum PCB concentration was 37.1 mg/kg but concentrations up to 270 mg/kg were encountered during the subsequent excavations. At the conclusion of the 2013 field season, all analytical samples were below the site-specific cleanup levels for PCBs (USACE 2014c). The excavation was backfilled and compacted. Contaminated soil removal south of the B plume is considered complete.

The maximum DRO concentration of 13,000 mg/kg listed in the DD was found at 10 to 12 feet bgs near the A2 plume. At the conclusion of the 2013 field season, all analytical samples were below site-specific cleanup levels for DRO and RRO (USACE 2014c). The excavation was backfilled and compacted. Contaminated soil removal at the A2, B1, and B2 plumes are considered complete. Site 13 maximum concentrations are presented in Table 6-14.

Table 6-14
Site 13 Analytes Exceeding Cleanup Levels in Soil

Analyte	Cleanup Level [a]	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration	2013 Maximum Remaining Concentration
PCB	1	mg/kg	**37.1**	**1.6**	0.81
DRO	9,200	mg/kg	**13,000**	7,200	9,100
RRO	9,200	mg/kg	3,400	73	9,100

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).

There are currently no downgradient- or onsite-groundwater monitoring wells for this location. Wells previously located on this site were sampled 1994, 1998, and 2004 with benzene and lead results exceeding cleanup levels in some samples (USACE 2007d). DRO, GRO, and RRO were found in wells throughout the MOC. Refer to Section 6.4.6 for a data review of MOC groundwater.

Recommendations for Site 13

- Implement the LUC to limit future drinking water uses.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should

be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.

- Continue conducting periodic reviews until RAOs are met.

6.4.10 Site 15 Fuel Pipeline

The contingency remedy at Site 15 is excavating and removing petroleum-contaminated soils, MNA of groundwater, and implementing an LUC to limit future drinking water use. The excavation portion of the remedy was initiated in 2011 and continued through 2013. Soil data were reviewed for expectations of meeting cleanup levels and RAOs. Groundwater monitoring is ongoing.

The only soil COC exceeding cleanup levels at Site 15 at the time of the DD was DRO (USACE 2009b). In 2011, an attempt to excavate the G plume was unsuccessful when groundwater was encountered before the excavation could advance to the target depth of contamination at 8 feet bgs. No contaminated soil was excavated in 2011. In 2012, soil was removed to 2 feet below the groundwater surface, which occurred at 12 feet bgs. Confirmation sampling indicated that three samples on the excavation floor below the groundwater surface exceed the site-specific cleanup level for DRO with concentrations ranging from 10,000 to 40,000 mg/kg (USACE 2013b). The location of three confirmation samples below the groundwater surface that contain DRO concentrations ranging from 10,000 to 40,000 mg/kg will not be excavated. Excavation efforts were conducted to the maximum extent practicable taking into consideration existing technology, site location, and logistics in light of overall project purposes. Three additional sidewall samples exceeded the cleanup level for DRO in 2012 with results ranging from 9,200 to 12,000 mg/kg (USACE 2012). In 2013, the locations of the three confirmation sample exceedances were located by survey and excavated. At the conclusion of the 2013 field season, sidewall confirmation sample 13NCMOCSS022 exceeded the site-specific cleanup level with a concentration of 13,000 mg/kg DRO. The sample was collected within the footprint of the 2012 G plume excavation at a depth of approximately 14 feet bgs, deeper than the 2012 G plume excavation extent of 12 feet bgs, which was two feet below the standing water level in 2012. The location was excavated and subsequent field-screening results were less than 80 percent of the cleanup level. No additional soil will be removed within the footprint of historical excavations that extended 2 feet below groundwater (USACE 2014c). All other samples were confirmed to be below the site-specific cleanup levels (USACE 2014c). Site 15 soil exceedances are presented in Table 6-15.

Table 6-15
Site 15 Analytes Exceeding Cleanup Levels in Soil

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration	2013 Maximum Remaining Concentration
DRO	9,200[a]	mg/kg	**16,000**	**40,000[b]**	1,500

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] This maximum concentration is below the groundwater surface and is not anticipated to be excavated. Three additional locations with concentrations ranging from 9,200 to 12,000 mg/kg were excavated in 2013.

Groundwater monitoring well MW88-5 is downgradient of this location. DRO and benzene continued to exceed cleanup levels in this well through 2012 (USACE 2013b). Refer to Section 6.4.6 for the data review of MOC groundwater.

Recommendations for Site 15

- Implement the LUC to limit future drinking water uses.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Continue conducting periodic reviews until RAOs are met.

6.4.11 Site 16 Paint and Dope Storage

The selected remedy for Site 16 is excavating and removing PCB-contaminated soil and implementing the LUC to limit future drinking water use. Excavation was initiated and completed in 2010. Confirmation sampling data were reviewed for expectations of meeting cleanup levels and RAOs.

Final excavation sample results confirmed PCB concentrations for all Aroclors were less than 1 mg/kg (USACE 2011). Soil was removed to a depth of approximately 6 to 12 inches. The maximum Aroclor 1260 concentration remaining was 0.16 mg/kg. During excavation, Aroclor 1254 was detected in one location at 1.2 mg/kg (USACE 2011). Soil from that sample location was removed and confirmation sampling indicated the remaining maximum concentration of Aroclor 1254 to be 0.049 mg/kg. Aroclor 1254 was detected during the 1994 site investigation at 0.2 mg/kg at 6 inches bgs and was the only Aroclor other than Aroclor 1260 to be detected at that time. Therefore, excavation in 2010 appears to have removed the PCB-contaminated soil at Site 16. Site 16 soil contaminant concentrations are given in Table 6-16.

Table 6-16
Site 16 Contaminant Concentrations in Soil

Analyte	Cleanup Level [a]	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration
Aroclor 1254	1	mg/kg	0.2	0.049 J
Aroclor 1260	1	mg/kg	**1.4**	0.16 M,J
Lead	400	mg/kg	**822**[b]	not sampled [b]

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] It is assumed the lead was removed with stained soil removal in 2001 (USACE 2009b).
M – a matrix effect was identified
J- the analyte was positively identified; the quantitation is an estimate.

The 2010 PCB excavation confirmation samples were not analyzed for lead in 2010 (USACE 2011). Seven surface samples collected at this site in 1994 and 2001 did not exceed the cleanup level for lead (USACE 2009b). It is assumed that lead in the area has been removed through excavations in 2001 and 2010 and surface samples confirm that there is no widespread lead contamination at the site.

Recommendations for Site 16

- Implement the LUC to limit future drinking water use.
- Conduct periodic reviews until RAOs are met.

6.4.12 Site 19 Auto Maintenance

The contingency remedy at Site 19 is excavating and removing petroleum-contaminated soil, MNA of groundwater, and implementing an LUC to limit future drinking water use. The excavation portion of the remedy was initiated in 2011 and completed in 2012. Groundwater monitoring is ongoing. Soil data were reviewed for expectations of meeting cleanup levels and RAOs.

In 2012, soil was removed to 2 feet below the groundwater surface, which occurred between 11 and 14 feet bgs. Confirmation samples collected from the excavation floor (Table 6-17), indicated that DRO and RRO concentration were less than the site-specific cleanup levels (USACE 2013b).

Table 6-17
Site 19 Post-Excavation Analyte Concentrations in Soil

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration
DRO	9,200[a]	mg/kg	**13,300**	8,700
RRO	9,200	mg/kg	--	970

Notes:
-- Data not reported in the DD (USACE 2009b)
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).

Sample results from MW88-5, a groundwater monitoring well downgradient of this location, indicated that DRO and benzene continued to exceed cleanup levels through 2012 (USACE 2013b). Refer to Section 6.4.6 for a data review for MOC groundwater.

Recommendations for Site 19

- Implement the LUC to limit future drinking water use.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Continue conducting periodic reviews until RAOs are met.

6.4.13 Site 21 Wastewater Tank

The selected remedy at Site 21 was excavating and removing PCB- and arsenic-contaminated soils. Excavation of PCB-contaminated soil was completed in 2010 and excavation of arsenic-contaminated soil was initiated in 2010 and is not yet complete. Soil and surface water data were reviewed for expectations of meeting cleanup levels and RAOs.

Excavation of PCB-contaminated soil was completed in two locations in 2010:

- The historical exceedance (03NEC21SB01) located immediately beneath the outfall piping adjacent to the septic tank was reported to have a PCB concentration of 1.7 mg/kg at 5 feet bgs. Field-screening samples in 2010 did not indicate the presence of PCBs, so confirmation samples were collected. Only Aroclor 1254 and Aroclor 1260 were detected, and all results were less than the 1 mg/kg cleanup level (USACE 2011).
- Historical location 94NE21168SS, sampled in 1994 from surface soil and analyzed in triplicate had results ranging from 0.93 to 4.2 mg/kg for total PCBs (USACE 2009b). Approximately 10.4 tons of soil was removed in 2010 and excavation confirmation samples did not detect PCBs at concentrations greater than cleanup levels (USACE 2011).

Table 6-18 presents the maximum results for COCs in soil.

Table 6-18
Site 21 Contaminant Concentrations in Soil

Analyte	Cleanup Level [a]	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration	2013 Maximum Remaining Concentration
Aroclor 1254	1	mg/kg	0.14[b]	0.091	Not sampled
Aroclor 1260	1	mg/kg	**4.2**	0.073	Not sampled
Arsenic	11	mg/kg	**170**	**320**	**79**

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] Only total PCB concentration was reported in the DD (USACE 2009b). The risk assessment listed the Aroclors separately (USACE 2004).

Excavation of arsenic-contaminated soils near the highest historical exceedance (170 mg/kg) began in 2010. In 2011, an additional arsenic background level study was performed by collecting nine samples from a drainage south of the site. The arsenic results ranged from

2.9 to 22 mg/kg and confirmed that the 95 percent upper confidence limit for the average background arsenic concentration was 11.49 mg/kg (USACE 2012). During excavation in 2011, the highest concentrations of arsenic in soil occurred in a red/brown silty peat located directly below the vegetative layer.

Following additional excavation in 2012, approximately 135 tons of arsenic-contaminated soil exceeding the site-specific cleanup level of 11 mg/kg had been removed. At the conclusion of the 2012 excavation, samples from four sidewall locations exceeded the site-specific cleanup level with concentrations ranging from 23 to 320 mg/kg. The floor samples were all collected at least 2 feet below the groundwater surface and concentrations did not exceed the cleanup level. In 2013, 19 soil borings were advanced to delineate the vertical and horizontal extent of arsenic contamination at Site 21. Excavation efforts were guided by soil boring results and at the conclusion of the 2013 field season, arsenic concentrations remaining at Site 21 were between 17 mg/kg and 79 mg/kg (USACE 2014c).

Historical samples collected in 1994, 2001, and 2003 indicated that there were 12 additional locations at Site 21 where arsenic concentrations exceeded 11 mg/kg. Figure A-12 provides the approximate locations of these historical exceedances.

- Four surface sample locations in the outfall area (11.5 to 39 mg/kg)
- Six locations along the utilidors (11.4 to 35.2 mg/kg)
- Two locations where arsenic confirmation samples were not collected following the PCB excavations (arsenic concentrations ranged between 13.9 and 18 mg/kg [USACE 2007d])

Surface water from the excavation was sampled for total and dissolved arsenic in 2012 and 2013. The results are presented in Table 6-19. Dissolved arsenic was not detected. These results are consistent with the groundwater results at the time of the DD (dissolved arsenic concentration of 0.01 mg/L) when, although soil arsenic concentrations exceeded the migration to groundwater cleanup level of 3.6 mg/kg and the background concentration of 11 mg/kg, dissolved arsenic did not exceed the groundwater cleanup level.

Table 6-19
Site 21 Arsenic Concentrations in Excavation Surface Water

Analyte	Cleanup Level [a]	Unit	2012 Maximum Result	2013 Maximum Result
Arsenic (total)	0.01	mg/L	0.0052	ND (0.004)
Arsenic (dissolved)	0.01	mg/L	ND (0.004) QL	ND (0.004)

Notes:
[a] Cleanup level from Alaska *Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, Drinking Water Criteria*, 18 AAC 70
J = Result is an estimate
ND = Nondetect: limit of detection (LOD) in parentheses
QL = Quality control failure with potential low bias.

Recommendations for Site 21

- Expand the removal action to all locations that exceed the site-specific cleanup level for arsenic.
- Continue conducting five-year reviews until RAOs are met.

6.4.14 Site 27 Diesel Fuel Pump

The contingency remedy at Site 27 is excavating and removing petroleum-contaminated soils, MNA of groundwater, and implementing an LUC to limit future drinking water use. The excavation portion of the remedy was initiated in 2012. Groundwater monitoring is ongoing. Soil, surface water, and groundwater data were reviewed for expectations of meeting cleanup levels and RAOs.

Soil COCs exceeding cleanup levels at Site 27 at the time of the DD were DRO (up to 51,000 mg/kg) and naphthalene (up to 191 mg/kg) (USACE 2009b). In 2012, soil was removed to 2 feet below the groundwater surface (3 to 11 feet bgs) or to the extent of contamination (8 feet bgs). Confirmation sampling indicated that five sample locations on the excavation floor below the groundwater interface exceed the site-specific cleanup level for DRO with concentrations ranging from 13,000 mg/kg to 110,000 mg/kg (USACE 2013b). Excavation efforts were conducted to the maximum extent practicable taking into consideration existing technology, site location, and logistics in light of overall project purposes.

In 2013, three of the five confirmation samples that exceeded cleanup levels were excavated due to increased accessibility from low water levels in the E4 plume (USACE 2014c). The excavation extents of the E4 plume expanded into the D2 plume and proceeded westward. Nine confirmation samples were collected from the western sidewall, one of which (13NCMOCSS069) contained DRO concentrations exceeding site-specific cleanup levels (USACE 2014c). Along the northern sidewall, nine confirmation samples were collected, five of which contained DRO at concentrations exceeding the site-specific cleanup level. Two of the five samples also contained RRO concentrations exceeding the site-specific cleanup level. No further excavation occurred at these sample locations due to their close proximity to the Site 28 wetland (USACE 2014c).

The excavation of the E3 plume was also expanded in 2013 and three confirmation samples were collected. Sample exceedances were detected at one location (13NCMOCSS077/085) for DRO (USACE 2014c). The western extent of the E3 plume is not defined.

The analyte list for soils does not appear to cover all site COCs identified in the DD. Soil excavation confirmation samples were analyzed for DRO and RRO only. However, naphthalene was previously detected at this site in concentrations exceeding the site-specific cleanup level. Naphthalene also exceeds cleanup criterion in the sediment downgradient from this site. Post-excavation samples from Site 28 sediment removal Area 2 detected naphthalene at concentrations up to 450 mg/kg (USACE 2013c). DRO, RRO, and naphthalene exceedances are shown on Table 6-20.

Table 6-20
Site 27 Analytes Exceeding Cleanup Levels in Soil

Analyte	Cleanup Level	Unit	DD Maximum Concentration	2012 Maximum Remaining Concentration	2013 Maximum Remaining Concentration
DRO	9,200[a]	mg/kg	**51,000**	**110,000**[b]	**76,000**
RRO	9,200[a]	mg/kg	6,000	7,300	**14,000**
Naphthalene	120 [a]	mg/kg	**191**	Not sampled	Not sampled

Notes:
Bold = Concentration exceeds site-specific cleanup levels established in the DD (USACE 2009b).
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] This maximum concentration is below the groundwater surface and is not anticipated to be excavated.

Surface water adjacent to Site 27 and downgradient of the MOC was collected at three locations before, during, and after excavation activities in 2012 and 2013. The samples were collected as indicators of potential construction effects. During active excavation, a sample was collected while work was occurring in the E plume approximately 150 feet from the MOCSW01 sample location. MOCSW02 was collected further downgradient, and MOCSW03 was collected crossgradient in an area overlapping the I plume delineated by UVOST in 2010. Sample locations are shown in Figure A-9. Samples were analyzed only for DRO and RRO (Table 6-21). TAH and TAqH analyses were not included until 2013, which enabled comparison to surface water-quality parameters (USACE 2013b).

Groundwater monitoring wells MW88-4 and MW88-5 were located within or downgradient of Site 27. DRO continued to exceed the cleanup level in both wells through 2012 but benzene only exceeded the cleanup level in MW88-5 (USACE 2013b). The RRO concentration in well MW88-5 was less than the cleanup level for the first time in 2012. Naphthalene does not exceed the ADEC cleanup level of 0.73 mg/L in either well (maximum 0.089 mg/L in MW88-4). Refer to Section 6.4.6 for a complete data review of MOC groundwater.

Recommendations for Site 27

- Add naphthalene to the list of analytes for this site.
- During construction, soil movement should continue to be controlled using silt fences as appropriate and any sheen should be captured using sorbent booms.
- Implement the LUC to limit future drinking water uses.
- Install additional monitoring wells to achieve adequate groundwater characterization and MNA data of upgradient and downgradient edges of the plume. The well locations should be proposed in a work plan addressing the anticipated hydraulic gradient and a potential timeframe for the remedy using the first few years of data as a basis.
- Continue conducting periodic reviews until RAOs are met.

Table 6-21
Site 27 Downgradient Detections in Surface Water

Year	Analyte	Cleanup Level	Unit	MOCSW01			MOCSW02			MOCSW03		
				pre	during	post	pre	during	post	pre	during	post
2012	DRO	--	mg/L	6.7	7	5.6	1	0.69	0.6	2.2 J	3.1	2.4
	RRO	--	mg/L	3.1	4	1.9	0.33	0.23	0.2	0.52	0.68	0.31 J
2013	DRO	--	mg/L	6.1	5.2	3.2	0.085 J,ML	1.1	0.78	1.1	1.1	2.1
	RRO	--	mg/L	2.6	2.4	1.3	0.083 J,ML	1.1	0.15	0.49	0.40 B	0.39
	TAH	0.01	mg/L	0.00254	0.0027	0.002	0.0027	0.00266	0.002	0.00397	0.0027	0.00539
	TAqH	0.015	mg/L	0.0033038	0.003572	0.00248	0.0098246	0.0098154	0.0023542	0.0042837	0.0032996	0.01062

Notes:
The greater result of the primary or duplicate sample was included in the table for each event.
-- cleanup level not specified in the DD (USACE 2009b).
B – analyte detected in the blank, result with potential high bias.
J – result is an estimate.
ML – matrix interference suspected, result with potential high bias.

6.4.15 Site 28 Drainage Basin

The primary COCs in soil and sediment at Site 28 at the time of the DD were chromium, lead, zinc, PCBS, PAHs, DRO, and RRO (USACE 2009b). The selected remedy for Site 28 consisted of two components: (1) excavation and removal of petroleum-, metals- and PCB-contaminated sediment, including the removal of near-surface sediments from the narrow channel upgradient of the Suqitughneq River and (2) construction of a sedimentation pond or other appropriate controls and cleaning and removing the culverts or plugging them to prevent direct outflows of upgradient residual sources of contamination (USACE 2009b).

The culverts at Site 28 were removed in 2010 (USACE 2011). Sludge removed from the manhole in the western drainage contained high levels of lead, mercury, arsenic, barium, cadmium, silver, and Aroclor 1254, all of which are currently being sampled for in Site 28 sediments. Additional investigations were conducted in 2011 and 2012 and sediment removal activities began in 2012 and continued in 2013.

During the additional investigations in 2011, sediment results were compared to the criteria specified in the DD when applicable. If sediment criteria were not listed in the DD for a particular analyte, the NOAA SQuiRTs for freshwater sediment at the probable effects level was used. Only 10 of the samples collected in 2011 met the 2012 definition of sediment (all submerged loose mineral and organic material except for that which is actively growing vegetation or is part of the vegetative mat) (USACE 2013d). All other samples were compared to site-specific soil cleanup levels specified in the DD. Soil analytical results were also compared to values specified in 18 AAC 75, Tables B1 and B2 if a cleanup level was not specified in the DD for a particular analyte. The 2011 investigation found that DRO, RRO, toluene, ethylbenzene, total xylenes, PAHs, PCBs, arsenic, cadmium, chromium, lead, and selenium exceeded either site-specific soil cleanup levels or 18 AAC 75 Table B soil cleanup levels (USACE 2013c).

Excavation of contaminated sediments began in 2012 and continued in 2013 (USACE 2013c, 2013d, 2014c). Sediment migration was controlled by an in-stream sediment trap while remedial activities were in progress. Sediment and surface water data were reviewed for expectations of meeting cleanup levels and RAOs.

Following Phase I sediment removal in 2012 at Areas 1 and 2 near the MOC, confirmation samples indicated that multiple compounds continued to exceed site-specific cleanup levels. No sediment evaluation criteria are specified in the National Oceanic and Atmospheric Administration freshwater sediment screening tables for 1-methylnaphthalene, toluene, ethylbenzene, xylenes, or selenium.

In 2013, sediment removal continued within Areas 3 through 11. At the conclusion of the 2013 field season, several analytes, including arsenic, chromium, 2-methylnaphthalene, acenaphthene, fluorene, naphthalene, phenanthrene, LPAH, DRO, and RRO remained at concentrations greater than site-specific cleanup levels. In addition, 1-methylnaphthalene, acenaphthylene, and selenium were identified as exceeding other evaluation criteria and were thus carried forward to evaluate risk (see Appendix B). Analytes exceeding cleanup levels remain within all 11 sediment removal areas. Maximum results for each analyte are presented in Table 6-22.

Petroleum-Contaminated Sediment

The most prevalent fuel contaminants at Site 28 are DRO and 2-methylnaphthalene. Concentrated areas of fuel contamination are located in the middle and southern portion of Site 28 near the MOC. Downgradient of the MOC, several sample locations near the beginning of the stream channel and two ponds that the stream empties into have high concentrations of fuel analytes (USACE 2013d).

The DD does not specify a cleanup level for several detected PAHs in sediment. The maximum concentrations of acenaphthylene and 1-methylnapthalene in sediment were used to evaluate the human health risk (Appendix B). The maximum concentration of 1-methylnaphthalene at 540 mg/kg results in a hazard quotient level less than 1 (calculated at 0.64578). The maximum concentration of acenaphthylene of 4.4 mg/kg results in a hazard quotient level less than 1 (calculated at 0.0002). Acenaphthylene and 1-methylnaphthalene were determined to not significantly affect the human health risk (Appendix B). An Explanation of Significant Differences is not needed at this time.

PCB-Contaminated Sediment

PCBs exceeded the site-specific cleanup level of 0.7 mg/kg in two of 51 sediment samples collected in 2012, with concentrations of 2.1-QH mg/kg and 0.84-QH mg/kg, respectively. The QH designation indicates the result is an estimated value with high bias due to quality control failure. These samples were located near the MOC, within approximately 250 feet of the pad (USACE 2013d). These concentrations are not greater than the maximum concentration of 5.4 mg/kg PCBs identified in the DD. In 2013, the two PCB exceedance locations were dredged within Areas 6 and 7. Subsequent confirmation samples were collected and PCBs were detected at concentrations less than the cleanup level (USACE 2014c).

Table 6-22
Site 28 Contaminant Concentrations in Sediment

Analyte	Cleanup Level [a]	Unit	DD Maximum Concentration	2012 Maximum Detected Concentration	2012 Post-Removal Concentrations (Area 1 and 2)	2013 Post-Removal Concentrations (Areas 3 through 11)
Arsenic [b]	93 [a]	mg/kg	--	**100**	4.5	**88**
Cadmium [b]	3.53[c](6.7)	mg/kg	--	1.4[f]	0.3 J	0.77 J
Chromium	270 [a]	mg/kg	**649**	35[f]	19	32
Lead	530 [a]	mg/kg	**4,590**	91[f]	17	64
Selenium [b]	--	mg/kg	--	3 J[f]	1.9	3.2
Zinc	960 [a]	mg/kg	**4,810**	380[f]	56	220
PCBs	0.7 [a]	mg/kg	**5.4**	**2.1 QH[f]**	0.084	0.61
Toluene [b]	--	mg/kg	0.37	1.4[e]	0.19	ND (0.077)
Ethylbenzene [b]	--	mg/kg	1.8	3.6[e]	2.7	4.7
Xylenes [b]	--	mg/kg	0.78	33[e]	11.8	28
1-methylnaphthalene	--	mg/kg	**--**	540	540	78
2-methylnaphthalene	0.6 [a]	mg/kg	**500**	**890**	**890**	**86**
Acenaphthene	0.5 [a]	mg/kg	**14**	**10**	**10**	**5.2**
Acenaphthylene	0.128 [c] (66)	mg/kg	0.047	4.4[d]	4.4[d]	2.9[d]
Fluoranthene	2.0 [a,b]	mg/kg	**14**	**5.6[f]**	0.23	2.3
Fluorene	0.8 [a]	mg/kg	**20**	**4,800[e]**	**15**	**11**
Naphthalene	1.7 [a]	mg/kg	**220**	**81,000[e]**	**450**	**40 J**
Phenanthrene	4.8 [a]	mg/kg	**21**	**57[e]**	**14**	**5 MN**
Total LPAH	7.8 [a]	mg/kg	--	**85,208**	**493**	**47.8**
Total HPAH	9.6 [a]	mg/kg	--	**13.36 J**	0.55	3.06
DRO	3,500 [a]	mg/kg	**150,000**	**110,000[f]**	**94,000**	**85,000**
RRO	3,500 [a]	mg/kg	**14,000**	**34,000 MN[f]**	**9,100**	**26,000**

Notes:
Bold = Concentration exceeds site-specific cleanup levels.
[a] Cleanup level recorded in the DD (USACE 2009b).
[b] Analyte not listed as a COC in the DD but detected in excess of applicable cleanup levels in subsequent sampling.
[c] Values taken from SQuiRTs, Freshwater Sediment, PEL (Probable Effects Level) as presented in USACE 2013c. Value from the Washington Administrative Code Table III Sediment minimum cleanup level (WAC 1995) is listed in parentheses.
[d] Values exceed the concentration specified in the NOAA SQuiRTs, Freshwater Sediment, PEL as presented in USACE 2013c.
[e] Maximum concentration was detected within Area 1 or 2 and was subject to the Removal Effort in 2012 (USACE 2013c).
[f] Maximum concentration was detected within an area that was subject to the Removal Effort in 2013 *USACE 2014c).
-- Data was not reported in the DD (USACE 2009b).
QH = Result is an estimated value with a high bias due to a quality control failure.
MN = Result is an estimate with no directional bias due to matrix interference.
J = Result is an estimated value.

Metal-Contaminated Sediment

Locations where samples exceeded one or more of the metal cleanup levels are located throughout most of the sediment areas in the Site 28 Drainage Basin and are not confined to one particular area (USACE 2014c). Arsenic was not evaluated in the risk assessment for Site 28 because it had not been detected at significant concentrations at the time (USACE 2004). The current sediment cleanup level established in the DD (93 mg/kg) was used to calculate carcinogenic and non-carcinogenic risk as part of the Five-Year Review limited risk evaluation (Appendix B). The DD-specified cleanup level for sediment of 93 mg/kg results in a hazard quotient level slightly greater than 1 (calculated at 1.32) and a carcinogenic risk of 6.9×10^{-5} using the exposure parameters specific in the risk assessment that supported the DD (USACE 2004). Although the carcinogenic risk exceeds the risk assessment point of departure (1.0×10^{-5}) it is within the EPA risk range (1.0×10^{-4} to 1.0×10^{-6}).

Surface Water

Surface water samples were collected from Site 28 to monitor the impact of remediation activities on contaminant concentrations. Samples were analyzed for BTEX, DRO, RRO, PAHs, PCBs, and total and dissolved metals (RCRA metals plus nickel, vanadium, and zinc). All surface water analytical results were below the TAqH criterion. All PCB results were ND and all GRO, DRO, and RRO results were ND, or very low with no significant variation occurring between sampling events (USACE 2013c, 2013d, 2014c).

Surface water samples were also collected from constructed impoundments used to contain the geotubes as they dewatered. Samples were evaluated to determine whether contained waters were within discharge criteria (USACE 2013d). Water did not meet discharge criteria for arsenic, dissolved arsenic, TAH, or TAqH in 2012, and was not discharged. Modifications to the water treatment system occurred in 2013 as described in Section 4.18.1. Analytical results from the first batch using the modified treatment system were below discharge criteria presented in the State of Alaska Wastewater General Permit 2009DB0004-0216, 18 AAC 75, and 18 AAC 70 (USACE 2014c).

Recommendations for Site 28

- Continue conducting CERCLA five-year reviews until RAOs are met.

6.4.16 Site 29 Suqitughneq River

The selected remedy for Site 29 was incidental debris removal and a data review is not applicable.

6.4.17 Site 31 White Alice Communications

The selected remedy for Site 31 is excavation and removal of PCB-contaminated soil. Excavation of contaminated soil began in 2010 and continued in 2011, 2012, and 2013. Confirmation soil data were reviewed for expectations of meeting cleanup levels and RAOs.

The DD identified four historical soil sample locations at approximately 2 feet bgs where concentrations exceeded cleanup levels for PCBs. In 2010, three of the historical sampling locations were identified by survey and investigated (USACE 2011). Excavation efforts were guided by the results of 221 field-screening samples, which were then submitted for field laboratory analysis. Forty-seven field-screening samples collected in 2010 contained PCB concentrations above cleanup levels. Excavation expansion continued until field-screening samples were below cleanup levels.

In 2010, 158 discrete confirmation samples were collected at 5-foot intervals and submitted for analysis of PCBs. Discrete samples were combined into 19 different composite groups and compared to 1/n the cleanup level. Only composite group 16 contained a PCB concentration below the 1/n cleanup level of 0.11 mg/kg. All other composite groups exceeded the 1/n threshold, suggesting that some of the discrete sample locations may be above the cleanup level for PCBs. The excavation was covered with 30-mil black plastic liner and covered with clean overburden for over-wintering.

In 2011, the clean overburden was removed to the 30-mil black plastic liner and temporarily stored on a lined stockpile area. The location of the former composite groups were identified by survey and investigated. A total of 541 field-screening samples were collected and submitted to the field laboratory. Although field-screening results continued to indicate PCB concentrations greater than site-specific cleanup levels, 178 discrete and 70 composite confirmation samples were collected and submitted to the analytical laboratory in order to prepare the site for over-wintering. Analytical results indicated PCB contamination remained throughout the site between 1 and 250 mg/kg (USACE 2012).

In 2012, excavation of PCB-contaminated soil continued at Site 31. Approximately 2,700 tons of PCB-contaminated soil was removed, and 225 confirmation samples were collected and submitted for PCB analysis. At the end of the 2012 field season, only one confirmation sample (12NC21SS199) contained PCB concentrations in excess of site-specific cleanup levels with a concentration of 1.3 mg/kg.

In 2013, the one confirmation sample location from the 2012 effort was located and approximately 1.5 to 2.0 feet bgs of soil was excavated. Soils were loaded directly into bulk bags and a confirmation sample was collected. Maximum PCB concentrations in confirmation samples are given in Table 6-23.

Table 6-23
Site 31 Maximum PCB Concentrations

Analyte	Cleanup Level	DD Maximum Concentration	2010 Maximum Detected Concentration	2011 Maximum Detected Concentration	2012 Maximum Detected Concentration	2012 Post-Removal Concentration	2013 Post-Removal Concentration
Total PCBs [a]	1 mg/kg	**7.09 mg/kg**	**4.3 mg/kg** [b]	**250 mg/kg**	**18 mg/kg**	**1.3 mg/kg**	0.44 mg/kg

Notes:
Bold = Concentration exceeds site-specific cleanup level.
[a] Total PCBs is the sum of Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260. To date, only Aroclor 1260 has been detected at Site 31.
[b] Sample result reflects a composited sample and was compared to 1/n the cleanup level where n represents the number of samples composited

The remedy is considered complete at Site 31 and no further action is required. A technical assessment and protectiveness statement are not required or necessary.

6.4.18 Site 32 Lower Tramway

The selected remedy for Site 32 was excavation and removal of DRO-contaminated soils. Excavation efforts were initiated and completed 2010; however, the area excavated was north of the DRO-contaminated area identified in the DD (USACE 2011). Excavation efforts conducted in 2010 removed approximately 20 tons of soil from two areas and did not identify any additional COCs for Site 32. The remedy selected for Site 32 is ongoing and additional excavation is planned in to 2014.

6.5 SITE INSPECTIONS

The site inspections for this Five-Year Review were conducted 13 through 15 September 2013. The site inspection team consisted of USACE consultants from Jacobs. The team visited each site included in this Five-Year Review. The team located, attempted to locate, and inspected actively monitored wells and looked for signs of site disturbance (such as excavations) and changes in land use from those described in the DDs. Site inspection checklists are located in Appendix D.

Site conditions and inspection results, as determined from the site inspections, are summarized below by site in Sections 6.5.1 through 6.5.17.

6.5.1 Site 1 Airstrip

The area near the airstrip where previous remedial efforts were concentrated was observed to be in good condition and fully re-vegetated. The excavation area has been graded to promote positive drainage away from the active airstrip.

6.5.2 Site 3 Fuel Pump House

Site 3 is located adjacent to three subsistence hunting camp structures. The area of previous excavation efforts appears to be in good condition and vegetative growth is occurring. A large tracked piece of equipment was temporarily stored onsite and appeared to be prepped for shipment off-island. The DD did not indicate the presence of a surface water body that was observed during the site inspection (Photo No. 11, Appendix D). An apparent petrogenic sheen, limited in size, was observed on the surface water near the seasonal hunting structures. A plastic cap (perhaps to an oil container) was observed onshore adjacent to the sheen (Photo No. 13, Appendix D).

6.5.3 Site 6 Gravel Pad

The gravel pad remains at Site 6 and was being used to store shipping CONEXs, six 21,000-liter fuel tanks, and some heavy equipment (Photo No. 17, Appendix D). Excavation areas were graded to promote positive drainage. Adjacent surface water was clear with no debris or observable sheen. Two abandoned monitoring well locations were observed onsite (Photo Nos. 14 and 15, Appendix D).

6.5.4 Site 8 POL Spill

Vegetation at Site 8 appeared to be healthy with no signs of stress. No noticeable petroleum odor was observed. There was no evidence of unauthorized site disturbance.

6.5.5 Site 9 Housing and Operations Landfill

The landfill cap at Site 9 was observed to be in good condition with no evidence of erosion or cracking. The soil used for vegetative cover was observed to very coarse making vegetative growth difficult and sparse. A minimal amount of debris was observed outside of the southern perimeter of the landfill cap. The new constructed drainage ditch on the east side of the landfill cap was observed in good condition and appears to be efficiently promoting drainage away from the cap as planned (Photo No. 43, Appendix D). Broken concrete was observed at the ground surface in the area believed to previously contain a monitoring well (Photo No. 42, Appendix D).

6.5.6 Site 10 Buried Drums

Site 10 was being used for a staging area during 2013 field activities (Photo Nos. 54 and 55, Appendix D). Minor amounts of debris were identified on the gravel pad and one 55-gal drum lid was observed west of the gravel pad (Photo Nos. 52 and 57, Appendix D). Vegetation was not evident on the gravel pad. Two monitoring wells were observed onsite. Bentonite was observed on the ground surface and thought to be an abandoned monitoring well (Photo No. 58, Appendix D). MW10-1 was identified and is in need of repair due to frost jacking (Photo No. 53, Appendix D). MW10-1 does not have a locking cap or bollards.

6.5.7 Site 11 Fuel Tanks

Site 11 appeared in good condition and had recently been graded and seeded. No debris was identified and a POL-related odor was noted while onsite. One monitoring well, identified in previous reports as both MW88-3 and MW11-2, was observed onsite and is in need of repair due to frost jacking (Photo No. 61, Appendix D). The monitoring well does not have a locking cap or bollards.

6.5.8 Site 13 Heat and Power Plant

The foundation for the Heat and Power Plant was removed from Site 13. The site had been excavated, recently graded to promote drainage, and seeded. There were no monitoring wells observed onsite; however, a small pile of polyvinyl chloride pipe that appeared to be from decommissioned wells was observed to the northwest of the site. A POL-related odor was observed onsite; however, the origin of the odor was not identified.

6.5.9 Site 15 Fuel Pipeline

Site 15 was recently graded to promote positive drainage and seeded. There were no monitoring wells observed. A POL-related odor was observed onsite; however, the origin of the odor was not identified.

6.5.10 Site 16 Paint and Dope Storage

Site 16 was being used as an equipment storage area for ongoing remedial efforts as well as road access for Site 28 (Photo No. 66, Appendix D). The Paint and Dope Storage structure no longer remains onsite. The site had been partially graded to promote positive drainage. A stockpile with approximately 3 cubic yards of soil was observed. Two decommissioned monitoring wells were observed onsite (Photo Nos. 67, 70, and 71, Appendix D).

6.5.11 Site 19 Auto Maintenance

The former foundation for Building 109 (Auto Maintenance) remains. The foundation for Building 108 (Auto Storage) no longer remained. A piece of geotextile fabric was observed protruding to the surface on the east side of Site 19 (Photo No. 73, Appendix D). The site had been recently graded and seeded. MW88-1 was observed onsite and is in need of repair due to frost jacking (Photo No. 72, Appendix D). The monitoring well does not have a locking cap or bollards.

6.5.12 Site 21 Wastewater Tank

Excavation efforts at Site 21 were performed in September of 2013 and seeding was actively occurring during the site inspection on 15 September 2013. The site appears in good condition with no debris. A sediment wattle was placed to the west of the excavation efforts and a silt fence was installed further downgradient of Site 21 (Photo No. 78, Appendix D). The site was graded to promote drainage.

6.5.13 Site 27 Diesel Fuel Pump

Site 27 had been recently graded to promote drainage and seeded. A POL-related odor was observed onsite; however, the origin of the odor was not identified. No groundwater monitoring wells were observed onsite.

6.5.14 Site 28 Drainage Basin

At the time of the site inspection, the contractor performing remedial actions at Site 28 was initiating demobilization. The site appeared in good condition and had thick vegetation. A sediment trap was placed within the drainage basin to assist in dredging activities. Several water pumps and intermediate ponds were used to pump dredged material upgradient to the flocculation station, water filters, and sediment tubes (Photo Nos. 86, 87, 88, and 91, Appendix D). A sediment trap was observed within the drainage upgradient of recent dredging areas (Photo No. 72, Appendix D). Sediment tubes were located within a constructed temporary containment basin near Site 16 (Photo No. 85, Appendix D). To the north, wattles were placed within the drainage basin at the junction with the Suqitughneq River (Site 29) (Photo No. 97, Appendix D).

6.5.15 Site 29 Suqitughneq River

Only one submerged drum was observed as debris in an adjoining pond on the west side of the Suqitughneq River (Photo No. 105, Appendix D, Figure A-14). No sheen was observed to be associated with the drum. No other debris was noted onsite. Water collection from the Suqitughneq River was observed near the temporary camp constructed near the airstrip for use as grey water (Photo No. 101, Appendix D).

6.5.16 Site 31 White Alice Communications

Four former antenna foundations and one building foundation were observed at Site 31. The building foundation contained an approximate 0.5-foot by 4-foot drain (Photo No. 112, Appendix D). The drain appeared to lead to an opening of approximately 5 feet by 9 feet by

6 feet, which may present a future safety issue. The area south of the building foundation was recently graded and seeded and new vegetation had begun sprouting.

6.5.17 Site 32 Lower Tramway

An area at Site 32 was recently excavated and graded, and vegetative growth was observed. The tramway concrete foundation remained onsite. An approximate 5-foot 6-inch diameter culvert was observed onsite to allow the flow of Kangukhsam Mountain Spring under the roadway leading to Site 32 (Photo Nos. 122 and 123, Appendix D). The roadway was in good condition with signs of settlement near the culvert (Photo Nos. 116 and 117, Appendix D).

6.6 INTERVIEWS

During the course of this Five-Year Review, interviews were conducted by Jacobs personnel with representative from several agencies and community members associated with the Northeast Cape FUDS. Interview Record Forms are provided in Appendix E. The responses are summarized below.

Five members of the Kukulget Inc. Board of Directors provided responses to interview questions in a group format. Their general impression of the cleanup efforts at Northeast Cape was good but they had several remaining questions, concerns, and suggestions. Issues discussed during this group interview are summarized by topic below.

Community Understanding

- One of the primary concerns discussed by community members was that they do not feel as well informed as they could be due to the barrier of communicating technical information to an audience with various backgrounds. They requested information about the contamination and progress of Northeast Cape be presented to community members in layman's terms. They also indicated that it may be helpful to perform a Northeast Cape site walk with the Tribal Council or Tribal Corporation to increase the understanding of updated site conditions.
- The members had specific concerns regarding the DDs. They were not familiar with the documents and would like copies to review. They questioned its relationship to the 1952 agreement with the Native Village of Savoonga to return the Northeast Cape FUDS to its original condition.

Remaining Contamination

- Several community members observed helicopter activity around the south side of the Kangukhsam Mountain at the time of facility closure at Northeast Cape. It was believed that this helicopter was hauling material to another dump site located south of the Radome (Site 34, not included in this Five-Year Review). During recent hunting activities more than 10 drums were seen on the south side of the mountain. The members interviewed would like to ensure that this area is investigated and remediated if necessary.
- Another major concern was related to the historical use of abandoned Northeast Cape building materials for the construction of fishing camp structures. Community members questioned if these current structures contain contaminants above acceptable levels. Because these materials originated at the Northeast Cape FUDS, the community members feel the USACE should ensure these structures are also safe for use.
- One member questioned the level of contamination in backfilled gravel used by USACE or alternatively, the level of contamination located beneath the backfilled gravel.
- One member indicated several utilidors were left in place at the MOC. He stated that a utilidor was present at Pad 98 where the loading frame was located during remedial efforts.
- One member indicated that there was a septic tank present between Sites 21 and 28. He would like USACE to follow-up with this area and provide information to the community regarding the necessity of remedial efforts at this area.
- One member indicated barrels and sludge were observed to remain below ponds at Site 24.

Remedial Efforts

- Landfills were capped and reseeded with what was referred to as “local grass.” The community members expressed concern with the lack of vegetative re-growth on the landfill cap and stated, “Grass can’t grow on rocks.”
- One member that had previously worked with Bristol during the remedial actions at Site 7 in 2009 indicated that engines, an airplane, transformers, batteries, a road grader, and barrels were all seen beneath the area that was excavated. He indicated that excavation efforts were limited to the surface and these items remain onsite beneath the cap. He stated he did not understand the rationale of removing large amounts of contaminated soil throughout Northeast Cape while leaving significant amounts of potentially hazardous debris in the landfills. He recommended opening up the cap to remove all remaining debris and changing the cap material to soil where vegetation can grow.
- Several members suggested adding signage to the perimeter of the landfills to notify site visitors of the presence of the landfill. They also suggested adding monitoring wells to landfills and the MOC for continued groundwater monitoring and requested that the monitoring wells be well marked to avoid being hit during the winter months when visibility of the stick-up mounts may be obscured by snow.
- A commercial fishing “hot spot” is located close to land, just outside of the Suqitughneq River drainage. Concerns were brought up regarding contaminants leaching into the Suqitughneq River and long-term monitoring was requested that takes into consideration the frequent changes in water flow of the Suqitughneq River due to drainage freeze up and breaching of the sand berm at the mouth.
- One member expressed concern regarding the limitation of POL-excavations to 2 feet below groundwater even when contamination remained above cleanup levels. This methodology suggested that the sites were not getting clean and that contamination remained above cleanup levels. He requested that all contaminated soil be removed.
- Fragments of asbestos and concrete slabs have been left at Site 31 and MOC. The community members would like them removed. There is concern about contamination that may be present underneath the concrete slabs.

Other Concerns

- There have been reports to community members that Bristol and its employees have used four-wheelers for beachcombing. This is believed to have occurred every summer that work has been performed which violates the Right-of-Entry agreement between the USACE and landowners.
- One member would like the USACE to continue to maintain the airstrip at Northeast Cape.

Alaska Community Action on Toxics and Native Village of Savoonga Tribal Member; Executive Director (Pamela Miller) and Environmental Health and Justice Program Director (Vi Waghiyi) provided responses to interview questions via email. Ms. Miller and Ms. Waghiyi indicated that the tribe should be an official signatory to the DDs. Their general impression was that cleanup efforts at Northeast Cape were far from complete and additionally not protective of the health of the people living on the island. They had several additional questions, concerns, and suggestions, which are summarized by topic below.

Remaining Contamination

- Ms. Miller and Ms. Waghiyi stated that the Northeast Cape FUDS was "not properly characterized and thus the remediation has not been fully informed enough to identify and remove important source areas of contamination." They referenced source areas containing fuel-related compounds, PCBs, and pesticides that continue to contaminate the Suqitughneq River and groundwater. They specifically indicated that integrative sampling methods such as sediment cores and biological sampling of fish and wildlife should be used within the Suqitughneq River and its estuary to fully delineate remaining contaminant levels.
- Ms. Miller and Ms. Waghiyi indicated that the analytical methods used during RIs were not sensitive enough to assess the range of contaminants known to exist at Northeast Cape. They requested analyses to include congener-specific PCBs, Mirex, hexachlorobenzene, dioxins/furans, DDE, BTEX, PAHs, TCE and other solvents, and vinyl chloride. They also had specific concerns regarding undisclosed information of harmful substances (including radionuclides/radiation hazards) used and/or left at Northeast Cape.

Selected Remedies

- Ms. Miller and Ms. Waghiyi expressed concern regarding the cleanup levels established in the DDs (USACE 2009a; 2009b). They indicated, "cleanup standards are far from adequate." The cleanup level established for DRO and RRO in soil at 9,200 mg/kg allows soil to continue to serve as a contamination source for groundwater and surface water.
- Ms. Miller and Ms. Waghiyi stated that they believed contamination to persist beneath the landfill caps installed at Sites 7 and 9. They indicated this is of great concern for human health and expressed concern regarding leachate from the landfills effecting the Suqitughneq River watershed, fish and wildlife, and human health.
- They stated MNA is not an acceptable remedy due to the timeframe required to reduce contaminants to the level considered safe. They suggested active remediation methods as an alternative.
- Long-term monitoring of groundwater is requested to occur at sites where monitoring wells have been removed as well as installment of new monitoring wells at key locations such as down gradient of the MOC and landfill sites.

Other Concerns

- Ms. Miller and Ms. Waghiyi indicated that the original community of the Village of Northeast Cape has been, and continues to be, displaced by the military operations that occurred onsite. Although, the people of St. Lawrence Island intend to re-establish the community at Northeast Cape, they will not be able to do so until they are assured that the cleanup is protective of human health.
- Upon abandonment of the Northeast Cape FUDS, proper signage, including the Yupik language, was not used to warn site visitors of potential hazards. As a result, locals salvaged hazardous materials for use in home and cabin construction. To date, there are still no warning signs in place, which indicate the potential danger of consuming water from the Suqitughneq River.
- Ms. Miller and Ms. Waghiyi indicated the USACE has not conducted proper government-to-government consultations per their legal obligations. They indicated that past USACE project managers have not been culturally sensitive. They indicated that concerns and information requests made by community members and their technical advisor have not been respected or acted upon. They suggested that Jacobs review past RAB meeting minutes, statements, and concerns and include these items in the Five-Year Review.

Various other community members also voiced concerns. Issues discussed during these individual interviews are summarized below by interviewee.

- <u>Robert Annogiyuk, Native American Lands Environmental Mitigation Program (NALEMP) Project Manager:</u> Mr. Annogiyuk commented that the Northeast Cape cleanup program moves quickly, sometimes too quickly. He felt that he was not well informed because of the use of technical terms used during community outreach. He felt that providing more introductory information would be helpful to allow people to get a better perspective on the contaminants and what they mean.
- <u>Orville Toolie, Community Member:</u> Mr. Toolie commented that the Northeast Cape project is doing pretty good and that the area is a lot cleaner than Savoonga. He indicated that the people of Savoonga know what is going on at the site and suggested the USACE send letters to the community with updates on project progress. He expressed concern regarding the materials that had historically been removed from the Northeast Cape facilities by community members and used as building materials. He would like to have these current buildings evaluated for remaining contaminants. Mr. Toolie also indicated that the community would like to use the area of Northeast Cape for local housing in the future.
- <u>Dean Kolowiyi, Community Member:</u> Mr. Kolowiyi's general impression of the project was that the cleanup is going okay. He is happy the work is moving forward. Mr. Kolowiyi expressed concerns about getting information and questioned when this would be available. He did not understand why getting the information was taking so long. He felt some of the community health concerns were not being addressed. He also stated that

family members were put at risk by participating in cleanup activities prior to Hazardous Waste Operations and Emergency Response training.

- Name Withheld, Community Member: This community member indicated that he would like maps of the Northeast Cape provided to community members that indicated which areas remain above cleanup levels. He indicated that beachcombing during remedial efforts by cleanup crews was a concern because he felt it was trespassing. He liked the format of the RAB meetings and indicated that they provided good information. He would like to move to Northeast Cape in the future.

- Name Withheld, Community Member: This community member indicated that he would like the whole area of Northeast Cape cleaned up, not just individual sites. He indicated that there was a general lack of information and understanding about the project and had concerns about ammunition and weapon storage at Northeast Cape. He would like more information about what they have found. He did not have a good understanding of the DDs and the process of how they were signed. He indicated that the community of Savoonga was presenting health problems that did not exist before. He expressed concern regarding former Northeast Cape building materials that were used at Southwest Cape and Sipenpak Camps. This material may contain lead-based paint and tar that originated at Northeast Cape. He did not have confidence that the area of Northeast Cape was clean. He states, "I don't want to use that land, it might still be dirty."

- Curtis Dunkin, Environmental Program Specialist, ADEC: Mr. Dunkin stated that overall, ADEC perceives the remedial activities at Northeast Cape to have occurred in an adequate and timely manner that is accordance with CERCLA law and ADEC regulations. He indicated that St. Lawrence Island residents and community members have expressed gratitude for the remedial activities, as well as concerns regarding the overall protectiveness of the selected remedies. From the perspective of ADEC, the effects of the site operations on the surrounding community have been positive mainly due to the decrease in human and environmental exposure risks.

- Mitchell Kiyuklook, President of the Native Village of Savoonga: Mr. Kiyuklook indicated the Northeast Cape FUDS has had significant impacts on the surrounding community including an increased incidence of cancer, high blood levels of PCBs, and decreases in the number of seals on the island and fish in the Suqitughneq River. Mr. Kiyuklook had concerns regarding remedies identified in the DDs including the site-specific cleanup levels established for petroleum hydrocarbons and capping the Site 7 landfill with a large number of remaining buried drums. Mr. Kiyuklook indicated materials were collected from the Northeast Cape FUDS for construction around the island and thus, contaminants may be present throughout St. Lawrence Island. Mr. Kiyuklook did not feel as though he was well informed about the activities and progress at Northeast Cape. He indicated that although the information may have been presented at meetings, the community required a better explanation of what the regulations mean and how the cleanup levels were established. He suggested that information be provided to the community before the reports are finalized, which can sometimes be up to a year after work has been completed. Mr. Kiyuklook requested that reindeer on the island be re-sampled for levels of PCBs now that PCB cleanup efforts have been completed. Lastly, Mr. Kiyuklook indicated that a recent conference call with NALEMP, Alaska Community Action on Toxics (ACAT), and Ron Scurdato discussed trace levels of radiation that was identified on metals shipped from Northeast Cape for recycling. He indicated that he would like this new information investigated further.

- Paul Rookok, Tribal Government of Savoonga: Mr. Rookok indicated that overall, the cleanup effort at Northeast Cape FUDS is "a fair job – not a good one." He indicated that the community needed a better understanding of the DDs and that the management of the land should be up to the Native Corporation. Mr. Rookok expressed specific concerns regarding the areas of the Northeast Cape FUDS that were not grouped into the 34 sites. He stated that as a laborer for Bristol, he was instructed to only cleanup areas that were defined within the site boundaries, while there were other areas that contained debris and possibly contaminants he thought should be investigated. Mr. Rookok indicated that more sampling should have been completed during the RIs to get a better understanding of what is there and what needs to be cleaned up. In regards to the remedial actions, Mr. Rookok expressed concern about the number of shareholders that were employed by Bristol. He would like to see more shareholders earning money cleaning up the land. He stated this would also help with community understanding about the work that is being performed at Northeast Cape. He indicated only a handful of people know the details about the cleanup activities. Information presented to the community is difficult to understand and should be presented in layman's terms. He also stated that although pictures of the remedial efforts are nice, they do not tell the complete story of what is being done and why. Mr. Rookok indicated that shareholders in Gambell have been complaining about the recreational activities of Bristol employees. There have been rumors circulating about employees that are not shareholders, yet they are riding all-terrain vehicles in restricted areas and talking artifacts such as old ivory from the land. These are cultural and traditional items that belong to the Native Corporation.

- Delbert Pungowiyi, Community Member: Mr. Pungowiyi indicated that he was happy that the cleanup at Northeast Cape is moving forward; however, he indicated that overall he was very disappointed. Mr. Pungowiyi indicated that there was a lack of communication and honesty between the USACE and the community. He felt that ACAT and Ron Scrudato have been instrumental in helping the community get information. He stated that from the beginning, cost has been a deciding factor for cleanup efforts and he felt this was unfair. He stated that it has been a "huge ordeal" to get the USACE to clean up the site to residential cleanup levels. Specific concerns Mr. Pungowiyi raised were related to debris remaining at the landfills beneath the cap, radiation identified on metals removed from the island, the determination that some petroleum was biogenic in nature, and the potential for PCBs to be stirred up during remedial efforts. Mr. Pungowiyi indicated that the Northeast Cape FUDS has had a significant impact on the health of the people on the island, particularly with cancer, and that a common phrase in the community is, "who's next?" Mr. Pungowiyi indicated that the Native Village of Savoonga should be included as a signatory on the DD, and referenced an agreement that took place in 1952. Mr. Pungowiyi has a strong opposition to the DD for Northeast Cape and feels that it was illegal that the document was signed without Tribal consent. He indicated that the people of St. Lawrence Island deserve recognition for the instrumental role they played for our country.

7.0 TECHNICAL ASSESSMENT

The protectiveness of the remedies is analyzed in this technical assessment, which was completed by answering three questions for each site, as described below.

Question A: Is the remedy functioning as intended by the DD?

This question was answered by considering the remedy's implementation status (Section 4.0), available information reviewed in Section 6.0, and comparing the remedy to the requirements in the DD. Remedial action performance, monitoring, LUCs, and indicators of potential problems were assessed as applicable.

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

Question B was answered by evaluating the effects of cleanup level or action limit changes in ARARs and exposure assumptions that were used at the time of remedy selection that may affect the protectiveness of the remedy. In addition, COCs listed in the applicable DD were evaluated to determine whether new standards or new data obtained after the DDs were signed to become potential COPCs (Appendix B).

This evaluation was completed according to the following EPA (2001) Guidance:

> *"Generally you should only consider changes in standards that were identified as ARARs in the Record of Decision (ROD), then identify any newly promulgated standards for COPCs, and TBCs* [to be considered] *identified in the ROD that bear on the protectiveness of the remedy. As such, you should review any newly promulgated standards, including revised chemical-specific requirements (such as MCLs* [Maximum Contaminant Levels]*, ambient water quality criteria), revised action and location-specific requirements, and state standards if there were considered ARARs in the ROD. In evaluating a change in a standard that was identified as an ARAR in the ROD, or a newly promulgated standard or TBC, you should establish whether the new requirement indicates that the remedy is no longer protective."*

The evaluation of new or changed standards was accomplished by first identifying the applicable standard and then comparing it to the current standard. Potential cleanup levels for

COPCs not identified in the DD were compared to current applicable state cleanup standards. Table B-1 in Appendix B summarizes the evaluation of COCs. The COCs with new or more stringent standards or with new data were further evaluated by comparing the current applicable standard with the most recent maximum detected levels, as shown in Table B-2 in Appendix B.

Carcinogenic risk and non-carcinogenic hazard values were calculated for any compound where current maximum detected levels exceeded the current applicable standard and where the current cleanup level was not defined. In this case, this only applies to sediment because all soil COPCs not identified in the DD are being screened using the standard ADEC Table B2 cleanup levels (ADEC 2012). Cancer risk and non-cancer hazards for current maximum values in sediment were calculated using the most recent compound-specific toxicity values along with exposure assumptions used in the 2004 Risk Assessment (USACE 2004). An exposure duration of 90 days was used for this evaluation to match the durations used in the DDs. Calculations were performed using Equations 3, 4, 7, and 8 for soils from the ADEC *Cleanup Levels Guidance* (ADEC 2008). The results are presented in Appendix B, Table B-3. Equations 3 and 4 of the ADEC *Cleanup Levels Guidance* (for soils) represent the ingestion pathway, and Equations 7 and 8 represent the inhalation pathway. No new toxicity data were available for any of the COCs or COPCs evaluated in this Report.

Table B-4 summarizes the evaluation of the cleanup levels used for sediments if the human health risk had not previously been evaluated. Risks and hazards were calculated for these compounds using the most recent reference doses and cancer slope factors. The EPA's risk management decision range of 1×10^{-4} to 1×10^{-6} for carcinogens, and a hazard quotient of 1 or less for non-carcinogens, are used to assess the risk calculation results.

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

This question was answered by considering if ecological risks have been adequately addressed at the site, if the site is subject to natural disasters, and any plans for potential land use or land use changes.

7.1 SITE 1 AIRSTRIP

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The selected remedy for Site 1 is excavation and disposal or treatment of petroleum-contaminated soils to prevent current and future exposure to humans and ecological receptors. Investigative efforts conducted in 2010 were unable to replicate the RRO exceedance in soil at Site 1 (USACE 2011). Thirteen primary and two duplicate confirmation samples were collected in 2010 and results confirmed that RRO concentrations are below cleanup levels.

Systems Operations/O&M

Not applicable.

Implementation of LUCs and Other Measures

Not applicable.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD identified soil cleanup levels based on the Human Health and Ecological Risk Assessment (2004) and continue to be considered protective of future residential use.

Changes in Exposure Pathways

No changes to land use or site conditions were identified during this review period that would add or change exposure pathways identified in the risk assessment.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs for Site 1 are considered met.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.2 SITE 3 FUEL PUMP HOUSE

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The selected remedy for Site 3 included excavation and disposal or treatment of petroleum-contaminated soils to prevent current and future exposure to humans and ecological receptors. In addition, historical sediment samples containing RRO exceeding cleanup levels were to be re-sampled and subjected to silica gel cleanup. Remedial efforts conducted in 2010 identified the historical sampling location and was unable to replicate the DRO exceedance. Four test pits were excavated and both floor and sidewall samples were found to be below site-specific cleanup levels. Historical sediment sampling locations were identified and subjected to silica gel cleanup procedures. RRO concentrations in sediment were reduced by 60 percent following silica gel cleanup procedures, and were no longer greater than site-specific cleanup levels.

An additional area of petroleum-contaminated soils was identified within Site 3 in 2010. This area was excavated and removed from site. Confirmation sample results confirmed that DRO concentrations are below cleanup levels at Site 3.

Systems Operations/O&M

Periodic Reviews are required at Site 3 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 3 included the implementation of an LUC to designate areas not suitable for drinking water. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *No.*

Changes in Standards and TBCs

The DD identified soil cleanup levels for Site 3 based on the Human Health and Ecological Risk Assessment (USACE 2004) which continue to be considered protective of future residential use. Sediment cleanup levels for Site 3 were based on incidental ingestion/dermal contact with future residents (exposure frequency of 90 days per year and a target hazard quotient of 0.1) and are still considered protective.

Changes in Exposure Pathways

The 2013 site inspection identified a large area of surface water not present at the time of the DD. The depressions that hold the surface water appear to be the result of excavations. An apparent petrogenic sheen, limited in size, was observed within the surface water. It is unknown whether the petrogenic sheen is related to FUDS activities or recent use. An evaluation of the surface water is recommended.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs for Site 3 will be considered complete upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.3 SITE 6 GRAVEL PAD

Question A: *Is the remedy functioning as intended in the DDs?*
Answer: *Yes.*

Remedial Action Performance

The selected remedy for Site 6 is excavation and disposal or treatment of DRO-contaminated soil. Remedial efforts identified the presence of RRO-contaminated soil above cleanup levels and were removed concurrently with DRO-contaminated soil. Field activities in 2010 excavated the area until DRO and RRO were confirmed to be below site-specific cleanup levels, or when groundwater was encountered. Review of the Remedial Action Report (USACE 2011) indicates groundwater was encountered prior to obtaining soil samples below site-specific cleanup levels within a significant portion of the interior of the excavation. It is likely that groundwater encountered during excavation efforts contains DRO and RRO in addition to previously reported COCs; however, groundwater at Site 6 was not included as a contaminated medium in the DD.

Systems Operations/O&M

Periodic Reviews are required at Site 6 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 6 included the implementation a LUC to designate areas not suitable for drinking water. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *No.*

Changes in Standards and TBCs

The DD identified soil cleanup levels for Site 6 based on the Human Health and Ecological Risk Assessment (USACE 2004) which continue to be considered protective of future residential use.

Changes in Exposure Pathways

PCBs were not evaluated as a COPC at Site 6 at the time of DD (USACE 2009b). During pre-construction sampling efforts in 2009, PCBs were detected at Site 6 at a concentration of 2.2 mg/kg which exceeds the DD identified ARAR for PCBs in soil (18 AAC 75.341). Post-construction sampling at Site 6 in 2009 and surface *MULTI INCREMENT* sampling in 2011 were not able to replicate PCBs concentrations greater than 1 mg/kg. Analysis of PCBs was not included in waste characterization or confirmations samples collected during 2010 remedial efforts and it is unclear whether PCB concentrations above cleanup levels persist within subsurface soil at Site 6.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs to prevent ingestion, inhalation, and dermal contact with contaminated soil are expected to be complete following the implementation of LUCs and verification of complete removal of potential PCB contamination in subsurface soil.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.4 SITE 8 POL SPILL

Question A: *Is the remedy functioning as intended in the DDs?*
Answer: *No.*

Remedial Action Performance

The selected remedy for Site 8 is MNA and LUCs. The limited data available indicates the concentration of DRO in sediment at Site 8 is decreasing in the LDU and MDU; however the usability of the data to evaluate MNA is questionable. Data collected in 2010, 2011, and 2012 was produced from composited sediment samples from randomly selected locations that varied each year. In 2012, 2-methylnaphthalene was identified as exceeding cleanup levels established in the DD. Contaminant variability within the decision units was not established prior to composite sampling. Current results may be underestimating the level of contamination in sediment at Site 8.

System Operations/O&M

Periodic Reviews are required at Site 8 until RAOs are met.

Implementation of Institutional Controls and Other Measures

The selected remedy for Site 8 included implementing LUCs by conducting a survey to delineate the location and extent of sediment contamination, provide a detailed map of the site to the landowner, and record a deed notice that the area should not be used for residential land use without additional investigation and/or cleanup. At the time of this review, LUCs have not been implemented.

Opportunities for Optimization

MNA should be continued until contaminants have been verified to be below cleanup levels. The appropriateness of the decision unit locations should be evaluated and adjusted if necessary to efficiently evaluate natural attenuation. Future sampling efforts should use an ADEC-approved incremental sampling approach to evaluate average contaminant concentrations within each decision unit. Water quality parameters used to evaluate MNA in sediment should be measured in pore water rather than surface water.

Early Indicators of Potential Issues

Current sampling methods may be underestimating the level of contamination in sediment at Site 8.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

Cleanup levels in the DD were based on incidental ingestion/dermal contact with future residents (exposure frequency of 90 days per year and a target hazard quotient of 0.1) and WAC 173-204-520. For those compounds listed as COCs, the cleanup levels and are still considered protective.

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

Current data is insufficient to evaluate whether RAOs for Site 8 will be met through the use of MNA.

Question C:	*Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer:	*No.*

7.5 SITE 9 HOUSING AND OPERATIONS LANDFILL

Question A:	*Is the remedy functioning as intended in the DD?*
Answer:	*Yes.*

Remedial Action Performance

The selected remedy for Site 9 is landfill capping, removal of partially submerged exposed debris from flowing streams, periodic visual monitoring of the cap for settlement and erosion for five years, long-term monitoring to verify COCs in shallow groundwater are not migrating downgradient and impacting surface waters, long-term monitoring to demonstrate the shallow groundwater meets the RAOs for a non-drinking water source, and LUCs. Debris from the surface and surface water adjacent to the landfill was removed in 2010. Following debris removal, the landfill at Site 9 was capped and completed in 2010. Periodic visual monitoring and the 2013 site inspection did not identify any indications of erosion and/or cracking of the landfill cap. Capping appears to have provided containment by reducing water infiltration and minimizing vertical movement of contaminants and preventing human exposure to the waste materials. Monitoring events to verify COCs in shallow groundwater were not migrating downgradient and impacting surface waters was conducted in 2010/2011 and 2013. Long-term monitoring to demonstrate the shallow groundwater meets the RAOs for a non-drinking water source is ongoing.

System Operations/O&M

The landfill cap will continue to be monitored on a five-year basis for up to 30 years for signs of erosion. Continue monitoring surface water to verify COCs in shallow groundwater are not migrating downgradient and affecting surface waters. Continue monitoring shallow groundwater (six long-term monitoring events spaced five years apart) to demonstrate the groundwater meets the RAOs for a non-drinking water source. Periodic Reviews are required at Site 9 until LUCs are implemented and all monitoring events and visual inspections have been completed.

Implementation of Institutional Controls and Other Measures

The selected remedy for Site 9 included the implementation of LUCs to designate areas not suitable for drinking water and to prevent construction of buildings on top of landfills. At the time of this review, LUCs have not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75.341 as the ARAR for soil. For those compounds listed as COCs, the cleanup level has not changed and is still considered protective.

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.6 MOC GROUNDWATER

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The original selected remedy of chemical oxidation does not appear to be capable of meeting target cleanup levels for COCs due to the peat and organic silts in the soil, the presence of permafrost and/or frozen zones, and the observation of preferential flow zones. The contingency remedy of MNA appears to be active in some wells. An overall decrease in COC concentrations and the geochemical parameters in those wells indicate that MNA may meet RAOs eventually for the plume captured by those wells. The final effect of excavation and ultimately MNA on contaminant levels at the MOC is not apparent at this time. Additional information is needed after excavation activities are complete to evaluate MNA as a remedy for groundwater.

Systems Operations/O&M

Continue monitoring shallow groundwater to evaluate natural attenuation in groundwater at the MOC. Periodic Reviews are required for MOC groundwater until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for MOC groundwater included the implementation of the LUC to limit drinking water uses for groundwater at the MOC. At the time of this review, the LUC has not been implemented.

Opportunities for Optimization

Revise/repair the existing well network as planned for 2014.

Early Indicators of Potential Issues

Potential issues for the remedy include multiple, shallow water-bearing zones with potentially different contaminant concentrations, an insufficient well monitoring network, and an unknown reason for DRO contamination in groundwater at MW88-1 in 2010. DRO was not detected above cleanup levels in 2011, 2012, or 2013. As discussed in Section 6.4.6, geochemical parameters indicate that biodegradation appears to be occurring within this plume under reducing conditions.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD identified regulations promulgated by the State of Alaska in 18 AAC 75 to be the only ARAR for groundwater. Only one groundwater cleanup level has changed since the time of the DD: the GRO cleanup level has increased from 1.3 mg/L to 2.2 mg/L. The GRO cleanup level identified in the DD remains 1.3 mg/L. No formal request has been made at this time to adjust the GRO cleanup levels. Analytes retained as groundwater COCs were compared to the current cleanup levels (Appendix B, Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

Current data is insufficient to evaluate whether RAOs for MOC groundwater will be met through the use of MNA.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.7 SITE 10 BURIED DRUMS

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The contingency remedy of excavation and removal of petroleum-contaminated soils was conducted in 2012 and 2013. Surface soil excavation at specific locations identified in the DD had not been initiated at the time of this review. Additional contaminants not anticipated by the DD were encountered in 2012 and removed in 2013. The remedy for groundwater at this site is MNA. Monitoring is ongoing.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews are required at Site 10 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 10 included the implementation an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B:	*Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer:	*Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75.341 as the ARAR for soil. For those compounds listed as COCs, the cleanup level has either not changed or the site-specific values were calculated using a Method Four risk assessment.

Changes in Exposure Pathways

Additional analytes were identified at Site 10 following the signature of the DD. In 2012, these analytes were detected at concentrations that exceeded the cleanup level established in the DD or the 18 AAC 75 migration to groundwater cleanup level (USACE 2013b). Remedial activities conducted in 2013 removed the identified contaminants to the maximum extent practicable (USACE 2014c). Ethylene glycol, methylene chloride, and tetrachloroethylene were evaluated and determined to not significantly affect the human health risk (Appendix B).

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.8 SITE 11 FUEL TANKS

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of petroleum-contaminated soils is functioning as described in the DD. The excavation portion of the remedy was initiated in 2011 continued in 2013 as part of the Site 10 excavations.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews are required at Site 11 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 11 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.9 SITE 13 HEAT AND POWER PLANT

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of PCB- and petroleum-contaminated soils is functioning as described in the DD. The excavation portion of the remedy was initiated in 2010 and completed in 2013. Groundwater monitoring is ongoing.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews are required at Site 13 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 13 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.10 SITE 15 FUEL PIPELINE

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of petroleum-contaminated soils is functioning as described in the DD. The excavation portion of the remedy was initiated in 2011 and completed in 2013. Groundwater monitoring is ongoing.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews are required at Site 15 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 15 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.11 SITE 16 PAINT AND DOPE STORAGE

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of PCB-contaminated soils is functioning as described in the DD. Excavation was completed in 2010.

Systems Operations/O&M

Periodic Reviews are required at Site 16 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 16 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, LUCs had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.12 SITE 19 AUTO MAINTENANCE

Question A: *Is the remedy functioning as intended in the DDs?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of petroleum-contaminated soils is functioning as described in the DD. Excavation was initiated in 2011 and completed in 2012. Groundwater monitoring is ongoing.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews at Site 19 are required until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 19 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C:	*Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer:	*No.*

7.13 SITE 21 WASTEWATER TANK

Question A:	*Is the remedy functioning as intended in the DD?*
Answer:	*Yes.*

Remedial Action Performance

The remedy of excavation and removal of PCB- and arsenic-contaminated soils is functioning as described in the DD. Excavation of PCB-contaminated soil was completed in 2010. Excavation of arsenic-contaminated soil was initiated in 2010 and is currently ongoing.

Systems Operations/O&M

CERCLA five-year reviews are required at Site 21 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 21 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

The source of the arsenic contamination remains unclear. The current excavation is focused only around the area of the highest concentration identified in the DD (170 mg/kg at the end of the discharge pipe). Samples collected in 1994, 2001 and 2003 indicate that there are 12 additional locations at Site 21 where arsenic concentrations exceed the background level of 11 mg/kg: four surface sample locations in the outfall area (11.5 to 39 mg/kg), six locations along the utilidors (11.4 to 35.2 mg/kg) and two locations where arsenic confirmation samples were not collected following the PCB excavations (arsenic concentrations ranged between 13.9 and 18 mg/kg [USACE 2007]). These locations must be addressed to meet the same RAOs addressed by the main excavation: preventing current exposure to humans by ingestion, inhalation, and dermal contact with contaminated soils at levels above ARARs.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. Since the time of the risk assessment, the arsenic migration to groundwater cleanup level has increased from 2 to 3.9 mg/kg (USACE 2004). However, a background level of 11 mg/kg is being applied as the cleanup target for this site. In 2011, a background study suggested 11.49 mg/kg to be an appropriate background concentration and the cleanup goal was not changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

The excavation of PCB-contaminated soils has met RAOs to prevent ingestion, inhalation, and dermal contact with contaminated soil. RAOs for arsenic-contaminated soil are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.14 SITE 27 DIESEL FUEL PUMP

Question A: *Is the remedy functioning as intended in the DDs?*
Answer: *Yes.*

Remedial Action Performance

The remedy of excavation and removal of petroleum-contaminated soils is functioning as described in the DD for DRO and RRO in soil. The excavation portion of the remedy was initiated in 2012 and ended in 2013. Performance has not been verified for naphthalene. Groundwater monitoring is ongoing.

Although naphthalene was not included in the analyte list for excavation confirmation sampling, groundwater results indicate that naphthalene is not migrating to groundwater at this time and that MNA is occurring in the adjacent wells. However, downgradient sediment samples contain elevated levels of many fuel-related contaminants and nearby surface water samples detected elevated levels of DRO and RRO.

Systems Operations/O&M

When the excavation remedy is complete, install new wells, or repair/refurbish existing wells. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy. Periodic Reviews are required at Site 27 until RAOs are met.

Implementation of LUCs and Other Measures

The selected remedy for Site 27 included the implementation of an LUC to prevent the use of the aquifer for drinking water purposes until cleanup levels are met. At the time of this review, the LUC had not been implemented.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

The analyte list currently applied to soil samples does not appear to cover all site COCs. Soil excavation confirmation samples were analyzed for DRO and RRO only. However, naphthalene was previously detected at this site in concentrations exceeding the site-specific cleanup level. Naphthalene also exceeds its cleanup criterion in the sediment downgradient from this site at Site 28. Post-excavation samples from Site 28, Sediment Removal Area 2 detected naphthalene at concentrations up to 450 mg/kg (USACE 2013d).

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed 18 AAC 75 as the ARAR for soil. No soil cleanup levels have changed. Soil analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1).

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.15 SITE 28 DRAINAGE BASIN

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The selected remedy for Site 28 consisted of two components: excavation and removal of petroleum-, metals-, and PCB-contaminated sediment, including the (1) removal of submerged sediments from the narrow channel upgradient of the Suqitughneq River, and (2) construction of a sedimentation pond or other appropriate controls. The ends of the culverts would also be cleaned out and removed or plugged to prevent direct outflows of upgradient residual sources of contamination.

The culverts were removed in 2010. Excavation of contaminated sediments occurred in 2012 and 2013 after additional investigation was conducted in 2011 and 2012. Sediment migration is currently being controlled by an in-stream sediment trap installed in 2012 while remedial activities are in progress. The in-stream sediment trap is removed prior to demobilization at the end of each field season.

Systems Operations/O&M

CERCLA five-year reviews are required at Site 28 until RAOs are met.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Implementation of LUCs and Other Measures

Current sediment control measures appear to be effective. An in-stream sediment trap was installed in 2012 and 2013 during remedial actions at Site 28. All surface water samples meet the surface water criteria. Following completion of the remedy, a permanent sedimentation pond or other appropriate controls may need to be installed to prevent any further migration of sediment downgradient of the site.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD listed two sources of sediment cleanup levels: consensus-based probable effects concentrations (EPA 2002) and WAC 173-204-520, Table III sediment minimum cleanup level (WAC 1995). The WAC standard was updated in February 2013. Table III now appears in 173-204-562, but the numeric cleanup levels did not change. Sediment analytes were compared to the current cleanup levels as presented in Appendix B (Table B-1). The current sediment cleanup level for arsenic in sediment (93 mg/kg) was used to calculate carcinogenic and non-carcinogenic risk as part of the Five-Year Review limited risk evaluation (Appendix B). The DD-specified cleanup level for sediment of 93 mg/kg results in a hazard quotient level slightly greater than 1 (calculated at 1.32) and a carcinogenic risk of 6.9×10^{-5} using the exposure parameters specific in the risk assessment that supported the DD (USACE 2004). Although the carcinogenic risk exceeds the ADEC risk assessment point of departure (1.0×10^{-5}) it is within the EPA risk range (1.0×10^{-4} to 1.0×10^{-6}).

Changes in Exposure Pathways

Arsenic was not evaluated in the risk assessment for Site 28 because it had not been detected at significant concentrations at the time (USACE 2004). The current sediment cleanup level established in the DD (93 mg/kg) was used to calculate carcinogenic and non-carcinogenic risk as part of the Five-Year Review limited risk evaluation (Appendix B). The DD-specified cleanup level for sediment of 93 mg/kg results in a hazard quotient level slightly greater than 1 (calculated at 1.32) and a carcinogenic risk of $6.9E^{-05}$ using the exposure parameters specific in the risk assessment that supported the DD (USACE 2004). Although the carcinogenic risk exceeds the risk assessment point of departure (1.0 x 10^{5}) it is within the EPA risk range (1.0 x 10^{-4} to 1.0 x 10^{-6}).

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.16 SITE 32 LOWER TRAMWAY

Question A: *Is the remedy functioning as intended in the DD?*
Answer: *Yes.*

Remedial Action Performance

The selected remedy for Site 32 is excavation and disposal or treatment of DRO-contaminated soils. DRO-contaminated soil identified in the DD remains onsite and is planned for removal in 2014.

System Operations/O&M

Periodic Reviews are required at Site 32 until RAOs are met.

Implementation of LUCs and Other Measures

Not applicable.

Opportunities for Optimization

None identified.

Early Indicators of Potential Issues

None identified.

Question B: *Are the exposure assumption, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection still valid?*
Answer: *Yes.*

Changes in Standards and TBCs

The DD identified soil cleanup levels based on the Human Health and Ecological Risk Assessment (2004) and continue to be considered protective of future residential use.

Changes in Exposure Pathways

None identified.

Changes in Toxicity and Other Contaminant Characteristics

None identified.

Changes in Risk Assessment Methods

None identified.

Expected Progress Toward Meeting RAOs

RAOs are expected to be met upon completion of the remedy.

Question C: *Has any other information come to light that could call into question the protectiveness of the remedy?*
Answer: *No.*

7.17 TECHNICAL ASSESSMENT SUMMARY

Attainment of RAOs is measured through collection of empirical data and data were compared against ARARs. For most of the sites, the remedy is functioning as intended by the

DD, but implementation is not yet complete. The remedy is expected to meet RAOs upon completion at Sites 3, 8, 9, 10, 11, 13, 15, 16, 19, 21, 27, 29, and 32.

At Site 6, PCBs were detected at a concentration 2.2 mg/kg in 2009, which exceeded the cleanup level of 1 mg/kg. The site-wide RAO applicable to PCBs is to prevent current and future exposure to humans by ingestion, inhalation, and dermal contact with contaminated soils at levels above ARARs or pertinent risk-based standards (USACE 2009b). Because it is not clear if PCBs persist in subsurface soil at Site 6, exposure assumptions could not be verified.

Vapor intrusion exposure at Northeast Cape is not currently an issue due to the absence of housing or habitable structures on the site. However, if residential structures are planned for areas of known soil or groundwater contamination, structures should be constructed in manner that eliminates the potential for vapor intrusion.

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8.0 ISSUES

This section summarizes issues and concerns related to current site operations, conditions, or activities that were identified during this Five-Year Review. Issues were evaluated to determine if they affected current of future protectiveness of the associated remedy. Table 8-1 summarizes issues identified as affecting the protectiveness of the associated remedy. Table 8-2 summarizes issues identified as not affecting the protectiveness of the associated remedy. Unresolved concerns raised by the community are also summarized and discussed.

Table 8-1
Issues Affecting Protectiveness

Issue No:	Site(s)	Issue	Reference	Affects Current Protectiveness? (Yes/No)	Affects Future Protectiveness? (Yes/No)
1	3, 6, 8, 9, 10, 11, 13, 15, 16, 19, 21, 27	LUCs to prevent the use of the aquifer for drinking water purposes until cleanup levels are met (Sites 10, 11, 13, 15, 16, 19, 21, and 27), to designate areas unsuitable for drinking water (Sites 3, 6, and 9), to prevent construction of buildings on top of landfills (Site 9), and to designate areas not suitable for residential land use without additional investigation and/or cleanup (Site 8) are not formally implemented.	USACE 2009b	No	Yes
2	6	Pre-construction soil samples identified one surface soil sample with a PCB concentration of 2.2 mg/kg. Excavations occurred as part of the remedial action for DRO at the site and may have removed the PCBs. Post-excavation samples were not tested for PCBs. It is not known if PCBs remain onsite at the location of the previous detection.	USACE 2009b USACE 2011 USACE 2012	No	Yes
3	10	Ethylene glycol was identified and removed to the extent practicable in soil. There is not currently enough information to evaluate the presence or potential risk presented by the leaching of ethylene glycol to groundwater.	USACE 2013b	No	Yes
4	MOC (10, 11, 13, 15, 19, 27)	The well network does not provide sufficient downgradient coverage of the site. Existing monitoring wells have been damaged by frost jacking and utilization of locking caps is not currently possible.	USACE 2013b	No	Yes
5	MOC (10, 11, 13, 15, 19, 27)	The locations of monitoring wells with historic contamination (MW88-10 and MW88-1) appear to be upgradient of source areas identified as part of the MOC. The source of DRO in the wells is unclear.	USACE 2013b	No	Yes
6	21	Current remedial activities are focused on arsenic removal around the highest historic result at the utilidor outfall, but are not addressing locations along the former utilidor route with concentrations greater than the currently accepted cleanup level.	USACE 2007d	No	Yes
7	27	Previous sampling detected the site COC naphthalene in soil above the cleanup level (up to 191 mg/kg) but naphthalene is not included in the analyte list for excavation confirmation sampling. Attainment of soil cleanup levels for naphthalene cannot be confirmed.	USACE 2009b USACE 2013c	No	Yes

Table 8-2
Issues Not Affecting Protectiveness

Issue No:	Site(s)	Issue	Reference	Affects Current Protectiveness? (Yes/No)	Affects Future Protectiveness? (Yes/No)
1	3	The 2013 site inspection identified a large area of surface water at Site 3 not evaluated as an exposure pathway at the time of the risk assessment.	Site 3 site inspection (Appendix C) USACE 2004	No	No
2	3	An apparent petrogenic sheen, limited in size, was observed in surface water at Site 3. A small plastic motor oil container cap was also observed near the sheen.	Site 3 site inspection (Appendix C)	No	No
3	8	Previous monitoring activities to assess the progress of natural attenuation may not be adequate because of the sampling technique used to collect samples. Current results may not be representative of the sediment concentration within the entire decision unit at Site 8.	USACE 2009b USACE 2011 USACE 2012 USACE 2013b	No	No
4	8	Site 8 sediment sampling, composite sampling completed in 2010, 2011, and 2012 identified 2-methylnaphthalene at concentrations greater than the site-specific cleanup level.	USACE 2009b USACE 2011 USACE 2012 USACE 2013b	No	No
5	8	Established Decision Units may not include the most heavily impacted area.	USACE 2009b USACE 2011 USACE 2012 USACE 2013b	No	No
6	8	Water quality and natural attenuation parameters are measured in surface water.	USACE 2009b USACE 2011 USACE 2012 USACE 2013b	No	No
7	MOC (10, 11, 13, 15, 19, 27)	As of 2012, elevated levels of DRO and RRO were found in surface water during excavation activities. TAH and TAqH were not included as test parameters.	USACE 2013b	No	No

8.1 COMMUNITY ISSUES

Issues raised by the community regarding cleanup activities were identified through community interviews, RAB meeting minutes, public meeting minutes, and letters to the EPA. A description of the identified issues and their current status are described below.

The communities of St. Lawrence Island would like the tribes instituted as official signatories/Parties to any Records of Decision (ACAT 2009; Community Interview 2013)

The Corps cannot seek Tribal signatures on Records of Decision because the tribe does not have jurisdiction over the land itself. CERCLA regulations required that Indian tribes have jurisdiction over the site in order to be afforded substantially the same treatment as states (USACE letter to EPA, April 2010).

Lichen is prominent throughout the site and has not been sampled for contaminants. Reindeer populations frequent this area and are used for subsistence (RAB 2012a).

Lichen has not been evaluated for contaminants at Northeast Cape. The U.S. Department of Health and Human Services (DHHS) performed a health consultation in 2001 and determined reindeer exposures to site-related contaminants are low (DHHS 2001). Detectable health effects are not expected in individuals consuming reindeer muscle and fat on St. Lawrence Island (DHHS 2001 [health consultation]). The risk assessment conducted for Northeast Cape evaluated reindeer as an ecological endpoint and determined the cross fox represented a more highly exposed terrestrial mammal because it has a smaller home range than reindeer and, as a carnivore, is at a higher trophic level. The results of the evaluation indicated the ecological hazard estimate for the cross fox was below the departure criterion of 1.0 for all sites (USACE 2004).

A community member indicated there was a pipeline break between the Native Village of Northeast Cape and the Site 7 Landfill. He would like this area located and tested (RAB 2012a)

The area (identified as an additional pipeline break site during the 2012 December RAB meeting) was included as an area of investigation during the 2013 field season. Analytes were not identified at concentrations greater than site-specific cleanup levels (USACE 2014c).

Alaska Community Action on Toxics (ACAT) obtained a sediment sample from the Suqitughneq River using a semi-permeable membrane device and brought up mirex as a COC. ACAT would like more samples collected from the Suqitughneq River estuary (RAB 2012b).

Water collection using a semi-permeable membrane is not an ADEC-approved method of collection (RAB 2012b). The USACE and Savoonga community are discussing additional sampling of the Suqitughneq River following the completion of remedial efforts at the MOC and Site 28 (EPA 2011c).

A community member indicated there are cabins on St. Lawrence Island that were built using salvaged Northeast Cape FUDS materials. The community requested that these cabins be included as part of the remedial efforts at Northeast Cape (RAB 2012b, 2013 Community Interview).

Structures constructed using salvaged materials from the Northeast Cape FUDS are not eligible under the FUDS program at this time (2013 Community Interview). Selected structures near Site 3 are being addressed under the Native American Lands Environmental Mitigation Program.

ACAT would like cleanup levels to be re-evaluated given the multiple health burdens that affect the community (EPA 2011c).

Cleanup levels used for the Northeast Cape were developed based on the Human Health and Ecological Risk Assessment, WAC, and AAC. They are considered protective of future residential use (USACE 2009b; USACE 2004).

A community member indicated during Northeast Cape operations, oil was used along Cargo Beach Road for dust suppression. The community requested soil from Cargo Beach Road be tested for potential contaminants (RAB 2012b)

Four test pits at four different roadway segments of Cargo Beach Road were excavated and sampled during the 2013 field season to address this concern. The locations of the excavations were between Cargo Beach and Site 6, between the airstrip and Site 8, between Site 8 and the MOC, and between the MOC and Site 31. Test pits were advanced to a depth of 2 feet bgs using an excavator. Soil samples were collected between 1 and 2 feet bgs and submitted for analysis of GRO, DRO, RRO, BTEX, PAHs, PCBs, RCRA metals, and zinc. No contaminants were identified at concentrations exceeding cleanup levels.

A community member stated there was a pipeline break between the Native Village of Northeast Cape and the Site 7 landfill. The community requested testing of this area for potential contaminants (RAB 2012b)

The area identified during the December 2012 RAB meeting was clarified to be located where a culvert passes under Cargo Beach Road between Site 3 and Site 7. It is believed that a fuel leak may have occurred on the northwest site of the road where the fuel pipeline used to transfer diesel from Site 3 pumphouse to tanks at the MOC. The area west of Cargo Beach Road was sampled during the 2013 field season at the location of the suspected pipeline break between Sites 3 and 7. Four soil borings were advanced to 2 feet bgs within a 15-foot by 15-foot area. Two samples were collected from each soil boring at depths of approximately 1 foot and 2 feet bgs and submitted for analysis of BTEX, GRO, DRO, and RRO. No contaminants were identified at concentrations exceeding cleanup levels.

A community member indicated stressed vegetation was observed along the road leading to the former Upper Camp (Site 34) (also known as Radome Road). A request was made to test the area of stressed vegetation for potential contaminants (EPA 2011c; RAB 2012b).

In 2012, the area identified during the 2011 RAB Meeting was investigated twice prior to soils sample collection. It was concluded that vegetation along the Radome Road was consistent with vegetation in the general area at the top of Mt. Kangukhsam (USACE 2013b). Six samples were collected from 4 to 6 inches bgs along the side of the road near the former Radome. An additional sample was collected from an undisturbed area uphill of the six samples to represent background/natural conditions. All samples were sent to an analytical laboratory for analysis of GRO, DRO, RRO, BTEX, PAHs, PCBs, and RCRA metals plus nickel, vanadium, and zinc. Sample results were compared to the site-specific cleanup levels and no exceedances were identified (USACE 2013b).

Kangukhsam Mountain Spring, located near the Lower Tramway (Site 32) was identified by community members as a seasonal drinking water source.

In 2013, surface water samples were collected from Kangukhsam Mountain Spring and analyzed for GRO, DRO, RRO, BTEX, PAHs, and PCBs as well as total and dissolved RCRA metals and zinc. All sample results were compared to the site-specific cleanup levels and no exceedances were identified (USACE 2014b).

Responses to questionnaires identified a few areas where additional contamination related to FUDS activities may be present. Areas identified include a potential dump site on the south side of the Kangukhsam Mountain, remaining utilidors at the MOC, and barrels and sludge below ponds at Site 24. Additionally one member noted a septic tank between Site 21 and Site 28 but it is unknown if this refers to the septic tank removed in 2003 and documented in the DD (USACE 2009b).

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9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Recommendations and follow-up actions have been identified, to address the issues presented in Section 8.0. Table 9-1 presents recommendations to issues identified as affecting protectiveness and Table 9-2 presents recommendations to issues identified as not affecting protectiveness.

Table 9-1
Recommendations and Follow-up Actions for Issues Affecting Protectiveness

Issue No.	Site(s)	Recommendations/Follow-up Actions	Party Responsible	Regulatory Party	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
1	3, 6, 8, 9, 10, 11, 13, 15, 16, 19, 21, 27	Implement LUCs, as described in the DD, following completion of the remedial action fieldwork.	USACE	ADEC	2018	No	Yes
2	6	Confirm the presence or absence of PCBs in soil at the location of the previous detection.	USACE	ADEC	2018	No	Yes
3	10	Add ethylene glycol to the suite of analytes evaluated in Site 10 groundwater.	USACE	ADEC	2018	No	Yes
4	MOC (10, 11, 13, 15, 19, 27)	When the excavation remedy is complete, install new wells or repair/refurbish existing wells downgradient of MOC Sites 10, 11, 13, 15, 19, and 27. The location and quantity of wells should take into account the hydraulic gradient and duration of the groundwater remedy.	USACE	ADEC	2018	No	Yes
5	MOC (10, 11, 13, 15, 19, 27)	Install a monitoring well upgradient of MW88-10 and MW88-1. The well location should take into account the anticipated hydraulic gradient at the site.	USACE	ADEC	2018	No	Yes
6	21	Continue remedy implementation at all site locations that exceed the arsenic cleanup level.	USACE	ADEC	2018	No	Yes
7	27	Collect soil confirmation samples for naphthalene to verify that it does not persist above cleanup levels at this site.	USACE	ADEC	2018	No	Yes

Table 9-2
Recommendations and Follow-up Actions for Issues Not Affecting Protectiveness

Item No.	Site	Recommendations/Follow-up Actions	Party Responsible	Regulatory Party	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
1	3	Evaluate surface water as an exposure pathway at Site 3.	USACE	ADEC	2018	No	No
2	3	Determine whether the sheen continues to be present at the Site 3 pond and if non-FUDS activities are a contributing factor. If sheen is observed, collect samples to determine the nature of the sheen.	USACE	ADEC	2018	No	No
3	8	Establish the average decision unit concentration using an incremental sampling approach.	USACE	ADEC	2018	No	No
4	8	Continue monitoring natural attenuation in sediment.	USACE	ADEC	2018	No	No
5	8	Ensure the most heavily impacted area is included within the Decision Unit boundaries.	USACE	ADEC	2018	No	No
6	8	Evaluation of natural attenuation parameters and water quality should be conducted in pore water to more accurately assess natural attenuation in contaminated sediment.	USACE	ADEC	2018	No	No
7	MOC (10, 11, 13, 15, 19, 27)	If GRO, DRO, or RRO is suspected, add VOCs and PAHs to surface water samples, to allow TAH/TAqH evaluation. These analyses were included in the 2013 Work Plan.	USACE	ADEC	2018	No	No

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10.0 PROTECTIVENESS STATEMENT(S)

Protectiveness statements were developed in accordance with EPA's *Five-Year Review Guidance* (EPA 2001) and are included in this section.

10.1 SITE 3 FUEL PUMP HOUSE

The remedy at Site 3 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.2 SITE 6 GRAVEL PAD

A protectiveness determination of the remedy at Site 6 cannot be made until further information is obtained. Further information will be obtained by confirming the absence of PCBs in subsurface soil. It is expected that these actions will take approximately three years to complete, at which time a protectiveness determination will be made.

10.3 SITE 8 POL SPILL

The remedy at Site 8 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.4 SITE 9 HOUSING AND OPERATIONS LANDFILL

The remedy at Site 9 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.5 SITE 10 BURIED DRUMS

The remedy at Site 10 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.6 SITE 11 FUEL TANKS

The remedy at Site 11 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.7 SITE 13 HEAT AND POWER PLANT

The remedy at Site 13 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.8 SITE 15 FUEL PIPELINE

The remedy at Site 15 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.9 SITE 16 PAINT AND DOPE STORAGE

The remedy at Site 16 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.10 SITE 19 AUTO MAINTENANCE

The remedy at Site 19 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.11 SITE 21 WASTEWATER TANK

The remedy at Site 21 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.12 SITE 27 DIESEL FUEL PUMP

The remedy at Site 27 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.13 SITE 28 DRAINAGE BASIN

The remedy at Site 28 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

10.14 SITE 32 LOWER TRAMWAY

The remedy at Site 32 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks in these areas.

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11.0 NEXT REVIEW

Future five-year reviews for Northeast Cape FUDS Sites 21 and 28 are necessary because contamination remains above levels that allow for UU/UE in these areas. The next Five-Year Review is due on or before 3 September 2019.

Periodic Reviews are necessary at Sites 3, 6, 8, 9, 10, 11, 13, 15, 16, 19, 27, and 32 on a periodic basis until RAOs are met.

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APPENDIX A

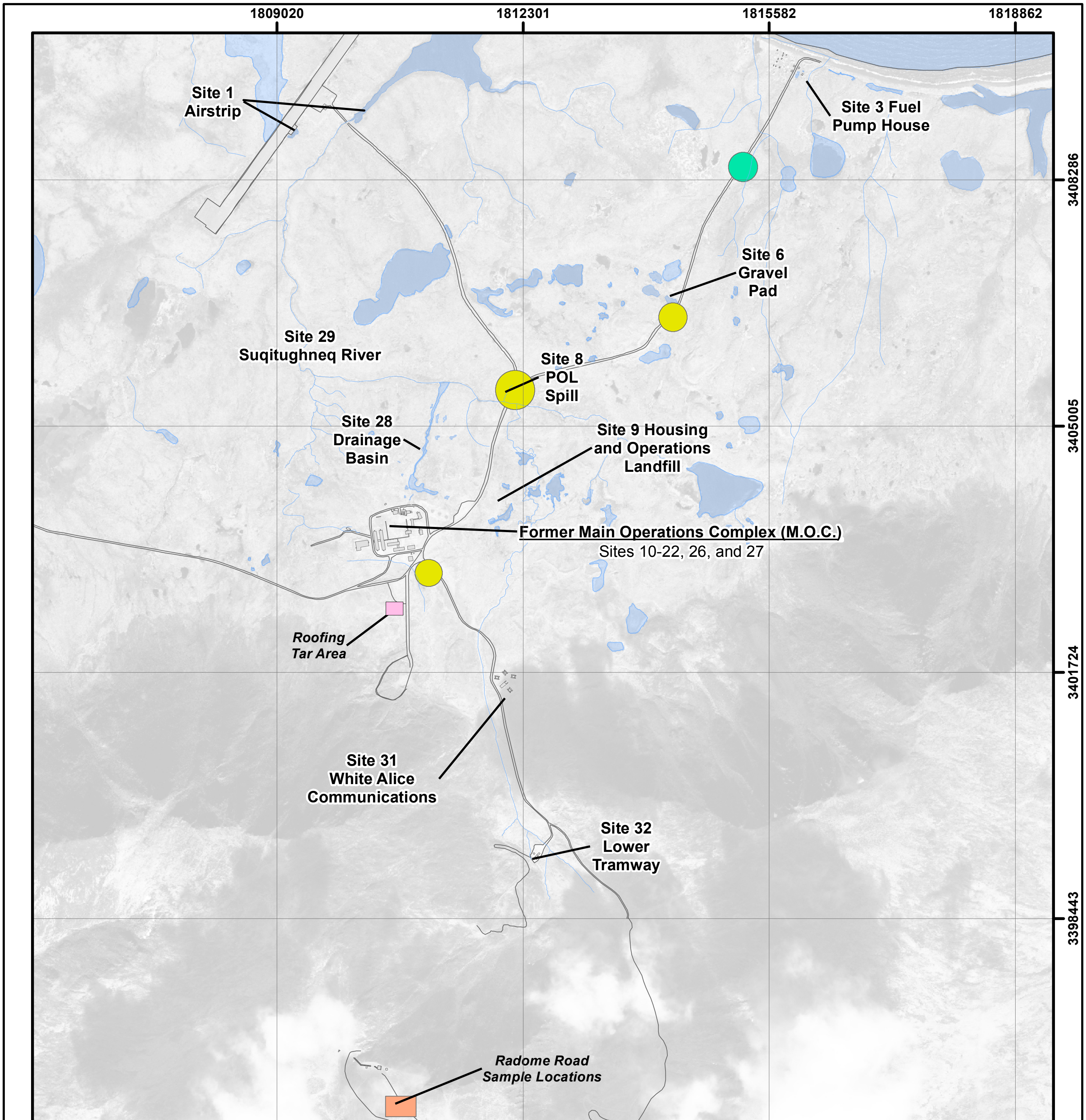
Figures

NORTHEAST CAPE
VICINITY MAP

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-1

P:\StLawrenceIsland\MXD\TO09_NorthEastCape\StLawrenceVic.mxd wattta



Suspected Pipeline Break Sampling Location

2013 Road Sampling Locations

Roofing Tar

Radome Road Sample Locations

Road/Path

Surface Water

All Locations Are Approximate

0 0.25 0.5

Miles

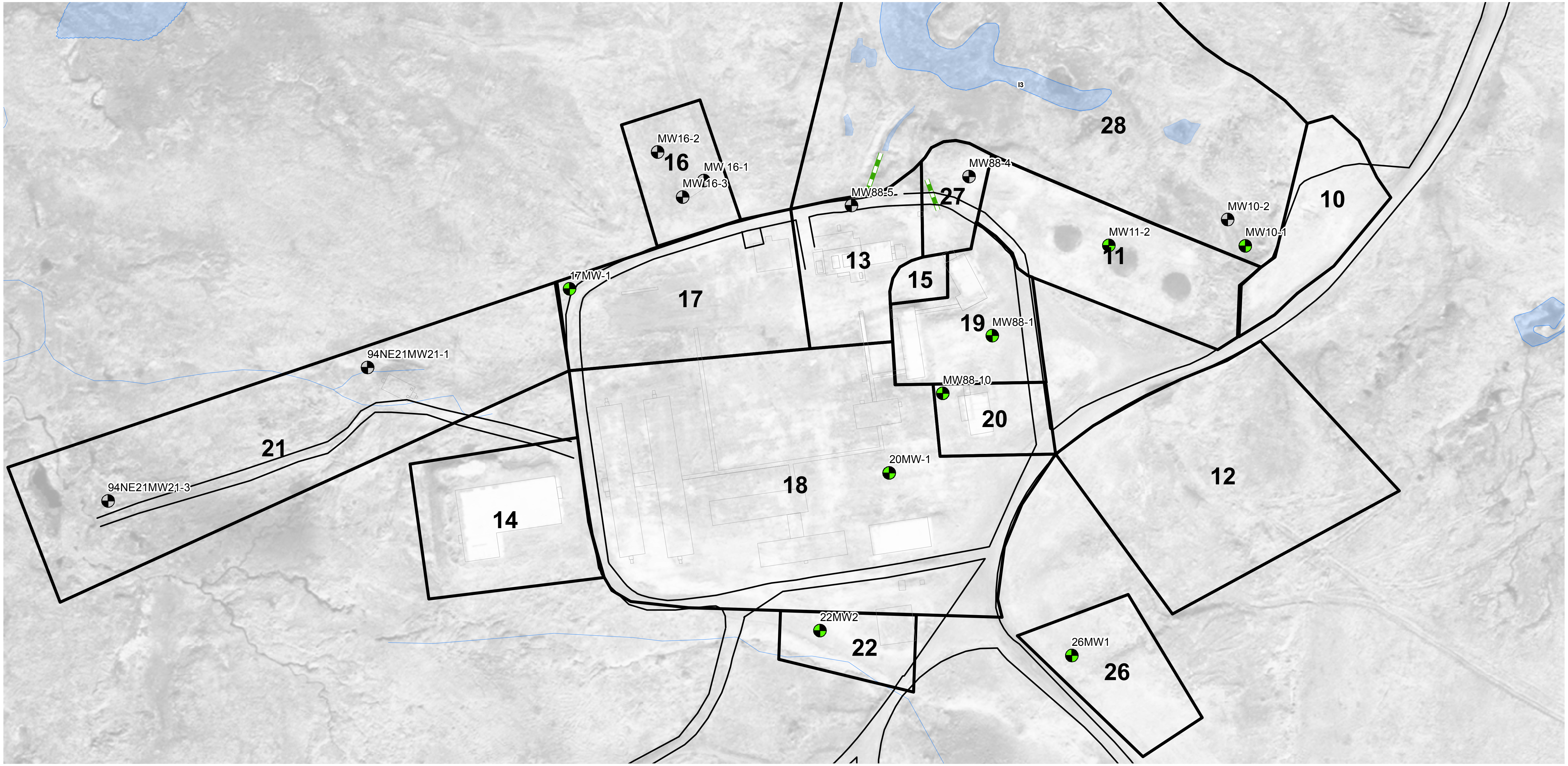
NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE LOCATIONS

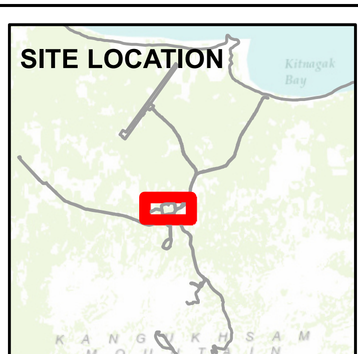
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-2



Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

SITE LOCATION



- Monitoring Well
- Well Abandoned
- Road
- Former Culvert
- Approximate Site Boundaries
- Building
- Surface Water

All Locations Are Approximate

0 100 200 300 400

Feet

N

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

NORTHEAST CAPE 5-YEAR REVIEW
MAIN OPERATIONS COMPLEX (MOC) OVERVIEW

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-3

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Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Samples refer to samples taken prior to the signing of the Decision Document in 2009.

Confirmation Sample Below Site-Specific Cleanup Level
Historical Sample Exceedance Location
Surface Water

N

All Locations Are Approximate

0 40 80 120 160
Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26 Aug, 2008

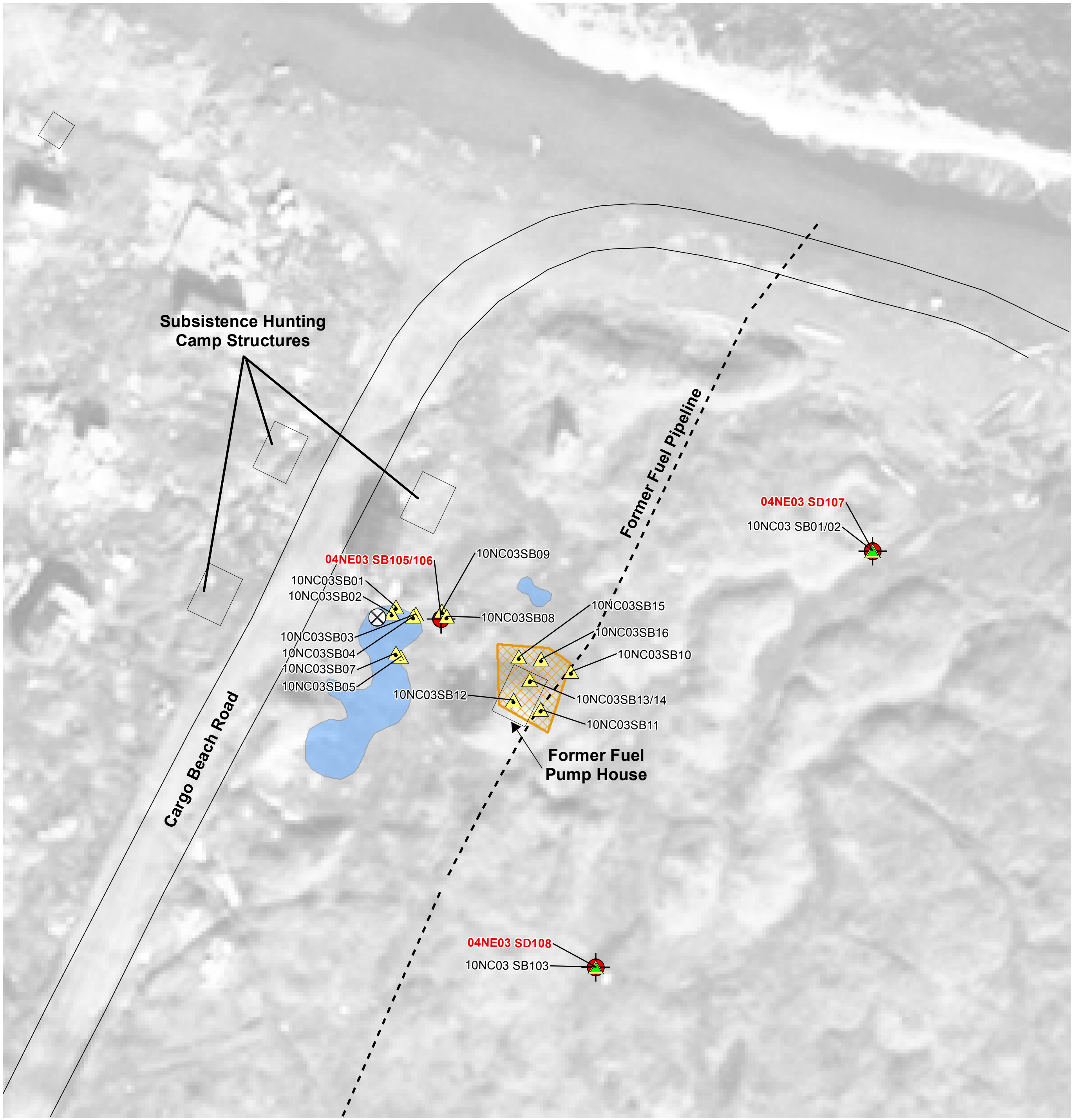
NORTHEAST CAPE 5-YEAR REVIEW
SITE 1 - AIRSTRIP

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-4

P:\StLawrenceIsland\MXD\TO09_NorthEastCape\5YearReview\A4_Site01_Airfield_StLawrence.mxd wattta



Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Samples refer to samples taken prior to the signing of the Decision Document in 2009.

Silica Gel Confirmation Sample Below Site-Specific Cleanup Level
Confirmation Sample Below Site-Specific Cleanup Level
Historical Sample Exceedance Location
Former Fuel Pipeline
Stockpile Removal Extent
Approximate Location of Surface Water Observed During 2013 Site Inspection
Road
Building
Approximate Location of Apparent Petrogenic Sheen Observed During 2013 Site Inspection

All Locations Are Approximate

0 25 50 75 100

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26 Aug, 2008

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 3 - FORMER FUEL PUMP HOUSE

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-5

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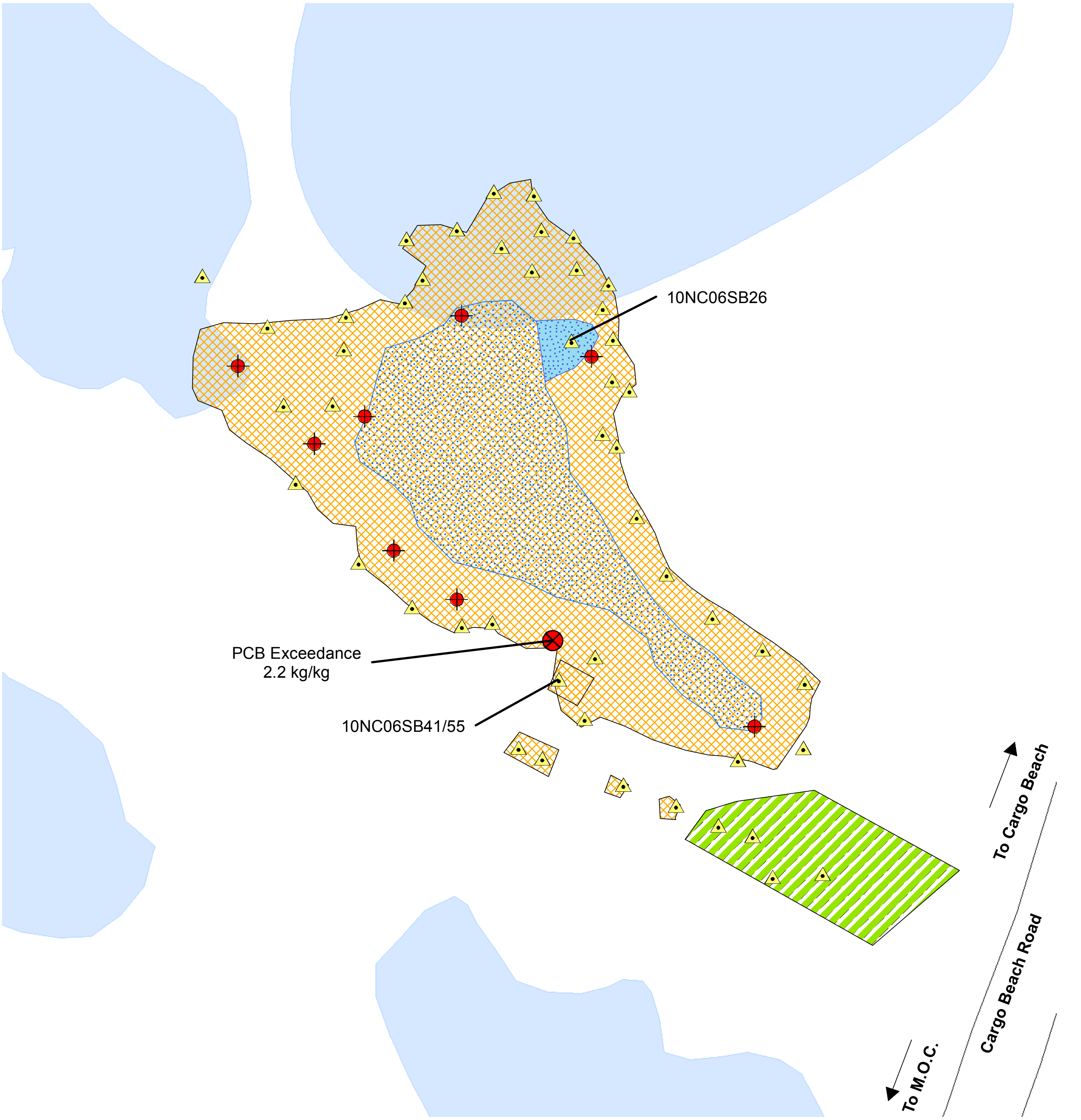

Notes: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Samples refer to samples taken prior to the signing of the Decision Document in 2009.

SITE LOCATION

Confirmation Sample Below Site-Specific Cleanup Level
Historical Sample Exceedance Location
2009 PCB Exceedance Approximate Location (USACE 2010b)
Surface Water
Excavation Boundary
Excavation to Groundwater
Excavation to Groundwater (Approximate)
Plant Screen

All Locations Are Approximate
0 20 40 60 80
Feet
NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26 Aug, 2008

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 6 - GRAVEL PAD
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-6

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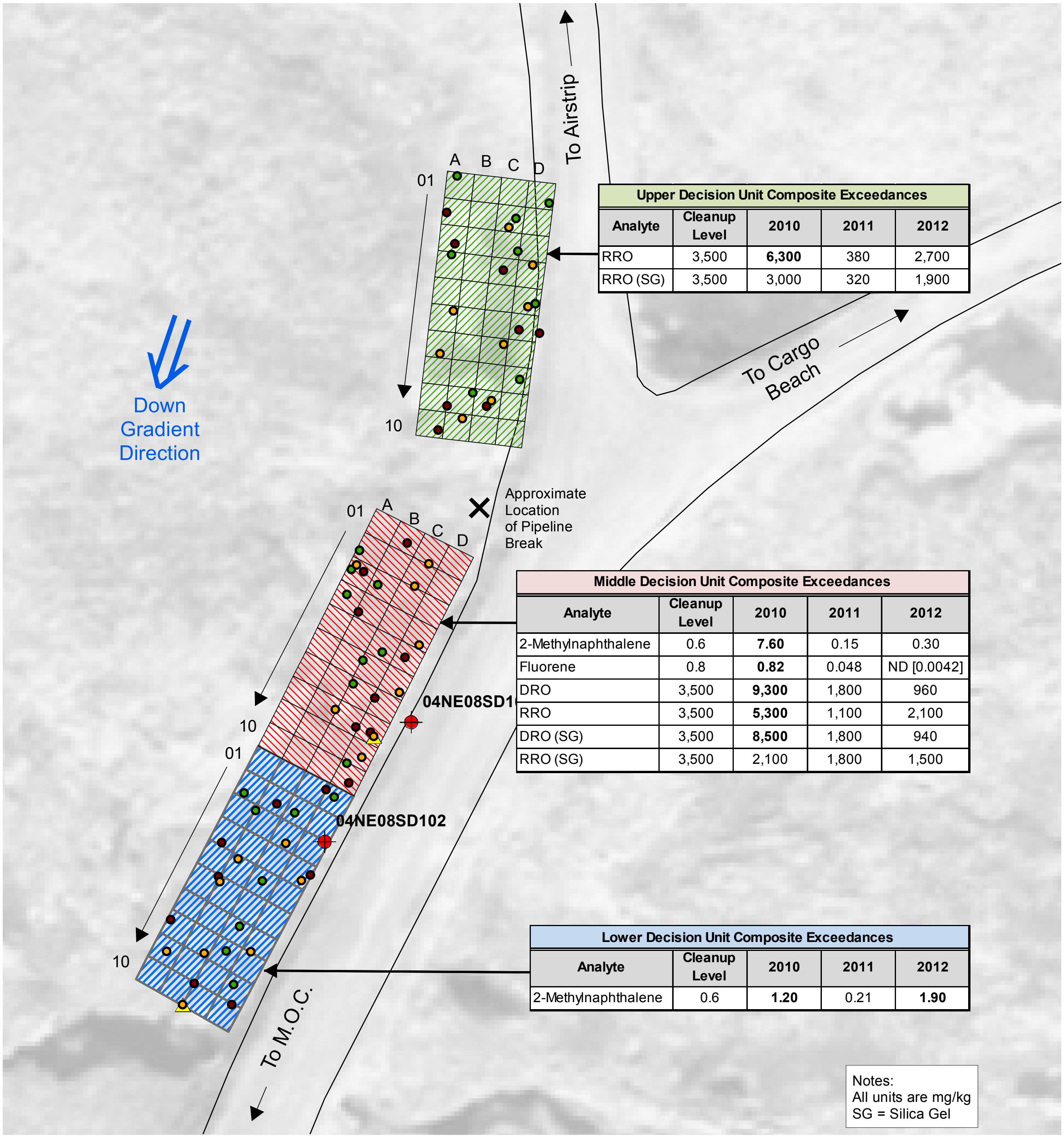

Upper Decision Unit Composite Exceedances

Analyte	Cleanup Level	2010	2011	2012
RRO	3,500	**6,300**	380	2,700
RRO (SG)	3,500	3,000	320	1,900

Middle Decision Unit Composite Exceedances

Analyte	Cleanup Level	2010	2011	2012
2-Methylnaphthalene	0.6	**7.60**	0.15	0.30
Fluorene	0.8	**0.82**	0.048	ND [0.0042]
DRO	3,500	**9,300**	1,800	960
RRO	3,500	**5,300**	1,100	2,100
DRO (SG)	3,500	**8,500**	1,800	940
RRO (SG)	3,500	2,100	1,800	1,500

Lower Decision Unit Composite Exceedances

Analyte	Cleanup Level	2010	2011	2012
2-Methylnaphthalene	0.6	**1.20**	0.21	**1.90**

Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

SITE LOCATION

Historical Sediment Sample Exceedance

2012 Surface Water Sample Location

2012 Sediment & Surface Water Sample Location

2011 Sediment & Surface Water Sample Location

2010 Sediment & Surface Water Sample Location

Upper Decision Unit

Middle Decision Unit

Lower Decision Unit

Road

All Locations Are Approximate

0 20 40 60 80

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26, Aug, 2008

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 8 - POL SPILL

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-7

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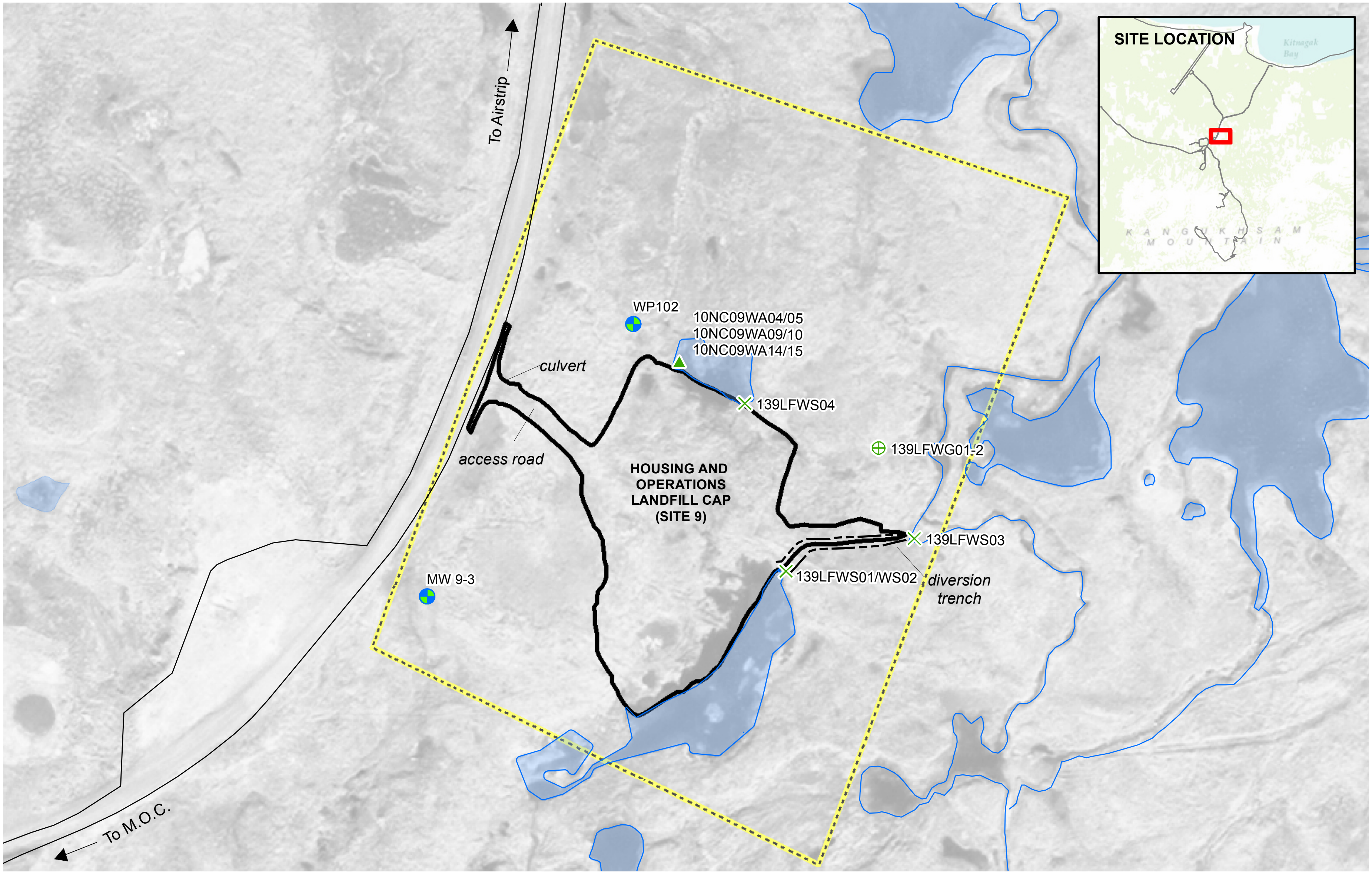

Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

- 2010 Surface Water Samples (Approximate Location)
- 2013 Surface Water Sample
- 2013 Groundwater Sample
- 2001 Abandoned Monitoring Well (Approx. Location)
- Non-Drinking Water Area
- Surface Water

N

All Locations Are Approximate

0 50 100 150 200
Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

NORTHEAST CAPE 5-YEAR REVIEW
SITE 9 - HOUSING AND OPERATIONS LANDFILL

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-8

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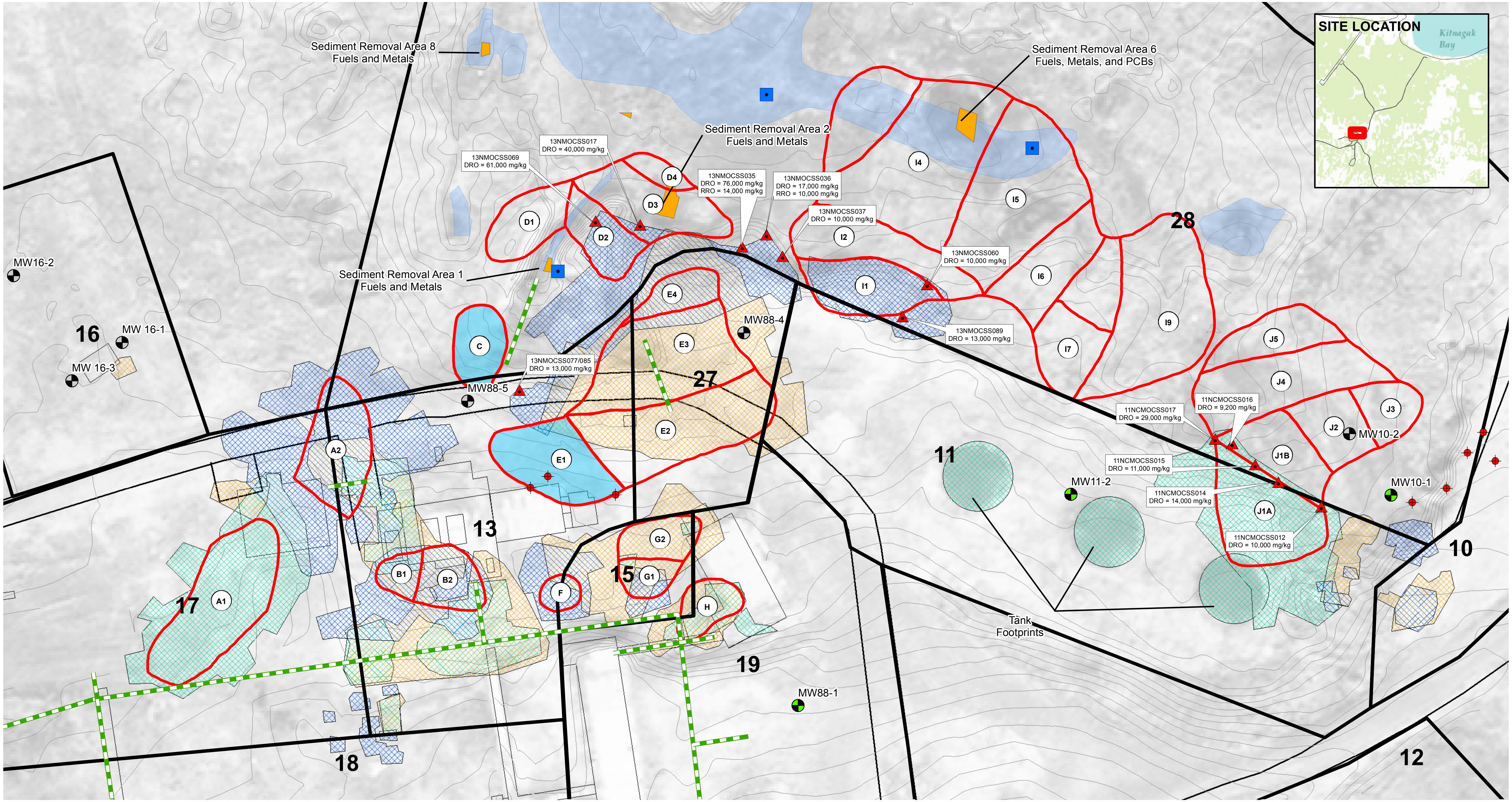

Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

Confirmation Sample Exceedance
Historical Sample Exceedance Location
2012-2013 Surface Water Sample Location
Monitoring Well
Well Abandoned
Building
Approximate Site Boundaries
UVOST® Delineated Plume (2010)
Planned Excavation 2014
2011 Excavation
2012 Excavation
2013 Excavation
Sediment Removal Area
Surface Water
Former Culvert
Elevation Contour
Road or Path

N

0 50 100 150 200
Feet

All Locations Are Approximate
NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

NORTHEAST CAPE 5-YEAR REVIEW
MAIN OPERATIONS COMPLEX (MOC) OVERVIEW
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-9

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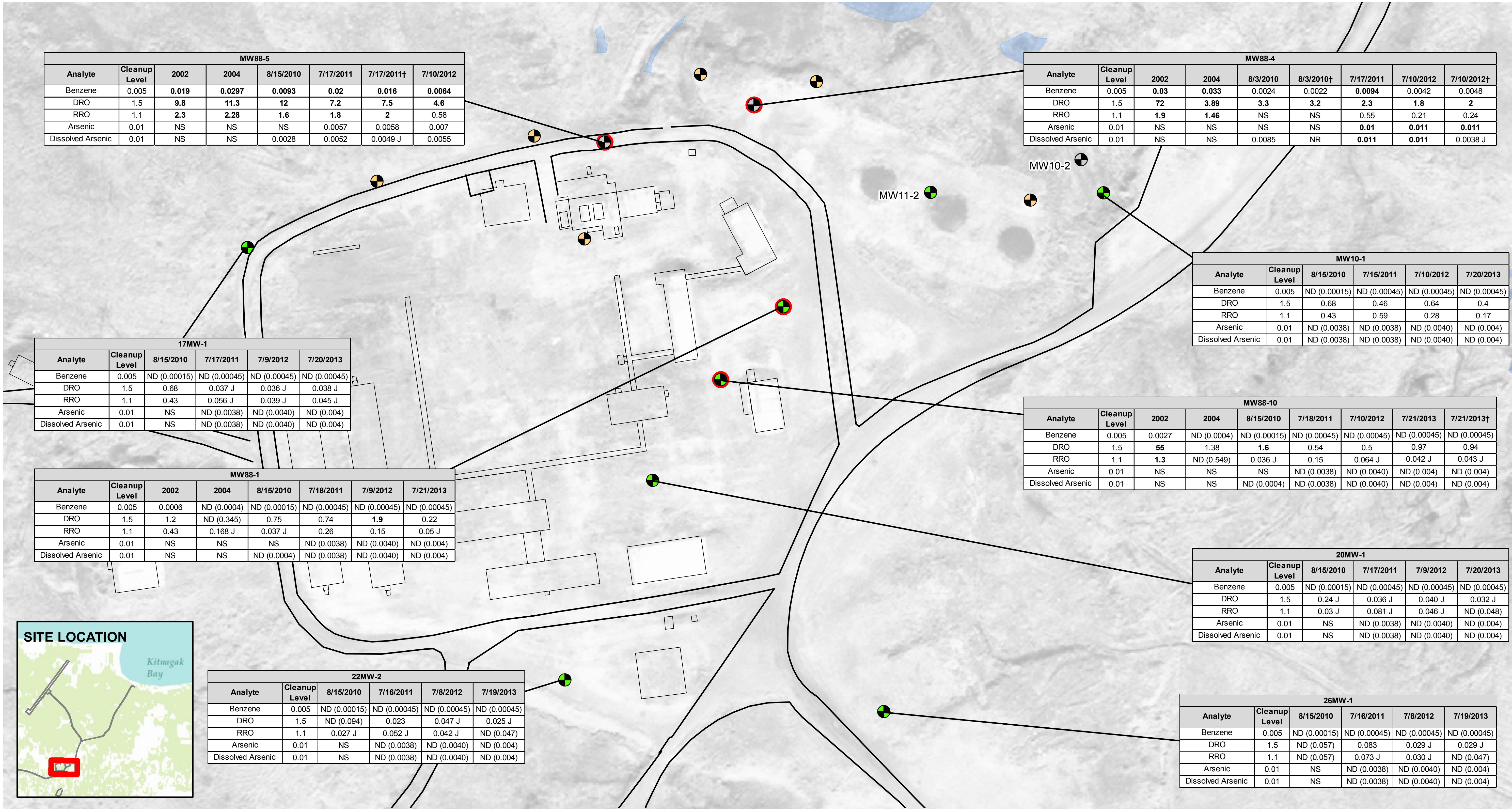

MW88-5							
Analyte	Cleanup Level	2002	2004	8/15/2010	7/17/2011	7/17/2011†	7/10/2012
Benzene	0.005	**0.019**	**0.0297**	**0.0093**	**0.02**	**0.016**	**0.0064**
DRO	1.5	**9.8**	**11.3**	**12**	**7.2**	**7.5**	**4.6**
RRO	1.1	**2.3**	**2.28**	**1.6**	**1.8**	**2**	0.58
Arsenic	0.01	NS	NS	NS	0.0057	0.0058	0.007
Dissolved Arsenic	0.01	NS	NS	0.0028	0.0052	0.0049 J	0.0055

MW88-4								
Analyte	Cleanup Level	2002	2004	8/3/2010	8/3/2010†	7/17/2011	7/10/2012	7/10/2012†
Benzene	0.005	**0.03**	**0.033**	0.0024	0.0022	**0.0094**	0.0042	0.0048
DRO	1.5	**72**	**3.89**	**3.3**	**3.2**	**2.3**	**1.8**	**2**
RRO	1.1	**1.9**	**1.46**	NS	NS	0.55	0.21	0.24
Arsenic	0.01	NS	NS	NS	NS	**0.01**	**0.011**	**0.011**
Dissolved Arsenic	0.01	NS	NS	0.0085	NR	**0.011**	**0.011**	0.0038 J

MW10-1					
Analyte	Cleanup Level	8/15/2010	7/15/2011	7/10/2012	7/20/2013
Benzene	0.005	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	0.68	0.46	0.64	0.4
RRO	1.1	0.43	0.59	0.28	0.17
Arsenic	0.01	ND (0.0038)	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	ND (0.0038)	ND (0.0038)	ND (0.0040)	ND (0.004)

17MW-1					
Analyte	Cleanup Level	8/15/2010	7/17/2011	7/9/2012	7/20/2013
Benzene	0.005	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	0.68	0.037 J	0.036 J	0.038 J
RRO	1.1	0.43	0.056 J	0.039 J	0.045 J
Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)

MW88-10								
Analyte	Cleanup Level	2002	2004	8/15/2010	7/18/2011	7/10/2012	7/21/2013	7/21/2013†
Benzene	0.005	0.0027	ND (0.0004)	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	**55**	1.38	**1.6**	0.54	0.5	0.97	0.94
RRO	1.1	**1.3**	ND (0.549)	0.036 J	0.15	0.064 J	0.042 J	0.043 J
Arsenic	0.01	NS	NS	NS	ND (0.0038)	ND (0.0040)	ND (0.004)	ND (0.004)
Dissolved Arsenic	0.01	NS	NS	ND (0.0004)	ND (0.0038)	ND (0.0040)	ND (0.004)	ND (0.004)

MW88-1							
Analyte	Cleanup Level	2002	2004	8/15/2010	7/18/2011	7/9/2012	7/21/2013
Benzene	0.005	0.0006	ND (0.0004)	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	1.2	ND (0.345)	0.75	0.74	**1.9**	0.22
RRO	1.1	0.43	0.168 J	0.037 J	0.26	0.15	0.05 J
Arsenic	0.01	NS	NS	NS	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	NS	NS	ND (0.0004)	ND (0.0038)	ND (0.0040)	ND (0.004)

20MW-1					
Analyte	Cleanup Level	8/15/2010	7/17/2011	7/9/2012	7/20/2013
Benzene	0.005	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	0.24 J	0.036 J	0.040 J	0.032 J
RRO	1.1	0.03 J	0.081 J	0.046 J	ND (0.048)
Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)

22MW-2					
Analyte	Cleanup Level	8/15/2010	7/16/2011	7/8/2012	7/19/2013
Benzene	0.005	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	ND (0.094)	0.023	0.047 J	0.025 J
RRO	1.1	0.027 J	0.052 J	0.042 J	ND (0.047)
Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)

26MW-1					
Analyte	Cleanup Level	8/15/2010	7/16/2011	7/8/2012	7/19/2013
Benzene	0.005	ND (0.00015)	ND (0.00045)	ND (0.00045)	ND (0.00045)
DRO	1.5	ND (0.057)	0.083	0.029 J	0.029 J
RRO	1.1	ND (0.057)	0.073 J	0.030 J	ND (0.047)
Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)
Dissolved Arsenic	0.01	NS	ND (0.0038)	ND (0.0040)	ND (0.004)

Note: Due to data conflicts found in multiple historical data sources and discrepensies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

Wells with Historical or Current Contaminant Concentrations Exceeding Cleanup Levels

2014 Proposed Monitoring Well Location

Current Monitoring Well

Well Abandoned

Surface Water

Notes:
All unit are mg/L
† indicates duplicate sample results
NS = not sampled
NR = not reported

All Locations Are Approximate

0 50 100 150 200
Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

N

NORTHEAST CAPE 5-YEAR REVIEW
MOC MONTORING WELL LOCATIONS AND SELECT SAMPLE RESULTS

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE: 06 OCT 2014

PROJECT MANAGER: K. MAHER

FIGURE NO: A-10

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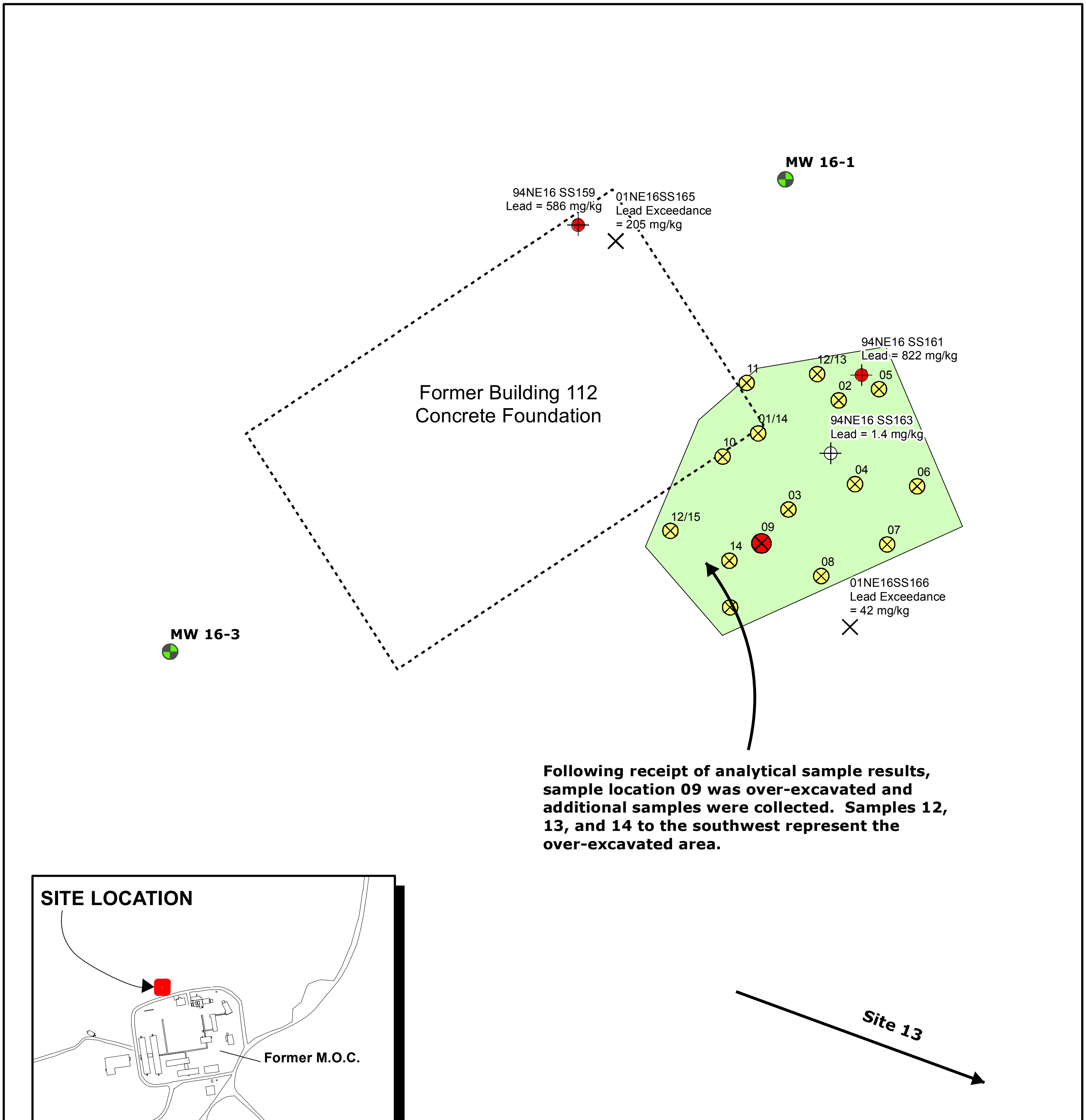


Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

- 2001 Estimated Sample Location: Lead<400 mg/kg
- 2010 Confirmation Sample; Result above cleanup level for PCBs
- 2010 Confirmation Sample; Result below cleanup level for PCBs
- 1994 Estimated Sample Location; Lead > 400 mg/kg
- 1994 Estimated Sample Location; No Exceedance
- Monitoring Well
- Excavation

All Locations Are Approximate

0 2.5 5 7.5 10

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

Image Date: 26, Aug, 2008

N

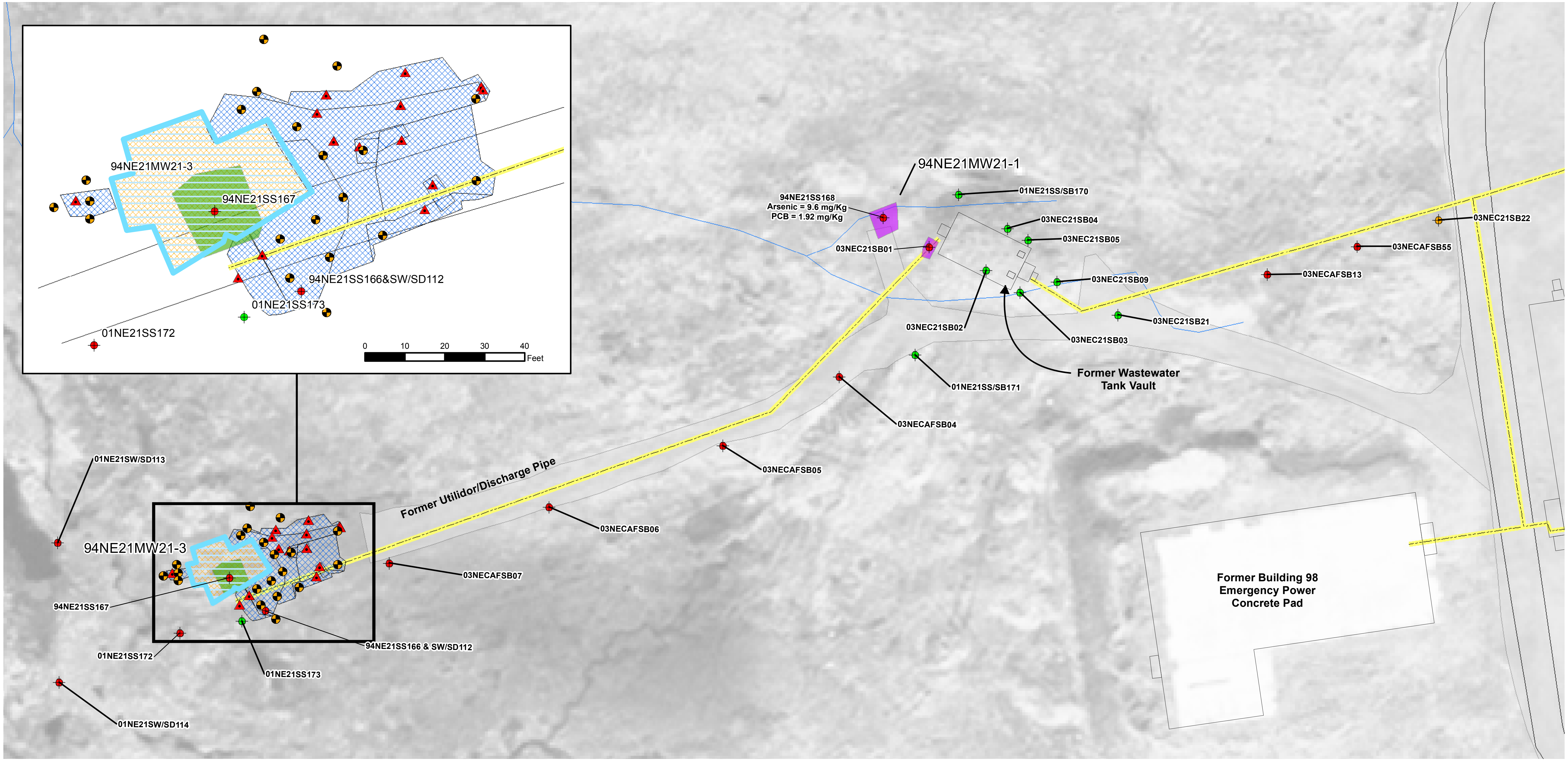
NORTHEAST CAPE 5-YEAR REVIEW
SITE 16 - PCB EXCAVATION

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

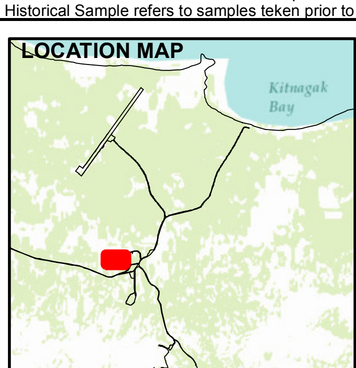
DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-11

P:\StLawrenceIsland\MXD\TO09_NorthEastCape\5YearReview\A11_Site16_PCB_Excavation_StLawrence.mxd wattta



Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Sample refers to samples teken prior to the signing of the Decision Document in 2009.

LOCATION MAP



- 2013 Confirmation Sample with Exceedance
- 2013 Soil Boring Location
- Historical Soil Sample Location with Arsenic < 11 mg/Kg
- Historical Soil Sample Location with Arsenic > 11 mg/Kg
- Historical Soil Sample Location with Arsenic Level Unknown
- 2012 Excavation
- 2013 Excavation
- 2010 Arsenic Excavation
- 2010 PCB Excavation
- Flooded Portion of Excavation
- Road
- UtilityFeatureSegment
- Building
- Surface Water

All Locations Are Approximate

0 50 100 150 200
Feet

N

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

NORTHEAST CAPE 5-YEAR REVIEW
SITE 21- WASTEWATER TANK
HISTORICAL SAMPLING LOCATIONS
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-12

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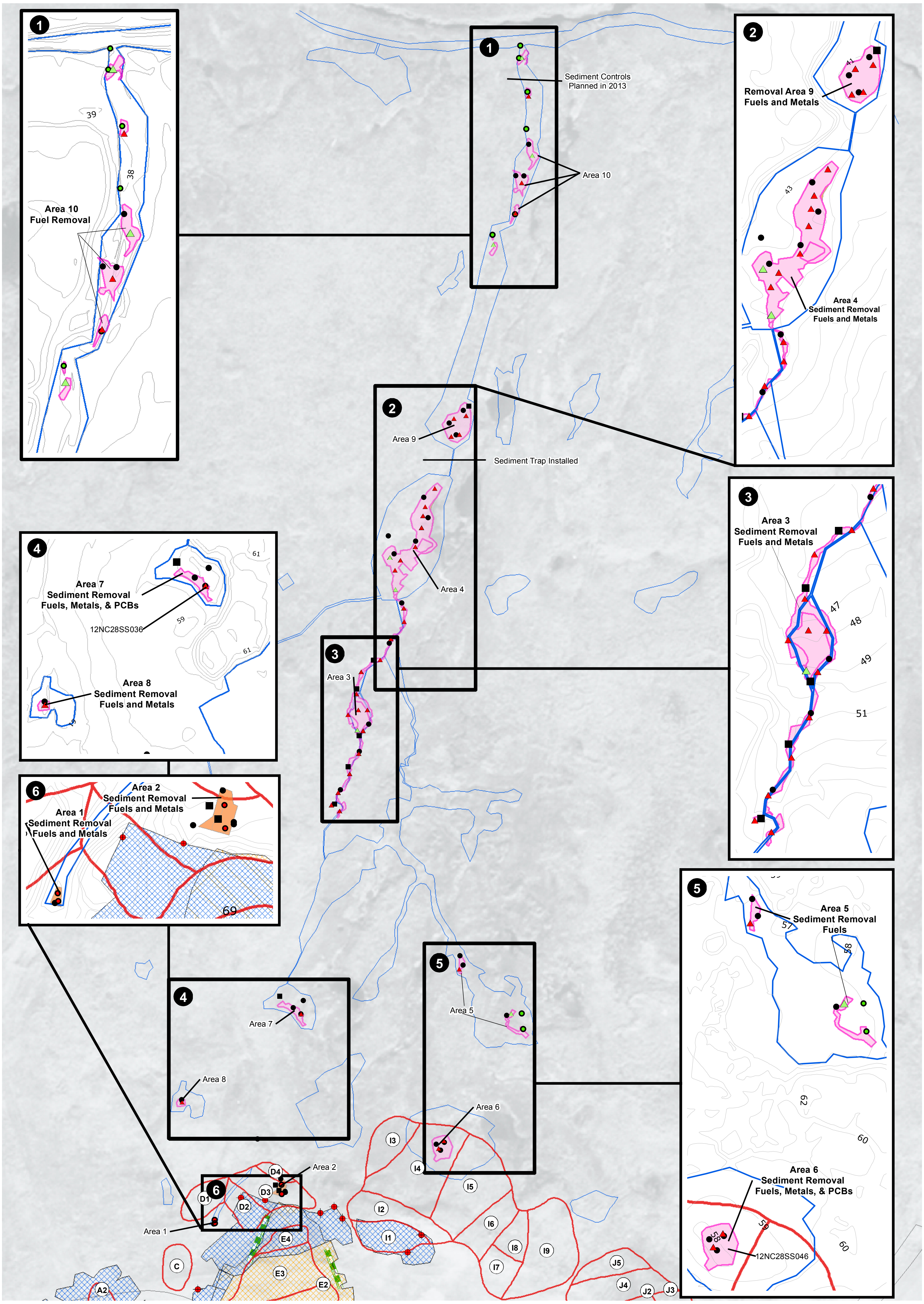
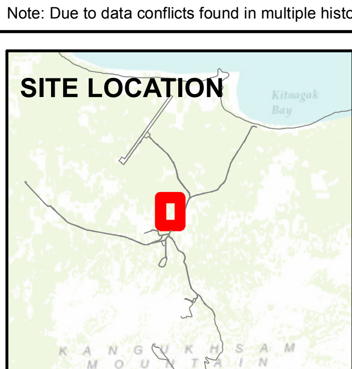


Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.



- 2013 Soil Confirmation Sample - 1 or More Analytes Exceed Cleanup Levels
- 2013 Sediment Confirmation Sample - 1 or More Analytes Exceed Cleanup Levels
- 2013 Sediment Confirmation Sample - No Analytes Exceeded
- 2012 Confirmation Sample - 1 or More Analytes Exceed Cleanup Levels
- 2012 Sediment Sample - No Analytes Exceeded
- 2012 Sediment Sample - 1 or More Analytes Exceed Cleanup Levels
- 2011 Sediment Sample - 1 or More Analytes Exceed Cleanup Levels
- UVOST® Delineated Plume (2010)
- 2012 Excavation Extent
- 2013 Excavation Extent
- 2012 Sediment Removal
- 2013 Sediment Removal
- Roads and Structures
- Former Culvert
- Surface Water

N

All Locations Are Approximate

0 100 200 300 400

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

NORTHEAST CAPE 5-YEAR REVIEW
SITE 28 - DRAINAGE AND EXCAVATIONS

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-13

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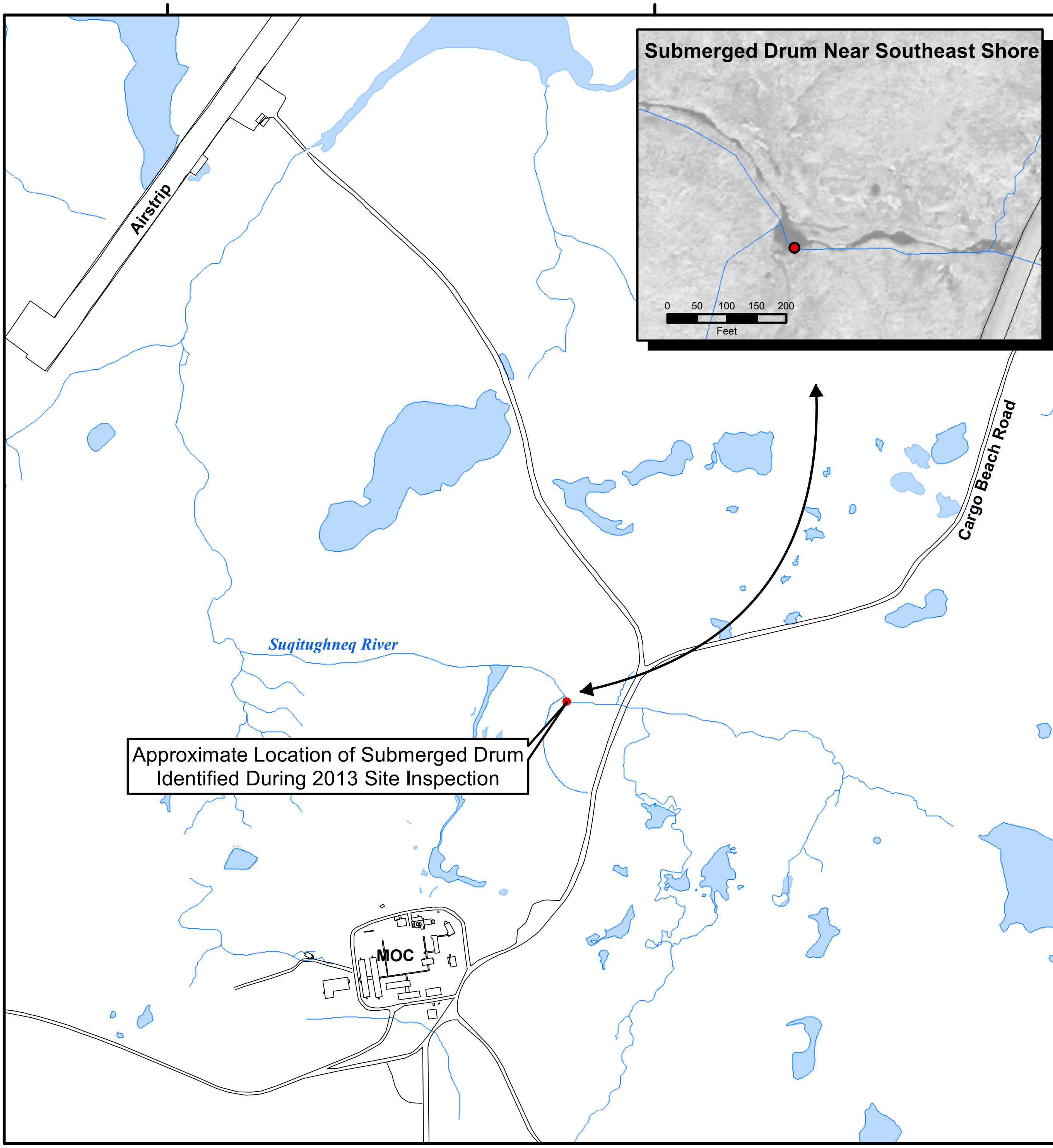

Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

Road

Building

Surface Water

All Locations Are Approximate

0 500 1,000 1,500 2,000

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE 5-YEAR REVIEW

SITE 29 - SUQITUGHNEQ RIVER - SUBMERGED DRUM

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-14

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Notes: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Samples refer to samples taken prior to the signing of the Decision Document in 2009.

- Historical Sample Exceedance Location
- Historical exceedance identified in the Decision Document but not investigated as part of the 2010 excavation, assumed to be removed.

- 2013 Excavation
- 2012 Excavation
- 2011 Excavation
- 2010 Excavation

All Locations Are Approximate

0 10 20 30 40

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 31 - WHITE ALICE COMMUNICATIONS

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-15

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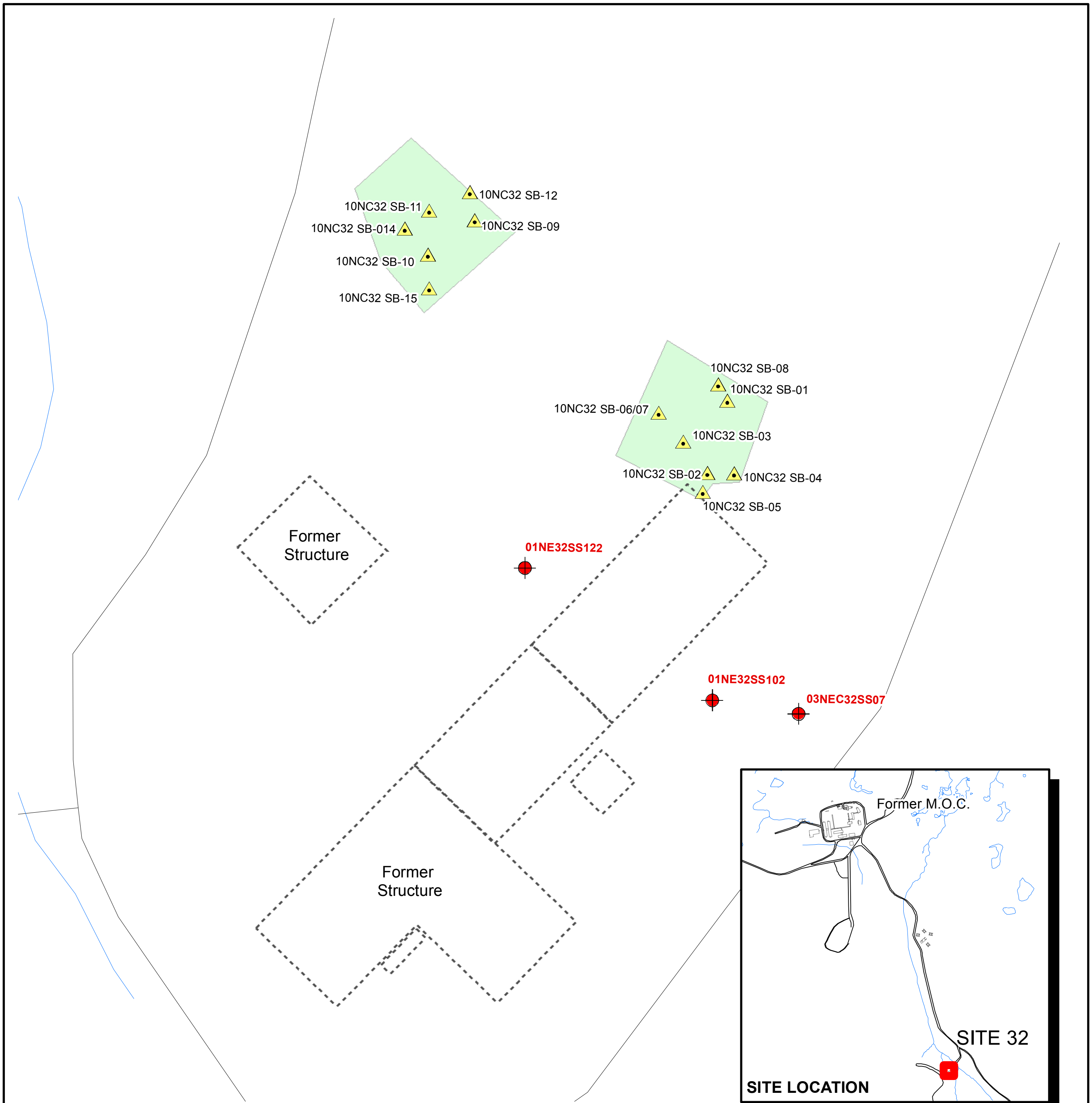
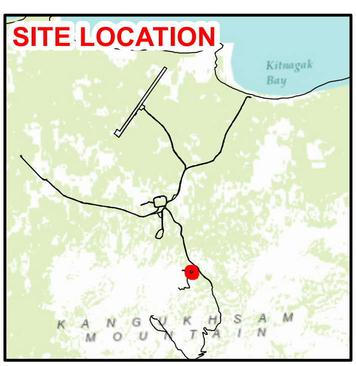


Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.
Historical Samples refer to samples taken prior to the signing of the Decision Document in 2009.



Historical Sample Exceedance Location

Confirmation Sample Below Site-Specific Cleanup Level

2010 Excavation Extent

Road Pathway

Former Building

Surface Water

All Locations Are Approximate

0 10 20 30 40

Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 32 - LOWER TRAMWAY

NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 06 OCT 2014	PROJECT MANAGER: K. MAHER	FIGURE NO: A-16

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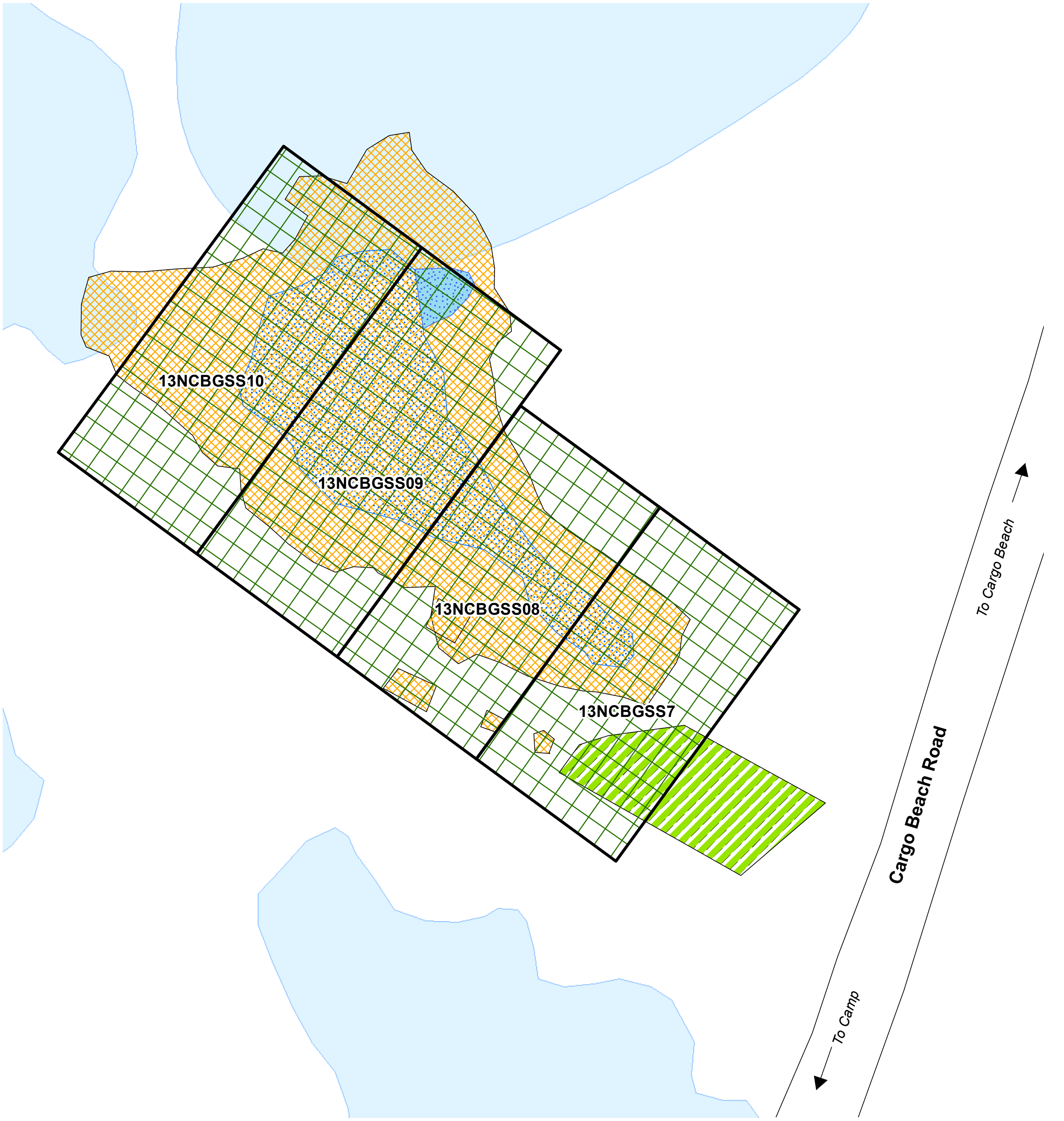
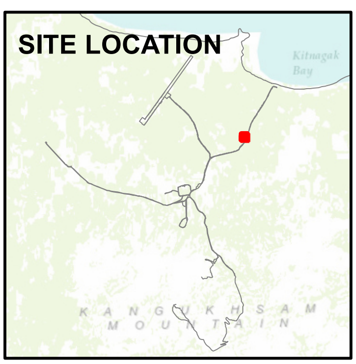


Note: Due to data conflicts found in multiple historical data sources and discrepancies in surveys conducted from 2010 to 2013, actual locations cannot be verified.

SITE LOCATION



MULTI INCREMENT® Decision Unit
Excavation Boundary
Excavation to Groundwater
Excavation to Groundwater (Approximate)
Plant Screen
Surface Water

All Locations Are Approximate

0 20 40 60 80
Feet

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE 5-YEAR REVIEW
SITE 6 - MULTI INCREMENT® SAMPLING AREAS 2012 & 2013
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
06 OCT 2014	K. MAHER	A-17

P:\StLawrenceIsland\MXD\TO09_NorthEastCape\5YearReview\A17_Site06_MI_Sampling_StLawrence.mxd wattta

APPENDIX B

Cleanup Levels, Toxicity and Risk Evaluation

U.S. Army Corps of Engineers
Alaska District

FIRST FIVE-YEAR REVIEW REPORT

NORTHEAST CAPE FUDS
ST. LAWRENCE ISLAND, ALASKA

APPENDIX B
CLEANUP LEVELS, TOXICITY, AND RISK EVALUATION

Formerly Used Defense Site F10AK0969-03

FINAL
FEBRUARY 2015

TABLE OF CONTENTS

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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ARAR	Applicable or Relevant and Appropriate Requirements
COC	contaminant of concern
COPC	contaminant of potential concern
DD	Decision Document
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
GRO	gasoline-range organics
HPAH	high molecular weight PAHs
LPAH	low molecular weight PAHs
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NA	not applicable
NOAA	National Oceanic and Atmospheric Administration
PAH	polycyclic aromatic hydrocarbons
PCB	polychlorinated biphenyl
PEL	probable effects level
RAO	remedial action objective
RRO	residual-range organics
SQuiRT	screening quick reference tables
WAC	Washington Administrative Code

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INTRODUCTION

Updates to regulations and chemical-specific toxicity data may occur over time. The effects of those changes are evaluated as part of the technical assessment conducted for the Northeast Cape *First Five-Year Review Report* to ensure the selected remedy remains protective of human health. The evaluation of regulatory updates involves a two-step process followed by the evaluation of chemical-specific toxicity data updates (risk evaluation). The evaluation process summarized below is explained in greater detail in Section 7.0 of the Five-Year Review Report:

- The evaluation begins by determining whether any contaminants of potential concern (COPC) or contaminants of concern (COC) have new or changed standards since the time of the Decision Documents (DD) (USACE 2009a, 2009b). All compounds identified in the DD are presented in Table B-1. Additionally, any compounds detected during remedy implementation that exceed the cleanup levels listed in the applicable or relevant and appropriate regulations (ARAR) have been included; therefore, Table B-1 includes more compounds than the DD list of COPCs and COCs.
- If a new or more stringent standard was identified, the COPC or COC was carried forward (Table B-2). The Table B-2 evaluation compares the current applicable standard with maximum detected levels at the time of the DD, or more recent applicable concentrations.
- If a respective concentration exceeded the applicable standards, or if the human health risk of the standard had not previously been evaluated, the compound was carried forward for the risk evaluation (Table B-3). A risk evaluation was completed by calculating carcinogenic and non-carcinogenic values for each individual compound at the best available onsite concentrations using current toxicity information. The calculated risk/hazard values were compared to the U.S. Environmental Protection Agency (EPA) management decision risk range of 1×10^{-4} to 1×10^{-6} for carcinogens and a hazard quotient of 1 for non-carcinogens. The results of the risk evaluation are presented in Table B-3.
- Table B-4 summarizes the evaluation of the cleanup levels used for sediments if the human health risk had not previously been evaluated. For sediment COPCs, risk was calculated using Equations 3, 4, 7 and 8 for soils (Alaska Department of Environmental Conservation [ADEC] 2008). Note that Equations 3 and 4 for soils represent the ingestion pathway, and Equations 7 and 8 represent the inhalation pathway. The exposure duration was changed to 90 days to match the durations used in the DD.

ADEC CLEANUP LEVELS USED FOR SOIL

For soil cleanup levels, the ADEC Method Two under 40-inch zone, migration to groundwater cleanup level (Title 18 of the Alaska Administrative Code [AAC], Chapter 75, Table B1), was applied for all compounds not listed in the DD as COCs. For those compounds listed as COCs, the cleanup level has either not changed or the site-specific values were calculated using a Method Four risk assessment.

CLEANUP LEVELS USED FOR GROUNDWATER AND SURFACE WATER

For groundwater or surface water cleanup levels, the strictest cleanup levels or standards listed in 18 AAC 75, Table C or 18 AAC 70 were used. Federal maximum contaminant levels (MCL) were also used for screening purposes.

CLEANUP LEVELS USED FOR SEDIMENT

Cleanup levels for sediment were established in the DD using Washington State Administrative Code (WAC) 173-204-520 Table III sediment cleanup levels or MacDonald et al. consensus-based probable effect concentrations (EPA 2002). The National Oceanic and Atmospheric Administration (NOAA) screening quick reference tables (SQuiRT) have been used in recent work plans and reports as screening levels for contaminants not listed in the DD. This evaluation presents the NOAA screening values probable effects level (PEL) or next most stringent value, which may be guidelines "to be considered," but they are not ARARs for this work. The sediment risk evaluation ultimately is performed using WAC Table III values.

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

COPCs/COCs	DD-Established RAO for COCs	Source [c]	Current Federal MCL or NOAA SQuiRT	Current Alaska Cleanup Level	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
Sediment (mg/kg)						
DRO C_{10} to C_{25}	3,500	Risk Assessment/site-specific	NA	NA	No	No
RRO C_{25} to C_{36}	3,500	Risk Assessment/site-specific	NA	NA	No	No
Acenaphthene	0.5	WAC 173-204-520 T3	0.0889[g]	NA	No[j]	No
Acenaphthylene	--	--	0.128 [g] (0.66)	NA	No[f]	Yes
Benzo(g,h,i)perylene	1.7	MacDonald et al 2002	0.17[g]	NA	No[j]	NA
Fluoranthene	2	MacDonald et al 2002	2.355[g]	NA	No[j]	NA
Fluorene	0.8	WAC 173-204-520 T3	0.144[g]	NA	No[j]	NA
Indeno(1,2,3-cd)pyrene	3.2	MacDonald et al 2002	0.2 [g]	NA	No[j]	NA
1-Methylnaphthalene	--	--	NA	NA	No[f]	Yes
2-Methylnaphthalene	0.6	WAC 173-204-520 T3	NA	NA	No	NA
Naphthalene	1.7	WAC 173-204-520 T3	0.391[g]	NA	No[j]	NA
Phenanthrene	4.8	WAC 173-204-520 T3	0.515[g]	NA	No[j]	NA
Total LPAHs[a]	7.8	WAC 173-204-520 T3	NA	NA	No	NA
Total HPAHs[b]	9.6	WAC 173-204-520 T1[e]	NA	NA	No[e]	NA
PCBs (sum)	0.7	WAC 173-204-520 T3, MacDonald et al 2002	0.277[g]	NA	No[j]	NA
Arsenic	93	WAC 173-204-520 T3	17[g]	NA	No	NA[h]
Chromium	270	WAC 173-204-520 T3	90[g]	NA	No[j]	NA
Lead	530	WAC 173-204-520 T3	91.3[g]	NA	No[j]	NA
Selenium	--	--	NA	NA	No[f]	Yes
Zinc	960	WAC 173-204-520 T3	315[g]	NA	No[j]	NA

Table B-1
Evaluation of Changes in Chemical-Specific Standards (Continued)

COPCs/COCs	DD-Established RAO for COCs	Source [c]	Current Federal MCL or NOAA SQuiRT	Current Alaska Cleanup Level	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
Groundwater (mg/L)						
GRO C_6 to C_{10}	1.3	18 AAC 75 Table C	--	2.2	Yes	No
DRO C_{10} to C_{25}	1.5	18 AAC 75 Table C	--	1.5	No	NA
RRO C_{25} to C_{36}	1.1	18 AAC 75 Table C	--	1.1	No	NA
Benzene	0.005	18 AAC 75 Table C	0.005	0.005	No	NA
Ethylbenzene	0.7	18 AAC 75 Table C	0.7	0.7	No	NA
Arsenic (total)	0.01	18 AAC 75 Table C	0.01	0.01	No	NA
Arsenic (dissolved)	0.010	18 AAC 75 Table C	0.01	0.010	No	NA
Lead (total)	0.015	18 AAC 75 Table C	0.015	0.015	No	NA
Lead (dissolved)	0.015	18 AAC 75 Table C	0.015	0.015	No	NA
Surface Water (mg/L)						
DRO C_{10} to C_{25}	No Sheen	18 AAC 70	--	--	No	NA
RRO C_{25} to C_{36}	No Sheen	18 AAC 70	--	--	No	NA
total aromatic hydrocarbons	0.01	18 AAC 70	--	0.01	No	NA
total aqueous hydrocarbons	0.015	18 AAC 70	--	0.015	No	NA
Soil (mg/kg)						
DRO C_{10} to C_{25}	9200	18 AAC 75 Method 4/site-specific	--	250	No	NA
RRO C_{25} to C_{36}	9200	18AAC75 Method 4/site-specific	--	10,000	No	NA
Arsenic	11[d]	Site-specific Background	--	3.9	Yes[i]	No
Benzene	2	18 AAC 75 Method 4/site-specific	--	0.025	No	NA
Ethylene glycol	--	18 AAC 75	--	190	No[f]	Yes
Methylene chloride	--	18 AAC 75	--	0.016	No[f]	Yes

Table B-1
Evaluation of Changes in Chemical-Specific Standards (Continued)

COPCs/COCs	DD-Established RAO for COCs	Source [c]	Current Federal MCL or NOAA SQuiRT	Current Alaska Cleanup Level	Is There A Newly Promulgated Cleanup Level Since Previous Review?	Is the New Level More Stringent than the Previous Standard?
Naphthalene	120	18 AAC 75 Method 4/site-specific	--	20	No	NA
PCBs (sum)	1	18 AAC 75	--	1	No	NA
Selenium	--	18 AAC 75	--	3.4	No	Yes
Tetrachloroethylene	--	18 AAC 75	--	0.024	No[f]	Yes
Xylenes	--	18 AAC 75	--	63	No	Yes

Notes:

[a] LPAHs include naphthalene, acenaphthylene, acenaphthene, fluorene, phenanthrene, and anthracene.

[b] HPAHs include fluoranthene, pyrene, benz(a)anthracene, chrysene, total benzofluoranthenes, benzo(a)pyrene, indeno(1,2,3,-c,d)pyrene, dibenzo(a,h)anthracene, and benzo(g,h,i)perylene.

[c] Sources listed in the DD include :
Washington State Administrative Code 173-204-520 Table III Sediment Minimum Cleanup Level (WAC 1995, updated 2013);
MacDonald et al, *Consensus-Based Probable Effects Concentration* (EPA 2002);
18 AAC 75 Table C;
18 AAC 75 Table B1;
18 AAC 75 Method 4 risk-based residential cleanup level from the *Feasibility Study* (U.S. Army Corps of Engineers [USACE] 2007)

[d] DD-specified limit based on elevated background concentrations.

[e] HPAH cleanup level specified in the DD (9.6 mg/kg) is from Table I of WAC 173-204-320 and is more stringent than the 53 mg/kg listed in Table III.

[f] Compound will be listed in Table B-2 for further evaluation due to the availability of new analytical data. This analyte was not listed as COC in the DD but has been detected in excess of applicable cleanup levels in subsequent sampling.

[g] Values taken from NOAA Screening Quick Reference Tables (SQuiRTs), Freshwater Sediment, PEL as presented in *Site 28 Phase I Sediment Removal Report* (USACE 2013 [May]). Value from the ARAR (Washington Administrative Code Table III Sediment minimum cleanup level (WAC 1995, updated 2013) is listed in parentheses.

[h] Arsenic was not evaluated at this cleanup level in the risk assessment as presented in the *Feasibility Study* (USACE 2007). This compound will be listed in Table B-2 for further evaluation.

[i] A new background study indicated the background concentration of arsenic was 11.49 mg/kg, which is higher than the previously calculated background concentration of 11 mg/kg.

[j] The NOAA SQuiRT values are presented for comparison purposes and may be lower than the sediment cleanup levels in the DD. However, the NOAA SQuiRT values are not ARARs and the ARAR values have not changed, so these contaminants have not been carried through to Table B-2.

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

COPC/COCs	DD-Established RAO for COCs	Current ARAR	Current Alaska Cleanup Level	Maximum Detected at DD	Maximum Detected During Most Recent Sampling Event	New Risk Evaluation Needed?
Sediment (mg/kg)						
Acenaphthylene	--	0.66	NA	0.047	4.4	Yes
Arsenic	93	93	NA	Not reported	100	Yes
1-Methylnaphthalene	--	--	NA	Not Reported	540	Yes
Selenium	--	--	3.4[a]	Not reported	3.2	Yes
Soil (mg/kg)[a]						
Ethylene glycol	--	190	190	Not reported	890[b]	Yes
Methylene chloride	--	0.016	0.016	Not reported	ND	No[c]
Tetrachloroethylene	--	0.024	0.024	Not reported	ND	No[c]
Xylenes	--	63	63	Not reported	28	No

Notes:
[a] Soil cleanup levels are the ADEC Method Two Table B2 cleanup levels. Selenium does not have a sediment cleanup level and the soil cleanup level is listed for reference.
[b] Ethylene glycol has been detected in concentrations up to 40,000 mg/kg. However, during excavation in 2013 a floor sample of 890 mg/kg was detected. The location was subsequently excavated to bedrock and no material remained to sample.
[c] Although methylene chloride was detected up to 0.028 mg/kg and tetrachloroethylene was detected up to 0.16 mg/kg at Site 10, the final confirmation samples following excavation in 2013 did not detect these compounds. Further risk evaluation for remaining concentrations are not necessary given these data.

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

COPC/COCs	Current Standard (mg/kg)	Applicable Site Concentration (mg/kg)	RfDo (mg/kg-d)	SFo $(mg/kg\text{-}d)^{-1}$	Dermal Reference Dose (RfDd) (mg/kg-d)	Dermal Slope factor (SFd) $(mg/kg\text{-}d)^{-1}$	Absorption Factor	Hazard Quotient (≥ 1 in Bold)	Cancer Risk
Sediment (mg/kg)									
Arsenic	93	100	0.0003	1.5	0.000123	3.66	0.03	**1.32**	7.42E-05
Acenaphthylene	0.66	4.4	0.06	none	0.0186	none	0.13	0.0002	NA
1-Methylnaphthalene	--	540	0.004	none	0.0032	none	0.13	0.64578	NA
Selenium	3.4	3.2	0.005	none	0.0022	none	0	0.00210	NA
Soil (mg/kg)									
Ethylene glycol	190	890	2	none	1	none	0.1	0.01	NA

Notes:

Exposure parameters were taken from ADEC *Cleanup Level Guidance* (9 June 2008).

Sediment calculations based on ADEC *Cleanup Level Guidance* Equations 3 and 4 for direct contact and 7 and 8 for inhalation adjusted for exposure frequency of 90 days/year per the DD.

Oral Reference Dose (RfDo) and Oral Slope Factor (SFo) are those published on the EPA's Integrated Risk Information System (IRIS).

Dermal Reference Dose (RfDd) and Dermal Slope Factor (SFd) are those published in ADEC Cleanup Levels Guidance (ADEC 2008).

Table B-4
Risks and Hazards for COCs with Toxicity Changes or Not Previously Evaluated

Chemical	Cleanup Level (mg/kg)	Equation 3 Direct Contact Factor Noncancer	Equation 4 Direct Contact Factor Cancer	Hazard Quotient	Cancer Risk	Is Cleanup Level Sufficiently Protective?
Arsenic (sediment)	93	0.0132	7.42E-07	1.23	6.9E-05	No

Notes:

Exposure parameters were taken from ADEC *Cleanup Level Guidance* (9 June 2008).

Sediment calculations based on ADEC *Cleanup Level Guidance* Equations 3 and 4 for direct contact and 7 and 8 for inhalation adjusted for exposure frequency of 90 days/year per the DD.

Toxicity factors used to calculate the factors are listed in Table B-3.

REFERENCES

ADEC (Alaska Department of Environmental Conservation). 2008 (June). *Cleanup Levels Guidance*. Division of Spill Prevention and Response. Contaminated Sites Program.

USACE (U.S. Army Corps of Engineers). 2009a (June). *Decision Document: Site 7 Cargo Beach Road Landfill, Containerized Hazardous, Toxic, and Radioactive Waste (CON-HTRW) Project #F10AK096905, Northeast Cape Formerly Used Defense Site (FUDS).* St. Lawrence Island, Alaska. Prepared by USACE-Alaska District, June 2009.

USACE. 2009b (January). *Decision Document: Hazardous, Toxic, and Radioactive Waste (HTRW) Project #F10AK096903, Northeast Cape Formerly Used Defense Site (FUDS).* St. Lawrence Island, Alaska. Prepared by USACE-Alaska District, January 2009.

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APPENDIX C

Site Inspection Checklists and Logbook

INCH 1 2 3 4 5 6

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6 32281 37311 7

NE CAPE 5-YR REVIEW
LOGBOOK #1 SITE NOTES

9/11/13 TO 9/16/13

Rite in the Rain
ALL-WEATHER
UNIVERSAL
№ 373

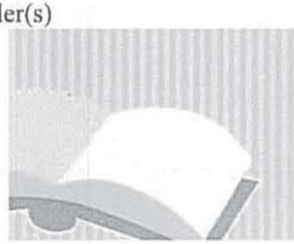
C. FELL
J. ORCZEWSKA
K. MAHER

HTRW-J07-05F45902-H04-0001
05F45902

Did you remember ... ???

Daily Logbook Checklist

- ☐ Project name / Site ID / Client
- ☐ Date
- ☐ Weather, site conditions, and other salient observations
- ☐ Level of PPE used
- ☐ Full names of onsite personnel and affiliations (including all visitors)
- ☐ Daily objectives
- ☐ Field measurements and calibrations
- ☐ Time and location of activity
- ☐ Field observations and comments
- ☐ Deviations from the Work Plan
- ☐ Site photographs
- ☐ Site sketches (with reference i.e. "N" arrow)
- ☐ Survey and location i.e. samples or debris (GPS coordinates when possible)
- ☐ For each sample record:
  - – Date, time, sampler(s)
  - – Sample ID
  - – Media, container(s), preservatives
  - – QC (dup/MS/MSD)
  - – Analysis
  - – MeOH lot #
  - – Tare weight
- ☐ Sample shipments (when, what, destination)
- ☐ Waste tracking (when, how much, destination)
- ☐ Daily summary of activities (i.e. # of samples collected)



LOGBOOK #1 SITE NOTES

Rite in the Rain
ALL-WEATHER WRITING PAPER

DCN
HTRW-J07-05F45902-H04-0001

Name JACOBS ENGINEERING

Address 4300 B STREET SUITE 600
ANCHORAGE AK 99503

Phone 907 563 3322

Project NE CAPE 5-YR REVIEW
05F45902

C. FELL CF
J. ORCZEWSKA
K. MAHER

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CONTENTS

NE CAPE, 5-YR REVIEW, USACE 9/11/13

~1240 LEFT NOME FOR NE CAPE ON BERING AIR

~1400 ARRIVED AT BRISTOL ENG. CAMP ON NE CAPE

SITE ORIENTATION W/ CHUCK CROLEY

PERSONNEL (LEVEL D PPE)

JACOBS	K. MAHER	P.M.
JACOBS	J. ORCZEWSKA	BIOLOGIST
JACOBS	C. FELL	GEOLOGIST
BRISTOL	C. CROLEY	SITE SUPER
USACE	J. CRANER	QAR

1430 GOT SITUATED IN LODGING AND PREPPED SOME OF THE FIELD GEAR

↳ GEL ICE IN FREEZER

↳ ONLY 12 COOLERS → SPACE ISSUE?

NOTE PLAN TO SPEND REMAINDER OF DAY SCOUTING SITES AND FLAGGING SAMPLING LOCATIONS

WX: MOSTLY CLOUDY TO OVERCAST
South wind 5 to 10 mph temp mid 40s

Scale: 1 square = ______ PAGE 1 Rite in the Rain

NE CAPE

9/11/13 5-YR REVIEW USACE

1521 SITE DRIVE W/ THE QAR (USACE)

↳ SITE 8 IS THE LOW LYING AREA ALONG THE RIGHT SIDE OF THE ROAD (CAMP)

LEFT FROM CAMP ROAD

↳ SITE 7 IS THE THINLY VEGETATED HILL LEFT FROM SITE 8

↳ SITE 6 IS WHERE INTERMODAL CONTAINERS ARE STAGED

↳ SITE 3 IS ON THE RIGHT JUST BEFORE BEACH

↳ SITE 4 IS ON THE LEFT JUST BEFORE BEACH

↳ SITE 5 IS ON THE BEACH

NOTE MARK BOUNDARIES OF SITES WHERE OBSERVED OR MAKE SKETCHES

1612 ↳ SITE 9 IS THE BARE AREA ON LEFT SIDE OF ROAD JUST BEFORE INTERMODAL CONTAINER STAGING AREA ON THE RIGHT

↳ SITE 10 IS THE NEWLY GRADED AREA JUST PAST CONTAINER STAGING AREA.

↳ SITE 11 IS THE NEWLY DISTURBED AREA JUST DOWNHILL OF ~~THE~~ CF 9/11/13 SITE 10

↳ SITE 28 IS THE LOW AREA BELOW SITE 10

↳ SITE 31 & 32 ARE UP THE ROAD TOWARD QUARRIES

→ 32 IS FOUNDATION AT BASE OF HILL

Scale: 1 square =

NE CAPE

5-YR REVIEW USACE 9/11/13

1711 ↳ SITE 16 IS ESSENTIALLY AT THE GAC STATION JUST BEFORE THE GAC STATION

* DIRECTIONS ARE BASED ON COMING FROM CAMP

1742 END OF SITE WALK

1745 TO 1815 DINNER

1820 GEAR ORGANIZATION & COOLER PREP

Bottle Count		From WP	WS19
Coolers = 12			
250 HNO_3 Polys = 33	3	30	Filtered Unfiltered
1L HCL = 35	5	30	>10
1L No pres = ~~1240~~ 50		45	
40mL HCL VOA = ~~88~~		60	

Per cooler Sample location

Ground water + SW

- 6 x 40mL VOA
- 2 x 1L HCL Amber
- 3 x 1L No pres Amber
- 2 x 250mL HNO_3 [Filtered, Unfiltered]

2005 END OF DAY

Scale: 1 square =

Rite in the Rain

Ø655 HEALTH AND SAFETY MEETING (BRISTOL)

Ø715 DAILY TAILGATE (JACOBS)

↳ PERSONNEL (LEVEL D PPE)

JACOBS	K. MAHER	SITE LEAD
JACOBS	C. FELL	SSHO/TECH
JACOBS	J. ORCZEWSKA	TECH

WX: PARTLY TO MOSTLY CLOUDY
35°F TO 40sF
CALM TO LIGHT BREEZE

Ø752 DAILY OBJECTIVES:
- COMPLETE GW/SURFACEWATER SAMPLING
- SITE WALKS FOR SITE 7 & 9 (LANDFILL)

Christopher D. Fell 9/12/13

Ø754 TURBIDIMETER (S/N 6192)
↳ CALIBRATED ON 9/6/13 BY TTT ENVIRO

Ø905 YSI (S/N 1000449) CALIBRATION VERIFICATION
↳ CALIBRATED ON 9/6/13 BY TTT ENVIRO
↳ BAROMETER CAL: 29.72 in Hg
↳ CAL VERIFICATION
→ ORP: 240mV exp. 12/17 = 256.8mV OK
→ COND: 1413 um/cm (25°C) / 1020 um/cm (11°C) = 929 OK
→ pH 7.0: 6.95 OK
→ pH 10.01: 10.01 OK
→ pH 4.01: 3.95 OK

Ø940 LOADED SUPPLIES IN PICKED AND TRAVELLED TO SITE 9

Ø945 ARRIVED AT SITE 9 LANDFILL
↳ BEGAN SAMPLING PROCEDURE AT LOCATIONS 9LF-WSØ1 & 9LF-WSØ2

Ø950 ADVANCED DRIVE POINT

NE CAPE
5 YEAR REVIEW

USACE
9/12/13

1000 *SAMPLE: 13-9LF-WS01-0
PRIMARY & MS/MSD
↳COLLECTED WITH DEDICATED DIPPER
↳4 40ml VOAs (HCl) AK101/BTEX SW8260
unfiltered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
filtered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
CF/KM/JO ↳2 1L AMBER (HCl) AK102/AK103
↳3 1L AMBER (none) SW8270SIM/SW8082
→SURFACE WATER
X3 FOR MS/MSD
—FILTERED METALS COLLECTED W/PERISTALTIC

1000 *SAMPLE: 13-9LF-WS02-0
↳COLLECTED WITH DEDICATED DIPPER
DUPLICATE ↳4 40ml VOAs (HCl) AK101/BTEX SW8260
unfiltered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
Filtered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
↳2 1L AMBER (HCl) AK102/AK103
CF/KM/JO ↳3 1L AMBER (none) SW8270SIM/SW8082
→SURFACE WATER
—FILTERED METALS COLLECTED W/PERISTALTIC

1135 FINISHED SAMPLING 9LF-WS01
9LF-WS02

*SAMPLES MAINTAINED AT 4±2°C AFTER COLLECTION

Scale: 1 square = ____

NE CAPE
5 YEAR REVIEW

USACE
9/12/13

1149 BEGAN SAMPLING PROCEDURE AT LOCATION 9LF-SW03

1155 *SAMPLE: 13-9LF-WS03-0
CF/KM/JO PRIMARY
↳COLLECTED WITH DEDICATED DIPPER
↳4 40ml VOAs (HCl) AK101/SW8260
unfiltered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
filtered ↳1 250poly (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
↳2 1L AMBER (HCl) AK102/AK103
↳3 1L AMBER (none) SW8270SIM/SW8082
→SURFACE WATER
→FILTERED METALS COLLECTED W/PERISTALTIC

1211 FINISHED SAMPLING AT LOCATION 9LF-WS03

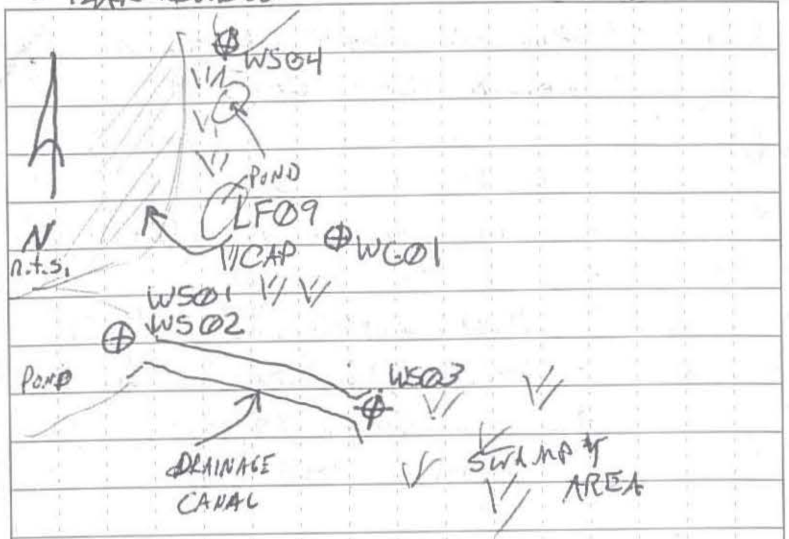
1212 SAMPLING LOCATIONS ARE RECORDED ON APPENDIX A FIGURES IN THE WORKPLAN (FIELD COPY) AND ON PAGE 8

1215 LEFT FOR LUNCH

Scale: 1 square = ____

NE CAPE USACE

5 YEAR REVIEW 9/12/13



1305 HEADED BACK TO SITE

1310 ADVANCED DRIVE POINT AT SITE 7 LAND FILL

↳ REFUSAL AT APPROX 4-6 inches BGS

↳ STEPPED OUT APPROX. 1FT → REFUSAL AT 6in

↳ STEPPED OUT APPROX 10FT NORTH → REFUSAL AT 6in

↳ STEPPED OUT APPROX 20FT NORTH → REFUSAL AT 30in

1340 BEGAN SAMPLING AT 9LF-WG01

1345 BEGAN SAMPLING PROCEDURE AT LOCATION 9LF-WS04

Scale: 1 square = ______

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1350 * SAMPLE: 13-9LF-WS04-0

PRIMARY ↳ COLLECTED W/ DEDICATED DIPPER, FILTERED METALS COLLECTED W/ PERISTALTIC

↳ 4 40ml VOAs (HCL) AK101/SW8260 (BTEX)

↳ 2 1L AMBER (HCL) AK102/AK103

FILTERED ↳ 1 250ml POLY (HNO_3) SW6020 RCRA METALS SW7471 MERCURY

UNFILTERED ↳ 1 250ml POLY (HNO_3) SW6020 RCRA METALS SW7471 MERCURY

↳ 3 1L AMBER (none) SW8270 SIM/SW8082

→ SURFACE WATER

1351 * SAMPLE: ~~13-9LF-WS0~~ CF 9/12

PRIMARY 13-9LF-WG01-2

↳ COLLECTED W/ PERISTALTIC PUMP

1416 ↳ 4 40ml VOAs (HCl) AK101/SW8260 (BTEX)

1550 FILTERED ↳ 1 250ml POLY (HNO_3) SW6020 RCRA METALS SW7471 MERCURY

~~↳ 250ml POLY (HNO_3)~~ CF 9/12

Christopher D Fell 9/12/13

Scale: 1 square = ______

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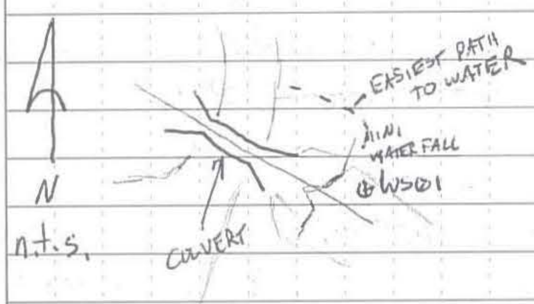
1437 GROUNDWATER GRAB SAMPLING AT
LOCATION 9LF-WG01
- WATER EXTREMELY TURBID W/
SILT/FINE SAND & ORGANICS.
- SCREEN CONTINUALLY PLUGS WITH
FINE ORGANICS & SEDIMENT
- PRODUCTION RATE MUCH LOWER
THAN 250ml/min
- 4 40ml VOAs IN ONE HOUR

1450 FINISHED SAMPLING 9LF-WS04

1504 ARRIVED AT KANGUKSHAM MOUNTAIN
SPRING SAMPLING LOCATION (KMS



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1516 STARTED SAMPLING PROCEDURE
AT THE KANGUKSHAM MOUNTAIN
SPRING

1521 *SAMPLE: 13-KMS-WS01-0
PRIMARY ↳ COLLECTED WITH DEDICATED DIPPER,
FILTERED ~~w/~~ CF 9/12 METALS COLLECTED
CF/JO WITH PERISTALTIC PUMP
↳ 4 40ml VOAs (HCl) AK101/SW8260(BTEX)
↳ 1 250ml POLY (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
↳ 1 250ml POLY (HNO_3) SW6020 RCRA METALS SW7471 MERCURY
↳ 2 1L AMBER (HCl) AK102/AK103
↳ 3 1L AMBER (none) SW8270SIM/SW8082
→ SURFACE WATER

1539 FINISHED SAMPLING AT
KANGUKSHAM MOUNTAIN SPRING

1550 FINISHED SAMPLING AT
~~9LF-WG0~~ CF 9/12
9LF-WG01-2 DUE TO EXTREMELY
LOW WATER PRODUCTION FROM THE
WELL POINT

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1600 ARRIVED AT SITE 7 LANDFILL
↳ LAID OUT LOCATIONS

1625 STARTED SAMPLING PROCEDURE AT
7LF-WS01

1630 *SAMPLE: 13-7LF-WS01-0
PRIMARY ↳ COLLECTED w/ DEDICATED DIPPER,
CF/JO/KM FILTERED METALS COLLECTED w/
PERISTALTIC PUMP
↳ 4 40ml VOAs (HCl) AK101/SW8260 (BTEX)
FILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
UNFILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
↳ 2 1L AMBER (HCl) AK102/AK103
↳ 3 1L AMBER (none) SW8270SIM/SW8082
– SURFACE WATER

1650 FINISHED SAMPLING AT 7LF WS01

1640 STARTED SAMPLING PROCEDURE AT
7LF-WS02

Scale: 1 square = ____________

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5 YEAR REVIEW

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1644 *SAMPLE: 13-7LF-WS02-0
PRIMARY ↳ COLLECTED w/ DEDICATED DIPPER,
JO/CF/KM FILTERED METALS COLLECTED WITH
PERISTALTIC PUMP
↳ 4 40ml VOAs (HCl) AK101/SW8260 (BTEX)
FILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
UNFILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
↳ 2 1L AMBER (HCl) AK102/AK103
↳ 3 1L AMBER (none) SW8270SIM/SW8082
→ SURFACE WATER

1653 STARTED SAMPLING PROCEDURE AT
7LF-WS03-0
~~PRIM~~
CF 9/12

1654 *SAMPLE: 13-7LF-WS03-0
PRIMARY ↳ COLLECTED w/ DEDICATED DIPPER, FILTERED METALS
JO/CF/KM WITH PERISTALTIC PUMP
↳ 4 40ml VOAs (HCl) AK101/SW8260 (BTEX)
FILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
UNFILTERED ↳ 1 250ml POLY (HNO3) SW6020 RCRA METALS SW7471 MERCURY
↳ 2 1L AMBER (HCl) AK102/AK103
↳ 3 1L AMBER (none) SW8270SIM/SW8082
→ SURFACE WATER

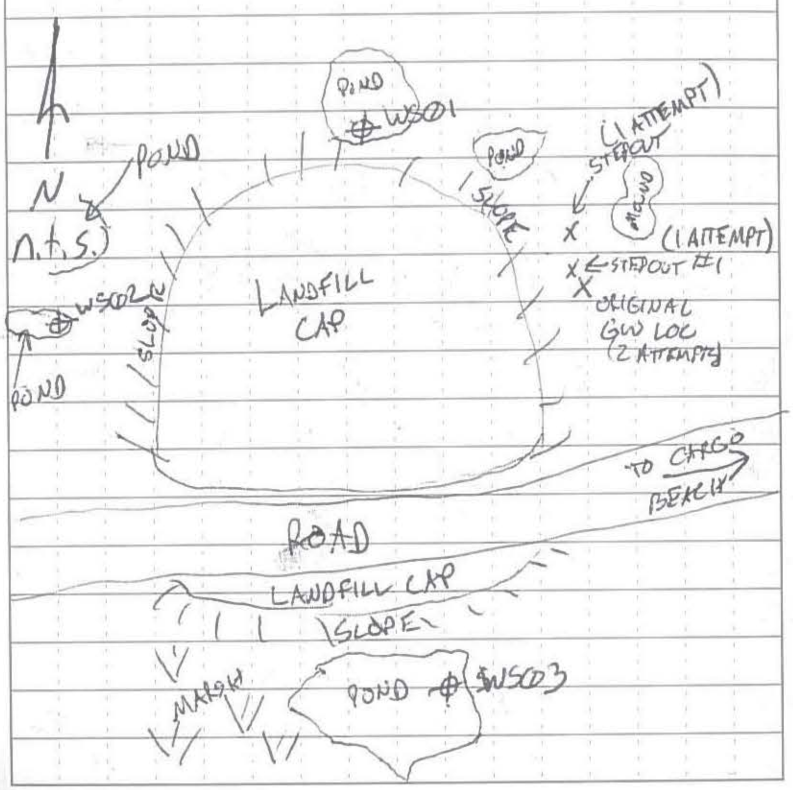
Scale: 1 square = ____________

1720 FINISHED SAMPLING AT 7LF-WS02

1738 FINISHED SAMPLING AT 7LF-WS03

~~LEFT SITE FOR THE DAY~~ CP 9/12

1736 7LF GW SAMPLING LOCATION



1749 LEFT SITE FOR THE DAY
↳ TRANSFERRED SAMPLES BACK TO CAMP
↳ SAMPLING WASTE/IDW TRANSFERRED BACK TO CAMP IN 5 GALLON BUCKETS (PAGE 62)

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9/12/13

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0700 JACOBS TAILGATE

PERSONNEL

JACOBS	K. MAHER	SHE LEAD
JACOBS	C. FELL	SSHO/TECH
JACOBS	J. ORCZEWSKA	TECH

→ K. MAHER DEPARTED AT APPROX 1440

WX: WINDY 10-20mph GUSTS
30sF TO 40sF
OVERCAST

0720 DAILY OBJECTIVES
- COOLER PACKING
- RENTAL DEMOBE
- 5 YR REVIEW TRAINING
- BEGIN 5YR REVIEWS

0800 BRISTOL TAILGATE

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0830 TO 1140 PREPARED CHAINS OF CUSTODY FOR 8 COOLERS WITH SAMPLES COLLECTED ON 9/12/13

COOLERS
- KILO
- JULIETT
- CHARLIE
- MIKE
- ALFA
- HOTEL
- ECHO
- ROMEO

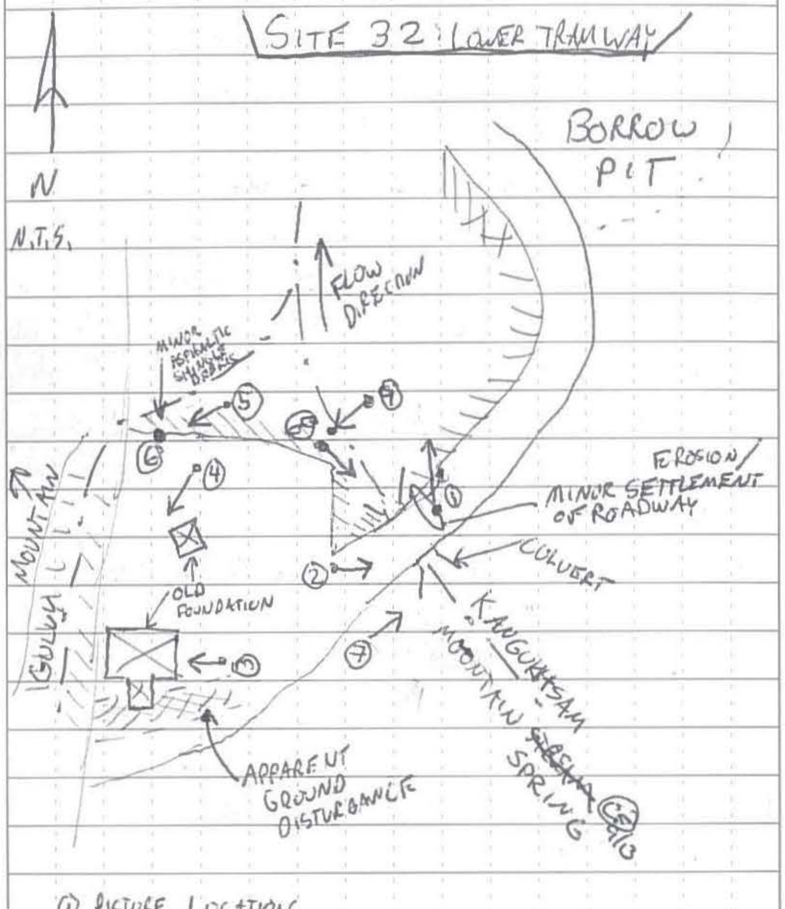
1140 5YEAR REVIEW CHECKLIST TRAINING

1200 LUNCH

1230 BACK FROM LUNCH - GOING TO START SITE WALKS
→ K. MAHER WAITING IN CAMP FOR AIRPLANE TO NOME

1240 SITE WALK OF SITE 32 - LOWER TRAMWAY
↳ SEE CHECKLIST FOR FURTHER INFORMATION

SITE 32: LOWER TRAMWAY



① PICTURE LOCATION

1313 OBSERVED MINOR WOOD AND METAL DEBRIS ON SITE

1321 OBSERVED MINOR ASPHALTIC SHINGLE DEBRIS 1x2 FT TO 2x2 FT (APPROX) DIMENSIONS ON THE GROUND WEST OF THE OLD FOUNDATION

1325 OBSERVED APPARENT GROUN DISTURBANCE (RECENT) TO THE EAST OF THE OLD FOUNDATION, THIN VEGETATION IS GROWING ON THE EXTREMELY ROCKY SOIL

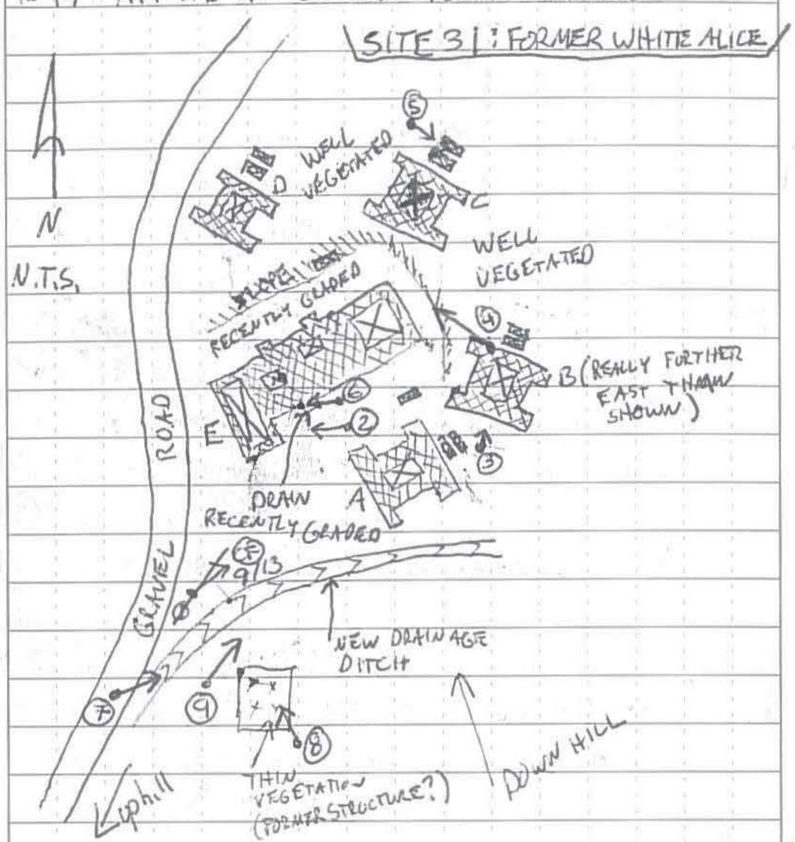
1327 NO GROUNDWATER MONITORING WELLS WERE OBSERVED

1330 CULVERT UNDER ROAD AT THE SITE IS APPROX 5 TO 6 FT IN DIAMETER

1332 ONGOING REMEDIAL ACTIVITY IS MINING BORROW FOR BACKFILL ADJACENT TO THE SITE ON THE OPPOSITE SIDE OF KANGUKHSAM MOUNTAIN SPRING

1343 LEFT SITE 32: LOWER TRAMWAY

1347 ARRIVED AT SITE 31: FORMER WHITE ALICE



FOUNDATION (CONCRETE)

① → PHOTO + DIRECTION

☒ HOLES IN FOUNDATIONS (FILLED W/ SOIL)

1404 OBSERVED MINOR WOOD/METAL/WIRING DEBRIS NEAR ANTENNA FOUNDATION "C"

1405 OBSERVED A DRAIN COVER (RUSTED) ON THE SOUTH SIDE OF FOUNDATION "E" WITH AN UNFILLED VOID UNDERNEATH (APPROX 6 FT DEEP, 5 WIDE, 9FT LENGTH) DRAIN IS APPROX 4FT LONG & 6INCHES WIDE.

SAFETY ISSUE

1415 AREA AROUND FOUNDATION "E" AND ANTENNA FOUNDATION "A" HAVE BEEN RECENTLY GRADED, COMPACTED, AND SEEDED. NEW VEGETATION IS JUST SPROUTING. AREA APPEARS TO BE GRADED TO PROMOTE POSITIVE DRAINAGE AND MITIGATE EROSION

1416 HOLES IN FOUNDATIONS HAVE BEEN FILLED WITH SOIL
↳ NO STAINING OF CONCRETE OBSERVED

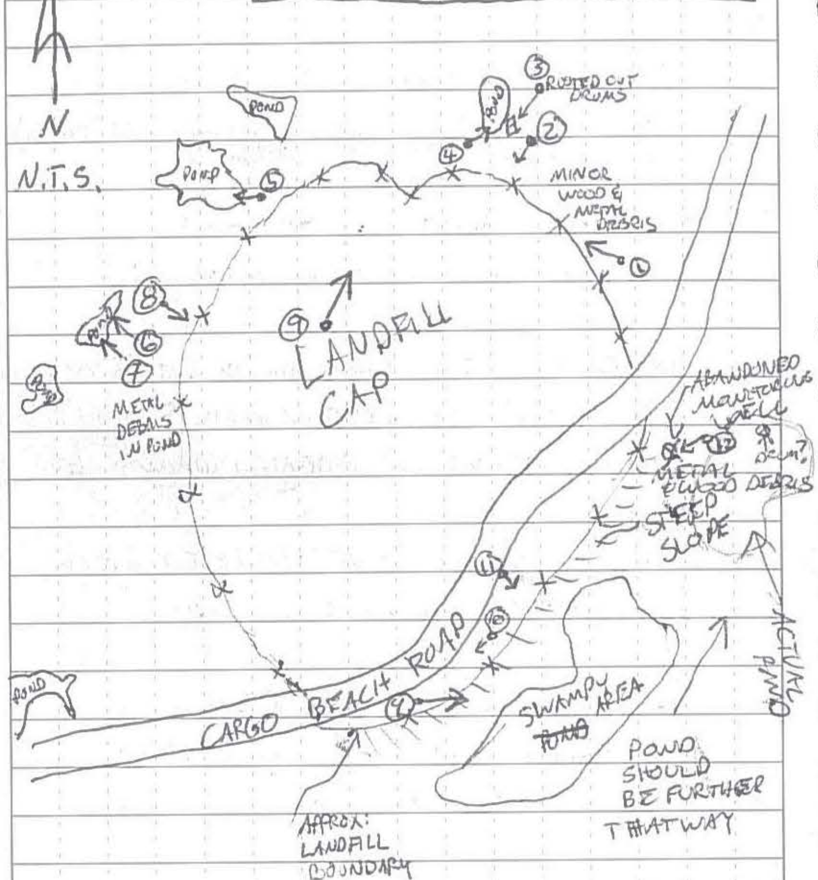
1420 AREA OF STUNTED VEGETATION ~~UP~~ CF 9/13 UPHILL FROM THE WACS SITE (APPROX 20FT BY 30FT RECTANGLE)

1424 NO GROUNDWATER MONITORING WELLS OBSERVED

1440 LEFT SITE: 31: WHITE ALICE
↳ CHECKLIST ON SEPERATE FORM

1509 ARRIVED AT SITE 7: CARGO BEACH ROAD LANDFILL

SITE 7: CARGO BEACH ROAD LANDFILL



—x—x— LANDFILL BOUNDARY (APPROX) TTTT STEEP SLOPE

①—→ PICTURE LOCATION & DIRECTION

1517 THE LANDFILL COVER APPEARS TO CONSIST OF FINE AND COARSE GRAVEL AT THE SURFACE WITH PATCHY GRASS COVER

1523 CARGO BEACH ROAD CROSSES THE LANDFILL CAP. NO SETTLEMENT OBSERVED GRADING/DRAINAGE APPEARS ADEQUATE

1528 WOOD DEBRIS AT PICTURE ① LOCATION (MINOR) WITH OTHER WOOD AND METAL DEBRIS NEARBY

1546 OBSERVED 2 RUSTED OUT DRUMS NEAR THE EDGE OF THE POND NEAR THE NE CORNER OF THE LANDFILL (55gal?)

1547 OBSERVED METAL/WOOD/PLASTIC DEBRIS IN THE NORTHEAST POND

1552 OBSERVED METAL DEBRIS IN THE POND AT THE NW CORNER OF THE LANDFILL WHERE PICTURE ⑤ WAS TAKEN

1553 LANDFILL CAP DOES NOT HAVE OBSERVED SIGNS OF SETTLEMENT/EROSION OR LANDFILL DEBRIS STICKING THROUGH THE CAP

1559 OBSERVED METAL DEBRIS IN THE POND TO THE WEST OF THE LANDFILL (METAL ROOFING?) → PICTURES 6 & 7

1607 RUBBER HOSE STICKING THROUGH LANDFILL CAP ALONG WITH SOME METAL DEBRIS NEAR PICTURES 10 & 11

1615 OBSERVED AN ABANDONED MONITORING WELL NEAR THE SE CORNER OF THE LANDFILL - ABANDONED WITH HYDRATED BENTONITE

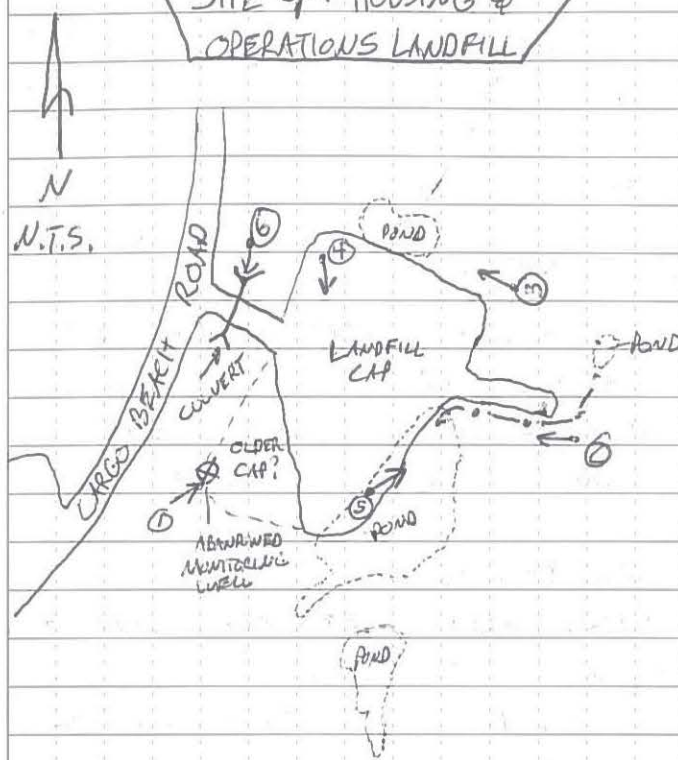
1616 OBSERVED ~~MINOR~~ CF 9/13 METAL DEBRIS AND OTHER DEBRIS IN THE POND NEAR THE SE CORNER OF THE LANDFILL
↳ OBSERVED A SUBMERGED OBJECT W/ A ROUND OPENING (DRUM?)

1633 * ITEMS OF INTEREST *
- DEBRIS PROTRUDING THROUGH CAP ON S SIDE (MINOR)
- SIGNIFICANT METAL & WOOD DEBRIS IN THE SURROUNDING PONDS (INCLUDING A FEW RUSTED OUT DRUMS

1637 LEFT SITE 7 LANDFILL
↳ 5 YR REVIEW CHECKLIST ON SEPERATE FORM

1640 ARRIVED AT SITE 9: HOUSING & OPERATIONS LANDFILL
↳ 5 YR REVIEW CHECKLIST INCLUDED ON A SEPERATE FORM

SITE 9: HOUSING & OPERATIONS LANDFILL



① → PICTURE LOCATION & DIRECTION
POND BOUNDARY
DIVERSION DITCH
CULVERT

1642 DRAINAGE IN EXCELLENT CONDITION ~ NO VEGETATION IN DITCH

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1649 LANDFILL CAP APPEARS TO BE IN GOOD CONDITION WITH THIN GRASSY VEGETATION. CAP IS COMPOSED OF COARSE MATERIAL (GRAVEL) THAT MAKES VEGETATIVE GROWTH DIFFICULT.

1651 EROSION & SETTLEMENT WERE NOT OBSERVED. GRADING APPEARS TO ALLOW DRAINAGE

1657 OBSERVED AN ABANDONED MONITORING WELL AT THE SW CORNER OF THE OLD LANDFILL CAP.

↳ COULD NOT FIND THE OTHER 2 MONITORING WELLS SHOWN IN THE DECISION DOCUMENT

1734 LEFT SITE 9: HOUSING & OPERATIONS LANDFILL

END OF DAY

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9/13/13

Scale: 1 square = ____

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5 YEAR REVIEW

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9/14/13

0800 BRISTOL TAILGATE

0830 JACOBS TAILGATE

PERSONNEL

JACOBS	C. FELL	SITE LEAD
JACOBS	J. ORCZEWSKA	SSHO/TECH

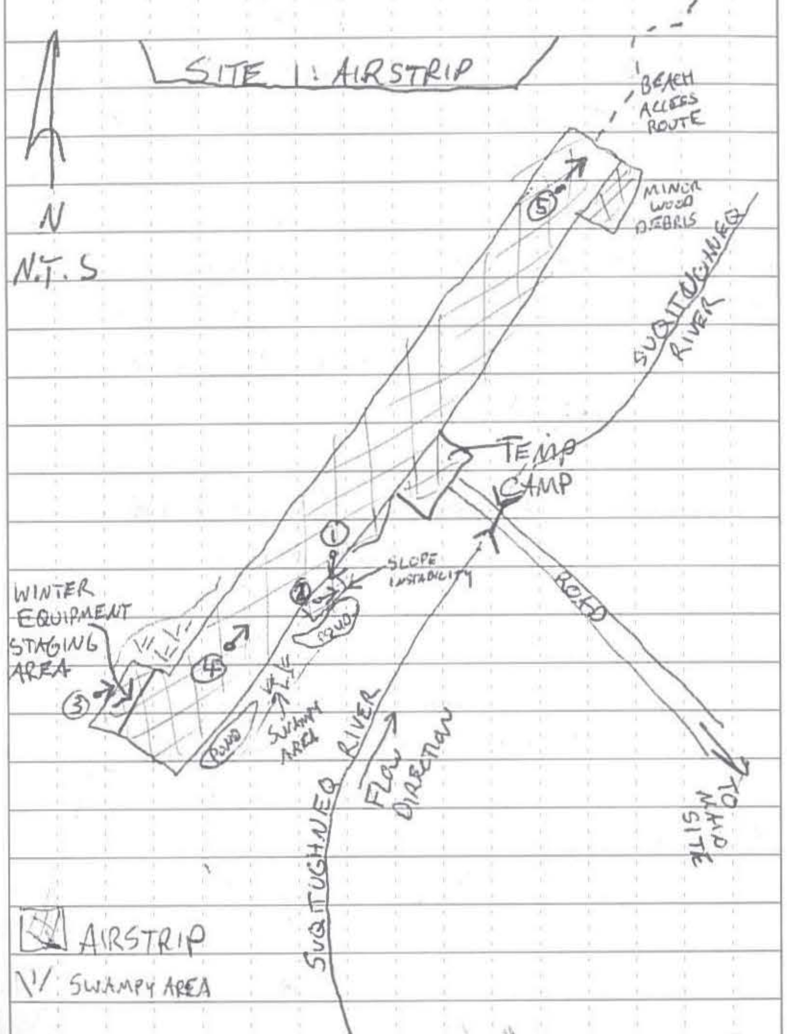
WX: CALM
30s TO 40s F
OVERCAST

850 DAILY OBJECTIVES
- 5 YEAR REVIEW SITE WALKS
- PAPERWORK QC
- CONTINUE PREP FOR DEMOBE

850 to SITE HISTORY REVIEW

Scale: 1 square = ____

0944 LEFT CAMP TO CONDUCT SITE WALK FOR SITE 1: AIRSTRIP



0955 OBSERVED 1 TO 6 INCH TENSION CRACKS IN THE SLOPE OF A SIDING OFF THE SIDE OF THE RUNWAY. THE NORTHEAST CORNER OF THE PAD HAS APPROXIMATELY 1 FT OF SETTLEMENT AT THE TOP OF THE SLOPE.

↳ SLOPE INSTABILITY IS APPROX 30-40 FT FROM THE EDGE OF THE RUNWAY AND WILL NOT AFFECT OPERATIONS ON THE RUNWAY

1000 RUNWAY SURFACE WAS OBSERVED TO BE IN GOOD CONDITION AND WAS FREE OF RUTTING, SETTLEMENT, OR EROSION DAMAGE

↳ SLOPES IMMEDIATELY ADJOINING THE RUNWAY SURFACE WERE GENERALLY FREE OF SIGNS OF SLOPE INSTABILITY, HOWEVER ARE SLOPED BETWEEN 1½ TO 1 AND 3/4 TO 1 WHICH MAY LEAD TO EROSIVE DAMAGE OVER TIME

↳ SMALL TENSION CRACKS ON 3/4 TO 1 SECTIONS

1014 A FEW SHIPPING RACKS ARE STAGED ON THE END OF THE RUNWAY AT THE WINTER STORAGE AREA
↳ NO SOIL STAINING OBSERVED AT STORAGE AREA

1033 MINOR WOOD DEBRIS NOTED ALONG THE EAST SIDE OF THE RUNWAY NEAR THE NORTH END

1038 A TRAIL HAS BEEN FORMED OFF THE NORTH END OF THE RUNWAY LEADING TO THE BEACH.

1044 LEFT SITE 1: AIRSTRIP
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM CF 9/14

ITEMS OF INTEREST
- MINOR SLOPE STABILITIES ISSUES ON THE RUNWAY EDGES.

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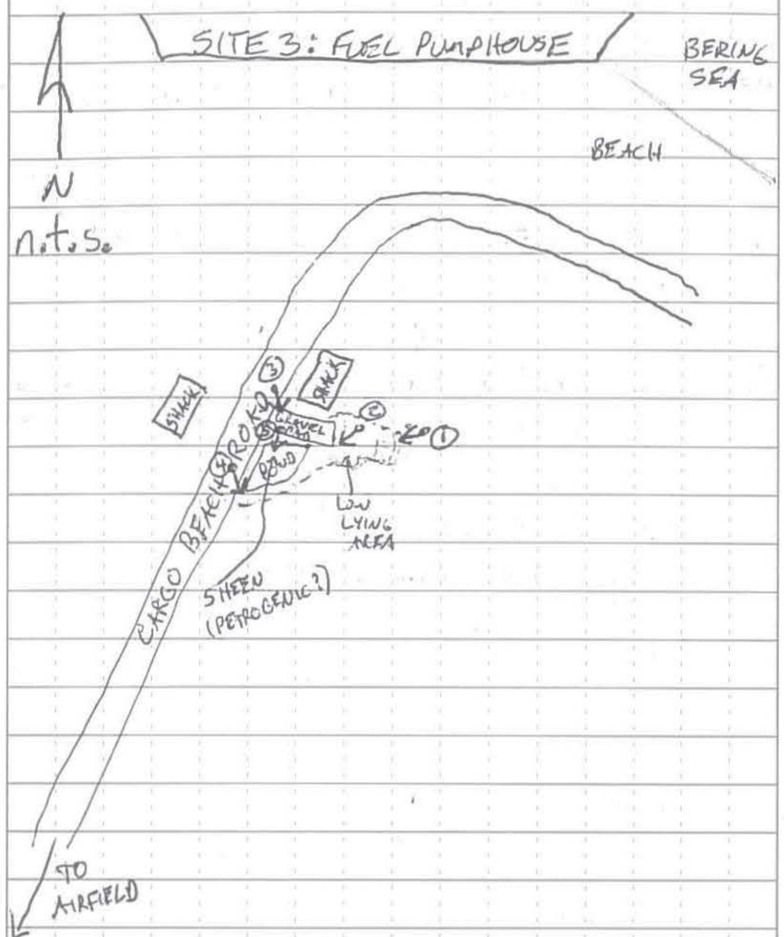
9/14/13

1055 ARRIVED AT SITE 3: FUEL PUMPHOUSE



1112 OBSERVED A SALVAGED PIECE OF RUSTED OUT EQUIPMENT STAGED FOR REMOVAL

1113 EXCAVATION AREA NOTED IN THE ROD APPEARS TO NOW BE A ROAD

1114 BIOGENIC SHEEN (BRITTLE) NOTED ON SOME WATER IN FROM THE ROAD

1116 FORMER PIPELINE WAS NOT OBSERVED (REMOVED?)
FORMER PUMPHOUSE STRUCTURE HAS BEEN REMOVED.

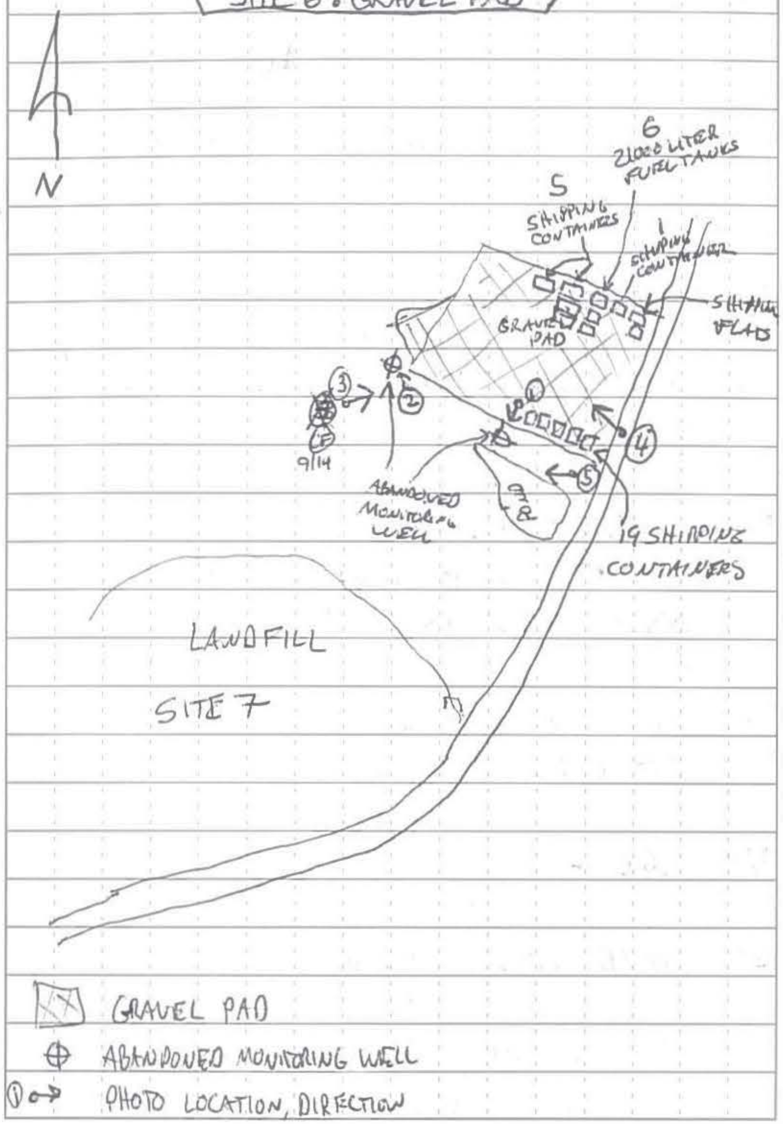
1119 SHEEN NOTED ON PONDED WATER NEAR THE GRAVEL PAD. SHEEN WAS NOT BRITTLE AND FLOWED BACK TOGETHER AFTER BEING DISTURBED (LIGHT SHEEN)

1126 VEGETATION IS GROWING WELL ONSITE EXCEPT ON A NEW GRAVEL PAD

1132 LEFT SITE 3: FUEL PUMPHOUSE

1133 ARRIVED AT SITE 6: GRAVEL PAD
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM

SITE 6: GRAVEL PAD



1140 OBSERVED AN ABANDONED MONITORING WELL ON THE SW SIDE OF THE SITE. (HYDRATED BENTONITE)

1143 A SECOND ABANDONED MONITORING WELL OBSERVED ON THE WEST CORNER OF THE PAD (HYDRATED BENTONITE)

1148 DID NOT OBSERVE STAINING ON THE NEWLY GRADED GRAVEL PAD THAT IS CURRENTLY BEING USED TO STORE SHIPPING CONTAINERS.

↳ PAD APPEARS TO HAVE BEEN RECENTLY SAMPLED
  ↳ GRID SAMPLING
↳ PAD GRADED TO PROMOTE DRAINAGE AND MITIGATE EROSION

1153 DID NOT OBSERVE DEBRIS OR A SHEEN W THE POND TO THE SOUTH OF THE SITE

1155 LEFT SITE 6: GRAVEL PAD

1206 LUNCH

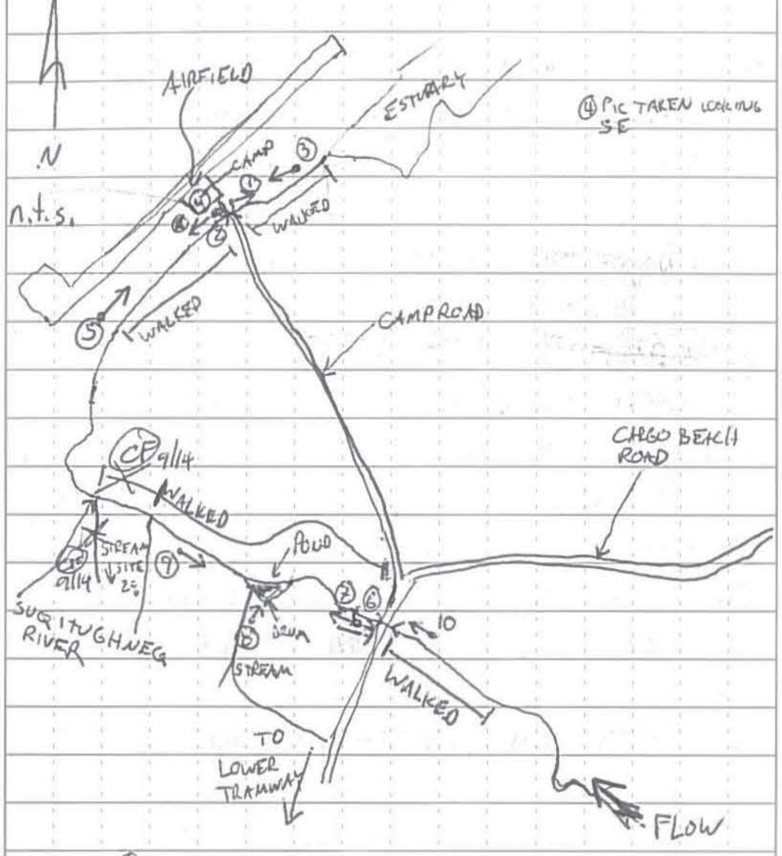
1230 DONE WITH LUNCK

1230 to 1340 VIEWED HISTORICAL PHOTOS WITH JEREMY CRANER (USACE)

Scale: 1 square = ______

1341 SITE WALK FOR SITE 29: SUQITUGHNEQ RIVER
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM.

SITE 29: SUQITUGHNEQ RIVER



① OR ① PHOTO, DIRECTION

Scale: 1 square = ______

1352 WALKED THE SUQITUGHNEQ RIVER FROM CAMP ROAD TO THE ESTUARY

1357 DID NOT OBSERVE ANY DEBRIS OR (PETROGENIC) SHEEN. LOOKS LIKE A RIVER

1402 CONSTRUCTION CAMP IS PUMPING WATER FROM THE SUQITUGHNEQ RIVER FOR GENERAL USE (SOUTH OF ROAD)

1411 WALKED THE SUQITUGHNEQ RIVER FROM CAMP ROAD TO THE END OF THE RUNWAY

1412 ~~DID NOT~~ CF 9/14 DID NOT ~~OVERF~~ OBSERVE CE 9/14 ANY DEBRIS OR SHEEN (PETROGENIC).

TRAVELLED UP RIVER

1426 WALKED THE SUQITUGHNEQ RIVER FROM CARGO BEACH ROAD TOWARDS THE AIRFIELD

1433 OBSERVED A DRUM IN A POND → VERY RUSTED, NO SHEEN OBSERVED

1445 DID NOT SEE DEBRIS/SHEEN (PETROGENIC) TO MOUTH OF SITE 28 DRAINAGE

1450 WALKED THE SUQITUGHNEQ RIVER FROM CARGO BEACH ROAD UPSTREAM
↳ WATER HOSE (4inch) IN THE WATER AT THE CULVERT FOR CARGO BEACH ROAD. MAYBE IN USE AS A WATER SOURCE FOR CONSTRUCTION/ REMEDIATION ACTIVITIES.

1500 DID NOT SEE DEBRIS/SHEEN (PETROGENIC) ALONG THE SUQITUGHNEQ RIVER

1512 LEFT SITE 29: SUQITUGHNEQ RIVER

1515 SITE WALK FOR SITE 8: POL SPILL
↳ 5 YEAR CHECKLIST ON A SEPERATE FORM

1522 VEGETATION IS THICK AND HEALTHY
NO ODOR OBSERVED
NO SHEEN (PETROGENIC) OBSERVED
NO DEBRIS OBSERVED

1533 LEFT SITE 8: POL SPILL

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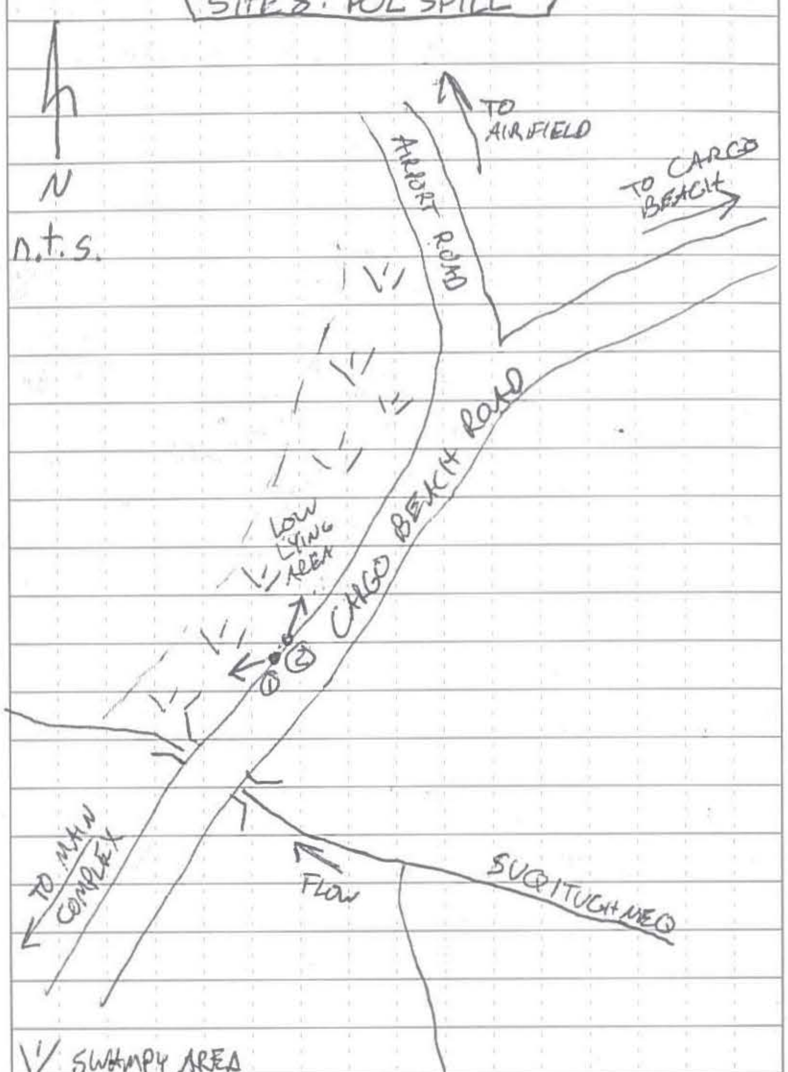
SITE 8: POL SPILL



\\/ SWAMPY AREA
CULVERT DAYLIGHT ① → PHOTO, DIRECTION FACING

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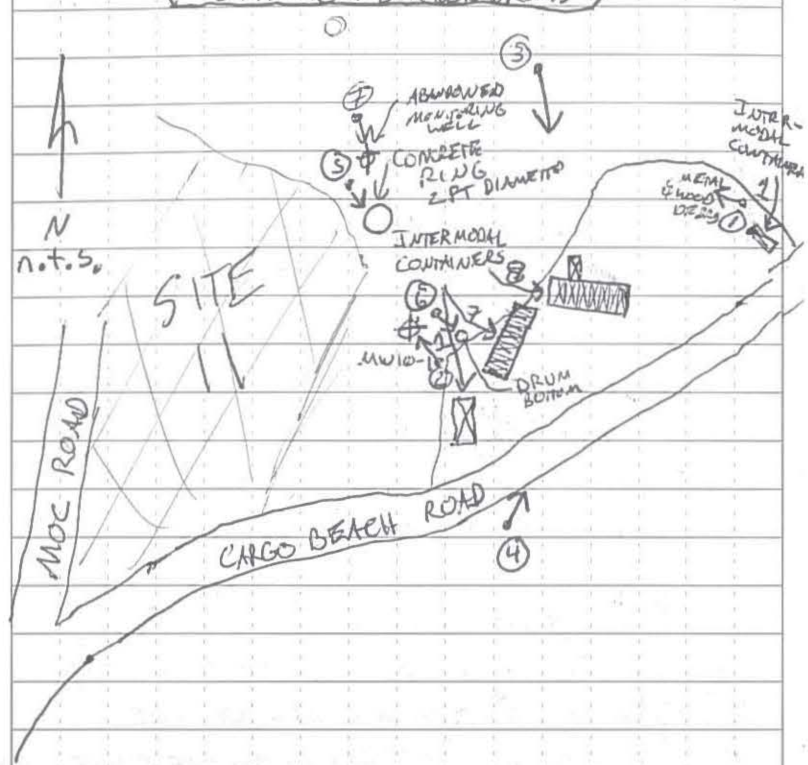
1534 ARRIVED AT SITE 10: BURIED DRUMS
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM

SITE 10: BURIED DRUMS



① → PHOTO, DIRECTION FACING
⊠ INTERMODAL CONTAINER

1547 OBSERVED WOOD AND METAL DEBRIS (MINOR) AT THE NE CORNER OF THE SITE

1550 OBSERVED MONITORING WELL 10-1. WELL CASING HAS JACKED 1 FOOT ABOVE THE PROTECTIVE STEEL CASING, NO LOCKING CAP OR PROTECTIVE BOLLARDS.

1554 ~~EVIDEN~~ 9/14 OBSERVED EVIDENCE OF RECENT SOIL BORINGS & SAMPLING ACTIVITY

1558 SITE IS CURRENTLY BEING USED AS A LAYDOWN AREA BY THE REMEDIAL CONTRACTOR (BRISTOL). SITE IS GRADED AND COMPACTED TO PROMOTE POSITIVE DRAINAGE AND MITIGATE EROSION

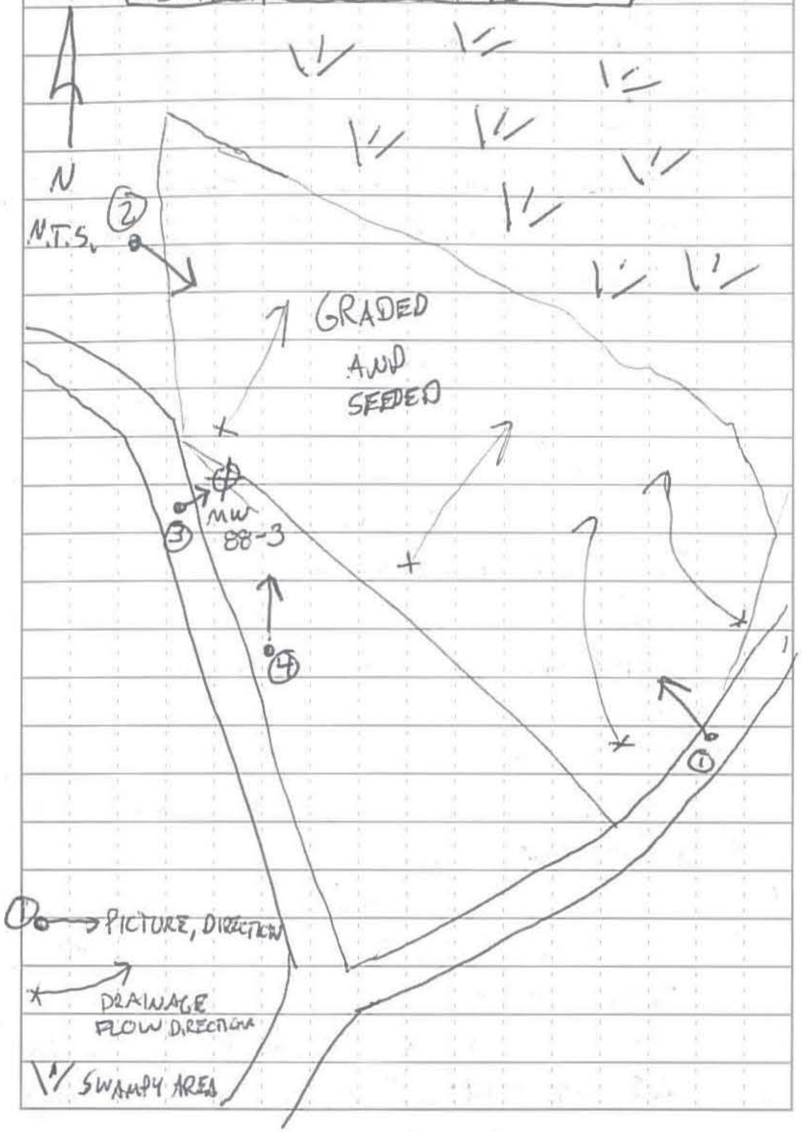
↳ NO VEGETATION PRESENT ON THE GRAVEL PAD, VEGETATION AROUND THE PAD APPEARS HEALTHY

1604 OBSERVED A DRUM BOTTOM AT BASE OF SLOPE

1608 2ND MONITORING WELL SHOWN ON THE FIGURE IN THE ROD WAS NOT FOUND.
↳ JEREMY CRAMER (USACE) INDICATES IT WAS DECOMMISSIONED
↳ OBSERVED THE ABANDONED WELL

1624 LEFT SITE 10: BURIED DRUMS

SITE 11: FUEL TANKS



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1625 ARRIVED AT SITE ~~16~~ @ 9/14 11: FUEL TANKS
FOR A SITE WALK
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM

1635 OBSERVED MONITORING WELL MW88-3.
↳ CASING HAS A LOCKING CAP - WITH NO LOCK
↳ FLUSH MOUNT MONUMENT DOES NOT CLOSE
AS THE WELL APPEARS TO HAVE FROST
JACKED

1643 SITE HAS BEEN GRADED/COMPACTED/AND
SEEDED TO PROMOTE POSITIVE DRAINAGE
AND MITIGATE EROSION.
↳ OBSERVED THE REMEDIAL CONTRACTOR (BRISTOL)
SPREADING SEED ON THE AREA

1645 LOCATIONS OF THE FORMER ASTS ARE
NOT APPARANT

1650 DEBRIS NOT OBSERVED ONSITE OR AROUND
THE PERIMETER

1715 LEFT THE SITE Christopher D. Fell 9/14/13

Scale: 1 square = PAGE 42

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5 YEAR REVIEW
USACE
9/15/13

0730 PAPERWORK & SITREP
0745 BREAKFAST
0800 BRISTOL TAILGATE

0830 JACOBS TAILGATE

PERSONNEL
JACOBS J. ORCZEWSKA SSHO/TECH
JACOBS C. FELL SITE LEAD

WX:
OVERCAST
LIGHT BREEZE
LOW 40s F

PPE: LEVEL D MODIFIED

DAILY OBJECTIVES
- SITEWALK REMAINING 7 SITES
- PREP FOR DEMOB

Scale: 1 square = PAGE 43

0931 ARRIVED AT SITE 28: DRAINAGE BASIN
↳ 5 YEAR REVIEW CHECKLIST ON A SEPERATE FORM

0950 OBSERVED 5 30 FT BY 60 FT SETTLING PONDS FOR COLLECTING WATER & SEDIMENT FROM DREDGE OPERATIONS
↳ 11 SEDIMENT COLLECTION BAGS (25FT × 6FT × 1½FT) PRESENT IN THE PONDS
↳ GAC SYSTEM BY PRO ACT BEING USED TO TREAT WATER PRIOR TO ONSITE DISPOSAL (ONTO TUNDRA)

0956 INTERMEDIATE PONDS ARE BEING USED TO LIFT WATER & SEDIMENT UPHILL WITH PUMP STATIONS

1009 A SEDIMENT TRAP (STEEL WALL, 6FT WITH 3FT WALLS)

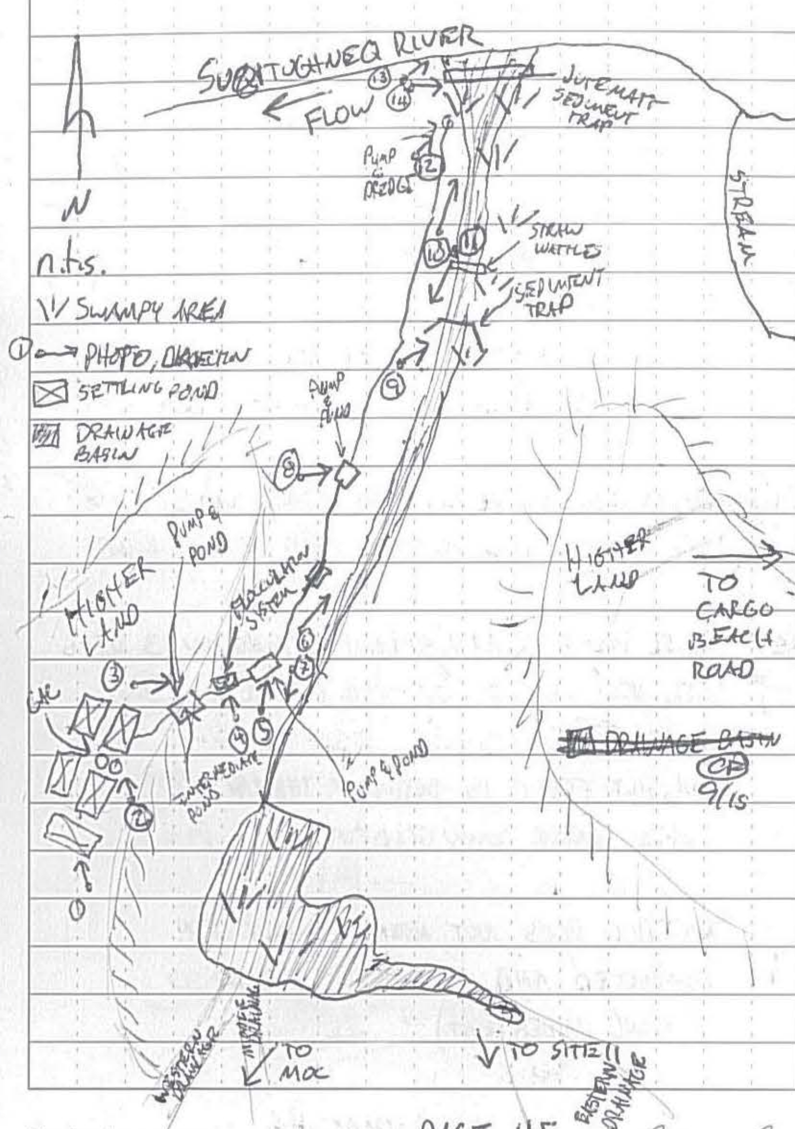
1014 A SMALL DREDGE WAS BEING USED TO REMOVE SEDIMENT (ON PONTOONS)

1017 A JUTT MATT SEDIMENT TRAP WAS AT THE MOUTH OF THE DRAINAGE, DID NOT OBSERVE SEDIMENT ESCAPING INTO THE SUQITUGHNEQ RIVER

1018 DID NOT OBSERVE DEBRIS IN THE DRAINAGE

Scale: 1 square =

SITE 28: DRAINAGE BASIN



Scale: 1 square =

1027 LEFT SITE 28: DRAINAGE BASIN

1030 MET W/ ECO LAND SURVEYING ABOUT SURVEY OF SAMPLING LOCATIONS FROM 9/12/13
↳ NEED TO REMARK SITE 32
↳ WILL VISIT SITE 7 & SITE 9 WITH THE SURVEYOR BEFORE LUNCH

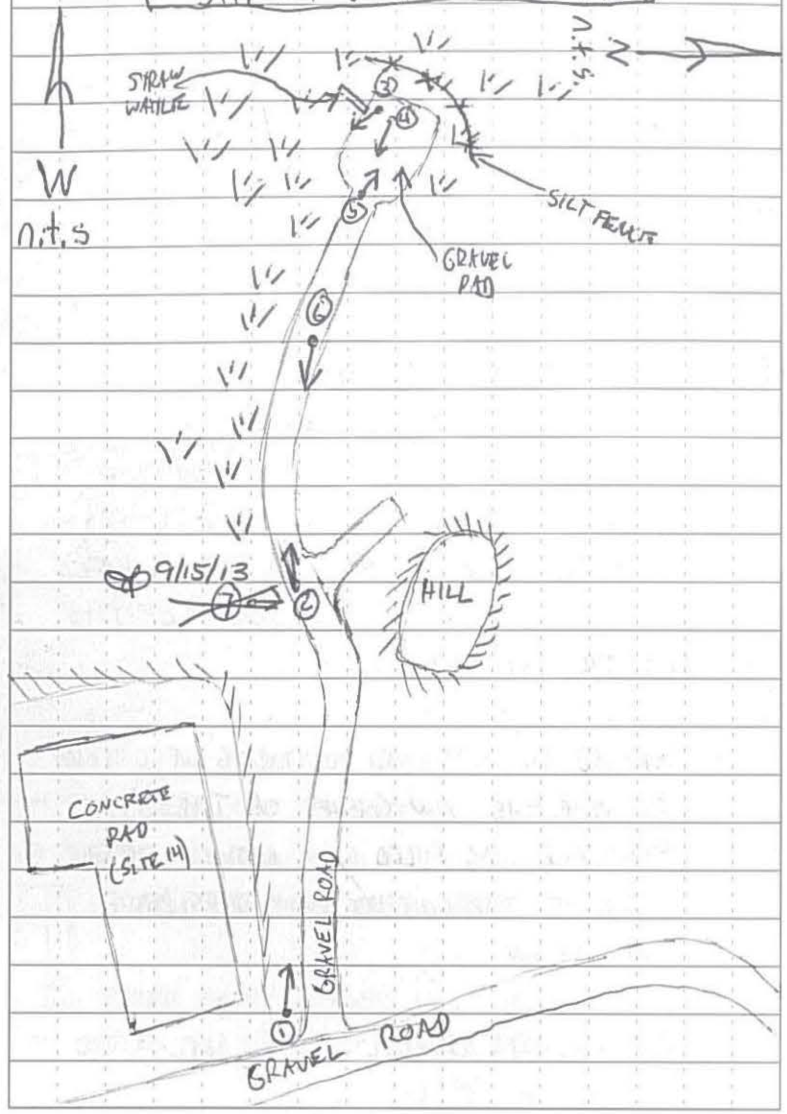
1050 ARRIVED AT SITE 21: WASTEWATER TANK
↳ 5 YEAR REVIEW FORM ON A SEPERATE FORM

1105 OBSERVED BRISTOL (REMEDIAL CONTRATOR) SEEDING THE GRAVEL PAD AT THE END OF THE ROAD

1109 GRAVEL PAD HAD BEEN AN OPEN EXCAVATION 3 DAYS AGO. NOW IS BACKFILLED WITH GRAVEL ~~with~~ CF 9/15 LITTLE SILT.
↳ A SILT FENCE IS BETWEEN THE PAD AND OPEN WATER DOWN GRADIENT

BACKFILL DOES NOT APPEAR TO HAVE BEEN COMPACTED AND IS TOO WET TO DO SO (PUMPING UNDER FOOT)

SITE 21 : WASTEWATER TANK



1121 LEFT SITE 21: WASTEWATER TANK

1123 ARRIVED AT SITE 16: ~~HEAT & POWER PLANT~~ PAINT & DOPE STORAGE CE 9/15
↳ 5 YEAR REVIEW FORM ON A SEPERATE FORM

1125 TO 1155 MET WITH SURVEYORS TO SHOW WHERE SAMPLING LOCATIONS ARE

1155 LEFT SITE FOR LUNCH
1230 LEFT CAMP FOR SITE

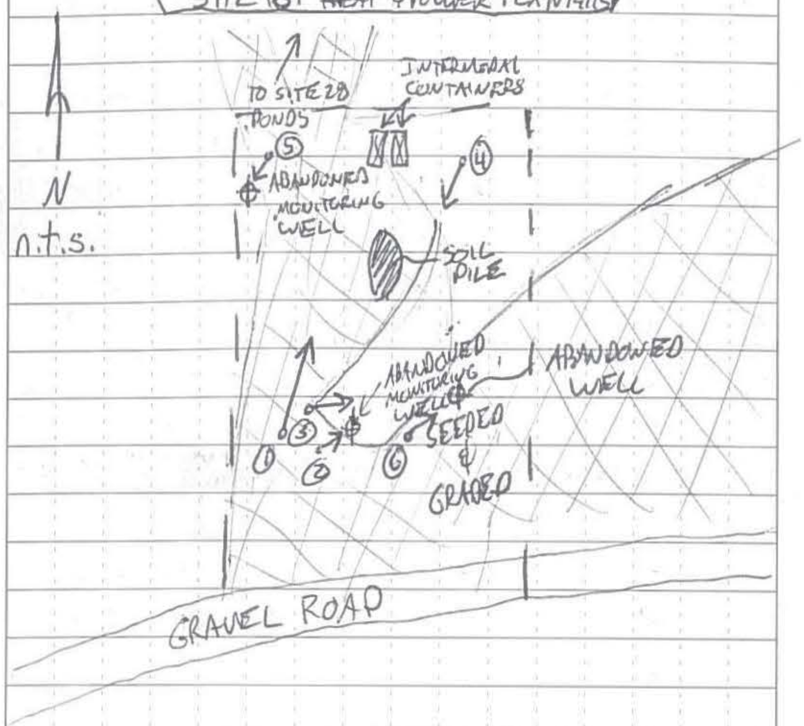
1241 ARRIVED ON SITE 16: ~~HEAT & POWER PLANT~~ PAINT & DOPE STORAGE CE 9/15

1251 OBSERVED AN ABANDONED MONITORING WELL THAT WAS NEAR THE SW CORNER OF THE FORMER BUILDING

1257 OBSERVED AN ABANDONED MONITORING WELL THAT WAS NEAR THE NW CORNER OF THE SITE.
↳ SURFACE WAS FILLED WITH NATIVE MATERIAL SOME OF THE CONCRETE FROM THE SURFACE COMPLETION

1300 SITE HAS BEEN RECENTLY GRADED AND SEEDED ON THE SE PORTION

SITE 16: ~~HEAT & POWER PLANT~~ PAINT & DOPE STORAGE CE 9/15



— — — APPROX SITE BOUNDARY
⌖ ABANDONED MONITORING WELL
▨ DISTURBED GROUND / GRADED AREA

⑥ TAKEN AFTER PICTURE 11 AT NOC SITE (PG 51)

NE CAPE USACE
5 YEAR REVIEW 9/15/13

1301 MUCH OF THE WESTERN PORTION OF THE SITE IS BEING USED TO ACCESS SITE 28 OR AS AN EQUIPMENT STORAGE AREA - AN APPROX 3 YD PILE OF SOIL IS ON SITE

1302 GRADING OF THE SITE APPEARS TO PROMOTE POSITIVE DRAINAGE AND MITIGATE EROSION

1307 LEFT SITE 16: PAINT & DOPE STORAGE

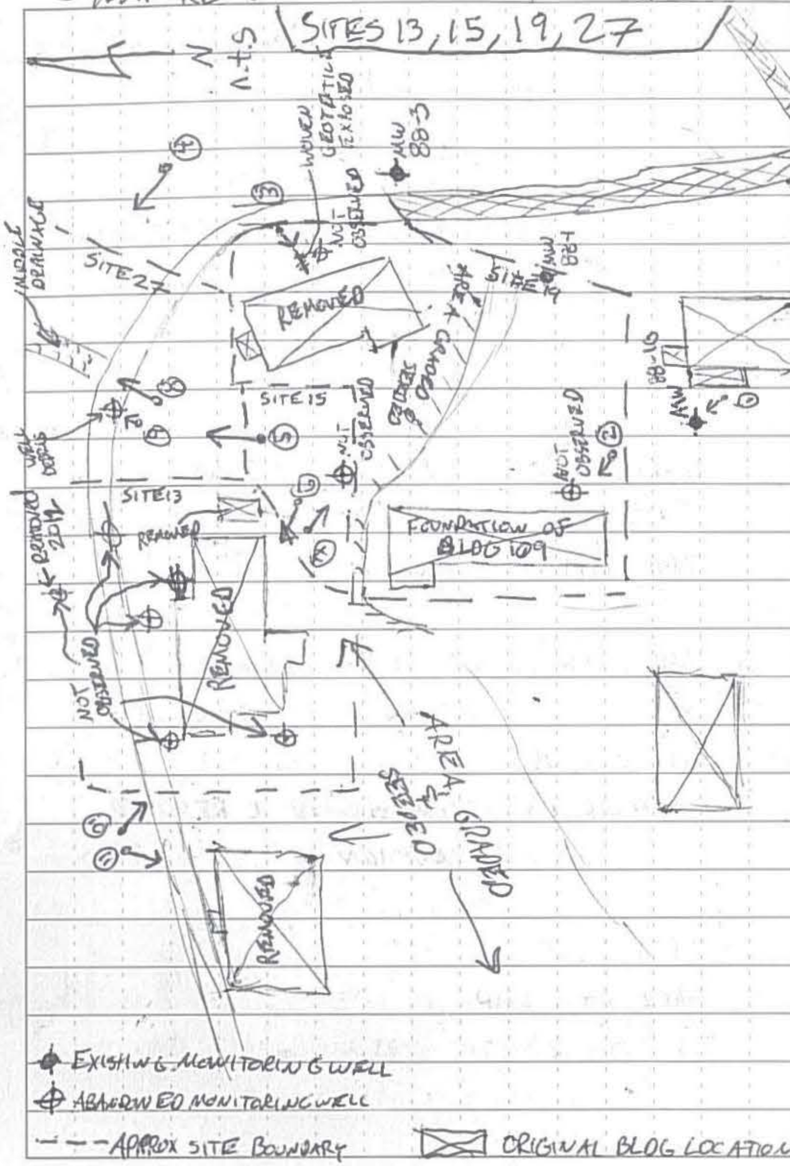
1313 ONSITE (13, 15, 19, 27) FOR SITE WALKS
↳ 5 YEAR REVIEW CHECKLIST ON SEPERATE FORMS

1325 MONITORING WELL ~~"X"~~ 9/15 MW88-10 → OK CONDITION NEEDS REPAIR
- WELL MONUMENT (FLUSH) CLOSES BUT NOT BOLTED
- WELL CASING IS OK AND FITTED WITH LOCKING CAP THAT IS NOT LOCKED

1332 MONITORING WELL MW 88-1 → POOR CONDITION
- WELL MONUMENT (FLUSH) DOES NOT CLOSE
- WELL CASING HAS FROST JACKED AND THE CAP IS NOT LOCKED

1335 MONITORING WELL MW88-3 → POOR CONDITION
- WELL MONUMENT (FLUSH) DOES NOT CLOSE
- WELL CASING HAS FROST JACKED AND THE CAP IS NOT LOCKED

NE CAPE USACE
5 YEAR REVIEW 9/15/13



Rite in the Rain

1350 BUILDING AT SITE 13 HAS BEEN REMOVED ALONG WITH THE FOUNDATION

1353 BUILDING & FOUNDATION ON THE ~~NW~~ NE PORTION OF SITE 19 HAS BEEN REMOVED. THE FOUNDATION FOR THE BUILDING ON THE SW PORTION OF SITE 19 REMAINS.

1355 SITES 13, 15, & 27 HAVE BEEN RECENTLY GRADED, ~~AND~~ SEEDED TO PROMOTE POSITIVE DRAINAGE AND MITIGATE EROSION ALONG WITH THE NORTHERN HALF OF SITE 19

1356 MONITORING WELLS IN THE CENTRAL PORTION OF THE MAIN OPERATIONS COMPLEX (MOC) WERE NOT OBSEVED
↳ LIKELY DECOMMISSIONED OR REMOVED DURING EXCAVATION

1400 LEFT SITE
1415 BACK AT CAMP

Scale: 1 square = ______

1415 to 1800 5 YEAR REVIEW PAPERWORK and QC

End of Day

9/15/13

Scale: 1 square = ______

Personnel: C. FELL
J. ORCZEWSKA

Weather: Rain, 30-40°F
light wind

PPE: Mod. Level D

Objectives: - Prep site for Demobe
- QC paperwork
- Interview QAR for any remaining questions

CF 9/16/13
~~08~~ 0755: Bristol/Tailgate

0800: Jacobs Tailgate

0830: Continue site paperwork and QC.

~~1300~~ CF 9/16/13

Scale: 1 square =

1030 - Prep gear for Demob

~~1415 - FLIGHT TO NOME~~ CF 9/16/13

1300 - INTERVIEW w/ J. CRANER (USACE)

↳ SITE 28 SEDIMENTATION POND(S)
- PLAN TO NOT CONSTRUCT AS SEDIMENT LOAD IN THE DRAINAGE IS LOW AND CONSTRUCTION WOULD LIKELY INCREASE RISK OF SPREADING CONTAMINATED SEDIMENT

↳ SITES W/ MNA REMEDIES
- PLAN TO REPAIR WELLS NEXT SEASON
- PLAN TO AUGMENT NETWORK TO PROVIDE SUFFICIENT MONITORING NEXT YEAR

1415 - DEMOBE TO NOME
2000 - DEMOBE TO ANC
2130 - END OF DAY

Christopher D. Fell 9/16/13

Scale: 1 square =

NE CAPE
5 Year REVIEW

USACE
PHOTO LOG

CONTINUED FROM PG 61

Date	Photo#	Dir.	Description
9/14/13	Ø7Ø	N/A	Site29 Drum in Pond
	Ø71	SE	Site29 Sugi River
	Ø72	NW	Site29 Sugi River
	Ø73	SW	Site8 South overview
	Ø74	NE	Site8 North overview
	Ø75	W	Site10 Debris
	Ø76	N/A	Site10 Monitoring well
	Ø77	S	Site10 Bristol Staging
	Ø78	N	Site 10 Bristol Staging
	Ø79	N/A	Site10 Concrete Ring
	Ø80	N/A	Site10 drum lid
	Ø81	N/A	Site10 abandoned well
	Ø82	NW	Site11 overview
	Ø83	SW	Site11 overview
	Ø84	N/A	Site11 monitoring well
9/14/13	Ø85	N	Site11 seeding
9/15/13	Ø86	N	Site28 Sedim Pond
	Ø87	W	Site28 Water filters
	Ø88	NW	Site28 Sediment Tubes
	Ø89	E	Site28 Intermed Pond
	Ø90	N	Site28 Floculate add
	Ø91	N	Site28 Intermed Pond
9/15/13	Ø92	NE	Site28 overview.

Scale: 1 square = ______

NE CAPE
5 YEAR REVIEW

USACE
PHOTO LOG

Date	Photo#	Dir	Description
9/15/13	Ø93	SW	Site 28 Overview
	Ø94	E	Site28 Water Pump
	Ø95	E	Site28 Sediment Trap
	Ø96	N	Site28 Bristol Demob
	Ø97	S	Site28 Overview
	Ø98	S	Site28 Dredge
	Ø99	E	Site28 Drainage to Sugi
	1ØØ	E	Site28 Wattles before Sugi
	1Ø1	W	Site21 Road
	1Ø2	W	Site21 Road
	1Ø3	SE	Site21 Backfill
	1Ø4	E	Site21 Backfill
	1Ø5	W	Site21 Silt Fence
	1Ø6	S	Site21 Seeding
	1Ø7	E	Site21 Road
	1Ø8	N	Site16 Overview S28 Access
	1Ø9	N/A	Site16 Abandoned well
	11Ø	E	Site16 Overview
	111	S	Site16 Overview
	112	N/A	Site16 abandoned well
	113	N	Site16 Abandoned well
	114	N	MOC Overview
9/15/13	115	N	MOC Overview

Scale: 1 square = ______

5 year Review
NE CAPE

USACE
PHOTOLOG

Date	Photo#	Dir.	Description
9/15/13	116	N	Site19 Monitoring well
	117	W	Site19 GeoTek
	118	W	MOC Overview
	119	~~W~~ N	~~MOC~~ Site15 Overview
	120	N	Site13 overview
	121	SE	Site15 Overview
	122	N	Site27 drainage
	123	N	Site27 Welldebris
	124	E	MOC Overview
9/15/13	125	S	MOC Overview

Scale: 1 square = ____

NE CAPE
5-YR REVIEW

USACE
PHOTO LOG

DATE	PHOTO #	DIRECTION FACING	DESCRIPTION
9/12/13	001	S	CALIBRATION YSI
9/12/13	002	S	SITE KMS SAMPLING
9/12/13	003	N	SITE OVERVIEW
9/12/13	004	N	7LF GW SAMPLING LOCATION
9/12/13	005	NE	9LF GW SAMPLING
9/12/13	006	n/a	9LF GW TURBIDITY
9/13/13	007	N	GW attempts 7LF
9/13	008	N	Site32 Road~~way~~ & depression ap 9/13/13
9/13	009	~~W~~E ap 9/13	Site32 ~~lower tramway~~ Roadway ap
9/13	010	~~S~~W ap 9/13	Site32 ~~Old foundation~~ upper tramway ap
9/13	011	~~W~~S ap 9/13	Site32 ~~Debris~~ old foundation ap
9/13	012	W	Site32 Debris
9/13	013	N/A	Site32 Asphaltic debris
9/13	014	N	Site32 culvert
9/13	015	E	Site32 culvert
9/13	016	S	Site32 metal debris
9/13	017	W	Site31 Recent grading
9/13	018	N	Site31 Antenna foundation
9/13	019	W	Site31 Antenna foundation
9/13	020	E	Site31 Metal debris
9/13	021	N/A	Site31 Drain
9/13	022	N	Site31 Drainage
9/13/13	023	N	Site31 Depression

Scale: 1 square = ____

NE CAPE USACE

5-YR REVIEW PHOTO LOG

DATE	PHOTO #	DIRECTION FACING	DESCRIPTION
9/13/13	Ø24	N	Site31 Foundations N/E
	Ø25	N	Site 7 Debris
	Ø26	N/A	Site 7 Metal Debris
	Ø27	N/A	Site 7 Metal Debris
	Ø28	N	Site 7 Rusted Drums
	Ø29	N	Site7 debris in Ponds
	Ø30	W	Site7 landfill cap
	Ø31	N	Site7 Debris in Pond
	Ø32	NW	Site7 Debris in Pond
	Ø33	W	Site7 Debris in Pond
	Ø34	E	Site7 landfill cap
	Ø35	E	Site7 top of cap
	Ø36	E	Site7 Armored rock
	Ø37	N/A	Site7 Debris
	Ø38	S	Site7 Debris
	Ø39	N/A	Site7 Abandoned well loc.
	Ø40	S	Site 7 Debris in Pond
	Ø41	N/A	Site 7 Possible Drum
	Ø42	N/A	Site9 Abandoned well loc
	Ø43	W	Site9 Diversion trench
	Ø44	W	Site9 landfill cap
	Ø45	E	Site9 Vegetation
9/13/13	Ø46	N	Site9 Pond near cap

Scale: 1 square =

NE CAPE USACE

5-YR REVIEW PHOTO LOG

DATE	PHOTO #	DIRECTION FACING	DESCRIPTION
9/13/13	Ø47	S	Site9 Culvert
9/14/13	Ø48	S	Site1 Pond
	Ø49	E	Site1 cracking on edge
	Ø50	E	Site1 Loading equip.
	Ø51	NE	Site1 Runway
	Ø52	NE	Site1 4-wheel trail off runway
	Ø53	W	Site3 Overview
	Ø54	SW	Site3 Pond onsite
	Ø55	S	Site3 Pond onsite
	Ø56	SE	Site3 Recent excavation
	Ø57	N/A	Site3 Sheen in Pond
	Ø58	N/A	Site6 Abandoned well
	Ø59	N/A	Site6 Abandoned well
	Ø60	E	Site6 Bristol Staging
	Ø61	NW	Site6 Bristol Staging
	Ø62	E	Site6 Nearby Pond
	Ø63	E	Site29 Overview from Road
	Ø64	W	Site29 Overview from Road
	Ø65	E	Site29 Sugi River
	Ø66	SE	Site29 Bristol Water Intake
	Ø67	E	Site29 Sugi River
	Ø68	E	Site29 Culvert
9/14/13	Ø69	W	Site29 Sugi River

* CONTINUED ON PAGE 56 *

Scale: 1 square =

NE CAPE
5 YR REVIEW

USACE
WASTE TRACKING

CONTAINER ID	GEN DATE	CONTENTS	CONTAINER TYPE / DESCRIPTION
13NECAPE-B1	9/12/13	DECON/PURGE H_2O/CAL WASTE	5 gallon bucket NON-HAZ ↳SHIPPED TO NOME 9/13/13
13NECAPE-B2	9/12/13	IDW/PPE WASTE	5 gallon bucket NON-HAZ ↳ADDED TO BRISTOL'S

Scale: 1 square = ______ PAGE 62

Site Inspection Team Roster
Site Inspection – 13 – 15 September 2013
First Five-Year Report for Northeast Cape, St. Lawrence Island, Alaska

Name	Title	Affiliation
Christopher Fell	Geologist	Jacobs Engineering Group Inc.
Julieanna Orczewska	Biologist	Jacobs Engineering Group Inc.

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 1 - Air Strip	**Date of Inspection:** 09/14/2013
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ____________________

2. O&M staff NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ____________________

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

Agency ADEC

Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☒ Report attached) ____________________

Agency ____________________

Contact ____________ (Name) ____________ (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ____________________

4. **Other interviews** (optional) (☒ Report attached) ____________________

Site Name: Site 1

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents
   - O&M manual ☐Readily available ☐Up to date ☒N/A
   - As-built drawings ☐Readily available ☐Up to date ☒N/A
   - Maintenance logs ☐Readily available ☐Up to date ☒N/A
   - Remarks: ~~Record of~~ Doc. decision used for Site information and site maps.

2. Site-Specific Health and Safety Plan ☐Readily available ☐Up to date ☒N/A
   - Contingency plan/emergency response plan ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

3. O&M and OSHA Training Records ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

4. Permits and Service Agreements
   - Air discharge permit ☐Readily available ☐Up to date ☒N/A
   - Effluent discharge ☐Readily available ☐Up to date ☒N/A
   - Waste disposal, POTW ☐Readily available ☐Up to date ☒N/A
   - Other permits:______ ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

5. Gas Generation Records ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

7. Groundwater Monitoring Records ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

8. Leachate Extraction Records ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

9. Discharge Compliance Records
   - Air ☐Readily available ☐Up to date ☒N/A
   - Water (effluent) ☐Readily available ☐Up to date ☒N/A
   - Remarks: ______

10. Daily Access/Security Logs ☐Readily available ☐Up to date ☒N/A
    - Remarks: ______

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ Contractor for State
- ☐ PRP in-house
- ☐ Contractor for PRP
- ☐ Federal Facility in-house
- ☐ Contractor for Federal Facility
- ☒ Other USACE

2. O&M Cost Records ~~NOT AVAILABLE~~

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all NE cape sites to conduct six 5 year reviews

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons ~~NOT AVAILABLE~~ NONE

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 Site 1 is located on a remote Island in Alaska. The airstrip is only accessible by air or ATV trails from the neighboring village approximately 60 miles away.

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 ______

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

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

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

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

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent _____ Depth _____
Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type _____ Areal extent _____
Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent _____ Depth _____
Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent _____ Depth _____
Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
☐ Location shown on site map Areal extent _____
Size _____
Remarks ______

6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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

C. Treatment System Applicable N/A

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ______

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

   Remarks ______

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

   Remarks ______

D. Monitoring Data N/A

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. Monitoring 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 ______________________________

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. ~~SEE ATTACHED~~

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.).

The selected remedy for Site 1 was intended to excavate and remove POL-contaminated soil and miscellaneous debris from the Site.

The selected remedy appears to be effective. The airstrip was observed in good condition with minimal ~~ero~~ tension cracks on the South west border. The area surrounding the airstrip has fully revegetated and ~~has~~ has very minimal wood debris. There is an ATV trail off of the East end of the airstrip leading to the beach.

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.

The ~~airstrip~~ Site is in good condition and has been graded to promote positive drainage and mitigate erosion in all but one small section.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~Regrade the southwest portion of the airstrip to remedy tension cracks and prevent erosion of airstrip~~ 09/11/13

NONE

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION

Site name: Site 3-Fuel Pumphouse	**Date of Inspection:** 9/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal/treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________

2. O&M staff NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________

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

Agency ADEC

Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☒ Report attached) ______________________

Agency ______________________

Contact ______ (Name) ______ (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________

4. **Other interviews** (optional) (☒ Report attached) ______________________

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents
   - O&M manual ☐ Readily available ☐ Up to date ☒ N/A
   - As-built drawings ☐ Readily available ☐ Up to date ☒ N/A
   - Maintenance logs ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ~~Record of~~ decision Doc used for site information and site maps

2. Site-Specific Health and Safety Plan ☐ Readily available ☐ Up to date ☒ N/A
   - Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

3. O&M and OSHA Training Records ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

4. Permits and Service Agreements
   - Air discharge permit ☐ Readily available ☐ Up to date ☒ N/A
   - Effluent discharge ☐ Readily available ☐ Up to date ☒ N/A
   - Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A
   - Other permits: ______ ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

7. Groundwater Monitoring Records ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

9. Discharge Compliance Records
   - Air ☐ Readily available ☐ Up to date ☒ N/A
   - Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A
   - Remarks: ______

10. Daily Access/Security Logs ☐ Readily available ☐ Up to date ☒ N/A
    - Remarks: ______

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ Contractor for State
- ☐ PRP in-house
- ☐ Contractor for PRP
- ☐ Federal Facility in-house
- ☐ Contractor for Federal Facility
- ☒ Other USACE

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 → Breakdown attached

Estimate for all NE Cape sites to conduct six 5 year reviews

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 3 is located on a remote island on Village property near a fish camp. The fish camp is routinely used by members of nearby Villages. Access is made by personal boats.

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 ______

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent______________ Depth____________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent______________ Depth____________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

Site Name: Site 3

JACOBS **Five-Year Review Site Inspection Checklist (8/12)**

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 ___

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

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

D. Monitoring Data N/A

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. Monitoring 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

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. ~~See Attached~~

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.).

The remedy at Site3 was intended to excavate and remove DOL-contaminated soil.

The remedy appears to have been effective with much of the vegetative regrowth flourishing. An old piece of tracked equipment remains onsite ~~prepped on a~~ prepared for shipment. A sheen was noted in a pond onsite with an oil cap nearby. A gravel pad remains onsite near the cabin. (SLIGHT SHEEN, PETROGENIC)

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.

NONE

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

~~NONE~~ The decision document does not indicate the presence of surface water observed during the site inspection. Surface water should be evaluated to ensure the remedy selected for Site 3 is adequate.

D. Opportunities for Optimization

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

~~NONE~~ Obtain formal 18 AAC 75.350 determination

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION

Site name: Site 6 - Gravel Pad	**Date of Inspection:** 9/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact Curtis Dunkin ______ Project Manager ______ 01/2014
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	☐Readily available	☐Up to date	☒N/A
Remarks: Decision Document used for site history and maps.			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

Site Name: Site 6

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE - Estimate For all NE cape sites to conduct six 5YR reviews

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 6 is located on Village property on a remote island with no road access from village.

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 ______

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

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

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

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

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ____
   ____

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ____
   ____

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

1. **Siltation** Areal extent______________ Depth____________ N/A
   ☐ Siltation not evident
   Remarks ____
   ____

2. **Erosion** Areal extent______________ Depth____________
   ☐ Erosion not evident
   Remarks ____
   ____

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ____
   ____

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ____
   ____

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ____
   ____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ____
   ____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A
1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident Areal extent _____ Depth _____ Remarks ______
2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A ☐ Vegetation does not impede flow Areal extent _____ Type _____ Remarks ______
3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent _____ Depth _____ Remarks ______
4. **Discharge Structure** ☐ Functioning ☒ N/A Remarks ______
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ 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: ______

Site Name: Site 4

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 ______

C. Treatment System Applicable N/A

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

   Remarks ____

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

   Remarks ____

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

   Remarks ____

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ____

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

   Remarks ____

6. **Monitoring Wells** (pump and treatment remedy)
   - ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
   - ☐ Good condition ☐ All required wells located ☐ Needs Maintenance
   - ☒ N/A NOT PART OF A TREATMENT SYSTEM

   Remarks ~~2 abandoned monitoring wells~~ locations ~~were observed onsite. Bentonite was used for abandonment~~ CP 9/16/13 CP 9/16/13

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. Monitoring 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 2 ABANDONED MONITORING WELL LOCATIONS WERE OBSERVED ONSITE HYDRATED BENTONITE WAS USED FOR ABANDONMENT.

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. ~~See Attached~~

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.).

The selected remedy at Site 6 was intended to remove POL-~~Relat~~ contaminated soil and related debris from the drum field.
The selected remedy appears to be effective.
A gravel pad remains onsite and is currently being used to store shipping connexes, 6-21000 L fuel tanks, and some heavy equipment. Nearby surface water is clear with no debris.
No general debris was observed onsite.

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.

Site has been graded to promote positive drainage.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ Obtain formal 18 AAC 75.350 determination

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 7 - Cargo Beach Road Landfill	**Date of Inspection:** ~~[illegible]~~ 9/13/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast ~40°F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Capping with land use controls
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact Curtis Dunkin Project Manager 01/2014
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs ~~R~~ Doc	☐Readily available	☐Up to date	☒N/A
Remarks: ~~Record~~ of Decision used for site information, and site maps.			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

JACOBS Five-Year Review Site Inspection Checklist (3/12)

Site Name: Site 7

IV. O&M COSTS	
1. O&M Organization	
☐ State in-house	☐ Contractor for State
☐ PRP in-house	☐ Contractor for PRP
☐ Federal Facility in-house	☐ Contractor for Federal Facility
☒ Other USACE	

2. O&M Cost Records ~~NOT AVAILABLE~~ 6-5 yReviews

☐ Readily available ☐ Up to date

☐ Funding mechanism/agreement in place → for all NE Cape Sites

Original O&M cost estimate $5851,587 Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
From ______	To ______	______	Breakdown attached
From ______	To ______	______	Breakdown attached
From ______	To ______	______	Breakdown attached
From ______	To ______	______	Breakdown attached
From ______	To ______	______	Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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

LUCs in PROGRESS

Remarks Site 7 cargo beach landfill ~~has existing~~ Remedy includes land use controls to ensure no buildings are constructed on landfillcap and to prevent use of groundwater. Site 7 is located on Village property on a remote island. There is currently no road access to site from either on-island Village.

VI. GENERAL SITE CONDITIONS

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Roads damaged** ☒ Location shown on site map ☒ Roads adequate ☐ N/A
   Remarks Cargo beach Road crosses over landfill cap.

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 Soil is very coarse making vegetative growth difficult
6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks Souther border of cap consist of armored rock on slope.
7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent ______ Height ______
   Remarks ______
8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   ☐ Wet areas location shown on site map Areal extent ______
   ☐ Ponding location shown on site map Areal extent ______
   ☐ Seeps location shown on site map Areal extent ______
   ☐ Soft subgrade location shown on site map Areal extent ______
   Remarks ______
9. **Slope Instability**
   ☐ Slides
   ☐ Location shown on site map
   ☒ No evidence of slope instability
   Areal extent ______
   Remarks ______

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent ______ Depth ______
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type ______ Areal extent ______
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent ______ Depth ______
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent ______ Depth ______
   Remarks ______

5. **Obstructions** Type ______ ☐ No obstructions
   ☐ Location shown on site map Areal extent ______
   Size ______
   Remarks ______

6. **Excessive Vegetative Growth** Type ______
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent ______
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ______________________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 ~~An abandoned well location was observed on southern side of Site.~~ 9/13/13

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks NOT APPLICABLE

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition
   ☐ Requires upgrade ☐ Needs to be provided
   Remarks NOT APPLICABLE

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

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

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

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

C. Treatment System Applicable N/A

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ______

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

   Remarks ______

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

   WAS NOT PART OF A TREATMENT SYSTEM CP 9/16/13

   Remarks ~~One abandoned well location was observed onsite. Bentonite used.~~ CP 9/16/13

D. Monitoring Data NOT APPLICABLE

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. Monitoring 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 One abandoned well location left 9/13/13 observed onsite

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.).

The Remedy at Site 7 Cargo beach Road landfill was intended to place a 2' cap over the landfill and implement land use controls. The selected Remedy is effective in general. The cap Remains in good condition however debris was noted along the perimeter. There was a small amount of debris protruding from the cap on the southern side near the armored rock. Debris was also observed in the nearby ponds.

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.

Site 7 has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE OBSERVED.

D. Opportunities for Optimization

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

Add additional fill to the southern side of the cap to ensure a 2' cover. Remove additional debris remaining outside of cap including a few rusted ~~of~~ 55gal drums.

Implement LUCs, obtain 18 AAC 75.350 formal documentation/approval

9/13/13

p23 - 55g draining drums
p16 - 5 ft. revised
p24 - Bentonite well
p26 - mention drainage ditch condition

9/13/13

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 8 POL Spill	**Date of Inspection:** 9/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ ~~Institutional controls~~ (LUC)
- ☐ Groundwater pump and treatment
- ☐ Other: ____
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____)

Problems, suggestions (☐ Report attached) ____

2. O&M staff NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____)

Problems, suggestions (☐ Report attached) ____

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____)

Problems, suggestions (☒ Report attached) ____

Agency ____
Contact ____ (Name) ____ (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____)

Problems, suggestions (☒ Report attached) ____

4. **Other interviews** (optional) (☒ Report attached) ~~USACE QAR (Jeremy Cramer) 9/16/13~~ 9/16/13

Site Name: Site 8

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents

O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: Record of decision doc used for site information and site maps

2. Site-Specific Health and Safety Plan ☐ Readily available ☐ Up to date ☒ N/A

Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☒ N/A

Remarks: ______

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

Remarks: ______

4. Permits and Service Agreements

Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits: ______	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks: ______

7. Groundwater Monitoring Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks: ______

8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks: ______

9. Discharge Compliance Records

Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

10. Daily Access/Security Logs ☐ Readily available ☐ Up to date ☒ N/A

Remarks: ______

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☒ Other USACE

2. O&M Cost Records NOT AVAILABLE BY SITE

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all WE capl sites to conduct six 5YR reviews

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 8 is located on Village property on a Remote Island. There is no Road access to the site from either village. Site 8 is accessible by Road from a fish camp to the East

LUCs for Site 8 are pending.

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 ______________________________

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______

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

1. **Siltation** Areal extent______ Depth______ N/A
   ☐ Siltation not evident
   Remarks ______

2. **Erosion** Areal extent______ Depth______
   ☐ Erosion not evident
   Remarks ______

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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~~ N/A 9/16/13

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 9/16/13

1. **Collection Structures, Pumps, and Electrical**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks: NONE PRESENT

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks: NONE PRESENT

3. **Spare Parts and Equipment**
   - ☐ Readily available ☐ Good condition
   - ☐ Requires upgrade ☐ Needs to be provided
   - Remarks: NONE PRESENT OR NEEDED

C. Treatment System Applicable N/A

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

   Remarks ________

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

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition
   ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks ________

4. **Discharge Structure and Appurtenances**
   ☒ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks ________

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

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

D. Monitoring Data N/A

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. Monitoring 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 ______________________________

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.).

The selected Remedy for Site 8 was monitored natural attenuation with land use controls.

The selected Remedy appears to be effective. Site vegetation was thick and healthy and no noticeable odor was observed. No debris observed onsite.

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.

Selected Remedy appears adequate

Site Name: Site 8

JACOBS **Five-Year Review Site Inspection Checklist (12/12)**

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ 9/16/13

~~There does not appear to be a monitoring well network at Site 8. MNA parameters may benefit by adding groundwater sampling~~ 9/16/13

It may be considered beneficial to incorporate Surface Water monitoring to Site 8 considering the nature of the contaminant of concern

Implement LUCs described in decision doc.

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 9 Housing & Operations Landfill	**Date of Inspection:** 9/13/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast ~40°F

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Capping with land use controls
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. **O&M site manager** NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. **O&M staff** NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.
Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/14 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ (Name) ______ (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	☐Readily available	☐Up to date	☒N/A
Remarks: Record of decision used for site history and maps.			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

IV. O&M COSTS

1. O&M Organization ~~NOT AVAILABLE~~

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE; 6 events of 5YR MONITORING ESTIMATED @ $5,851,587. for all NE Cape

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate 5,851,587 ☐ Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached
			☐ Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 land use controls are ~~present & placed on Site 9.~~ not implemented, currently in progress.

VI. GENERAL SITE CONDITIONS

A. Landfill Surface ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☐ Roads adequate ☒ N/A
   Remarks No roads cross over Site 9 cap

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 soil is coarse making vegetation growth difficult
6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
   Remarks ______
7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
   Areal extent _____ Height _____
   Remarks ______
8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   ☐ Wet areas location shown on site map Areal extent _____
   ☐ Ponding location shown on site map Areal extent _____
   ☐ Seeps location shown on site map Areal extent _____
   ☐ Soft subgrade location shown on site map Areal extent _____
   Remarks ______
9. **Slope Instability**
   ☐ Slides
   ☐ Location shown on site map
   ☒ No evidence of slope instability
   Areal extent _____
   Remarks ______

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

Site Name: Site 9

JACOBS **Five-Year Review Site Inspection Checklist (8/12)**

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

1. **Siltation** OP 9/16 ~~☒ Location shown on site map~~ ☒ Siltation not evident
~~Areal extent 150 linear ft. Depth ~3 ft~~ OP 9/16
Remarks Drainage ditch is approximately 3 ft deep and connects two ponds around the landfill to help prevent erosion of the cap & manage surface drainage
2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
~~☒ Vegetation does not impede flow~~ OP 9/13/13
Areal extent _____ Type _____
Remarks There is no vegetation to impede flow.
3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____
Remarks
4. **Discharge Structure** ☐ Functioning ☒ N/A
Remarks NO DISCHARGE STRUCTURE EXISTS, THE DITCH DAYLIGHTS IN TO A LOWER POND/WETLAND.

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

C. Treatment System Applicable N/A

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

   Remarks ______

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

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition
   ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks ______

4. **Discharge Structure and Appurtenances**
   ☒ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks ______

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

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
   ☐ Good condition ☐ All required wells located ☐ Needs Maintenance
   ☒ N/A
   Remarks 1 abandoned monitoring well location observed on south side of landfill cap.

D. Monitoring Data

1. **Monitoring Data** N/A
   ☐ Is routinely submitted on time ☐ Is of acceptable quality
2. **Monitoring data suggests:**
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Site Name: Site 9

JACOBS Five-Year Review Site Inspection Checklist (11/12)

E. Monitoring 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 1 abandoned monitoring well location observed onsite.

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.).

The remedy at Site 9 Housing and operations landfill was intended to place a 2' cap over the landfill and implement land use controls. The selected remedy is effective. The cap remains in good condition and only a few pieces of debris were observed outside of the cap. A drainage ditch has been ~~iste~~ installed at the east side of the cap to promote drainage away from the cap. The drainage ditch is in good condition.

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.

Site 9 has been graded to promote positive drainage and mitigate erosion. ~~The~~ A drainage ditch was also installed to promote drainage away from the cap.

MONITORING WELLS ARE NOT PRESENT AROUND THE LANDFILL FOR LONG TERM MONITORING. SEVERAL PONDS ARE AND SURFACE WATER SAMPLING HAS OCCURRED

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE OBSERVED

D. Opportunities for Optimization

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

~~NONE OBSERVED~~

implement land use controls

Obtain formal 18 AAC 75.350 determination for groundwater

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 10 - Buried Drums	**Date of Inspection:** 9/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☑ ~~Institutional controls~~ LUC
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ________________

2. O&M staff NONE (Name) NONE (Title) ____ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ________________

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☒ Report attached) ________________

Agency ________________
Contact ________ (Name) ________ (Title) ________ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)

Problems, suggestions (☐ Report attached) ________________

4. **Other interviews** (optional) (☒ Report attached) USACE QAR (JEREMY CRANER) 9/16/13

MR CRANER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITIONAL WELLS TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED.

Site Name: Site D

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents

O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ~~Record of~~ decision Doc used for site information and site maps

2. Site-Specific Health and Safety Plan

Site-Specific Health and Safety Plan	☐ Readily available	☐ Up to date	☒ N/A
Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

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

Remarks:

4. Permits and Service Agreements

Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

7. Groundwater Monitoring Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

8. Leachate Extraction Records ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

9. Discharge Compliance Records

Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

10. Daily Access/Security Logs ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

Site Name: Site 10

JACOBS **Five-Year Review Site Inspection Checklist (3/12)**

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available
- ☐ Up to date - Estim. for all NE Cape sites to conduct six 5YR Reviews
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

V. ACCESS AND INSTITUTIONAL CONTROLS

☒ Applicable ~~☐ N/A~~ 9/14/13

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~~ 9/14/13

Remarks The site is located on village property on a remote island. There is no road-access to the site from either village. Road access is available from fishcamp to the East. Land use controls are ~~implemented on site~~ 9/14/13 currently pending.

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 ______

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

1. **Flows Bypass Bench** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______________________________
2. **Bench Breached** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______________________________
3. **Bench Overtopped** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______________________________

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________
2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________
3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________
4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________
5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________
6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ______________________________

VIII. VERTICAL BARRIER WALLS

☐ Applicable ☒ 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: ______________________________

Site Name: Site 10

IX. GROUNDWATER/SURFACE WATER REMEDIES

☒ Applicable ~~☐ N/A~~ 9/15/13

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ~~☐ N/A~~ 9/15/13

1. **Pumps, Wellhead Plumbing, and Electrical**
   - ☐ Good condition ☐ All required wells properly operating
   - ☒ Needs Maintenance ~~☐ N/A~~
   - Remarks: MW10-01 is in need of repair – no locking cap and ballards

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Spare Parts and Equipment**
   - ☐ Readily available ☐ Good condition
   - ☐ Requires upgrade ☐ Needs to be provided
   - Remarks ______

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

1. **Collection Structures, Pumps, and Electrical**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

3. **Spare Parts and Equipment**
   - ☐ Readily available ☐ Good condition
   - ☐ Requires upgrade ☐ Needs to be provided
   - Remarks ______

C. Treatment System Applicable N/A

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ______

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

   Remarks ______

6. **Monitoring Wells** (pump and treatment remedy)
   - ☐ Properly secured/locked ☐ Functioning ☐ ~~Routinely~~ sampled
   - ☐ Good condition ☐ All required wells located ☒ Needs Maintenance
   - ~~☒ N/A~~ 9/14/13

   9/15/13

   Remarks MW10-01 Identified on site. ~~unable to find second monitoring well to the Northwest.~~ 9/14/13

D. Monitoring Data No locking cap and bollards on MW10-01. Second monitoring well location abandoned w/ bentonite.

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 for current COCs list only

contaminants discovered during drum removal are not included in analysis suite for GW. Well MW10-1 may not be downgradient of the current drum excavation.

Site Name: Site 10

JACOBS Five-Year Review Site Inspection Checklist (11/12)

E. Monitoring Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)

☐ Properly secured/locked ☒ Functioning ☐ Routinely sampled
☐ Good condition ☐ All required wells located ☒ Needs Maintenance
~~☒ N/A~~ 9/15/13

Remarks mw 10-01 was identified onsite and is need of repair. A second monitoring well was identified as abandoned with bentonite.

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. ~~SEE ATTACHED~~

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.).

The selected remedy for Site 10 included chemical oxidization as the primary remedy however it was not implemented. The contingency remedy of excavation of contaminated soil and monitored natural attenuation of groundwater.

The site is currently being used for a staging area for ongoing remediation. Debris was identified minor amounts of debri on the gravel pad. Vegetative regrowth has not yet begun to sprout. Ground water monitoring is ongoing.

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.

~~Second monitoring well was not found.~~ 9/14/13
First monitoring well could use some repairs. Site has been graded to promote positive drainage and avoid erosion

Second monitoring well was found to be abandoned w/ bentonite.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

- Repair monitoring well
- Remove remaining wood and metal debris (minor)
- Implement LUC described in Decision Doc

~~A MORE ROBUST MONITORING WELL NETWORK IS NEEDED TO ADEQUATELY ASSES MNA FOR THE SITE.~~ CP 9/17/13

THE MONITORING WELL NETWORK ON SITE DOES NOT APPEAR SUFFICIENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWN GRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 11-Fuel Tanks	**Date of Inspection:** 9/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ ~~Institutional controls~~ LUC - limit drinking water - excavation/construction
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation w/ disposal or treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE ___ NONE ___ ______
Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE ___ NONE ___ ______
Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact CURTIS DUNKIN Project Manager 01/2014
Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ ______ ______
Name Title Date

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) USACE QAR (JEREMY CRANER) 9/16/13
MR CRANER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITONAL WELLS TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED.

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

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

Remarks: ~~Record of~~ decision doc used for site information and site maps.

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

Remarks: ______

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

Remarks: ______

4. Permits and Service Agreements			
Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits: ______	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

7. Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

9. Discharge Compliance Records			
Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE ~~Per~~ SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 — Estimat for all NE cape sites to conduct six 5 yr reviews

Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 11 is on Village property on a remote island. There is no road access to the site from either village however there is road access from a near by Fishcamp. Land use controls are currently ~~onsite~~ pending.

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 ______________________________

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent ______ Depth ______
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type ______ Areal extent ______
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent ______ Depth ______
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent ______ Depth ______
   Remarks ______

5. **Obstructions** Type ______ ☐ No obstructions
   ☐ Location shown on site map Areal extent ______
   Size ______
   Remarks ______

6. **Excessive Vegetative Growth** Type ______
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent ______
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 one monitoring well observed onsite and is in need of repair from frost jacking

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

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

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

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

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

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

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

6. **Monitoring Wells** (pump and treatment remedy)
   - ~~☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled~~
   - ~~☐ Good condition ☒ All required wells located~~ 9/14/13 ~~☒ Needs Maintenance~~
   - ☐ N/A
   - Remarks Site 11 has 1 monitoring well that ~~has~~ needs repair. 9/14/13
   - 2 other monitoring wells on Site 11 were abandoned.

9/14/13

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. Monitoring Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☒ ~~All required wells located~~ 9/15/13 ☒ Needs Maintenance
☐ N/A

Remarks One monitoring well exists onsite. 2 wells were abandoned. The existing monitoring well is in need of repair and is upgradient of the site

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. ~~See attached~~

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.).

The selected remedy for Site 11 included chemical oxidization however this was not implemented. The contingency remedy of excavation of contaminated soil and monitored natural attenuation of groundwater was implemented.

The site is in good condition and has recently been graded and seeded. No debris was identified and a POL-related odor was noted while onsite.

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.

Site has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ CB 9/16

~~A MORE ROBUST MONITORING NETWORK IS NEEDED TO ASSESS MNA~~ CB 9/17

THE MONITORING WELL NETWORK DOES NOT APPEAR SUFFICIENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWN GRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK

implement LUCs described in Decision Doc.

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 13 - Heat + Power Plant	Date of Inspection: 9/15/2013
Location and Region: NE Cape	EPA ID: AK9799F2999
Agency, office, or company leading the five-year review: USACE	Weather/temperature: Overcast, foggy 30-40°F
Remedy Includes: (Check all that apply) ☐ Landfill cover/containment ☐ Access controls ☒ ~~Institutional controls~~ LUC ☐ Groundwater pump and treatment ☒ Other: Excavation with disposal or treatment	 ☒ Monitored natural attenuation ☐ Groundwater containment ☐ Vertical barrier walls ☐ Surface water collection and treatment
Attachments: ☒ Inspection team roster attached	☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE ______ NONE ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact CURTIS DUNKIN Project Manager 01/2014
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) USACE QAR (JEREMY CRANER) 9/16/13
MR CRANER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITIONAL WELLS TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	☐Readily available	☐Up to date	☒N/A
Remarks: ~~Record of~~ Decision Doc used for site information and site maps			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house ☐ Contractor for State
- ☐ PRP in-house ☐ Contractor for PRP
- ☐ Federal Facility in-house ☐ Contractor for Federal Facility
- ☒ Other USACE

2. O&M Cost Records NOT AVAILABLE BY SITE Estimate For all NE Cape sites to conduct six 5YR Reviews

- ☐ Readily available ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 13 is located on Village property on a Remote Island. There is no Road access to the site from either a village. Road access to the site is available from a nearby fish camp

Land use controls have not been implemented on site. LUCs are pending.

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 ______

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

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

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

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

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

1. **Settlement** ☐ Location shown on site map ☒ No evidence of settlement
Areal extent _____ Depth _____
Remarks ____________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type _____ Areal extent _____
Remarks ____________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent _____ Depth _____
Remarks ____________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent _____ Depth _____
Remarks ____________________

5. **Obstructions** Type _____ ☐ No obstructions
☐ Location shown on site map Areal extent _____
Size _____
Remarks ____________________

6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks ____________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ 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 ______

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ______________________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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

9/15/13 ~~☒ Applicable~~ ~~☒ N/A~~ ★ APPLICABLE ★

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

1. **Pumps, Wellhead Plumbing, and Electrical**
   - ☐ Good condition ☐ All required wells properly operating
   - ☐ Needs Maintenance ☒ N/A
   - Remarks ______

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Spare Parts and Equipment**
   - ☐ Readily available ☐ Good condition
   - ☐ Requires upgrade ☐ Needs to be provided
   - Remarks ______

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

1. **Collection Structures, Pumps, and Electrical**
   - ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

3. **Spare Parts and Equipment**
   - ☐ Readily available ☐ Good condition
   - ☐ Requires upgrade ☐ Needs to be provided
   - Remarks ______

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ________

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ________

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ________

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

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

D. Monitoring Data

1. **Monitoring Data**
   - ☒ ~~Is~~ routinely submitted on time ☒ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☐ Groundwater plume is effectively contained
     No wells downgradient of Site 13 at this time. Other wells do not detect PCB contamination
   - ☐ Contaminant concentrations are declining
     insufficient data

JACOBS Five-Year Review Site Inspection Checklist (11/12)

Site Name: Site 13

E. Monitoring Natural Attenuation → Groundwater monitoring of natural attenuation parameters was part of the selected remedy.

1. Monitoring Wells (natural attenuation remedy)

- ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
- ☐ Good condition ☐ All required wells located ☐ Needs Maintenance
- ☒ N/A ~~EP~~ 9/15/13

Remarks 5 monitoring wells were at one time on site. Site walk did not identify any remaining monitoring wells onsite. PVC from decommissioned wells was observed to the ~~West~~ Northwest of the site

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. ~~SEE ATTACHED~~

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.).

The selected remedy for Site 13 was ~~to~~ intended to address soil contamination using chemical oxidization. Chemical oxidization was not implemented. The contingency remedy of excavation and disposal was implemented to remove DRO- and PCB-contaminated soil.

The Remedy appears effective. The Heat and Power Plant foundation no longer remains. The site has been excavated and recently graded and seeded. ~~After~~ An odor of POL is detectable onsite. Due to the close proximity of Site 13 to other sites under natural attenuation, it is unclear which site generated the odor.

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.

The site has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ CB 9/17/13

THE MONITORING WELL NETWORK ON SITE DOES NOT APPEAR SUFFICIENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWN GRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK.

Implement LUCs described in Decision Doc.

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 15-Fuel Pipeline	**Date of Inspection:** 9/15/2013
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, foggy. 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ ~~Institutional controls~~ LUC
- ☐ Groundwater pump and treatment
- ☒ Other: excavation with treatment or disposal
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________________

2. O&M staff NONE (Name) NONE (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________________

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☒ Report attached) ______________________________

Agency ______________________
Contact ______________ (Name) ______________ (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)

Problems, suggestions (☐ Report attached) ______________________________

4. **Other interviews** (optional) (☒ Report attached) USACE QAR JEREMY CRAWER 9/16/13

MR. CRAWER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITIONAL WELL TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED.

Site Name: Site 15

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents

O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ~~Record of~~ Decision Doc was used for site information and site maps

2.

Site-Specific Health and Safety Plan	☐ Readily available	☐ Up to date	☒ N/A
Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

3.

O&M and OSHA Training Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

4. Permits and Service Agreements

Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5.

Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

7.

Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

8.

Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

9. Discharge Compliance Records

Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

10.

Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached — Estimate for all NE Cape sites to conduct six 5yr reviews.

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 15 is located on Village property on a remote island. There is no road access to the ~~village~~ site from either village. Road access is available from a nearby fish camp. Land use controls have ~~been~~ not been implemented onsite. LUCs are pending. 9/15/13

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 ______________________________

B. Benches ☐ Applicable ☒ N/A

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

1. **Flows Bypass Bench** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______
2. **Bench Breached** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______
3. **Bench Overtopped** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______
2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______
3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______
4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______
5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______
6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer	☐ Applicable	☒ N/A
1. **Outlet Pipes Inspected**	☐ Functioning	☒ N/A
Remarks ______		
2. **Outlet Rock Inspected**	☐ Applicable	☒ N/A
Remarks ______		
G. Detention/Sedimentation Ponds	☐ Applicable	☒ N/A
1. **Siltation** Areal extent______ Depth______ N/A		
☐ Siltation not evident		
Remarks ______		
2. **Erosion** Areal extent______ Depth______		
☐ Erosion not evident		
Remarks ______		
3. **Outlet Works**	☐ Applicable	☒ N/A
Remarks ______		
4. **Dam**	☐ Applicable	☒ N/A
Remarks ______		
H. Retaining Walls	☐ Applicable	☒ N/A
1. **Deformations**	☐ Location shown on site map	☐ Deformation not evident
Horizontal displacement ____	Vertical displacement ____	
Rotational displacement ____		
Remarks ______		
2. **Degradation**	☐ Location shown on site map	☐ Degradation not evident
Remarks ______		

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____
2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____
3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____
4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS

☐ Applicable ☒ 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~~ JO 9/15/13
A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☒ N/A 1. **Pumps, Wellhead Plumbing, and Electrical** ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☒ N/A Remarks 2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks 3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks
B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A 1. **Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance Remarks 2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks 3. **Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ____

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ____

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ____

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

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

D. Monitoring Data

1. **Monitoring Data**
   - ☒ Is routinely submitted on time ☒ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☐ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

mixed - downgradient wells exceed cleanup levels and an adjacent surface water location has been sampled for DRO and exceeds cleanup levels. Surface water results further downgradient meet cleanup criteria

E. Monitoring Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled
☐ Good condition ☐ All required wells located ☐ Needs Maintenance
~~☒ N/A~~ 9/15/13 ℜ

Remarks No monitoring wells were observed on Site 15
DD ~~ROD indicated~~ indicates groundwater will be monitored for natural attenuation parameters

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. ~~See Attached~~

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.).

The selected remedy for Site 15 was intended to use chemical oxidization – this was not implemented. The contingency remedy of excavation, removal, monitoring, and landuse controls was used to remove DRO-contaminated soil. The selected remedy appears to be effective. The site was recently graded and seeded. The previous monitoring well onsite was not observed. ~~An odor~~ ℜ 9/15/13 A POL-related odor was observed onsite. Due to the proximity of Site 15 to other POL-contaminated site under natural attenuation, it is unclear which site was generating the odor.

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.

The site has been graded to promote positive drainage and mitigate erosion.

Site Name: Site15

JACOBS **Five-Year Review Site Inspection Checklist (12/12)**

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ 9/17/13

THE MONITORING WELL NETWORK ON SITE DOES NOT APPEAR SUFFICIENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWN GRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK.

Implement LUCs described in Decision Doc.

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION

Site name: Site16-Paint and Dope Storage
Date of Inspection: 9/15/2013
Location and Region: NE Cape
EPA ID: AK9799F2999
Agency, office, or company leading the five-year review: USACE
Weather/temperature: Overcast, foggy 30-40°C

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ (Name) ______ (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	☐Readily available	☐Up to date	☒N/A
Remarks: ~~Record of~~ Decision Doc use for site information and sitemaps			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE FOR SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all NE Cape sites to conduct six 5YR Reviews

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 16 is located on Village property on a Remote island. There is no Road access to the site from either village. There is Road access to the site from a nearby fish camp

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 ____

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 9/15/13 ~~☒ 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

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

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

D. Monitoring Data N/A

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. Monitoring 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 ~~One~~ Two monitoring ~~well was~~ were found onsite. They both had been decomissioned 9/15/13

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. ~~SEE ATTACHED~~

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.).

The selected remedy for Site 16 was to excavated and dispose of PCB and lead contaminated Soil.

The selected remedy appears effective. The former building on Site 16 no longer stands. The area is currently being used to access Site 28 or as an equipment storage area.

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.

Site was partially graded and seeded to promote positive drainage and prevent erosion. There is currently a pile of ~3yds of soil stored onsite.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

Grade and seed the remaining portion of the site

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 19 - Auto Maint.	**Date of Inspection:** 9/15/13
Location and Region: SNE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, foggy, mist 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ ~~Institutional controls~~ LUC
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)
Problems, suggestions (☐ Report attached) ____________

2. O&M staff NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)
Problems, suggestions (☐ Report attached) ____________

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)
Problems, suggestions (☒ Report attached) ____________

Agency ____________
Contact ____________ (Name) ____________ (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ____________)
Problems, suggestions (☐ Report attached) ____________

4. **Other interviews** (optional) (☒ Report attached) USACE COR (JEREMY CRANER) 9/16/13
MR. CRANER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITIONAL WELLS TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED.

Site Name: Site 19.

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents

O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ~~Record of~~ Decision Doc was used for site information and site maps

2. Site-Specific Health and Safety Plan — ☐ Readily available ☐ Up to date ☒ N/A
Contingency plan/emergency response plan — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

3. O&M and OSHA Training Records — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

4. Permits and Service Agreements

Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits: ______	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

5. Gas Generation Records — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

7. Groundwater Monitoring Records — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

8. Leachate Extraction Records — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

9. Discharge Compliance Records

Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks: ______

10. Daily Access/Security Logs — ☐ Readily available ☐ Up to date ☒ N/A
Remarks: ______

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house ☐ Contractor for State
- ☐ PRP in-house ☐ Contractor for PRP
- ☐ Federal Facility in-house ☐ Contractor for Federal Facility
- ☒ Other USACE

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all NE Cape sites to conduct six 5YR Reviews.

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site19 is located on village property on a Remote island. There is no Road access to the site from either village. There is road access to the site from a nearby fish camp. Land use controls have not been implemented on site. LUCs pending.

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 ______

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

1. **Flows Bypass Bench** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______
2. **Bench Breached** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______
3. **Bench Overtopped** ☐ Location shown on site map ☒ N/A or okay
   Remarks ______

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______
2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______
3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______
4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______
5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______
6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

JACOBS **Five-Year Review Site Inspection Checklist (8/12)**

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ N/A

1. **Settlement** Location <u>shown</u> 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 mw88-1 is in need of repair due to frost jacking

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

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

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

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

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

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

C. Treatment System Applicable N/A

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ______

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

   Remarks ______

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

   Remarks ______

D. Monitoring Data

1. **Monitoring Data**
   - ☒ Is routinely submitted on time ☒ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

Mixed - downgradient wells exceed cleanup levels and an adjacent SW location has been sampled for DRO and exceeds cleanup level. SW results further downgradient meet cleanup criteria

E. Monitoring 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 mw88-1 is in poor condition, the monument does not close and the well casing has frost jacked

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. ~~SEE ATTACHED~~

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.).

The selected remedy for site 19 was chemical oxidation and was not implemented. POL-contaminated soil was excavated and removed as part of the contingency remedy. Groundwater monitoring and land use controls have been implemented.

The selected remedy appears effective. The foundation for Bldg 109 (Auto Maint) remains. Bldg 108 (Auto Storage) foundation no longer remains. A piece of GeoTek remains on the East side of site 19 separating 2 areas of soil. The site has recently been graded and seeded.

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.

The site has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ CR 9/17/13

THE MONITORING WELL NETWORK ON SITE DOES NOT APPEAR SUFFICIENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWNGRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK

Implement LUCs described in Decision Doc.

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 21-Wastewater Tank	**Date of Inspection:** 9/15/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Partly cloudy, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE NONE ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE NONE ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact CURTIS DUNKIN Project Manager 01/2014
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ ______ ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

Site Name: Site 21

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A
Remarks: ~~Record of Decision~~ DOC used for site information and site maps.			
2. Site-Specific Health and Safety Plan	☐ Readily available	☐ Up to date	☒ N/A
Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
3. O&M and OSHA Training Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:______	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
7. Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☒ Other USACE

2. O&M Cost Records NOT AVAILABLE BY SITE Estimate FOR all NE Cape sites to conduct six 5YR Reviews

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate $5,851,587 Breakdown attached

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 21 is located on village property on a Remote island. Road access from either village is non-existant. Road access is available from the fishcamp nearby.

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 ______

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

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

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

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

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent__________ Depth__________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent__________ Depth__________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 ______________________________

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☑ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Tanks, Vaults, Storage Vessels**
   - ☑ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

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

D. Monitoring Data N/A

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. Monitoring 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

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. ~~SEE Attached~~.

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.).

The selected Remedy for Site 21 was intended to excavate and dispose of PCB & arsenic-contaminated soil.

The selected remedy appears to be effective. Excavations were backfilled in Sept of 2013 and seeded on 9/15/2013. The site appears in good condition with no debris. A sediment wattle has been installed at the West end of Site 21. A SILT FENCE IS LOCATED DOWNGRADIENT AS SHOWN IN THE FIELD NOTES

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.

Site has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

NONE

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION

Site name: ~~SP~~ Site 27-Diesel Fuel Pump	**Date of Inspection:** 9/15/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, misting 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☒ ~~Institutional controls~~ LUC
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation w/ disposal or treatment
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE (Name) NONE (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

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

Agency ADEC

Contact CURTIS DUNKIN (Name) Project manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☒ Report attached) ______

Agency ______

Contact ______ (Name) ______ (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) USACE QAR (JEREMY CRANER) 9/16/13

MR. CRANER INDICATED THAT PLANS TO REPAIR EXISTING WELLS AND AUGMENT THE MONITORING WELL NETWORK WITH ADDITIONAL WELLS TO MONITOR NATURAL ATTENUATION ARE BEING DISCUSSED

III. ONSITE DOCUMENTS & RECORDS VERIFIED			
1. O&M Documents			
O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	Doc ☐Readily available	☐Up to date	☒N/A
Remarks: ~~Record of Decision~~ Record of Decision was used for site information and site maps			
2. Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A
Remarks:			
3. O&M and OSHA Training Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits:______	☐Readily available	☐Up to date	☒N/A
Remarks:			
5. Gas Generation Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
7. Groundwater Monitoring Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
8. Leachate Extraction Records	☐Readily available	☐Up to date	☒N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A
Remarks:			
10. Daily Access/Security Logs	☐Readily available	☐Up to date	☒N/A
Remarks:			

JACOBS **Five-Year Review Site Inspection Checklist (3/12)**

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all NE Cape sites to conduct six 5YR reviews

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 27 is located on village property on a remote island. There is no road access to the site from either village. Road access is available from a nearby fish camp. Land use controls have not been implemented on site.

LUCs pending.

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 ______________________________

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

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

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

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

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______

Site Name: Site 27

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________

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

1. **Siltation** Areal extent________ Depth________ N/A
   ☐ Siltation not evident
   Remarks ______________________

2. **Erosion** Areal extent________ Depth________
   ☐ Erosion not evident
   Remarks ______________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____

2. **Vegetative Growth** ☐ Location shown on site map ☑ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____

4. **Discharge Structure** ☐ Functioning ☑ N/A
   Remarks ____

VIII. VERTICAL BARRIER WALLS

☐ Applicable ☒ 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

Site Name: Site 27

JACOBS **Five-Year Review Site Inspection Checklist (10/12)**

C. Treatment System Applicable N/A

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

2. **Electrical Enclosures and Panels** (properly rated and functional)
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

3. **Tanks, Vaults, Storage Vessels**
   - ☒ N/A ☐ Good condition
   - ☐ Proper secondary containment ☐ Needs Maintenance
   - Remarks ______

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance
   - Remarks ______

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

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

D. Monitoring Data

1. **Monitoring Data**
   - ☒ Is routinely submitted on time ☒ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☒ Groundwater plume is effectively contained ☒ Contaminant concentrations are declining

Mixed - downgradient wells exceed cleanup levels. An adjacent SW location was sampled for DRO and exceeds the cleanup level. SW results further downgradient meet cleanup criteria

JACOBS Five-Year Review Site Inspection Checklist (11/12)

Site Name: Site 27

E. Monitoring 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 Site 27 did not appear to have any monitoring wells installed to monitor Natural attenuation

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. ~~SEE ATTACHED~~

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.).

The selected remedy for Site 27 was chemical oxidization but was not implemented. The contingency remedy of excavation, removal, groundwater monitoring, and land use controls was implemented.

The selected remedy appears to be effective. The site was recently graded and seeded. A POL-related odor was detectable onsite however due to the close proximity to other POL-contaminated sites, it is unclear where this odor originates. There were no groundwater monitoring wells observed onsite to monitor natural attenuation parameters.

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.

The site has been graded to promote positive drainage and mitigate erosion.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

~~NONE~~ CP 9/17/13

THE MONITORING WELL NETWORK ON SITE DOES NOT APPEAR SUFFICENT TO MONITOR NATURAL ATTENUATION BOTH IN PLUME AND DOWN GRADIENT OF THE SITE. IT IS RECOMMENDED THAT ADDITIONAL MONITORING WELLS BE INSTALLED TO AUGMENT THE NETWORK.

Implement LUCs described in Decision Doc.

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 28 - Drainage Basin	**Date of Inspection:** 9/15/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Partly cloudy, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment + SEDIMENTATION POND
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☒ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________________

2. O&M staff NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________________

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☒ Report attached) ________________

Agency ________________
Contact ________ (Name) ________ (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________________

4. **Other interviews** (optional) (☒ Report attached) USACE QAR (JEREMY CRANER) 9/16/13
– SEDIMENTATION POND WILL NOT BE CONSTRUCTED AS CONSTRUCTION WOULD LIKELY INCREASE THE RISK OF SPREADING CONTAMINATED SEDIMENT ONTO THE SURROUNDING AREA AND SEDIMENT LOAD IN THE DRAINAGE IS LOW.

Site Name: Site 28

JACOBS **Five-Year Review Site Inspection Checklist (2/12)**

III. ONSITE DOCUMENTS & RECORDS VERIFIED

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

Remarks: ~~Record~~ of decision DOC used for site information and site maps

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

Remarks:

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

Remarks:

4. Permits and Service Agreements			
Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

7. Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

9. Discharge Compliance Records			
Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records NOT AVAILABLE BY SITE

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 — Estimate for all NE Cape sites to conduct six 5YR Reviews Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 28 is located on Village property without Road access to the site from the village. Road access is available from a near by fish camp. Site 28 is on a Remote island

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 ____

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent ____________ Depth ____________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent ____________ Depth ____________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A	
1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident Areal extent _____ Depth _____ Remarks ________________	
2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A ☐ Vegetation does not impede flow Areal extent _____ Type _____ Remarks ________________	
3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident Areal extent _____ Depth _____ Remarks ________________	
4. **Discharge Structure** ☐ Functioning ☒ N/A Remarks ________________	
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ 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 ______

C. Treatment System Applicable N/A

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

   Remarks ____________

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

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition
   ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks ____________

4. **Discharge Structure and Appurtenances**
   ☒ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks ____________

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

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

D. Monitoring Data N/A

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. Monitoring 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

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. ~~SEE ATTACHED~~

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.).

The selected Remedy for site 28 was to excavate and dispose of DRO-contaminated sediment and *metals + PCB / to construct a sedimenation pond or other appropriate controls. recently completed. The selected Remedy was ~~currently ongoing~~. Dredging ~~of constructed sedimentation ponds~~ appears to be effective. Bristol has recently (9/13/13) completed dredging and treatment of site sediment. USACE QAR will be interviewed for sampling results. Site is in good condition w/ little debris.

CB 9/17/13

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.

9/15/13

Site is in good condition. Jute mat ~~wattles~~ wattles have been installed at the connection point between the drainage basin and the Suqitughneq River to prevent transport of sediment during sediment removal activities

SEDIMENTATION PONDS HAVE NOT BEEN CONSTRUCTED.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

NONE

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 29-Suqitughneq River	**Date of Inspection:** 09/14/13
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast, 30-40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Incidental Debris Removal
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________

2. O&M staff NONE (Name) NONE (Title) ______ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________

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

Agency ADEC
Contact CURTIS DUNKIN (Name) Project Manager (Title) 01/2014 (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☒ Report attached) ________

Agency ________
Contact ________ (Name) ________ (Title) ________ (Date)
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ________)
Problems, suggestions (☐ Report attached) ________

4. **Other interviews** (optional) (☒ Report attached) ________

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents

O&M manual	☐Readily available	☐Up to date	☒N/A
As-built drawings	☐Readily available	☐Up to date	☒N/A
Maintenance logs	☐Readily available	☐Up to date	☒N/A

Remarks: ~~Record of Decision~~ Doc used for Site information and site maps.

2.

Site-Specific Health and Safety Plan	☐Readily available	☐Up to date	☒N/A
Contingency plan/emergency response plan	☐Readily available	☐Up to date	☒N/A

Remarks: ______

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

Remarks: ______

4. Permits and Service Agreements

Air discharge permit	☐Readily available	☐Up to date	☒N/A
Effluent discharge	☐Readily available	☐Up to date	☒N/A
Waste disposal, POTW	☐Readily available	☐Up to date	☒N/A
Other permits: ______	☐Readily available	☐Up to date	☒N/A

Remarks: ______

5. Gas Generation Records ☐Readily available ☐Up to date ☒N/A

Remarks: ______

7. Groundwater Monitoring Records ☐Readily available ☐Up to date ☒N/A

Remarks: ______

8. Leachate Extraction Records ☐Readily available ☐Up to date ☒N/A

Remarks: ______

9. Discharge Compliance Records

Air	☐Readily available	☐Up to date	☒N/A
Water (effluent)	☐Readily available	☐Up to date	☒N/A

Remarks: ______

10. Daily Access/Security Logs ☐Readily available ☐Up to date ☒N/A

Remarks: ______

IV. O&M COSTS	
1. O&M Organization	
☐ State in-house	☐ Contractor for State
☐ PRP in-house	☐ Contractor for PRP
☐ Federal Facility in-house	☐ Contractor for Federal Facility
☒ Other USACE	
2. O&M Cost Records NOT AVAILABLE BY SITE	
☐ Readily available	☐ Up to date
☐ Funding mechanism/agreement in place	
Original O&M cost estimate $5,851,587	Breakdown attached

Estimate for all NE cape sites to conduct six 5YR Reviews

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 The ~~Suk~~ Sugitughneq (Suki) River is located on a remote island without road access from other on-island villages.

JACOBS **Five-Year Review Site Inspection Checklist (4/12)**

Site Name: Site 29

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 ______

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent ______ Depth ______
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type ______ Areal extent ______
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent ______ Depth ______
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent ______ Depth ______
   Remarks ______

5. **Obstructions** Type ______ ☐ No obstructions
   ☐ Location shown on site map Areal extent ______
   Size ______
   Remarks ______

6. **Excessive Vegetative Growth** Type ______
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent ______
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______

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

1. **Siltation** Areal extent ______ Depth ______ N/A
   ☐ Siltation not evident
   Remarks ______

2. **Erosion** Areal extent ______ Depth ______
   ☐ Erosion not evident
   Remarks ______

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ______

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ______

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ______

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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

C. Treatment System Applicable N/A

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

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

3. **Tanks, Vaults, Storage Vessels**
   ☒ N/A ☐ Good condition
   ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks ___

4. **Discharge Structure and Appurtenances**
   ☒ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks ___

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

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

D. Monitoring Data

1. **Monitoring Data**
   ☐ Is routinely submitted on time ☐ Is of acceptable quality
2. **Monitoring data suggests:**
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitoring 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

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. ~~See Attached~~

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.).

The selected remedy for Site 29 was to Remove incidental debris.

The selected remedy appears to be effective. Only one drum was observed as debris in an ajoining pond on the west side of the suki River (see log book for location). No sheen observed Vegetation ~~has regrowth~~ appears to be flourishing both in and around the River. CP 7/16

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.

Debris remaining was minimal.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

NONE

D. Opportunities for Optimization

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

Remove last remaining drum debris.

JACOBS

Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 31 - White Alice Comm	**Date of Inspection:** 9/13/2013
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast/Foggy ~40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE (Name) N/A (Title) N/A (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE (Name) NONE (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact Curtis Dunkin (Name) Project Manager (Title) 01/2014 (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______ (Name) ______ (Title) ______ (Date)

Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)

Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) (☒ Report attached) ______

III. ONSITE DOCUMENTS & RECORDS VERIFIED

1. O&M Documents			
O&M manual	☐ Readily available	☐ Up to date	☒ N/A
As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A
Remarks: Used ~~Record~~ of Decision Document for site information and Site Maps			
2. Site-Specific Health and Safety Plan	☐ Readily available	☐ Up to date	☒ N/A
Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
3. O&M and OSHA Training Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
4. Permits and Service Agreements			
Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
7. Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
9. Discharge Compliance Records			
Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			
10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A
Remarks:			

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☒ Other USACE

2. O&M Cost Records ~~NOT AVAILABLE~~

☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 Breakdown attached

Estimate for all NE Cape sites to conduct six 5yr review.

Total annual cost by year for review period if available

From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost
From ________ To ________ ________ Breakdown attached
Date Date Total cost

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 31 is located on Village property on a Remote Island with no road access. Right of entry is coordinated with Village. from village.

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 ______

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☒ N/A
   Remarks ______________________________

2. **Outlet Rock Inspected** ☐ Applicable ☒ N/A
   Remarks ______________________________

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

1. **Siltation** Areal extent __________ Depth __________ N/A
   ☐ Siltation not evident
   Remarks ______________________________

2. **Erosion** Areal extent __________ Depth __________
   ☐ Erosion not evident
   Remarks ______________________________

3. **Outlet Works** ☐ Applicable ☒ N/A
   Remarks ______________________________

4. **Dam** ☐ Applicable ☒ N/A
   Remarks ______________________________

H. Retaining Walls ☐ Applicable ☒ N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
   Horizontal displacement _____ Vertical displacement _____
   Rotational displacement _____
   Remarks ______________________________

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
   Remarks ______________________________

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ____________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ____________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ____________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ____________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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 ____________________

C. Treatment System Applicable N/A

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

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

   Remarks ______

D. Monitoring Data

1. **Monitoring Data**
   - ☐ Is routinely submitted on time ☐ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

Site Name: Site 31

JACOBS Five-Year Review Site Inspection Checklist (11/12)

E. Monitoring 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 ______________________________

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. ~~(see attached)~~

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.).

The remedy at Site 31 was intended to excavate and dispose of PCB contamination

Current condition of the site indicates remedy was effective. Northern portion of the site appears to be well vegetated and only minor debris was observed. 4 former antenna foundations and 1 building foundation remains onsite. No oil staining observed. Portion of site around building and southern antenna foundation appears to have been recently excavated and seeded. New vegetation is sprouting. Area appears to be graded to promote positive drainag[e] and mitigate erosion.

drain with an opening of 5' x 9' x 6' (W L D) below. It is unclear the extent of drain or contents and may present a safety issue.

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.

Site 31 is graded to allow positive drainage and mitigate erosion. A drainage ditch has been incorporated on the south side of the ~~most southern antenna foundation~~ (of) 9/16 site. THE DITCH APPEARS TO INTERCEPT WATER BEFORE IT CAN COME ON SITE FROM UPHILL.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None observed.

D. Opportunities for Optimization

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

~~#~~ Fill existing drain in building foundation to mitigate existing safety hazard.

JACOBS Five-Year Review Site Inspection Checklist

I. SITE INFORMATION	
Site name: Site 32 - Lower Tramway	**Date of Inspection:** 13 Sept 2013
Location and Region: NE Cape	**EPA ID:** AK9799F2999
Agency, office, or company leading the five-year review: USACE	**Weather/temperature:** Overcast/Foggy ~40°F

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- ☐ Groundwater pump and treatment
- ☒ Other: Excavation with disposal or treatment
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Surface water collection and treatment

Attachments: ☒ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS (CHECK ALL THAT APPLY)

1. O&M site manager NONE N/A N/A
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

2. O&M staff NONE NONE
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

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

Agency ADEC
Contact Curtis Dunkin Project Manager 01/2014
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☒ Report attached) ______

Agency ______
Contact ______
Name Title Date
Interviewed ☐ at site ☐ at office ☐ by phone (Phone no. ______)
Problems, suggestions (☐ Report attached) ______

4. **Other interviews** (optional) ☒ Report attached) ______

Site Name: Site 32

III. ONSITE DOCUMENTS & RECORDS VERIFIED

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

Remarks: Used ~~Record of~~ Decision Document for site information and site maps.

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

Remarks:

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

Remarks:

4. Permits and Service Agreements			
Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
Other permits:	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

5. Gas Generation Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

7. Groundwater Monitoring Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

9. Discharge Compliance Records			
Air	☐ Readily available	☐ Up to date	☒ N/A
Water (effluent)	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

10. Daily Access/Security Logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks:

IV. O&M COSTS

1. O&M Organization

- ☐ State in-house
- ☐ PRP in-house
- ☐ Federal Facility in-house
- ☒ Other USACE
- ☐ Contractor for State
- ☐ Contractor for PRP
- ☐ Contractor for Federal Facility

2. O&M Cost Records ~~NOT AVAILABLE~~

- ☐ Readily available
- ☐ Up to date
- ☐ Funding mechanism/agreement in place

Original O&M cost estimate $5,851,587 → Estimate for all NE Cape sites to conduct six 5YR Reviews
Breakdown attached

Total annual cost by year for review period if available

From (Date)	To (Date)	Total cost	
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached
			Breakdown attached

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

Describe costs and reasons: ~~NOT AVAILABLE~~ NONE

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 Site 32 is located on Village Property. Right of entry is coordinated with Village.

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 ____

B. Benches ☐ Applicable ☒ N/A

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

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

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

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

C. Letdown Channels ☐ Applicable ☒ N/A

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

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
   Material type _____ Areal extent _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
   Areal extent _____ Depth _____
   Remarks ______________________________

5. **Obstructions** Type _____ ☐ No obstructions
   ☐ Location shown on site map Areal extent _____
   Size _____
   Remarks ______________________________

6. **Excessive Vegetative Growth** Type _____
   ☐ No evidence of excessive growth
   ☐ Vegetation in channels does not obstruct flow
   ☐ Location shown on site map Areal extent _____
   Remarks ______________________________

D. Cover Penetrations ☐ Applicable ☒ N/A

1. **Gas Vents** ☐ Active ☐ Passive ☐ Properly secured/locked
   ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ 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 ______________________________

F. Cover Drainage Layer	☐ Applicable	☒ N/A
1. **Outlet Pipes Inspected**	☐ Functioning	☒ N/A
Remarks ______		
2. **Outlet Rock Inspected**	☐ Applicable	☒ N/A
Remarks ______		
G. Detention/Sedimentation Ponds	☐ Applicable	☒ N/A
1. **Siltation** Areal extent ______ Depth ______ N/A		
☐ Siltation not evident		
Remarks ______		
2. **Erosion** Areal extent ______ Depth ______		
☐ Erosion not evident		
Remarks ______		
3. **Outlet Works**	☐ Applicable	☒ N/A
Remarks ______		
4. **Dam**	☐ Applicable	☒ N/A
Remarks ______		
H. Retaining Walls	☐ Applicable	☒ N/A
1. **Deformations** ☐ Location shown on site map	☐ Deformation not evident	
Horizontal displacement ____ Vertical displacement ____		
Rotational displacement ____		
Remarks ______		
2. **Degradation** ☐ Location shown on site map	☐ Degradation not evident	
Remarks ______		

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

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

2. **Vegetative Growth** ☐ Location shown on site map ☒ N/A
   ☐ Vegetation does not impede flow
   Areal extent _____ Type _____
   Remarks ______________________________

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent _____ Depth _____
   Remarks ______________________________

4. **Discharge Structure** ☐ Functioning ☒ N/A
   Remarks ______________________________

VIII. VERTICAL BARRIER WALLS
☐ Applicable ☒ 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

C. Treatment System Applicable N/A

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

   Remarks ____________________

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

   Remarks ____________________

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

   Remarks ____________________

4. **Discharge Structure and Appurtenances**
   - ☒ N/A ☐ Good condition ☐ Needs Maintenance

   Remarks ____________________

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

   Remarks ____________________

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

   Remarks ____________________

D. Monitoring Data

1. **Monitoring Data**
   - ☐ Is routinely submitted on time ☐ Is of acceptable quality
2. **Monitoring data suggests:**
   - ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

E. Monitoring 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 ______

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. ~~(see attached)~~

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.).

The remedy at Site 32 was intended to excavate and dispose of POL contaminated soil.

Current condition of the site indicates remedy was effective. The Site appears to be revegetating and only minor debris was observed. The foundation (concrete) of the tramway remains onsite. A 5-ie' culvert remains to allow flow of Kangukhsam Mountain Spring under the Roadway. The Roadway is in good condition with minor settlement near the culvert.

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.

Site 32 is graded to allow positive drainage and mitigate erosion.

Site Name: Site 32

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future.

None observed.

D. Opportunities for Optimization

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

None observed.

01/2014 – Information obtained after site inspection was conducted indicates area of concern identified in the Decision Document Remains Excavate and remove Remaining contamination

APPENDIX D
Photograph Log

PHOTOGRAPH LOG
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Calibrating the YSI water quality meter. View facing south.

Photo No. 2 – 12 September 2013
Sampling Surface water at Kangukhsam Mountain Spring. View facing south.

Photo No. 3 – 12 September 2013
Overview of Northeast Cape Site. View facing north.

Photo No. 4 – 14 September 2013
View of a pond adjacent to Site 1. View facing south.

Photo No. 5 – 14 September 2013
Cracking along the border of the runway at Site 1. View facing east.

Photo No. 6 – 14 September 2013
Equipment stored at Site 1. View facing east.

Photo No. 7 – 14 September 2013
Airstrip runway at Site 1. View facing northeast.

Photo No. 8 – 14 September 2013
Off-road trail located at the northern end of the runway at Site 1. View facing northeast.

Photo No. 9 – 14 September 2013
Overview of Site 3. View facing west.

Photo No. 10 – 14 September 2013
Small pond to the northeast of Site 3. View facing southwest.

Photo No. 11 – 14 September 2013
Large pond located at Site 3. View facing south.

Photo No. 12 – 14 September 2013
Recent dirt work performed at Site 3. View facing southeast.

Photo No. 13 – 14 September 2013
Potentially petrogenic sheen identified in the large pond at Site 3.

Photo No. 14 – 14 September 2013
Abandoned monitoring well at Site 6.

Photo No. 15 – 14 September 2013
Abandoned monitoring well at Site 6.

Photo No. 16 – 14 September 2013
2013 Staging at Site 6. View facing east.

Photo No. 17 – 14 September 2013
2013 Staging at Site 6. View facing northwest.

Photo No. 18 – 14 September 2013
Pond located adjacent to Site 6. View facing east.

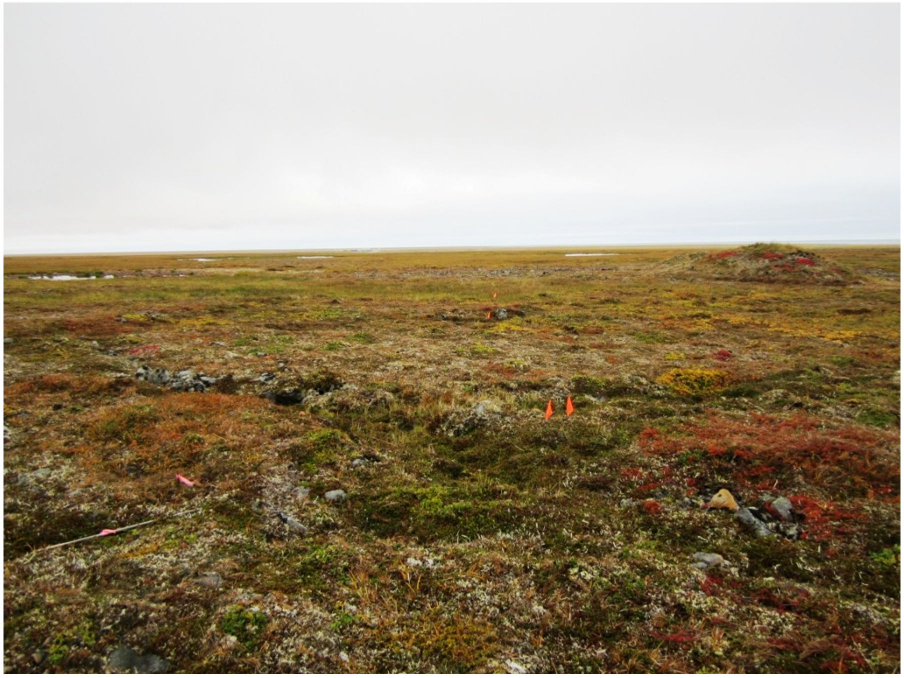

Photo No. 19 – 12 September 2013
Attempted groundwater grab sampling locations at Site 7. View facing north.

Photo No. 20 – 13 September 2013
Wood debris at Site 7. View facing north.

Photo No. 21 – 13 September 2013
Metal debris at Site 7.

Photo No. 22 – 13 September 2013
Metal debris at Site 7.

Photo No. 23 – 13 September 2013
Drum debris located near a pond at Site 7. View facing north.

Photo No. 24 – 13 September 2013
Debris in pond located adjacent to the landfill cap at Site 7. View facing north.

Photo No. 25 – 13 September 2013
Condition of northern edge of landfill cap at Site 7. View facing west.

Photo No. 26 – 13 September 2013
Miscellaneous debris in pond adjacent to landfill cap at Site 7. View facing north.

Photo No. 27 – 13 September 2013
Miscellaneous debris in pond near landfill cap at Site 7. View facing northwest.

Photo No. 28 – 13 September 2013
Metal debris in pond adjacent to landfill cap at Site 7. View facing north.

Photo No. 29 – 13 September 2013
Condition of northern edge of the landfill cap at Site 7. View facing west.

Photo No. 30 – 13 September 2013
View standing on top of the landfill cap at Site 7. View facing northwest.

Photo No. 31 – 13 September 2013
Condition of armored rock on the southern border of the landfill cap at Site 7. View facing east.

Photo No. 32 – 13 September 2013
Debris protruding through the southern side of the landfill cap at Site 7.

Photo No. 33 – 13 September 2013
Debris located with the armored rock at Site 7. View facing south.

Photo No. 34 – 13 September 2013
Abandoned monitoring well filled with bentonite at Site 7.

Photo No. 35 – 13 September 2013
Debris in pond south of landfill cap at Site 7. View facing south.

Photo No. 36 – 13 September 2013
Apparent drum located in pond south of landfill cap at Site 7.

Photo No. 37 – 14 September 2013
Overview of the southern portion of Site 8. View facing southwest.

Photo No. 38 – 14 September 2013
Overview of the northern portion of Site 8. View facing northeast.

Photo No. 39 – 12 September 2013
Collecting surface water quality parameters at Site 9. View facing northeast.

Photo No. 40 – 12 September 2013
Collecting surface water samples at Site 9. View facing northeast.

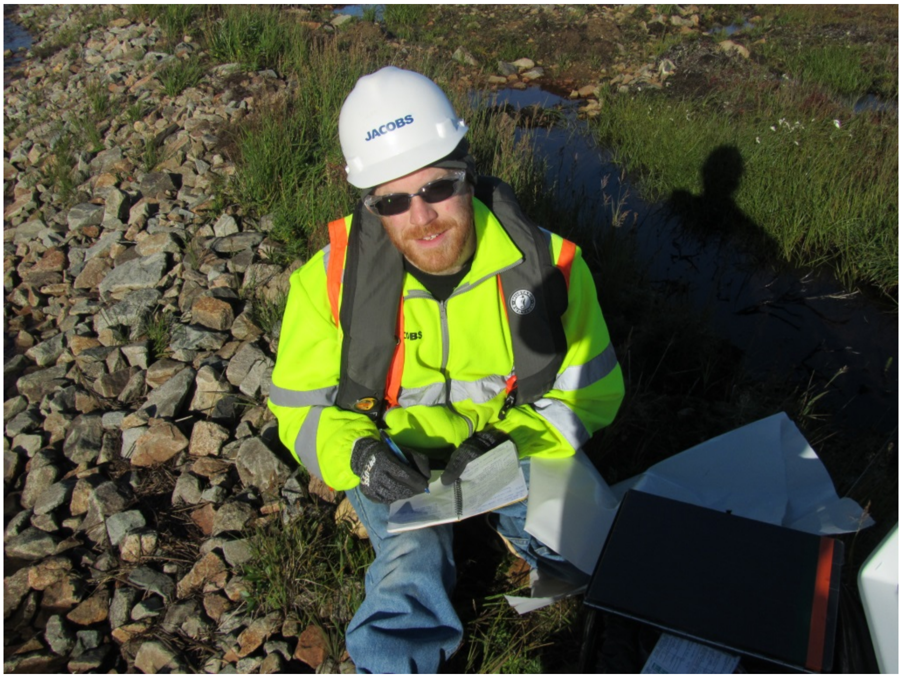

Photo No. 41 – 12 September 2013
Recording sampling activities in logbook at Site 9. View facing south.

Photo No. 42 – 13 September 2013
Abandoned monitoring well south of landfill cap at Site 9.

Photo No. 43 – 13 September 2013
Diversion trench adjacent to landfill cap at Site 9. View facing west.

Photo No. 44 – 13 September 2013
View of landfill cap at Site 9. View facing west.

Photo No. 45 – 13 September 2013
Vegetative growth on the surface of the landfill cap at Site 9. View facing east.

Photo No. 46 – 13 September 2013
Pond located at the southern extent of the diversion trench at Site 9. View facing north.

Photo No. 47 – 13 September 2013
Culvert beneath road access to Site 9 landfill cap. View facing south.

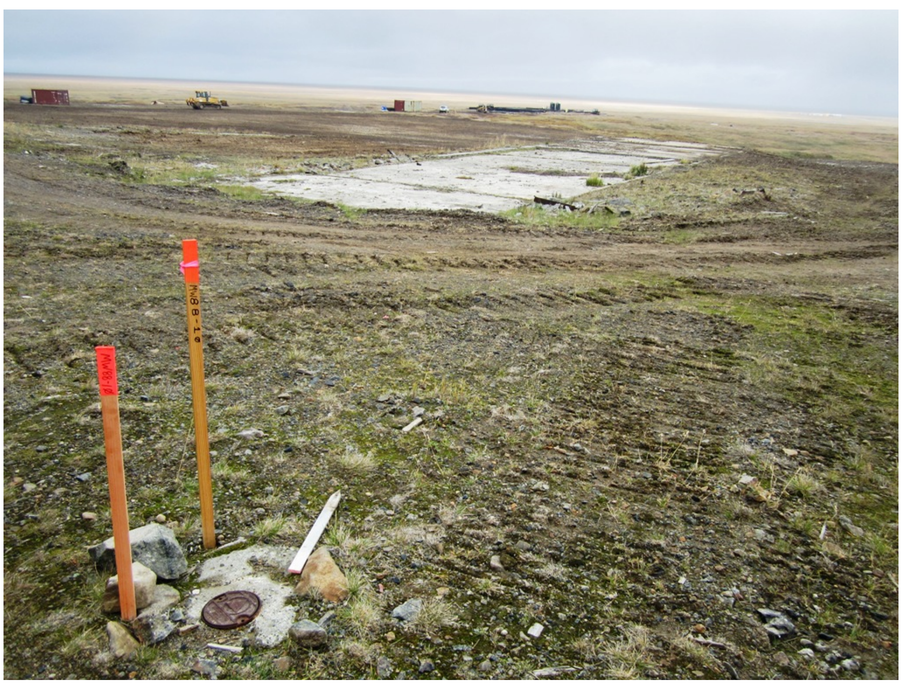

Photo No. 48 – 15 September 2013
Overview of MOC Sites 13, 15, 19, 27. View facing north.

Photo No. 49 – 15 September 2013
Northern edge of excavation MOC Sites 13, 15, 19, 27. View facing west.

Photo No. 50 – 15 September 2013
Overview of MOC Sites 13, 15, 19, 27. View facing east.

Photo No. 51 – 15 September 2013
Overview of MOC Sites 13, 15, 19, 27. View facing south.

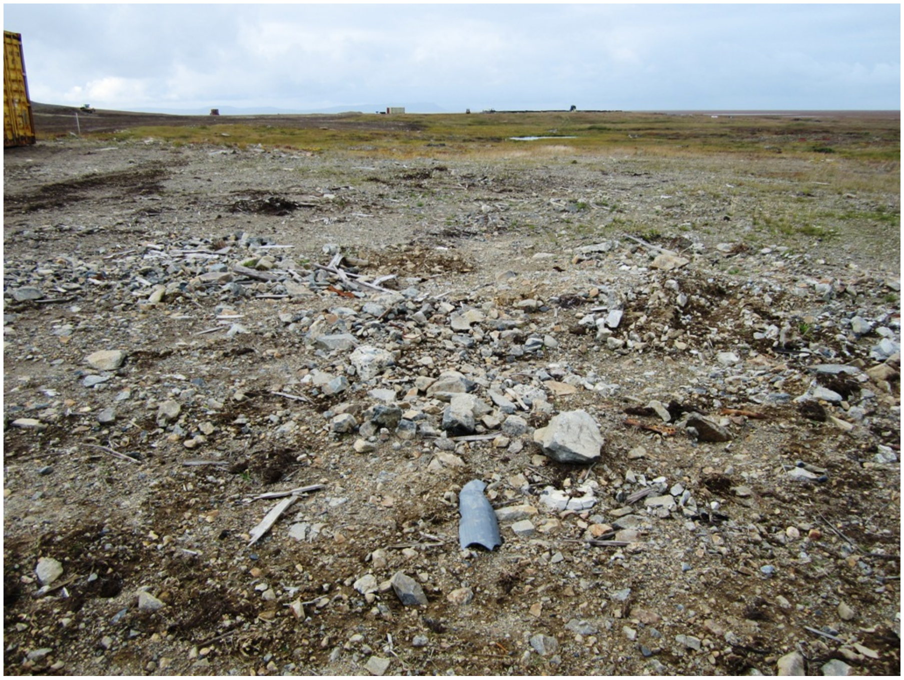

Photo No. 52 – 14 September 2013
Miscellaneous debris at Site 10. View facing west.

Photo No. 53 – 14 September 2013
Existing non-secured, frost-jacked monitoring well at Site 10.

Photo No. 54 – 14 September 2013
Staging at Site 10. View facing east.

Photo No. 55 – 14 September 2013
Staging at Site 10. View facing North.

Photo No. 56 – 14 September 2013
Large concrete ring at Site 10.

Photo No. 57 – 14 September 2013
Drum lid at Site 10.

Photo No. 58 – 14 September 2013
Abandoned monitoring well at Site 10.

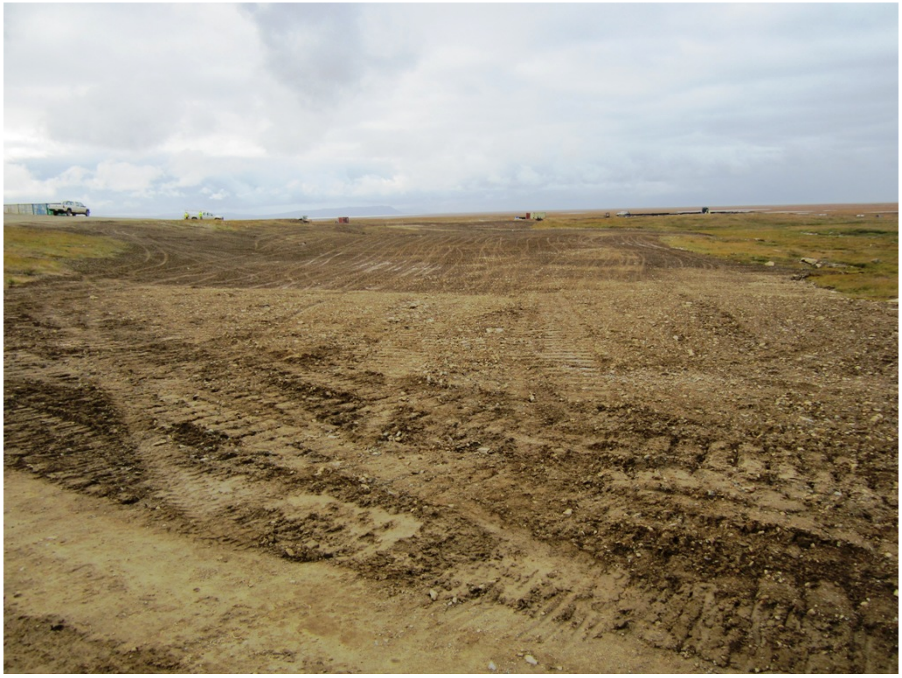

Photo No. 59 – 14 September 2013
Recent grading and seeding at Site 11. View facing southwest.

Photo No. 60 – 14 September 2013
Recent grading and seeding at Site 11. View facing northeast.

Photo No. 61 – 14 September 2013
Existing monitoring well at Site 11. View facing northeast.

Photo No. 62 – 14 September 2013
Seeding at Site 11. View facing north.

Photo No. 63 – 15 September 2013
Overview of Site 13. View facing north.

Photo No. 64 – 15 September 2013
Overview of Site 15. View facing north.

Photo No. 65 – 15 September 2013
Overview of Site 15. View facing southeast.

Photo No. 66 – 15 September 2013
Overview of Site 16 and road access to Site 28. View facing north.

Photo No. 67 – 15 September 2013
Abandoned well at Site 16.

Photo No. 68 – 15 September 2013
Overview of Site 16. View facing northeast.

Photo No. 69 – 15 September 2013
Overview of Site 16. View facing southwest.

Photo No. 70 – 15 September 2013
Abandoned well at Site 16.

Photo No. 71 – 15 September 2013
Abandoned well at Site 16. View facing northeast.

Photo No. 72 – 15 September 2013
Existing non-secured, frost-jacked monitoring well at Site 19. View facing north.

Photo No. 73 – 15 September 2013
Exposed geotextile liner identified at Site 19. View facing west.

Photo No. 74 – 15 September 2013
Road access to Site 21. View facing west.

Photo No. 75 – 15 September 2013
Road access to Site 21. View facing west.

Photo No. 76 – 15 September 2013
Backfill at Site 21. View facing southeast.

Photo No. 77 – 15 September 2013
Backfill and grading at Site 21. View facing east.

Photo No. 78 – 15 September 2013
Silt fence at Site 21. View facing west.

Photo No. 79 – 15 September 2013
Seeding at Site 21. View facing south.

Photo No. 80 – 15 September 2013
Road access to Site 21. View facing east.

Photo No. 81 – 15 September 2013
Drainage for Site 27. View facing north.

Photo No. 82 – 15 September 2013
Well debris identified at Site 27. View facing north.

Photo No. 83 – 15 September 2013
Sediment pond at Site 28. View facing north.

Photo No. 84 – 15 September 2013
Water filters for remediation at Site 28. View facing northwest.

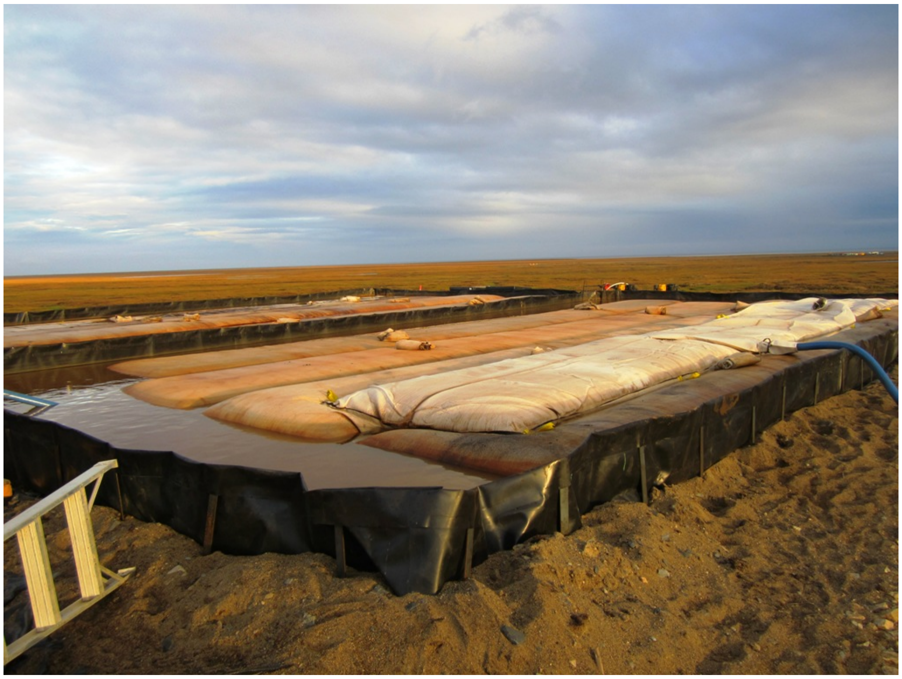

Photo No. 85 – 15 September 2013
Sediment tubes for remediation at Site 28. View facing northwest.

Photo No. 86 – 15 September 2013
Intermediate pond for remediation at Site 28. View facing east.

Photo No. 87 – 15 September 2013
Flocculant station for remediation at Site 28. View facing north.

Photo No. 88 – 15 September 2013
Intermediate pond for remediation at Site 28. View facing north.

Photo No. 89 – 15 September 2013
Overview of Site 28. View facing northeast.

Photo No. 90 – 15 September 2013
Overview of Site 28. View facing southwest.

Photo No. 91 – 15 September 2013
Water pump at Site 28. View facing east.

Photo No. 92 – 15 September 2013
Sediment trap at Site 28. View facing east.

Photo No. 93 – 15 September 2013
BERS demobilization at Site 28. View facing north.

Photo No. 94 – 15 September 2013
Overview of Site 28. View facing south.

Photo No. 95 – 15 September 2013
Dredge used by BERS at Site 28. View facing north.

Photo No. 96 – 15 September 2013
Drainage Basin (Site 28) flow into the Suqitughneq River (Site 29). View facing east.

Photo No. 97 – 15 September 2013
Wattles placed at the junction between the Drainage Basin (Site 28) and the Suqitughneq River (Site 29). View facing east.

Photo No. 98 – 14 September 2013
View of Suqitughneq River (Site 29) from the roadway. View facing east.

Photo No. 99 – 14 September 2013
View of Suqitughneq River (Site 29) from the roadway. View facing west.

Photo No. 100 – 14 September 2013
View of Suqitughneq River (Site 29) facing the roadway. View facing west.

Photo No. 101 – 14 September 2013
Water collection at Site 29 for the BERS camp. View facing southeast

Photo No. 102 – 14 September 2013
View of the Suqitughneq River (Site 29) facing the roadway. View facing east.

Photo No. 103 – 14 September 2013
Culvert beneath the roadway at Site 29. View facing east.

Photo No. 104 – 14 September 2013
View of Suqitughneq River (Site 29) from near the culvert. View facing east.

Photo No. 105 – 14 September 2013
Drum debris located in a pond connected to the Suqitughneq River (Site 29).

Photo No. 106 – 14 September 2013
View of the Suqitughneq River (Site 29) on the east side of the roadway. View facing southeast.

Photo No. 107 – 14 September 2013
View of the Suqitughneq River (Site 29) on the east side of the roadway. View facing northwest.

Photo No. 108 – 13 September 2013
Recent grading and seeding at Site 31. View facing west.

Photo No. 109 – 13 September 2013
Remaining foundation (B) at Site 31. View facing north.

Photo No. 110 – 13 September 2013
Remaining foundations (B, C, D) at Site 31. View facing west.

Photo No. 111 – 13 September 2013
Miscellaneous debris at Site 31. View facing east.

Photo No. 112 – 13 September 2013
Drain cover at Site 31.

Photo No. 113 – 13 September 2013
Constructed drainage at Site 31. View facing north.

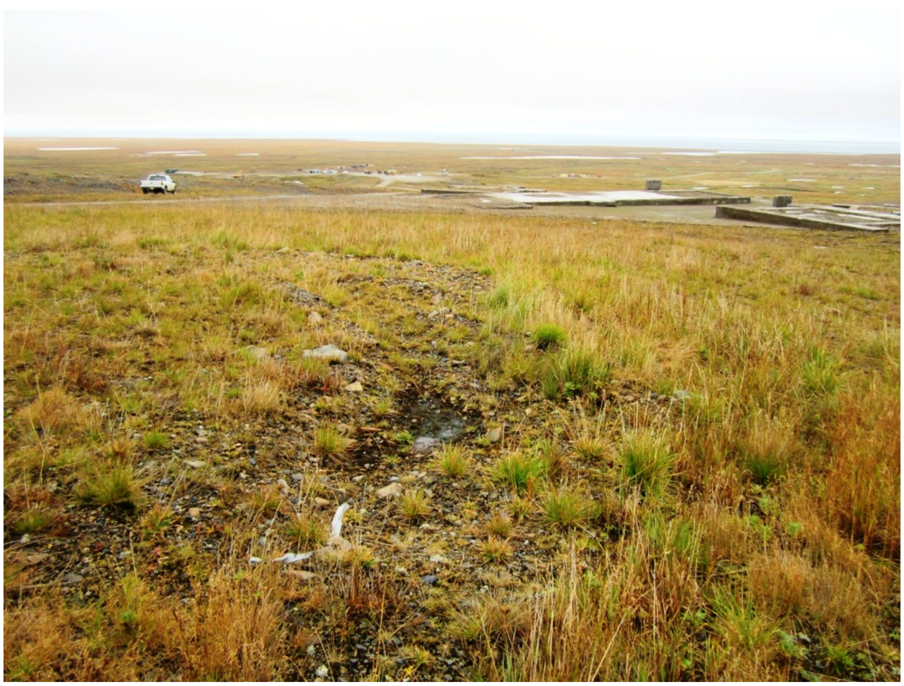

Photo No. 114 – 13 September 2013
Slight depression at Site 31. View facing north.

Photo No. 115 – 13 September 2013
Remaining foundations (A, E) at Site 31. View facing north.

Photo No. 116 – 13 September 2013
Condition of the road leading to Site 32. View facing north.

Photo No. 117 – 13 September 2013
Condition of the road leading to Site 32. View facing east.

Photo No. 118 – 13 September 2013
Lower Tramway Site 32 footprint. View facing west.

Photo No. 119 – 13 September 2013
Lower Tramway Site 32 footprint. View facing south.

Photo No. 120 – 13 September 2013
Miscellaneous debris at Site 32. View facing west.

Photo No. 121 – 13 September 2013
Asphalt debris at Site 32.

Photo No. 122 – 13 September 2013
Culvert extending to the south below roadway at Site 32. View facing north.

Photo No. 123 – 13 September 2013
Culvert extending to the north below the roadway at Site 32. View facing east.

Photo No. 124 – 13 September 2013
Metal debris at Site 32. View facing south.

APPENDIX E

Completed Interview Questionnaire Forms

Interview Record

Name: Robert Annogiyuk	Date: 1-15-2014
Organization: NALEMP Project Manager	Phone Number:
Title:	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

NALEMP - Program moves quickly. sometimes to quickly

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

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

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

Not well informed Because of some of the Technical Terms.

Contaminants + what they mean.

- more Introductory information would be helpful so people can get A Better perspective.

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

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

Interview Record

Name: Orville toolie	Date: 1-15-14
Organization:	Phone Number:
Title: Community Member	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

doing pretty good - a lot cleaner than Savoonga

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

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

No.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

People of Savoonga know whats going on.

→ letters from the corps to update the community

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

use the area for local housing

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

- Would like to have more Evaluation of materials taken off the site + used as Building materials

-

ey

Interview Record

Name: members of Kukulget Inc Board of Directors.	Date: ~~01/2014~~ 01/15/2014
Organization: –	Phone Number: –
Title: –	Email: –
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

* Cleanup is a good thing
* How much of that backfilled gravel is contaminated or over contaminated soil?

1952 agreement to Native Village of Savoonga to return site to original condition.

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

* Concerns about what contaminants were left there near the camp.
* During Military use - leftovers were dumped and community members picked through the dump to get to them.

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

* Reports that Bristol + employees were taking four wheelers and beachcombing which violated the agreement with the landowners. (Every summer sine work has been performed)

* Medivac injured personell while cleanup going on (2012 and 2013)

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

Yes.

- Don't get too technical - put it in laymens terms.

- more information about ~~how~~ what areas are clean and which arent.

* → Decision Document wasn't explained or presented to the community. major concern

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

* Site walk to previous areas to get updates. Tribal Council or Corporation

* Add signage to the landfills (around the perimeter) to notify site visitors.

* Add monitoring wells to landfills and MOC. Include signs or flags to avoid hitting them in the winter.

would at least have a copy of the signed document.

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

– Cap was seeded with "local grass"
"Grass can't grow on rocks" @ Open up cap take out debris and change cap material add soil.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

* Don't drink water from NE Cape anymore
* No longer use Kangukhsam Hth Spring.

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

* Left 2 landfills; if you are already taking out all of that soil; why not remove the debris.

* Site 7; engine, airplane, transformers, batteries, road grader, barrel all seen beneath the surface, Cleanup was only at the surface.

* moc. all utiliders left in place 1999-2004; more utiladors left in place moc. One at Pad 98, loading frame was located.

* Septic tank between Site 21 and Site 28.
→ Followup; with information to community or Remedial Efforts.

* Another dump site located South of Radome Site (Site 33?)

"Clean it up"

→ Community members observed helicopter activity around to the south side of the mountain. Believed to haul unknown

* Commercial fishing hot spot outside of Suqi River Drainage. Close to land.

* West side of mtn Kangukhsam Mtn. 10+ drums seen while hunting

* Sludge at Site 24 below ponds Barrels still remain.

* Long-term monitoring of the Suqi River The lagoon at the ~~[illegible]~~ end of Suqi freezes up. When it opens water movement increases

* Corps should maintain the airstrip

* POL sites limited to 2ft below ground water. Not getting to clean. Contamination remains

* Fragments of asbestos + concrete slabs left at Site 31 + MOC. would like them removed. → What is underneath them — what if we disturb them to use the land?

<u>Interview Record</u>

Name: Dean Kolowiyi		Date: 1-15-2014
Organization: community member		Phone Number:
Title:		Email:
Interview Type:	Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island	

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

Clean-up part is going ok. Happy work is moving Forward

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

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

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

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

When can you get information. Why are taking so long?

Feels like some community concerns are not being addressed.
(Health)

Family members were put at risk by participating in clean-up prior to HazWoper.

Interview Record

Name: Name withheld	Date: 1-15-2014
Organization: Community Member	Phone Number:
Title:	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

Email maps of what areas are above the cleanup level.

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

- Beachcombers are concern, Because in my opinion I consider it trespassing.

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

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

Likes the format of the RAB Meetings. good information.

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

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

Would like to move out there in the future

Interview Record

Name: Name Withheld	Date: 01/15/2014
Organization: Community Member	Phone Number:
Title:	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

- want the whole area cleaned up - not just the individual site. lack of information/understanding

- concern about ammo, weapon storage at NE cape - where location is, if contamination remains.

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

Gallons of heating fuel -

Health problems in Savoonga - problems that didn't exist before

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

NO

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

No - would like more information about what they have found

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

NO

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

* No good understanding of the DD and how it was signed etc.

* SW cape, Sipenpak camps, — material used contain lead-based paint that originated at NE Cape. Paint and tar used.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

NO

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

Do not have confidence that the land is clean. "I don't want to use that land! It might still be dirty."

Interview Record

Name: Pamela Miller and Vi Waghiyi	Date: 1-24-14
Organization: Alaska Community Action on Toxics and Native Village of Savoonga Tribal Member (Vi)	Phone Number: (907) 222-7714
Title: Executive Director (Pamela Miller) and Environmental Health and Justice Program Director and NVS Tribal Member (Vi Waghiyi)	Email: pamela@akaction.org and vi@akaction.org
Interview Type: **Mail/Email**	
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

The clean-up of the Northeast Cape site is far from complete and not protective of the health of the people living on the Island. We believe that the site was not properly characterized and thus the remediation has not been fully informed enough to identify and remove important source areas of contamination. Source areas of contamination are still contaminating the Suqi River and ground water. We are concerned about continuing contamination of the Suqi River and estuary from fuel-related compounds from prior large spills, PCBs, and pesticides. The Suqi River, once a prime fishing location for the people of St. Lawrence Island, has not recovered because of the damage caused by the military occupation, activities, and on-going contamination from sources areas.

2. **From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?**

The original community at NE Cape, the Native Village of Northeast Cape, was and continues to be displaced by the military operations at NE Cape. The people of St. Lawrence Island intend to re-establish the community at NE Cape, however cannot do so until they are assured that the cleanup is protective of health and well-being for a residential community and future generations. People cannot safely use the NE Cape area for traditional hunting and fishing or for the harvesting of food (greens and berries) and medicinal plants. The ground- and surface sources of drinking water sources are not safe.

Monitored Natural Attenuation is not an acceptable remedy as it will take decades for levels of contamination to reach "safe" levels. The contamination has already harmed the health of generations of families associated with NE Cape. Overall, we do not think the remedies are protective of health and the environment. We think and the tribe supports that other active remediation methods must be used, including additional and effective removal as well as active chemical oxidation as proposed by the RAB Technical Advisor.

Cleanup standards are far from adequate. For example, DRO cleanup standards for soil are 9,200 mg/kg. At those levels, contaminated soils will continue to serve as a source of contamination to ground- and surface waters. We believe that the contamination remaining in landfill sites at NE Cape is of great concern for health since they were simply capped and will remain in place and unabated. Leachate from these landfills will continue to harm and present hazards to the Suqi River watershed, fish and wildlife, and people's health.

Detection limits used for analysis and Aroclor analysis rather PCB congener analysis are not adequate methods to properly characterize the nature and extent of contamination. The analytical methods are not sensitive enough to assess the range of contaminants known to exist in the sediments, soils, water at NE Cape. Analyses should include: congener-specific PCBs, mirex, HCB, dioxins/furans, DDE, BTEX, PAHs, and others. Also, we think that TCE and other solvents, as well as vinyl chloride should be included among the analytes. People are also concerned that there might be undisclosed information about what harmful substances were used and/or left at NEC, including the possible use of radionuclides/radiation hazards.

The Army Corps of Engineers has not conducted proper government-government consultation according to their legal obligations. The past Corps of Engineer's Project Managers have not been culturally sensitive.

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

The military was not been responsible for posting proper signage in the Yupik language to warn people about the hazards of the site following their abandonment of the site. Therefore, people salvaged hazardous materials and used them for homes and cabins. Also, to this day, there are no warnings concerning the danger of consuming water from the Suqi River.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

We had to submit a petition to the Army Corps of Engineers to establish a Restoration Advisory Board (RAB). Although the RAB meetings provide information sharing, concerns and information requests expressed by community members and our technical advisor have not been respected or acted upon.

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

The site cleanup should not be closed at this stage because of the remaining contamination. Long-term monitoring should include re-installment at sites where monitoring wells have been removed and installment of new monitoring wells in key locations such as down gradient from the Main Complex and the landfill sites (including sites 7, 9, 10, for example). Integrative sampling methods should be employed within the Suqi River (such as SPMDs), as well as sediments cores within the Suqi River and its estuary, biological sampling of fish and wildlife that use the NEC area. As mentioned above, proper analytical techniques and improved characterization must be done. As stated by the RAB technical advisor, the estuary needs improved characterization and should be subjected to innovative remedial measures to reduce the concentration and distribution of chlorinated (PCBs, mirex, DDE and others), non-chlorinated organics, and metals (e.g. Hg). The Corps of Engineers has disregarded the on-going contamination by PCBs in the Suqi River and effects to water quality of the soluble PCB congeners and input to the estuary.

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

Yes. The tribe should be an official signatory to the Decision Document. The site should continue to receive active remediation and not be closed – additional monitoring and remediation is needed as discussed above.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

As described above, the remedial actions have not been sufficient to protect the health of people of St. Lawrence Island. Physical processes used to remove contaminated sediments are likely or will likely uncover additional contaminated sediments. This is not acceptable since previous sampling may not have included elevated concentrations. Disturbed samples are a new environment and may result in further exposures.

The cleanup is NOT complete and unless it is completed, it will continue to cause harmful exposures and prevent adequate health protections.

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

The RAB community members, tribal leaders, and RAB technical advisor's knowledge, concerns, and recommendations have not been followed or addressed by the Corps of Engineers or their contractors. Jacobs Engineering, as the third party independent reviewer, should review past RAB meeting minutes, RAB member statements/comments, and Technical Advisor statements and include these in the Review since most of these expressed concerns have not been addressed. These concerns and recommendations must be addressed for the protection of the health and well-being of the St. Lawrence Island Yupik people and future generations.

INTERVIEW RECORD

Site Name: Northeast Cape	**FUDS ID No.: F10AK096903**
Site Location: Northeast Cape, Saint Lawrence Island, Alaska	
Subject: First 5-Year Review	**Date: January 27, 2014**
Interview Type: ☐ Telephone ☐ Visit ☐ Email ☒ Questionnaire	

Interviewee:

Name: Curtis Dunkin	**Title: Environmental Program Specialist**	**Organization: Alaska Department of Environmental Conservation**

Telephone No: 907.269.3053 **Fax No: 907.269.7649** **E-Mail Address: Curtis.dunkin@alaska.gov**	**Street Address: 555 Cordova St.** **City, State, Zip: Anchorage, AK 99501**

The following general questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

INTERVIEW QUESTIONS

1. *What is your overall impression of the project?*

Remedial activities at Northeast Cape (NEC) have been ongoing for over 15 years; of which mobilizations to conduct remedial actions and remedy implementations have been occurring at the site the past 5 consecutive field seasons. In the past six years the Army Corps of Engineers (Corps) has prioritized the resources necessary to implement the cleanup at NEC and it is ADEC's understanding that the Corps plans to continue doing so until all remedies are implemented and protectiveness is achieved at all NEC sites. Remedial actions at NEC have been a very large and complicated undertaking due to the remoteness of the site, the short field season, and the complexity of the contamination issues. Overall, ADEC perceives the remedial activities to have occurred in an adequate and timely manner that is in accordance and consistency with CERCLA law and ADEC regulations. To date, a large majority of the planned removal actions have been completed and it is ADEC's understanding that the Corps plans to continue mobilizing and conducting remedial actions in the 2014 field season as well as in future years to continue cleaning up and/or monitoring the contamination at the NEC sites.

ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

2. *From your perspective, what effects have site operation had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?*

   Saint Lawrence Island residents and community members have expressed both gratitude that the NEC FUDS is being cleaned up as well as concerns regarding the overall protectiveness of the remedies in the 2009 Decision Documents. From ADEC's perspective, the immediate effects of site operations on the surrounding community (Savoonga and the Native Village of NEC) have been positive mainly due to the decrease in human and environmental exposure risks via the removal and offsite disposal of extensive volumes of contaminated soil. ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

3. *Are you aware of events, incidents, or activities at the site such as vandalism, trespassing, or emergency responses from local authorities? If so, please provide details.*

   ADEC is not aware of any events of vandalism, trespassing, or emergency responses from local authorities that have occurred in association with the NEC FUDS and/or its associated contamination issues.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

ADEC perceives that it is well informed about the remedial activities and progress associated with NEC. ADEC staff travel to Savoonga twice a year to attend the semi-annual Restoration Advisory Board meetings. ADEC staff travel to NEC at least once annually to conduct multi-day facility-wide site inspections of the remedial activities being conducted during the field season; and has in recent years conducted two separate site inspections. ADEC staff regularly participate in in-person meetings and teleconferences with project team members as needed. ADEC staff, per ADEC's CERCLA regulatory authority, review, submit comments, and grant approvals of work conducted in association with the contaminated sites issues at NEC. During field seasons when remedial activities are being conducted at NEC, the Corps has kept ADEC apprised with daily quality control and progress reports. The Corps has also notified ADEC in a timely manner whenever there has been a change in site conditions and/or when it has required ADEC's review, input, and approval to implement remedial activities.

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

Yes. ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

ADEC is not aware of any problems which have required or will require changes to any of the selected remedies or the two 2009 Decision Documents. ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

ADEC is not aware of any changes in land use, access, or site conditions associated with NEC which have occurred in the past five years that have had or may have an impact on protectiveness. ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

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

ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

9. Miscellaneous Comments:

ADEC will be submitting comments pertaining to each specific site being evaluated as part of this First Five-year Review for NEC to be considered and included in the draft 2014 Five-year Review Report after ADEC has received and reviewed the draft 2013 NEC Remedial Action Report.

Interview Record

Name: Mitchell Kiyuklook	Date: 4Feb2014
Organization: Pres. of Native Village of Savoonga	Phone Number: N/A
Title:	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

- looks like to be more cleaned up

Buried drums - at the landfills - would like them cleaned up.

NE Cape was active last from when the military was still there.

Recycling Metals place - found trace of radiation -

→ NALEMP coorinator, FCAT, EPA, Ron Scudato — conf. call. 29 Jan 14?

→ Elders speak about dead Walruses — Winefred James (Gambell) Black, burned skin.

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

— Increase incidence of cancer - concerned with the high rate of cancer on the island.

— High rate of PCB in the blood.

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

Collection of construction materials for use around the island.
→ Historic

a lot of exposure occurred during this time.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

Not really -

→ Help to understand what cleanup levels mean.
→ Better explaination of what the regulations mean and how the cleanup levels were established.

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

- Cleanup should be longer.
- DRO spill at Site 11 → could smell the DRO approx 6-7 miles. — DRO level is too high.

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

— Possible radiation that was identified on recycled metals. (Trace identified - unclear on location or source)

— Want it removed from the land.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

Sugi river ~~has~~ does not have as much fish as before

seal numbers have gone done - slowly returning

Subsistence is affected - The area is not used as much as it used to. Slowly returning.

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

* Do more research and testing of the soil + water.

— Provide information before the reports come out. Native Village of Savoonga

— sampling of the reindeer again - now that cleanup efforts have been initiated.

- dust stirup, leaching, etc..

↳ affecting lichen + grass.

Interview Record

Name: Paul Rookok	Date: 04 Feb 2014
Organization: Tribal Gov. in Savoonga	Phone Number: N/A
Title:	Email:
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

* Cleanup missed in areas that weren't included as a sites.

— As a laborer we were told to only cleanup the areas that were within the site.

— Wires and cables remain and were mostly covered by vegetation & water.

— "overall it's a fair job - not a good one."

*more sampling should have been done during the RIs to get a better sense of whats there.

— Took a lot of talking to get and old truck remove from landfill east of ['y'] area

hardly any shareholders - working on the cleanup - see more shareholders cleanup and - would like to see money upon earning - would also help w/ communication

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

only a handful of people know about the cleanup.

— most shareholders don't have any ideas.

To get information out - more details are needed to be explained - USE laymen's terms.

→ To the corporation

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

Shareholders in Gambell complaining about recreational activities in their leisure time - Employees that were not shareholders well riding ATV offsite and rumors indicate they were taking artifacts, old ivory, etc. Things that belong to the Native Corp. These are cultural and tradictional items.

4. Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?

— We need something that explains what's been cleaned up that everyone can understand.

— only a handful of people know - just people that worked there.

— Pictures are nice however it doesn't tell a complete story. What they are doing and why?

5. Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?

Work with Native Corp at Savoonga + Gambell and the IRA.

protect the artifacts + respect environment

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

need a better understanding of DD.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

Site belongs to Gambell & Savoonga.

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

Should be up to the Corporations
& not any body.

Interview Record

Name: Delbert Pungowiyi	Date: 04Feb2014
Organization: Community Member	Phone Number: N/A
Title: Former Pres of Nat. Village of Savoonga	Email: —
Interview Type: Mail/Email	Phone/In Person
Site (s) Name:	Northeast Cape, St. Lawrence Island

The following interview questions are based on EPA guidance (EPA 540-R-01-007). Questions may be left unanswered if they do not apply to you.

Interview Questions

1. What is your overall impression of the project (general sentiment)?

- Happy that Congress is moving forward and getting cleanup going
- Very disappointing.
- It has been a huge ordeal to get the Corps to clean up the site to Residential cleanup levels
- From the Begining there is always been a concern with cost not safety. It's disappointing.

Health has been effected dramatically.

CONCERNS

2. From your perspective, what effects have site operations had on the surrounding community? Are you aware of any community concerns/complaints regarding site operations, administration, implementation, or overall protectiveness of the remedies in the Decision Documents?

* The Native village of Savoonga should be included as a signatory on the Decision Document. Esp. given the agreement that took place on 1952. (Ratified by Sec. of State)

health of the people on island particularly cancer. PCB levels are very high - causes fear in the community. Common phrase is "Who's next?"

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

NO.

No- ACAT and Ron Scurdato have been instrumental in getting information to the community. - communication is lacking where are we at with the cleanup?

4. **Do you feel well informed about the site's activities and progress? Have there been communications or activities regarding the site?**

NO. lack of communication + honesty.
- Difficulty to deal w/ Corps Don't want to deal w/ Corps of AK - should be dealing with Washington. Government - to - Government Relationships are non-existance. Eye to Eye. There No need to deal with Alaska. This is is a federal issue.
- Repatriation Act of Aleuts.

5. **Do you have any suggestions regarding future operation, maintenance, and monitoring (OMM) at the site?**

- This should be negotiated with tribal governments - they need to be involved.
- get the debris out of landfills - not satisfied - theres still possibility for things to migrate out. Its just gravel for a cap.

6. Have any problems been encountered which required, or will require, changes to the remedy or Decision Document?

* Metals taken off island to be recycled have shown levels of radiation

* Seals numbers have decreased in the area.

* Determining POL was biogenic ~~was~~ was inaccurate without a reasonable doubt.

7. Are you aware of any changes in land use, access, or other site conditions that have occurred in the past five years that you feel may impact the protectiveness of the site?

People are scared of the area. Prior to the cleanup there was high levels of PCB -

- Wash all of the berries
- Dust stirred up is a concern - did this result in spread of PCBs?

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

Most Imp. — It is illegal that they signed the DD and excluded the Native Village of Savoonga - We have strong opposition to the ~~remedies and the~~ document itself.

I would like closure brought to this cleanup by including Native Village of Savoonga and have a Congressional hearing in Washington. The island needs recognition for the role they played for this country and the mistreatment of the peoples Human Right.

PCB as high as 7.5 ppm on the Island.

Record of Decision should be Native Village of Savoonga and the Commander and Chief not corps and State of AK.

APPENDIX F

Public Notice Documentation

US Army Corps of Engineers Announces Start of Five-Year Review

The Unites States Army Corps of Engineers at Joint Base Elmendorf-Richardson (JBER) announces the beginning of the Five-Year Review of cleanup remedies being implemented at the Northeast Cape Formerly Used Defense Site located on St. Lawrence Island, Alaska.

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121, and the National Contingency Plan requires that remedial actions which result in any hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure be subject to a five-year review.

The purpose of the Five-Year Review is to evaluate whether the remedies selected to clean up contaminated sites are operating as designed and remain protective of human health and the environment.

Detailed information concerning the Northeast Cape cleanup effort is available at the following information repositories :

Alaska Resources Library & Information Services, University of Alaska, Anchorage
3211 Providence Drive
(907) 786-1871

Savoonga City Hall
(907) 984-6614

Gambell Sivuqaq Lodge
(907) 985-5335

The findings of the Five-Year Review will be available for review after September 2014.

Interested persons can participate in the Five-Year Review process through December 2013 by responding to a questionnaire available from:

Kevin Maher, Jacobs Engineering
4300 B Street, Suite 600
Anchorage, AK 99508
kevin.maher@jacobs.com (907) 563-3322

Information on the cleanup process is shared with interested persons through periodic Northeast Cape public meetings. If you would like to be added to the contact list, contact Valerie Palmer at (907) 753-2578 or POA-FUDS@usace.army.mil

Publisher's Affidavit

UNITED STATES OF AMERICA,

State Of Alaska } **SS:**

Second Division

N. A., **being first duly sworn on oath deposes and says:**

That I am and was at all times herein this affidavit mentioned, administrator-ads **of THE NOME NUGGET, a newspaper of general circulation and published weekly at Nome, Second Division, State of Alaska, and online that the** ~~Start~~ of 5-yr review St Lawrence Island

a printed copy of which is hereto annexed, was published in said paper once and every week for one **successive and consecutive weeks in the issues of the following dates:**

August 22, 2013

x N. A

SUBSCRIBED and SWORN to before me this 2nd **day of** October, **20**13

NOTARY PUBLIC in and for the State of Alaska.

My commission expires 2/07/16

Nancy L McGuire

NANCY L. MCGUIRE
NOTARY
PUBLIC
STATE OF ALASKA

FIVE-YEAR REVIEW
NORTHEAST CAPE FORMERLY USED DEFENSE SITE
ST. LAWRENCE ISLAND, ALASKA

September 2013

FIVE-YEAR REVIEW

The United States Army Corps of Engineers (USACE) at Joint Base Elmendorf-Richardson is undergoing a five-year review of remedial actions implemented at the Northeast Cape Formerly Used Defense Site located on St. Lawrence Island, Alaska.

The five-year review is a detailed evaluation of the implementation and performance of the remedy selected to achieve environmental cleanup. The objective of the evaluation is to document if cleanup activities (or “remedies”) are protecting people and the environment. If the remedies are not effective, the five-year review makes recommendations to improve protectiveness. This evaluation is required by federal regulations, and the Alaska Department of Environmental Conservation (ADEC) will review the process to ensure completeness and accuracy. This will be the first five-year review for Northeast Cape.

SITES INCLUDED IN THE FIVE YEAR REVIEW

Based on the signed decision documents, remedial actions were selected for various sites to address surface soil, subsurface soil, groundwater, and sediment contaminated with polychlorinated biphenyls (PCB), diesel-range organics (DRO), residual-range organics (RRO), arsenic, benzene, and naphthalene. The following table lists the sites and the remedial actions performed at each site.

Site Number and Name		Action
Site 1	Air Strip	EX/D
Site 3	Fuel Pumphouse	EX/D
Site 6	Gravel Pad	EX/D
Site 7	Cargo Beach Road Landfill	C/LUC
Site 8	Petroleum, Oil, and Lubricant Spill	MNA/LUC
Site 9	Housing and Operations Landfill	C/LUC
Site 10	Buried Drums	EX/D and MNA/LUC[1]
Site 11	Fuel Tanks	EX/D and MNA/LUC[1]
Site 13	Heat and Power Plant	EX/D and MNA/LUC[1]

Site Number and Name		Action
Site 15	Fuel Pipeline	EX/D and MNA/LUC[1]
Site 16	Paint and Dope Storage	EX/D
Site 19	Auto Maintenance	EX/D and MNA/LUC[1]
Site 21	Wastewater Tank	EX/D
Site 27	Diesel Fuel Pump	EX/D and MNA/LUC[1]
Site 28	Drainage Basin	EX/D
Site 29	Suqitughneq River	Incidental Debris Removal
Site 31	White Alice Communications	EX/D
Site 32	Lower Tramway	EX/D

Notes:
EX/D = Excavation with disposal or treatment
MNA/LUC = Monitored natural attenuation with land use controls
C/LUC = Capping with land use controls
[1]Although chemical oxidation was identified as the primary remedy in the decision documents, it was not implemented. The contingency remedy described in the decision documents, excavation of soil and monitored natural attenuation of groundwater, will be implemented.

COMMUNITY INVOLVEMENT

The community is encouraged to participate in the review process. Public comments may be provided by responding to a written questionnaire through December 2013, or in person following the December 2013 Restoration Advisory Board public meeting in Savoonga. The questionnaire can be requested from and comments submitted to:

Kevin Maher, Jacobs Engineering Group Inc.
4300 B Street, Suite 600
Anchorage, AK 99508
kevin.maher@jacobs.com (907) 563-3322

ADDITIONAL INFORMATION

Documents pertaining to background information and the decision documents for Northeast Cape are on file at the following information repository locations:

Alaska Resources Library and Information Services, University of Alaska, Anchorage
3211 Providence Drive
(907) 786-1871

Savoonga City Hall
(907) 984-6614

Gambell Sivuqaq Lodge
(907) 985-5335

Information on the cleanup process is shared with interested persons through periodic public meetings. If you would like to be added to the contact list, contact Valerie Palmer at (907) 753-2578 or POA-FUDS@usace.army.mil

US ARMY CORPS OF ENGINEERS
Alaska District
P.O. Box 6898 (CEPOA-PM-ESP)
JBER, AK 99506-0898

OFFICIAL BUSINESS

DELIVER TO: