

U.S. Army Corps of Engineers Alaska District



LONG-TERM MANAGEMENT PLAN NORTHEAST CAPE FUDS

ST. LAWRENCE ISLAND, ALASKA

**Formerly Used Defense Site Nos.
F10AK0969-03 and F10AK0969-05**

**FINAL
SEPTEMBER 2016**

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1200C PERM

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TABLE OF CONTENTS

<u>SECTION</u>	<u>PAGE</u>
ACRONYMS AND ABBREVIATIONS	v
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1-1
1.1 SITE LOCATION AND HISTORY	1-2
1.1.1 History of Contamination.....	1-3
1.2 SITE DESCRIPTION	1-3
1.2.1 Physical Characteristics	1-4
1.2.2 Geology.....	1-4
1.2.3 Hydrogeology.....	1-5
1.2.4 Land and Resource Use.....	1-7
1.2.5 Existing Utilities, Infrastructure, and Logistical Considerations	1-7
1.3 LONG-TERM MANAGEMENT SUMMARY	1-8
1.4 INDIVIDUAL SITE DESCRIPTIONS	1-13
1.4.1 Site 1 – Airstrip	1-13
1.4.2 Site 2 – Airport Terminal and Landing Strip	1-13
1.4.3 Site 3 – Fuel Pump House.....	1-14
1.4.4 Site 4 – Native Fishing and Hunting Camp	1-15
1.4.5 Site 5 – Cargo Beach.....	1-16
1.4.6 Site 6 – Cargo Beach Road Drum Field.....	1-17
1.4.7 Site 7 – Cargo Beach Road Landfill	1-18
1.4.8 Site 8 – Petroleum, Oil, and Lubricants Spill	1-20
1.4.9 Site 9 – Housing and Operations Landfill.....	1-21
1.4.10 Sites 10 through 20, 22, 26, and 27 – Main Operations Complex	1-23
1.4.11 Site 10 – Buried Drums.....	1-25
1.4.12 Site 11 – Fuel Tanks.....	1-26
1.4.13 Site 12 – Gasoline Tank Area	1-28
1.4.14 Site 13 – Heat and Power Plant.....	1-29
1.4.15 Site 14 – Emergency Power/Operations Building	1-30

TABLE OF CONTENTS (Continued)

<u>SECTION</u>	<u>PAGE</u>
1.4.16 Site 15 – Fuel Pipeline	1-30
1.4.17 Site 16 – Paint and Dope Storage.....	1-31
1.4.18 Site 17 – General Supply Warehouse and Mess Hall Warehouse	1-32
1.4.19 Site 18 – Housing Facilities and Squad Headquarters	1-32
1.4.20 Site 19 – Auto Maintenance.....	1-33
1.4.21 Site 20 – Air Force Aircraft Control Warning Building.....	1-34
1.4.22 Site 21 – Wastewater Tank	1-34
1.4.23 Site 22 – Water Wells and Water Supply Building	1-36
1.4.24 Site 23 – Power and Communication Line Corridors	1-37
1.4.25 Site 24 – Receiver Building Area.....	1-38
1.4.26 Site 25 – Direction Finder Area	1-38
1.4.27 Site 26 – Former Construction Camp	1-39
1.4.28 Site 27 – Diesel Fuel Pump.....	1-39
1.4.29 Site 28 – Drainage Basin.....	1-41
1.4.30 Site 29 – Suqitughneq River	1-43
1.4.31 Site 30 – Site-Wide	1-44
1.4.32 Site 31 – WACS Station.....	1-44
1.4.33 Site 32 – Lower Tramway.....	1-45
1.4.34 Site 33 – Upper Tram Terminal	1-45
1.4.35 Site 34 – Upper Camp.....	1-46
2.0 LAND-USE CONTROLS.....	2-1
2.1 CONSTRUCTION/LAND USE.....	2-2
2.2 GROUNDWATER USE.....	2-2
3.0 INSPECTIONS	3-1
3.1 LANDFILL CAP VISUAL INSPECTIONS	3-2
3.2 PERIODIC REVIEWS	3-2
3.3 CERCLA FIVE-YEAR REVIEWS	3-3
4.0 MONITORING	4-1

TABLE OF CONTENTS (Continued)

<u>SECTION</u>	<u>PAGE</u>
4.1 SEDIMENT MONITORING.....	4-1
4.2 GROUNDWATER MONITORING.....	4-2
4.3 SURFACE WATER MONITORING.....	4-3
5.0 MAINTENANCE	5-1
5.1 LANDFILL CAPS	5-1
5.2 DIVERSION TRENCH	5-2
5.3 MONITORING WELL NETWORK.....	5-2
5.4 SEDIMENT CONTROL SYSTEM.....	5-2
6.0 REFERENCES.....	6-1

TABLES

Table ES-1	Sites Requiring Land-Use Controls	ES-1
Table ES-2	Sites Requiring Monitoring.....	ES-2
Table ES-3	Sites Requiring Inspections.....	ES-2
Table 1-1	Long-Term Management Required by Site.....	1-9
Table 2-1	Sites Requiring Land-Use Controls	2-2
Table 3-1	Sites Requiring Inspections.....	3-1
Table 4-1	Sites Requiring Monitoring.....	4-1
Table 4-2	Groundwater Monitoring Locations and Analytes.....	4-3
Table 5-1	Sites Potentially Requiring Maintenance	5-1

TABLE OF CONTENTS (Continued)

<u>SECTION</u>		<u>PAGE</u>
FIGURES		
Figure A-1	Northeast Cape Vicinity Map	
Figure A-2	Northeast Cape Management Plan Site Layout	
Figure A-3	Northeast Cape Remedial Actions Site 7 – Cargo Beach Landfill	
Figure A-4	Northeast Cape Site 8, Petroleum, Oil, and Lubricants Spill	
Figure A-5	Northeast Cape Site 9 – Housing, and Operations Landfill	
Figure A-6	Northeast Cape Main Operations Complex Overview	
Figure A-7	Northeast Cape MOC Monitoring Well Locations and Select Sample Results	
Figure A-8	Northeast Cape Site 28 – Drainage and Excavations	
Figure A-9	Northeast Cape Site 3 – Fuel Pump House & Site 4 – Native Fishing and Hunting Camp	

APPENDICES

Appendix A	Figures	
Appendix B	Decision Document Cleanup Levels	
Appendix C	Inspection Checklist	
Appendix D	Public Meeting Notes	
Appendix E	Responses to Comments	

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AAC	Alaska Administrative Code
AC&WS	Aircraft Control and Warning Station
ADEC	Alaska Department of Environmental Conservation
AST	aboveground storage tank
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
DD	decision document
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
FUDS	Formerly Used Defense Site
GRO	gasoline-range organics
IC	institutional control
LPAH	low-molecular weight polycyclic aromatic hydrocarbons
LTMP	Long-Term Management Plan
LUC	land-use control
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
MOC	Main Operations Complex
MWH	Montgomery Watson Harza Americas, Inc.
NFA	No Further Action
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
POL	petroleum, oil, and lubricants
RAO	remedial action objective
RecKey	record key
RI	remedial investigation

ACRONYMS AND ABBREVIATIONS (Continued)

RRO	residual-range organics
SGC	silica gel cleanup
TAH	total aromatic hydrocarbon
TAqH	total aqueous hydrocarbon
USACE	U.S. Army Corps of Engineers
UST	underground storage tank
UU/UE	unlimited use/unrestricted exposure
WACS	White Alice Communications System

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) contracted Jacobs Engineering Group Inc. to prepare a detailed and comprehensive Long-Term Management Plan (LTMP) for the Northeast Cape Formerly Used Defense Site (FUDS) on St. Lawrence Island, Alaska. The purpose of this LTMP is to identify the activities associated with long-term management at Northeast Cape FUDS, including: land-use controls (LUCs), inspections, monitoring, and maintenance.

Remedial investigations conducted at Northeast Cape FUDS between 1994 and 2004 identified environmental concerns at 34 separate sites. Two decision documents (DDs) were signed in June and September of 2009 that identified selected remedies for sites requiring remedial action and sites where no remedial action was planned. Remedial actions were completed in 2014. At the time of this LTMP, remaining remedial action objectives (RAOs) as described in the DDs include monitoring, inspection, reviews, LUCs, and ICs (USACE 2009a,b).

Twenty-one of the 34 Northeast Cape sites require some form of LUC as part of the selected remedy. Deed Notices will be provided through a Notice of Environmental Contamination filed at the State Recorder’s Office. Table ES-1 summarizes the LUCs required for each site.

**Table ES-1
Sites Requiring Land-Use Controls**

Site	LUC Description	Media
7 and 9	Prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.	Soil
1, 3, 6, 9, 10, 11, 13, 15, 19, 27, and 32	Future excavation and movement of soils above state cleanup levels should be managed.	
8	Area should not be used for residential land use without additional investigation and/or cleanup.	Sediment
3, 4, 6, 7, and 9	Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Groundwater
10, 11, 13, 15, 19, and 27 (part of MOC)	Groundwater should not be used as a drinking water source until RAOs are met.	

Note:
For definitions, refer to the Acronyms and Abbreviations section.

Eight of the 34 sites will require ongoing monitoring until RAOs have been met. Monitoring will consist of sample collection to evaluate the concentration of chemicals of concern and establish a data set to evaluate trends over time. Table ES-2 summarizes the monitoring activities for each site.

**Table ES-2
Sites Requiring Monitoring**

Site	Monitoring Description	Media
10, 11, 13, 15, 19, and 27 (part of MOC)	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.	Groundwater
9	Six monitoring events, spaced five years apart, to demonstrate that shallow groundwater meets RAOs for a non-drinking water source ^a .	
8	MNA sampling at five-year intervals for a period of up to 30 years or until RAOs are met.	Sediment

Notes:

^aOne monitoring event was completed in 2014 (USACE 2015a).
For definitions, refer to the Acronyms and Abbreviations section.

Twelve of the 34 Northeast Cape sites require some form of inspection. Inspections may coincide with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) five-year reviews and will consist of an onsite visit and report. Table ES-3 summarizes the inspection activities for each site.

**Table ES-3
Sites Requiring Inspections**

Site	Frequency	Inspection Type
7, 8, 9, 10, 11, 13, 15, 19, 27, and 32	Site inspections will be conducted on a periodic basis until RAOs are met.	Periodic review
21 and 28	Site inspections will be conducted as part of the CERCLA Five-Year Review until RAOs are met.	CERCLA five-year review
7 and 9	Initial periodic (annual) visual monitoring of the capped area for settlement and erosion has been conducted for five years. Additional visual monitoring, as necessary, will be based on the results of previous site inspections, and may occur for up to 30 years. ^a	Landfill cap visual inspection

Note:

^aInitial periodic (annual)visual monitoring for a period of five years has been conducted.
For definitions, refer to the Acronyms and Abbreviations section.

1.0 INTRODUCTION

The primary purpose of this plan is to describe the inspection, monitoring, and maintenance activities associated with long-term management at the Northeast Cape Formerly Used Defense Site (FUDS) and to move the land-use control (LUC) implementation process forward. The U.S. Army Corps of Engineers (USACE) will revise this document if new LUC information results from USACE and landowner coordination discussions, to document changes to LUCs based on the five-year/periodic reviews, and when new site information is identified that could affect the LUCs. Although this document includes summarized site histories and site data, it is not intended to reproduce the level of detail or the context of the cited reports that exist in the Northeast Cape Information Repository.

The USACE contracted Jacobs Engineering Group Inc. to prepare a detailed and comprehensive Long-Term Management Plan (LTMP) for all sites at the Northeast Cape FUDS on St. Lawrence Island, Alaska. Remedial investigations (RIs) conducted at Northeast Cape FUDS between 1994 and 2004 divided environmental concerns among 34 separate sites. Two decision documents (DDs) were signed in June and September of 2009 that identified selected remedies for sites requiring remedial action and sites where no remedial action was planned. The selected remedies for Northeast Cape FUDS were initiated in 2009, and the current status of each site is summarized in Section 1.4.

USACE will be responsible for assuring that the selected remedies remain functional and effective. USACE will retain any liability for any newly discovered contamination proven to be associated with previous military activities at Northeast Cape FUDS. At the time of this LTMP, remedial activities at Northeast Cape FUDS are nearing completion. This LTMP provides a detailed description of all activities required to manage remaining contamination to ensure protection of human health and the environment at some sites within Northeast Cape FUDS, including LUCs, inspections, monitoring, and maintenance. Some sites at Northeast Cape will require a combination of LUCs, monitoring, and inspection. Cleanup levels established in the DDs are included in Appendix B.

This LTMP is a dynamic planning document designed to present an overview of the current and reasonably forecast status of Northeast Cape FUDS. The LTMP will be updated as necessary based on five-year review recommendations. All draft work plans detailing specific objectives proposed to be completed during each mobilization will be submitted to ADEC for review. Periodically, as well as whenever determined necessary, the USACE will review this LTMP to assess the need for revisions. The USACE will submit the revised plan for ADEC review.

1.1 SITE LOCATION AND HISTORY

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 in Appendix A). It is 9 miles west of the northeastern cape of St. Lawrence Island at 63°19'N and 168°58'W. The Northeast Cape property originally encompassed approximately 4,800 acres (7.5 square miles) and is bounded by Kitnagak Bay to the northeast, Kangighsak Point to the northwest, and the Kinipaghulghat Mountains to the south.

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 an Alaskan 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 Northeast Cape site included areas for housing site personnel, power plant facilities, fuel storage tanks and distribution lines, maintenance shops, wastewater treatment facilities, and landfills (USACE 2009a).

The AC&WS and WACS operations were supported by 212 personnel and were terminated in 1969 and 1972, respectively. The majority of military personnel were removed from the site by the end of 1969. The buildings and majority of furnishings and equipment related to the AC&WS were initially abandoned in place due to the high cost of off-island transport (USACE 2009a).

In 1971, the villages of Gambell and Savoonga opted out of the Alaska Native Claims Settlement Act. The Gambell and Savoonga Native Corporations (now known as Sivuqaq, Inc. and Kukulget, Inc., respectively) received ownership of all of St. Lawrence Island (except U.S. Surveys 4235, 4237, 4340, 4369, 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. (USACE 2009a).

1.1.1 History of Contamination

The primary sources of petroleum contamination at Northeast Cape FUDS are attributed to spills and leaks of fuel products associated with aboveground storage tanks (ASTs), underground storage tanks (USTs), and associated piping. Other primary sources of non-petroleum contamination include electrical transformers, waste stored in 55-gallon drums, batteries, and organic chemicals from paint, solvents, and other miscellaneous facility activities. Four RIs were conducted at Northeast Cape FUDS between 1994 and 2004, during which time the environmental concerns at Northeast Cape were divided among 34 individual sites. Several removal actions have been conducted at some of the Northeast Cape sites. 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 (USACE 2009a).

A brief history and summary of the current conditions at each site is provided in Section 1.4. A detailed history for each site is available at three information repositories: Sivuqaq Lodge in Gambell, Savoonga City Hall in Savoonga, and Alaska Resource Library and Information Services in Anchorage.

1.2 SITE DESCRIPTION

The Northeast Cape FUDS project numbers are F10AK0969-03 and F10AK0969-05. The Alaska Department of Environmental Conservation (ADEC) contaminated sites record key (RecKey) number for the overall Northeast Cape FUDS is 198532X917901. Individual sites

within Northeast Cape FUDS are also tracked with separate RecKey numbers. The U.S. Environmental Protection Agency (EPA) site identification number is AK9799F2999. Northeast Cape FUDS is not listed on the National Priorities List.

1.2.1 Physical Characteristics

Northeast Cape FUDS consists mainly of rolling tundra, rising 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 mean sea level, roughly 3 miles from the coastline. Northeast Cape FUDS is not connected via road to the other permanent communities on the island and is only accessible by air, water, or all-terrain vehicle trails. The Native Village of Savoonga, the community closest to the Northeast Cape FUDS, 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 and 51 degrees Fahrenheit (°F) and winter temperatures average between -7 and 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.

1.2.2 Geology

As presented in the DDs (USACE 2009a,b), St. Lawrence Island consists of isolated bedrock highlands of igneous, metamorphic, and older sedimentary rocks surrounded by unconsolidated surficial deposits that overlie a relatively shallow erosional bedrock surface. The main area of operation at the site, 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 Northeast Cape FUDS, which includes Kangukhsam Mountain. The Suqitughneq River drainage in the Kinipaghulghat Pluton has created an erosional valley and an alluvial fan of unconsolidated sediments. 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, overlaying more sand-dominated soils at depth. The silt contains varying quantities of clay/sand/gravel, and varies from 0 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 range from 2 feet to greater than 20 feet in thickness. These deeper, coarse-grained materials are generally unsorted and are likely to be of glaciofluvial origin. The depth to bedrock at Northeast Cape FUDS is unknown (USACE 2009a,b).

1.2.3 Hydrogeology

Regional groundwater data on St. Lawrence Island are scarce (Montgomery Watson Harza Americas, Inc. [MWH] 2003). Bedrock materials south of the site (and underlying the unconsolidated deposits) are not expected to store and transmit significant quantities of groundwater. Typically, these types of granitic rocks are impermeable and transmit groundwater only through localized fractures and weathered soil zones at the surface. However, historical reports concerning water supply wells suggest that this deep, fractured bedrock aquifer supplied sufficient water to sustain the installation during operation (MWH 2003). Multiple production wells accompanied by storage tanks were used to supply the installation during its operation, and were drilled to depths of 50 to 70 feet into a fractured bedrock aquifer. The use of multiple water supply wells may indicate that groundwater availability was inconsistent and variable throughout the aquifer during different times of the year. There are insufficient data to determine the aquifer's extent across the site (MWH 2003).

The primary potential aquifer at Northeast Cape FUDS is the unconsolidated alluvial material that underlies the area. Regions where blocks of the bedrock are breaking off to form the talus fields that flank the Kinipaghulghat Mountains are likely capable of transmitting large

volumes of groundwater (MWH 2003). The mountainous area to the south of the former installation provides an ideal recharge area for these unconsolidated materials, providing runoff from rain and snowmelt during the summer that permeates the broken bedrock and alluvial and glacial deposits. Based on the topography and geology of the site, the regional groundwater flow direction is expected to be from the mountainous recharge area south of the site, flowing north and eventually discharging to the Bering Sea (MWH 2003).

The shallow groundwater encountered across the MOC (and across the former installation) likely consists of seasonally thawed water that is both spatially and temporally intermittent (MWH 2003). Groundwater elevations observed in monitoring wells at the MOC in 2013 ranged from approximately 60 to 71 feet above mean sea level and exhibited depths ranging from approximately 5 to 39 feet below ground surface (bgs), indicating a groundwater flow to the northwest (USACE 2014b). Water depths at the MOC are greatest to the south and become shallower progressing north to the Site 28 drainage basin. Key factors influencing the flow of groundwater at the site are the permafrost and frozen soils, which render the unconsolidated materials effectively impermeable in some areas (MWH 2003). The base of permafrost on the mainland at Nome (135 air miles northeast) is estimated at a depth of 120 feet. Although the depth of permafrost is variable, the U.S. Geological Survey has classified St. Lawrence Island as an area of moderately thick to thin permafrost (Ferrians 1965). Frozen soils have an effect in retarding groundwater flow throughout most of the year. The insulating effects of thick tundra vegetation have created a relatively shallow (2 to 4 feet bgs) active layer where water is only seasonally present primarily during summer months. Near the Bering Sea, depth to top of permafrost has been measured from 5 to 10 feet bgs (USACE 2007) and in areas of thin soil and exposed cobbles, the active layer appears to be significantly deeper and permafrost may be discontinuous (USACE 2009a). The deeper, unconsolidated soil deposits at the site are probably permanently frozen, and the shallow soils represent the active layer where soils thaw, primarily during summer months.

In addition to the Bering Sea north of the Northeast Cape facility, surface water near the work area consists of small streams, small- to moderate-sized lakes, and marshy areas (MWH 2003). Surface water generally flows northward from the more southerly highland

areas of the Kinipaghulghat Mountains. Small surface water bodies are common throughout the area. The primary stream drainage in the area, the Suqitughneq River, is fed by runoff from the Kinipaghulghat Mountain valley in the lower mountain area, south of the former installation. Several smaller tributaries, originating from two small, unnamed lakes feed this stream drainage as it flows north to Kitnagak Point (MWH 2003).

1.2.4 Land and Resource Use

St. Lawrence Island residents from the villages of Gambell and Savoonga engage in year-round subsistence fishing, hunting, and gathering in the Northeast Cape FUDS area. Local subsistence cabins are located adjacent to Site 3 and are occupied seasonally. Currently, there are no permanent residents in 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. Surface water from the Kanguksam Mountain spring is used by seasonal visitors to the site.

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 the Steller sea lion (endangered). Walrus are also 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, which is located within Northeast Cape FUDS, is used for subsistence fishing. The ocean surrounding Northeast Cape FUDS is used extensively for fishing and subsistence activities, including hunting of whale, walrus, seal, and sea birds.

1.2.5 Existing Utilities, Infrastructure, and Logistical Considerations

The remote nature of Northeast Cape FUDS presents significant logistical challenges that need to be considered when planning future monitoring, inspection, and potential maintenance activities. The logistical challenges include limited transportation options, no existing onsite utilities or infrastructure, and highly variable weather conditions.

Commercial air travel to Northeast Cape is nonexistent and the only viable transportation options to the site are limited to chartered aircraft flights. Chartered air transportation originating in Nome or Anchorage, Alaska, may be available as long as the runway is serviceable. Air transportation to Northeast Cape will likely cease in the future as the unmaintained runway deteriorates over time. The gravel runway at Northeast Cape is located approximately 0.75 miles from the former MOC sites. No ground transportation is available at Northeast Cape unless it is brought to the site.

There are no utilities, buildings, cellular phone service, or other infrastructure at Northeast Cape. The only shelters in the area consist of small subsistence cabins located approximately 1.5 miles east of the runway.

The subarctic climate described in Section 1.2.1 typically limits field activities to the summer months (June, July, and August). Although conducting fieldwork in September is possible, poor weather that could affect air transportation, such as heavy rain, low visibility, and high winds, are more likely to occur in the fall. Fieldwork performed in support of the RI and remedial actions for the 2009-2014 field seasons typically involved mobilizing to the site in late June and/or early July, continuing work through September, and demobilizing through the month of September and sometimes into early October.

1.3 LONG-TERM MANAGEMENT SUMMARY

Long-term management is required to manage remaining contamination and ensure protection of human health and the environment at Northeast Cape FUDS. Table 1-1 provides a summary of the type of management required for each site described in this LTMP.

**Table 1-1
Long-Term Management Required by Site**

Site	Site Name	Media	DD-Identified Contaminant	Long-Term Management	LUC Description	Frequency	Duration	Notes	
3	Fuel Pump House	Soil/sediment	DRO, RRO	None	-	-	-	-	
		Groundwater	DRO, RRO	LUC	Deed Notice: Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Deed Notice will be filed as part of remedy construction.	-	-	
6	Drum Field	Soil	DRO	None	-	-	-	-	
		Groundwater	Arsenic, barium, cadmium, lead, nickel, zinc	LUC	Deed Notice: Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Deed Notice will be filed as part of remedy construction.	-	-	
7	Cargo Beach Road Landfill	Groundwater	RRO, chromium, lead, nickel	LUC	Deed Notice: Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Deed Notice will be filed as part of remedy construction.	-	-	
		Soil	DRO, arsenic, chromium, lead	None	-	-	-	-	
		Sediment	Chromium, PCBs	None	-	-	-	-	
		Landfill cap	-	LUC	Deed Notice: Prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.	Deed Notice will be filed as part of remedy construction.	-	Initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted for five years and completed in 2015. Additional visual monitoring will be conducted periodically for up to 30 years as deemed necessary based on the results of previous site inspections.	In 2014, minor maintenance was conducted. Initial periodic (annual) visual monitoring for five years completed in 2015.
				Periodic review	-	Periodic	-		
				Landfill cap visual inspection	-		-		
Maintenance	-	As needed based on periodic review	As needed based on periodic review	-					
8	POL Spill	Sediment	DRO	LUC	Deed Notice: Area should not be used for residential land use without additional investigation and/ or cleanup.	Deed Notice will be filed as part of remedy construction.	-	LUCs will be implemented by conducting additional sediment sampling to delineate the location and extent of residual sediment contamination, providing a 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.	
				Monitoring	-	Five-year intervals	30 years or until RAOs are met	The initial monitoring period of three years was completed in 2010, 2011, and 2012. The periodic review completed in 2014 determined additional monitoring was necessary.	
				Periodic review	-	Five-year intervals	Until RAOs are met	Any change in land use will trigger a review.	

**Table 1-1
Long-Term Management Required by Site (Continued)**

Site	Site Name	Media	DD-Identified Contaminant	Long-Term Management	LUC Description	Frequency	Duration	Notes
9	Housing and Operations Landfill	Groundwater	DRO, RRO, lead	LUC	Deed Notice: Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Deed Notice will be filed as part of remedy construction.	-	A Deed Notice will be prepared to document the debris site capped boundaries, including a detailed map of the site, and provide information to the landowner that the shallow groundwater is not a reasonable potential future drinking water source.
				Monitoring	-	Five-year intervals	Six monitoring events over 30 years	Collect surface water to demonstrate that shallow groundwater meets RAOs for a non-drinking water source. First of six planned monitoring events at five-year intervals was conducted in 2013.
		Surface water	None	Monitoring	-	Not specified	Three monitoring events	Verify COCs in shallow groundwater are not migrating downgradient and impacting surface waters. Third and final monitoring event was conducted in 2015.
		Landfill cap	-	LUC	Deed Notice: Prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.	Deed Notice will be filed as part of remedy construction.	-	-
				Landfill cap visual inspection	-	Periodic	Initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted for five years and completed in 2015. Additional visual monitoring will be conducted periodically for up to 30 years as deemed necessary based on the results of previous site inspections.	Initial periodic (annual) visual monitoring for five years completed in 2015.
				Maintenance	-	As needed based on landfill cap visual inspection	As needed based on Landfill cap visual inspection	-
				Landfill cap/ groundwater/ surface water	-	Periodic review	Periodic	Periodic reviews will be performed until LUCs are implemented and all monitoring events and visual inspections have been completed.
10	Buried Drums	Soil	DRO	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Maintenance	-	As needed based on periodic review	As needed based on periodic review	Monitoring wells may require maintenance over time.
				Periodic review	-	Periodic	Until RAOs are met.	-

**Table 1-1
Long-Term Management Required by Site (Continued)**

Site	Site Name	Media	DD-Identified Contaminant	Long-Term Management	LUC Description	Frequency	Duration	Notes
11	Fuel Tanks	Soil	DRO	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Maintenance	-	As needed based on periodic review	As needed based on periodic review	Monitoring wells may require maintenance over time.
				Periodic review	-	Periodic	Until RAOs are met	-
13	Heat and Power Plant	Soil	DRO, PCB	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Maintenance	-	As needed based on periodic review	As needed based on periodic review	Monitoring wells may require maintenance over time.
				Periodic review	-	Periodic	Until RAOs are met	After RAOs for PCBs are met, this site will transition from the CERCLA review process to periodic review.
15	Fuel Pipeline	Soil	DRO	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Periodic review	-	Periodic	Until RAOs are met	-

**Table 1-1
Long-Term Management Required by Site (Continued)**

Site	Site Name	Media	DD-Identified Contaminant	Long-Term Management	LUC Description	Frequency	Duration	Notes
19	Auto Maintenance	Soil	DRO	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Maintenance	-	As needed based on periodic review.	As needed based on periodic review	-
				Periodic review	-	Periodic	Until RAOs are met	-
21	Wastewater Tank	Soil	Arsenic, PCBs	CERCLA five-year review	-	Five-year intervals	Until RAOs are met	-
27	Diesel Fuel Pump	Soil	DRO, naphthalene	None	-	-	-	-
		Groundwater	DRO, RRO, GRO, benzene ^a	LUC	Deed Notice: Groundwater should not be used as a drinking water source until RAOs are met.	Deed Notice will be filed as part of remedy construction.	-	-
				Monitoring	-	MNA sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals.	Until RAOs are met	-
				Maintenance	-	As needed based on periodic review	As needed based on periodic review	-
				Periodic review	-	Periodic	Until RAOs are met	-
28	Drainage Basin	Sediment	DRO, RRO, PCBs, chromium, lead, zinc, PAHs	None	-	-	-	-
				CERCLA five-year review	-	Periodic	Until RAOs are met	-
		Existing, natural sedimentation ponds	NA	None	-	-	-	-
30	Site-Wide	NA	NA	NA	-	-	-	-
32	Lower Tramway	Soil	DRO	Periodic review	-	Periodic	Until RAOs are met	Soil removal completed in 2014. Site will be reviewed as part of the next five-year review.

Notes:

The following sites are considered NFA by USACE at the time of this LTMP and are not listed in the above table: 1; 2; 4; 5; 12; 14; 16; 17; 18; 20; 22; 23; 24; 25; 26; 29; 31; 33; and 34.

^a Groundwater is monitored throughout the MOC and surrounding area and exceeded the cleanup level in some locations, but not necessarily in a well historically associated with this site.

- = Not Applicable

For definitions, refer to the Acronyms and Abbreviations section.

1.4 INDIVIDUAL SITE DESCRIPTIONS

This section provides a brief review of the 34 sites at the Northeast Cape FUDS and any required long-term management.

1.4.1 Site 1 – Airstrip

Site 1, the airstrip, is located on a low, flat ridge parallel to the lower Suqitughneq River drainage (Figure A-2). An area near the airstrip was reportedly used as a burn pit or for fire training; however, historical sampling has not revealed chemicals of concern (COCs) that would suggest these activities. Diesel-range organics (DRO) were identified in site soil but did not exceed the site-specific cleanup level (USACE 2009a). Two locations were identified as having residual-range organics (RRO) at concentrations that exceeded the site-specific cleanup level for soil with a maximum concentration of 19,300 milligrams per kilogram (mg/kg) in 2004 (USACE 2009a). The selected remedy of excavation with disposal or treatment was initiated and completed in 2010. The maximum concentration of RRO following remedy implementation was 4,200 mg/kg, which did not exceed the site-specific cleanup level (USACE 2011).

Long-Term Management

- Petroleum contaminated soil with concentrations above the site-specific cleanup level were removed and no long-term management is required at Site 1.

1.4.2 Site 2 – Airport Terminal and Landing Strip

Site 2, the airport terminal and landing strip, historically consisted of an operations/control tower, a transformer shed, and the gravel apron pad located at the northeast end of the airstrip along the southeast portion of the gravel surface (Figure A-2). Transformers were removed from the site in 1995 and soil samples were collected in 1994 and 1998. DRO and RRO did not exceed site-specific cleanup levels (USACE 2009a). An AST identified at the southeast corner of the tower building was removed in 2000. The terminal building and other miscellaneous debris were removed in 2003 (USACE 2009a).

Site 2 met risk-based cleanup levels and was determined to be No Further Action (NFA) in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 2.

1.4.3 Site 3 – Fuel Pump House

Site 3, the fuel pump house, is located just south of Cargo Beach on Kitnagak Bay, immediately adjacent to local subsistence cabins. It is occupied seasonally by individuals from Savoonga and Gambell (Figure A-9). Site 3 was historically used to transfer diesel fuel across Northeast Cape FUDS to the bulk storage facilities (Site 11) via a 4-inch welded fuel pipeline (USACE 2009a).

Soil/Sediment

Soil and sediment samples were collected in 1994 and 2001. In 2001, a total of 14 tons of petroleum-contaminated soil was removed from the former fuel pump house gravel pad and from the location of a former AST west of Cargo Beach Road (USACE 2009a). Additional sampling was conducted in 2004 and DRO was identified in gravel soil at concentrations up to 20,500 mg/kg (USACE 2009a). In sediment, DRO and RRO were identified at concentrations up to 3,720 mg/kg and 38,500 mg/kg, respectively.

The selected remedy was excavation with disposal or treatment of petroleum-contaminated soil. Upon completion of the remedy, sediment was re-sampled at Site 3 in 2010 to evaluate biogenic interference using silica gel cleanup (SGC) and as an additional line of evidence indicating that remaining soil and sediment met site-specific cleanup levels. The maximum concentration following SGC in soil for DRO and RRO in 2010 was 3,400 mg/kg and 2,300 mg/kg, respectively. Following SGC in sediment, the maximum concentration DRO and RRO in 2010 was 300 mg/kg and 2,100 mg/kg, respectively. Concentrations of petroleum-related contaminants in soil and sediment at Site 3 are below site-specific cleanup levels when evaluated after SGC (USACE 2011).

Groundwater

The maximum concentrations of DRO and RRO detected in groundwater at Site 3 at the time of the DD were 14.0 milligrams per liter (mg/L) and 8.1 mg/L, respectively (USACE 2009a). Groundwater remediation was not included as part of the selected remedy for Site 3 because groundwater at the site is not considered a current or reasonably expected future drinking water source (USACE 2009a).

Long-Term Management

- An LUC is required at Site 3 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.

1.4.4 Site 4 – Native Fishing and Hunting Camp

Site 4 includes a native fishing and hunting camp located southwest of the Cargo Beach barge landing area (Figure A-9). The site includes a wood frame structure originally constructed as housing for the native civilian employees of the base (USACE 2009a). Three structures are currently used on a seasonal basis by local residents. Former sources of contamination at the site include abandoned vehicles and drums (USACE 2009a). Additional work performed at Site 4 under the Native American Lands Environmental Mitigation Program, which is separate from the FUDS Program, is not described in this LTMP.

Soil

The debris, drums, and stained soils were removed from Site 4 in 2000-2001. Approximately 1.21 tons of petroleum-contaminated soil were excavated and disposed of offsite (USACE 2009a). The maximum concentration of DRO remaining onsite is 6,950 mg/kg, which does not exceed site-specific cleanup levels (USACE 2009a).

Groundwater

Shallow groundwater samples collected in 1998 detected DRO and RRO at concentrations of 3.7 and 6.5 mg/L, respectively. In 2001, three well points were installed to the maximum

depth feasible between 3 and 6 feet bgs. Sampling in 2001 detected DRO and RRO at concentrations up to 2.0 and 6.5 mg/L, respectively (USACE 2009a). All 2001 DRO results were qualified because the analyte was also detected in the associated method blank, indicating possible false-positive results (USACE 2009a). Groundwater remediation was not included in the selected remedy for Site 4 because the shallow groundwater present in the tundra surrounding the site is not considered a current or reasonably expected future drinking water source (USACE 2009a).

Because there is de minimis quantity of impacted soils, no unacceptable risk to human health or the environment, and shallow tundra groundwater not a potential future drinking water source, Site 4 meets risk-based cleanup levels. Site 4 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 4 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.

1.4.5 Site 5 – Cargo Beach

Site 5, the Cargo Beach area, is located immediately north of the hunting and fishing camp and extends west and east from Cargo Beach Road (Figure A-2). This area was used for barge offloading operations (USACE 2009a). During the 2003 and 2005 field seasons, exposed debris was removed from the site. A total of 26 tons of inert waste were transported off-island for disposal in 2003 (USACE 2009a). Additional piles of miscellaneous debris and scrap metal were removed in 2005. Chemical contamination has not been detected at this site (USACE 2009a). *MULTI INCREMENT*¹ soil samples were collected and analyzed for COPCs to confirm that materials staged at the site did not contribute contamination to Site 5 (USACE 2013a, 2015a). Sampling conducted in 2012 indicated that DRO and PCBs were below site-specific cleanup levels (USACE 2013a) while sampling conducted in 2014

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

indicated that DRO, GRO, RRO, and BTEX were below site-specific cleanup levels (USACE 2015a).

Site 5 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 5.

1.4.6 Site 6 – Cargo Beach Road Drum Field

Site 6, also known as the gravel pad, consists of a gravel pad and is located west of Cargo Beach Road, approximately 0.6 miles south of Site 3 and north of Site 7 (Figure A-2). During facility operation, Site 6 was used to dispose of empty drums once containing petroleum, oil, and lubricants (POL) products.

Soil

The selected remedy of excavation with disposal or treatment of petroleum-contaminated soil was initiated and completed in 2010 (USACE 2011). Following 2010 fieldwork, the maximum concentration of DRO in soil remaining onsite is 3,300 mg/kg, which does not exceed site-specific cleanup levels (USACE 2011).

The 2014 Five-Year Review conducted at Site 6 deferred a protectiveness determination due to an unexplained single polychlorinated biphenyl (PCB) sample result from 2009 containing a concentration of 2.2 mg/kg (USACE 2015b). Additional sampling was conducted in 2014 at Site 6 in the area of the historical exceedance. PCBs were not detected (USACE 2015a).

Groundwater

At the time of the DD, arsenic, barium, cadmium, chromium, lead, nickel, and zinc were identified as exceeding ADEC Table C cleanup levels (USACE 2009a). Groundwater remediation was not included in the selected remedy because the shallow groundwater present

in the tundra surrounding the site is not considered a current or reasonably expected future drinking water source (USACE 2009a).

Long-Term Management

- An LUC is required at Site 6 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.

1.4.7 Site 7 – Cargo Beach Road Landfill

The Site 7 Cargo Beach Road landfill is an unpermitted landfill that was used as the installation's primary solid waste disposal area from 1965 until closure in 1974 (Figures A-2 and A-3). The landfill appears to have been created by dumping debris off the sides of a topographic mound. The debris was then covered by grading soil out from the top of the mound.

Soil/Sediment

At the time of the DD, DRO, arsenic, chromium, and lead were identified in soil at concentrations that exceeded the site-specific cleanup levels. In sediment, chromium and PCBs were identified at concentrations that exceeded the site-specific cleanup level (USACE 2009a).

The selected remedy for Site 7 was initiated in 2009. Metallic anomalies identified by geophysical investigation in 2007 were located by survey and re-investigated. The top 1 foot of soil was uncovered to locate drums within the shallow subsurface. Excavation efforts encountered and disposed of approximately 201 pounds of PCB-containing light ballasts, 350 pounds of lead batteries, 4,100 pounds of lead debris, and approximately 10 gallons of antifreeze. Approximately 2,150 gallons of contents recovered from drums and 100 tons of petroleum-stained soil were containerized and shipped offsite for disposal. A landfill gravel cap was constructed to a depth of 2 feet using material from an on-island borrow source south of Site 31. The cap was graded to promote surface runoff and prevent erosion. Locations

where debris was not encountered are noted as potentially having less than a 2-foot cap in order to maintain grade (USACE 2010).

Groundwater

At the time of the DD, RRO, chromium, lead, and nickel were identified as exceeding ADEC Table C cleanup levels (USACE 2009a). Groundwater remediation was not included in the selected remedy because the shallow groundwater present in the tundra surrounding the site is not considered a current or reasonably expected future drinking water source (USACE 2009a).

Long-Term Management

- An LUC is required at Site 7 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonably expected potential drinking water source due to its limited availability and quantity. An additional LUC is required at Site 7 to inform landowners to prevent future building construction or excavation that could disturb the cap or occur within the immediate vicinity of the site.
- Periodic reviews and landfill cap visual inspections are required. For five years, initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted. Recommendations made in the *First Periodic Review Report, Site 7 Cargo Beach Road Landfill* (USACE 2015c) include conducting an additional periodic review to evaluate remedy implementation and make recommendations regarding future periodic reviews. Additional visual monitoring will be conducted periodically for up to 30 years, as deemed necessary based on the results of previous visual inspections. Maintenance of the landfill cap will be performed if deemed necessary based on previous visual inspections.

The initial three years of annual visual monitoring were completed in 2011 through 2013. In 2014, maintenance was conducted to remove debris protruding from the surface of the cap and to fill select areas that exhibited minor surface subsidence (USACE 2015a). The fifth periodic visual monitoring event was performed in 2015. The First Periodic Review Report for Site 7 recommended an additional periodic review of Site 7 with a milestone date of 2019 (USACE 2015c). The upcoming periodic review scoping process will identify the path forward for any necessary sampling to evaluate remedy performance.

1.4.8 Site 8 – Petroleum, Oil, and Lubricants Spill

Site 8 (POL spill), also known as the pipeline break site, is located southwest of the intersection of Cargo Beach Road and 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 2009a).

Sediment

The remedy selected—monitored natural attenuation (MNA) of petroleum-contaminated sediment for a period of three years—was initiated in 2010 (USACE 2011). Three decision units were created based on field observations and the approximate location of the pipeline break. In 2010, 2011, and 2012, composited primary sediment samples were collected from each decision unit, and a composite duplicate sediment sample was collected from one decision unit to establish site trends and possibly degradation rates. During each monitoring event, primary and duplicate sediment samples were composited from eight different locations within each decision unit. MNA sampling conducted in 2011 and 2012 indicated the maximum concentrations of DRO and 2-methylnaphthalene in sediment as 8,500 mg/kg and 7.6 mg/kg, respectively. Figure A-4 presents the locations of composited samples for each decision unit by year.

The first five-year review conducted at Site 8 in 2014 indicated that composite sampling conducted in 2010, 2011, and 2012 may have underestimated the level of contamination in sediment due to the limited number of subsamples collected per decision unit and potential bias introduced by composite sampling (USACE 2015b). An incremental sampling approach using ADEC-recommended subsampling procedures was recommended for continued monitoring of remedy performance.

Surface Water

In 2014, additional sampling of surface water occurred at Site 8. Two primary surface water samples were collected from the same locations as 2012 surface water samples at the middle and lower decision units. The primary sample and field duplicate sample from the middle decision unit exhibited total aqueous hydrocarbon (TAqH) levels of 0.0193 mg/L and 0.0329 mg/L, respectively. The TAqH levels exceeded the site-specific level of 0.015 mg/L identified in the 2009 DD (USACE 2009a). The TAqH levels in the primary sample from the lower decision unit and closest to the Suqitughneq River did not exceed the site-specific level. No surface water sheen was observed at either location at the time of sample collection.

Long-Term Management

- MNA of petroleum-contaminated sediment is required at five-year intervals for 30 years, or until RAOs are met.
- An LUC is required at Site 8 in the form of a Deed Notice to inform landowners that the area should not be used for residential land use without additional investigation and/or cleanup.
- Periodic reviews are required at Site 8 at five-year intervals until RAOs are met. In addition, any change in land use will trigger a review.

1.4.9 Site 9 – Housing and Operations Landfill

The Site 9 housing and operations landfill is located approximately 500 feet northeast of the MOC in a marshy area east of Cargo Beach Road (Figure A-5). 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.

Soil

The maximum concentrations of DRO and arsenic in soil at the time of the DD were 375 mg/kg and 30 mg/kg, respectively, which do not exceed site-specific cleanup levels (USACE 2009a). The selected remedy of removing remaining submerged debris in active stream channels and installing a 2-foot minimum thickness landfill gravel cap was initiated in

2010 (USACE 2011). 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. The landfill cap and diversion trench were completed in 2010 (USACE 2011).

Groundwater

DRO, RRO, and lead have previously been detected in shallow groundwater above ADEC Table C cleanup levels at Site 9 (USACE 2009a). Shallow groundwater at Site 9 was not considered a current or reasonably expected future drinking water source in the DD (USACE 2009a).

Surface Water

At the time of the DD, surface water samples collected from ephemeral ponds surrounding Site 9 did not contain lead at concentrations that exceeded drinking water criteria. In 2001, no other contaminants were detected above applicable cleanup levels in downgradient surface water within the landfill (USACE 2009a).

Long-Term Management

- An LUC is required at Site 9 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water. An additional LUC is required at Site 9 to inform landowners to prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.
- Periodic reviews and landfill cap visual inspections are required. For five years, initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted. As part of the First Periodic Review Report (USACE 2015b), continuing to monitor the landfill cap for erosion at Site 9 on a five-year basis, for up to 30 years, was deemed necessary based on the results of previous site inspections. Maintenance of the landfill cap will be performed if deemed necessary based on previous visual inspections.
- Six monitoring events are required at five-year intervals to demonstrate that shallow groundwater meets RAOs for a non-drinking water source. The requirements set forth in the DD will be met by the collection of surface water at the three 2013 surface water sampling locations shown on Figure A-5.

The initial five periodic visual monitoring events are complete; the fifth periodic visual monitoring event was completed in 2015. The first groundwater monitoring event was conducted in 2013. The three surface water monitoring events are complete; the third monitoring event was completed in 2015.

1.4.10 Sites 10 through 20, 22, 26, and 27 – Main Operations Complex

The MOC at the Northeast Cape installation comprises Sites 10 through 20, 22, 26, and 27 and encompasses what was previously the majority of the site infrastructure, including buildings, heat and power supply, fuel storage tanks, maintenance, and housing quarters (Figures A-2 and A-6). RIs were conducted at the MOC in 1994, 1996, 1998, 2001, 2002, and 2004 and are summarized in the DD (USACE 2009a). Sampling results indicated that soil and groundwater contained petroleum compounds at elevated levels.

In 2010, the selected remedy of chemical oxidation at primarily petroleum-contaminated sites (Sites 10, 11, 13, 15, 19, and 27) was determined to be ineffective at the MOC and, in order to implement the contingent remedy of excavation, soil contamination was further delineated through direct-sensing Ultraviolet Optical Screening Tool technology in 2010 (USACE 2011). The areas corresponding to DRO concentrations of 9,200 mg/kg or greater were used to map plume locations and to guide subsequent soil excavations to the extent practicable. Excavation of contaminated soil at the MOC is described by site in subsequent sections of this LTMP. PCB-contaminated soil was completely removed from Site 13 within the MOC. Sidewall soil confirmation sample locations with DRO remaining above the cleanup level were left in place in areas where diesel-contaminated soil excavations at the MOC bounded the wetland in Site 28. Excavations were backfilled with soil confirmed to be suitable for use as backfill. Backfill was then track-compacted using heavy equipment tracks (dozer) and buckets (excavator). The USACE considers soil removal at the MOC complete (USACE 2015a).

MOC Groundwater

Shallow groundwater was identified at the time of the DD as being contaminated throughout the northeast portion of the MOC, over an area of approximately 175,000 square feet. The

primary COCs are DRO, gasoline-range organics (GRO), RRO, benzene, and naphthalene (USACE 2009a). No measureable free product was observed in the monitoring wells during the various phases of the RI (USACE 2009a). The selected remedy for groundwater at Sites 10 through 20, 22, 26, and 27 included an LUC in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met (USACE 2009a).

In addition, as part of the contingency remedy for the MOC, MNA of groundwater was selected for Sites 10, 11, 13, 15, 19, and 27. MNA of groundwater at the MOC began in 2010 and is currently ongoing. DRO, RRO, benzene, arsenic, and lead in groundwater samples have exceeded groundwater cleanup levels in samples collected from at least one MOC monitoring well over the five-year monitoring period. The contaminant concentrations have not all exhibited the same trends over time. In general, concentrations of DRO and RRO have decreased in samples collected from wells MW88-4, MW88-5, and MW88-10 since 2002, but benzene concentrations have varied. The higher groundwater elevation in 2011 appeared to influence the benzene results, but there are too few data points to determine a correlation. In a sample collected in 2012 from well MW88-1, the concentration of DRO exceeded the cleanup level for the first time since monitoring began in 2002 but was significantly below the cleanup level in 2013. The source of the DRO single exceedance in samples collected from well MW88-1 is unclear. Arsenic exceeded the groundwater cleanup level in samples collected from only well MW88-4.

In 2014, changes were made to the monitoring well network to continue groundwater monitoring. Seven new wells were added, two wells were decommissioned, and one well was redeveloped. The MOC monitoring well network is now comprised of 15 monitoring wells. All 15 wells were sampled in 2015 following the well network updates (Figure A-7). DRO exceeded site-specific cleanup levels in samples collected from four of the MOC wells primarily in the area downgradient of the former ASTs. Although total lead exceeded site-specific cleanup levels in turbid samples from two wells, the filtered samples representative of dissolved lead did not exceed site-specific cleanup levels at these wells (USACE 2015a).

1.4.11 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-6). The gravel pad at Site 10 extends westward and drops off approximately 8 feet into a shallow wetland basin (Site 28) at the base of an embankment. The site was reportedly used as a storage area for drums containing a variety of petroleum products (USACE 2009a). At the time of the DD, DRO was identified in surface soil at Site 10 at concentrations that exceeded site-specific cleanup levels.

Soil

The contingency remedy of excavating petroleum-contaminated soil was initiated at Site 10 in 2011 and continued through 2014 (USACE 2012, 2013a, 2014c, 2015a). During the 2011 excavation, approximately 10 buried 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, additional drums containing liquids (new and used oil, oil/water mixtures, tar, diesel fuel, ethylene glycol, and alcohols) were recovered from the site and 59.4 tons of soil were excavated (USACE 2013b). In 2013, four excavations were opened to address the 2012 locations where concentrations of arsenic, ethylene glycol, tetrachloroethylene, and DRO in soil samples exceeded cleanup levels. Subsequent excavation efforts were successful in removing 290.49 tons of contaminated soil to concentrations below cleanup levels or evaluation criteria in 2013. One excavation opened to address ethylene glycol and tetrachloroethylene exceedances was terminated at bedrock per concurrence with USACE and ADEC (USACE 2014c). In 2014, additional excavation occurred at the locations of historical surface soil sample exceedances for DRO. During excavation activities, five drums were unearthed that contained approximately 20 gallons of a tar-like liquid. Stained soil was found in proximity to the drums. The excavation was successively expanded based on confirmation sampling over the course of the field effort and 265.6 tons of soil were removed in 2014. A total of 615.49 tons of contaminated soil were removed from Site 10. At the conclusion of the field season, final confirmation samples were collected. All confirmation samples were below the cleanup levels with the exception of one sidewall sample that contained 0.110 mg/kg of 1,1-dichloroethene. This residual

1,1-dichloroethene contamination remains in place (USACE 2015a). The excavation was backfilled with material from the onsite borrow area located on Kangukhsam Mountain.

Groundwater

Site 10 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.
- An LUC is required at Site 10 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.
- Maintenance of monitoring wells will be conducted, as needed, based on periodic reviews.

1.4.12 Site 11 – Fuel Tanks

Site 11 historically included three large ASTs located between the perimeter access road and Site 10 (Figure A-6). The tanks were on a constructed gravel pad that transitions to a 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 2009a).

Soil

At the time of the DD, visibly stained soil was present within the footprint of each dismantled fuel storage tank. The circular pads measured approximately 50 feet in diameter. The total depth of contamination was unknown (USACE 2009a). Adjacent soil borings, located outside the tank footprints contained DRO at concentrations up to 22,000 mg/kg at 11.5 feet bgs (USACE 2009a). Immediately downgradient of the tank footprints, DRO was detected in surface soils up to 69,100 mg/kg (USACE 2009a).

The contingency remedy of excavating petroleum-contaminated soil was initiated in 2011 (USACE 2012). 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, and the staining was suspected to be a result of the material coating the outside of the tanks. Excavations associated with Site 10 (adjacent) subsequently extended into Site 11.

The 2011 excavation extended to 2 feet below the groundwater, which was encountered at approximately 8 feet bgs (USACE 2012). In order to avoid the transport of material into the Site 28 wetland, a silt fence was erected at the northern boundary of the excavation. The excavation was guided by field screening results; when these results indicated the boundary had been reached, excavation confirmation samples were collected. Five confirmation sidewall samples from the northern boundary exceeded the site-specific cleanup level for DRO with results ranging from 9,200 to 29,000 mg/kg. The maximum RRO result was 800 mg/kg, which did not exceed the cleanup level (USACE 2012). The northern boundary of Site 11 is adjacent to and extends into the Site 28 wetland. No further excavation is planned.

Excavation of petroleum-contaminated soil continued in 2013. Following the removal of overburden to depths of 5 to 10 feet bgs, the excavation was extended to 9 to 15 feet bgs. Groundwater infiltrated the open excavation and eventually filled the excavation to 2 feet bgs limiting further excavation. A total of 13 sidewall samples were collected above the static water line and two floor samples were collected. One sidewall sample along the northern boundary of the excavation and one sidewall sample along the southern boundary of the excavation exceeded the site-specific cleanup level for DRO at 10,000 mg/kg and 13,000 mg/kg, respectively. One floor sample also exceeded the site-specific cleanup level at 9,900 mg/kg (USACE 2014b). In 2014, the location of the southern sidewall sample that exceeded site-specific cleanup levels was relocated and excavation continued in that area. The 2014 excavation reached a depth of 15 feet bgs. Confirmation samples were collected from the floor and sidewalls, and all analytical samples were below the site-specific cleanup levels for DRO and RRO.

Groundwater

Site 11 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.
- An LUC is required at Site 11 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.
- Maintenance of monitoring wells will be conducted, as needed, based on periodic reviews.

1.4.13 Site 12 – Gasoline Tank Area

Site 12 contained two ASTs (approximately 30,000 and 15,000 gallons) used for gasoline storage and a fuel pump inside a shed immediately east of the two tanks (Figure A-6). Prior to the DD, soil samples were collected to verify the ASTs had not contributed to contamination of the surrounding gravel soils. Sampling results identified DRO, RRO, and benzene, toluene, ethylbenzene, and xylenes (BTEX) in soil at concentrations below cleanup levels identified in the DD. No soil contamination was identified in the immediate vicinity of the ASTs (USACE 2009a). Groundwater beneath Site 12 is discussed as part of the MOC groundwater in Section 1.4.10.

Site 12 soil met risk-based cleanup levels and was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 12 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.14 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-6). Sources of contamination from this site consist of transformers, diesel generators, ASTs, USTs, and piping. At the time of the DD, DRO and PCBs were present in subsurface soils at concentrations that exceeded cleanup levels (USACE 2009a).

Soil

The selected remedy of excavation and removal of contaminated soil containing PCBs greater than 1 mg/kg was initiated in 2005 as part of a removal action (USACE 2009a). Excavation efforts continued at Site 13 from 2010 through 2013. Soil was excavated to a final depth of 9.8 feet bgs. Confirmation samples were collected from the floor and sidewalls of the excavation and all analytical samples were below the cleanup level for PCBs (USACE 2014b). PCB- and DRO-contaminated soils were comingled at Site 13 and removal actions focused on removing the PCB-contaminated soil first, after which the DRO-contaminated soil was the only driver for excavation.

The contingency remedy of excavation of petroleum-contaminated soil within Site 13 was initiated in 2012 (USACE 2014c) and continued in 2013 and 2014 (USACE 2015a). Soil was excavated to final depths of 15 feet bgs and 11 feet bgs. Confirmation samples were collected from the floor and sidewalls of the excavation and all analytical samples were below the site-specific cleanup levels for DRO and RRO (USACE 2014c, 2015a).

Groundwater

Site 13 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.

- An LUC is required at Site 13 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.
- Maintenance of monitoring wells will be conducted, as needed, based on periodic reviews.

1.4.15 Site 14 – Emergency Power/Operations Building

Site 14 included Building 98 and the immediately adjacent area (Figure A-6). A 5,000-gallon AST was historically located on the south side of the building, as well as a transformer pad (USACE 2009a). The building and tank were removed in 2001. Approximately 7.2 tons of PCB-contaminated soil were excavated and disposed of offsite in 2005. Soil confirmation samples were collected from the bottom of each excavation; these verified that no PCBs remained above 1 mg/kg (USACE 2009a). Groundwater beneath Site 14 is discussed as part of the MOC groundwater in Section 1.4.10.

Site 14 soil met risk-based cleanup levels and was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 14 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.16 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-6). A break in this fuel line resulted in a diesel fuel spill (USACE 2009a). A 2,000-gallon UST, the pipeline, and surrounding stained soil were removed in 2001 (USACE 2009a). In 2002, DRO was detected at a maximum concentration of 16,000 mg/kg at 6 to 8 feet bgs.

Soil

The contingency remedy of excavating and removing petroleum-contaminated soil was initiated in 2011. In 2011, an attempt to excavate the highest DRO contamination 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 (USACE 2012). In 2012, groundwater levels were lower and soil was excavated to a depth of approximately 12 feet bgs, which was 2 feet below the groundwater surface. Three confirmation samples collected from 2 feet below the groundwater surface contained a maximum DRO concentration of 40,000 mg/kg and will not be excavated (USACE 2013b). Three sidewall confirmation samples exceeded the site-specific cleanup level for DRO. In 2013, the locations of the confirmation sample exceedances were visually located using the plastic liner, and by survey, and then excavated. Confirmation samples were collected and indicated all samples were below the site-specific cleanup level (USACE 2014b).

Groundwater

Site 15 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.
- An LUC is required at Site 15 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.

1.4.17 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-6). 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 2009a).

Soil

The selected remedy of excavation and removal of PCB-contaminated soil was initiated and completed in 2010 (USACE 2011). Approximately 5 tons of soil was removed from Site 16. Confirmation samples were collected from the excavation floor and indicated all results were below cleanup levels (USACE 2011).

Groundwater

Site 16 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- An LUC is required at Site 16 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.18 Site 17 – General Supply Warehouse and Mess Hall Warehouse

Site 17 historically included Buildings 107 and 111 at the MOC. The warehouses were used to store miscellaneous materials required for general base operations (Figure A-6). The buildings were demolished and removed during the 2001 and 2003 field seasons. No sources of contamination were identified during the RI (USACE 2009a). Groundwater beneath Site 17 is discussed as part of the MOC groundwater in Section 1.4.10.

Site 17 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 17 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.19 Site 18 – Housing Facilities and Squad Headquarters

Site 18 historically included Buildings 99, 100, 101, 102, 104, 105, 106, 125, and 130, as well as the connecting utilidors and immediate surrounding area (Figure A-6). All structures were demolished and disposed of offsite in 2001 and 2003 (USACE 2009a). No contamination was

identified during the RI (USACE 2009a). Groundwater beneath Site 18 is discussed as part of the MOC groundwater in Section 1.4.10.

Site 18 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 18 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.20 Site 19 – Auto Maintenance

Site 19 consisted of the auto maintenance and auto storage buildings within the MOC (Figure A-6). The buildings were constructed with concrete floors and floor drains and were demolished in 2003 (USACE 2007, 2009a). 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 2007).

Soil

At the time of the DD, DRO was identified at concentrations that exceeded site-specific cleanup levels in subsurface soil with a maximum concentration of 13,300 mg/kg at 9.5 to 11.5 feet bgs (USACE 2009a). The contingency remedy of excavating and removing petroleum-contaminated soils was initiated in 2011, but an attempt to excavate soil was unsuccessful when groundwater was encountered at 5 feet bgs, before the excavation target depth of 7.5 feet bgs (USACE 2012). Excavation target depth for DRO was either 15 feet bgs or 2 feet below the existing seasonal water table, whichever was encountered first. In 2012, groundwater levels were lower and soil was excavated to depths ranging from 11 to 14 feet bgs, which was 2 feet below the groundwater surface. Confirmation samples were collected from the floor and sidewalls of the excavation and all samples were below site-specific cleanup levels for DRO and RRO (USACE 2013b).

Groundwater

Site 19 groundwater did not have a specific remedy identified in the DD. Groundwater is monitored as part of MOC groundwater monitoring described in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.
- An LUC is required at Site 19 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.
- Maintenance of monitoring wells will be conducted, as needed, based on periodic reviews.

1.4.21 Site 20 – Air Force Aircraft Control Warning Building

Site 20 historically included Building 103 at the housing and operations complex. The building was inspected, demolished, and disposed of offsite in 2003 (Figure A-6). No soil contamination was identified in the immediate vicinity of the former structure (USACE 2009a). Groundwater beneath Site 20 is discussed as part of the MOC groundwater in Section 1.4.10.

Site 20 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 20 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.22 Site 21 – Wastewater Tank

Site 21 is located west of the MOC perimeter road and historically contained the wastewater treatment system for the main housing and operations complex (Figure A-6). 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. The tank

compartments, utility corridor from the main complex, and the wooden utilidor outfall line were removed in 2003 (USACE 2009a).

Soil

At the time of the DD, PCBs and arsenic were identified as COCs in soil (USACE 2009a). 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 2009a). 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 (USACE 2009a). The selected remedy of excavating and removing PCB- and arsenic-contaminated soils was initiated in 2010 (USACE 2011). In 2010, approximately 10.4 tons of PCB-contaminated soil was excavated, and confirmation samples indicated all samples were below cleanup levels (USACE 2011). Arsenic removal efforts were initiated in the vicinity of the highest exceedance (170 mg/kg). From 2010 to 2012, approximately 135 tons of arsenic-contaminated soil above the calculated background level of 11 mg/kg was removed (Figure A-6). 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. 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, and 3 feet bgs. Of the 19 soil borings, 13 contained arsenic at concentrations exceeding site-specific cleanup levels (USACE 2014b). Soil boring results and confirmation samples were used to guide excavation efforts. During the 2013 field season, 305.13 tons of arsenic-contaminated soil was removed. Arsenic remained at 14 locations in the area of the 2013 excavation at concentrations that exceed 11 mg/kg, ranging between 17 mg/kg and 79 mg/kg (USACE 2014b).

In 2014, 40 soil borings were advanced at Site 21. Three soil samples were collected per boring at depths of approximately 1, 2, and 3 feet bgs. Of the 40 borings, five contained arsenic at concentrations from 12 to 23 mg/kg exceeding the site-specific cleanup level of 11 mg/kg. Areas with arsenic concentrations greater than 17 mg/kg were targeted for

excavation at Site 21. At the conclusion of the 2014 field season, 107.35 tons of arsenic-contaminated soil was removed. Arsenic remained at one location in the area of 2014 excavations at a concentration of 13 mg/kg, which exceeded the site-specific cleanup level of 11 mg/kg but was below 17 mg/kg, at (USACE 2015a).

Groundwater

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 2009a).

Surface Water

Nine surface water samples were collected in 2014 to monitor the effects of soil removal on surface water. Three samples each were collected prior to excavation, during excavation, and after excavation. Total and dissolved arsenic results were the limit of detection (0.0040 mg/L) for all samples except one total arsenic with a J-qualified sample result of 0.0039 mg/L. The estimated concentration was from a total arsenic sample. Arsenic was not found above the screening criteria of 0.01 mg/L in any of the samples collected (USACE 2015a). The surface water sampling results demonstrated the soil removals did not adversely impact surface water.

Long-Term Management

- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) five-year reviews are required until RAOs are met.

1.4.23 Site 22 – Water Wells and Water Supply Building

Site 22 included the water storage building, the pump house, and four water wells. The water storage building held four 20-foot-diameter and 26-foot-high water storage tanks (Figure A-2). A UST was located adjacent to the pump house (USACE 2009a). The buildings were demolished, the UST removed, and the water wells decommissioned in 2001 (USACE 2009a). Approximately 18 cubic yards of soil was removed from the tank

excavation. In 2004, two monitoring wells were installed downgradient of the former pump house and water storage building. The sampling results confirmed that the shallow groundwater was not impacted by fuel contamination. Groundwater beneath Site 22 is discussed as part of the MOC groundwater in Section 1.4.10. Soil borings surrounding the UST excavation also demonstrated that contamination had not migrated laterally or vertically. No soil contamination was identified in the immediate vicinity of the structures (USACE 2009a).

Site 22 soil met risk-based cleanup levels and groundwater met Table C cleanup levels. Site 22 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 22 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.24 Site 23 – Power and Communication Line Corridors

Site 23 consisted of the power and communication line corridors that historically extended from the MOC to the outlying facilities west along the access road (Figure A-2). During the 2003 and 2005 field season, debris was removed from the corridors in conjunction with the removal action at Sites 24 and 25. Two discrete areas along the corridor were investigated for metals, polycyclic aromatic hydrocarbons (PAHs), SVOCs, and PCBs. Low-level PCBs were detected at a single sample location but were not removed because the quantity of impacted soils was determined to be de minimis (USACE 2009a).

With de minimis quantity of impacted soils and no unacceptable risk to human health or the environment, Site 23 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 23.

1.4.25 Site 24 – Receiver Building Area

Site 24, also known as the receiver building area, is located approximately 1.5 miles west of the MOC and consisted of a reinforced concrete building on concrete pillars (Figure A-2). The equipment associated with the building was removed during deactivation of the installation. The concrete building was demolished and used as backfill in low areas at the MOC during the 2003 removal action (USACE 2009a). Miscellaneous debris and the connecting corridor to Site 25 were also removed during the 2003 field season. In 1994, DRO was detected at a maximum concentration of 4,250 mg/kg, which does not exceed the site-specific cleanup level (USACE 2009a). In 2001, DRO and antimony were detected in sediment at concentrations of 4,600 and 70 mg/kg, respectively. Since the 2001 antimony detection was isolated, and potential sources of contamination (e.g., miscellaneous debris) were removed in 2003, the antimony was not considered to pose a significant risk to human health and the environment (USACE 2009a).

With de minimis quantity of metals in sediment, no unacceptable risk to human health or the environment, and groundwater meeting Table C cleanup levels, Site 24 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 24.

1.4.26 Site 25 – Direction Finder Area

The direction finder area originally contained a small building with radio equipment (Figure A-2). The building was burned and the debris pushed to the side of the gravel pad when the installation was deactivated (USACE 2009a). Scattered drums on or near the gravel pad, as well as incidental stained soils, were removed during the 2000 removal action. Soil and sediment samples collected during the Phase I RI detected DRO in soil at concentrations up to 1,100 mg/kg and in sediment up to 300 mg/kg. The DRO detections in soil and sediment did not exceed the site-specific cleanup levels (USACE 2009a).

Site 25 met risk-based cleanup levels and was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 25.

1.4.27 Site 26 – Former Construction Camp

Site 26, the former construction camp area, is located adjacent to and upgradient of the MOC, southeast of the perimeter access road (Figure A-2). The site consisted of a flat gravel pad area and pump house shed. In 2001, the pump house shed was demolished and a water supply well at this site was decommissioned. The former water supply well was sampled before being decommissioned. No contaminants of potential concern were detected (USACE 2009a). In 2004, two new monitoring wells were installed and no contaminants were identified. Site 26 groundwater is discussed as part of MOC groundwater data in Section 1.4.10. Groundwater contamination at the MOC was the result of a release and not associated specifically with the infrastructure at Site 26.

Site 26 met Table C groundwater cleanup levels and was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- An LUC is required at Site 26 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

1.4.28 Site 27 – Diesel Fuel Pump

Site 27 includes the diesel fuel pump island originally used to refuel heavy equipment and vehicles (Figure A-6). The site was comprised of 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 2009a). 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 (USACE 2009a).

Soil

The contingency remedy of excavating and removing petroleum-contaminated soil was initiated in 2012 and continued in 2013 and 2014. The depths of contamination were suspected to range from 2 to 15 feet bgs (USACE 2011). Excavation efforts were guided by field screening results, but groundwater dictated the ultimate depth of excavation in 2012 and 2013. Excavation reached the extent of contamination or the target of 2 feet below groundwater in 2012 and 2013. Nine confirmation samples were collected in 2013 along the northern sidewall, five 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 Site 28. Four additional samples from the sidewalls exceeded the site-specific cleanup level for DRO and/or RRO. Further excavation occurred at three of the sample exceedance locations. Confirmation samples collected from the floor of the 2013 excavation were below site-specific cleanup levels with the exception of one sample collected from 2 feet below groundwater that contained DRO at a concentration of 11,000 mg/kg (USACE 2014c). Excavation activities continued at Site 27 in 2014 primarily along the southern portion of the site. Confirmation samples collected from the floor and sidewalls of the 2014 excavation were below site-specific cleanup levels (USACE 2015a).

The location of the 2001 sample, collected from 4 feet bgs, that contained naphthalene (191 mg/kg) above the screening level (FWEC 2002) was relocated by the survey crew in 2014. The historical sample location appeared to be in an area where soil excavation occurred in 2013 (USACE 2015a). A test pit was advanced to a depth of approximately 16 feet bgs. Fill material was present to approximately 12 feet bgs and native soil was present from 12 to 16 feet bgs. A soil sample and a field duplicate were collected from 12.5 feet to 13.5 feet bgs and found that naphthalene, DRO, and RRO were below the site applicable cleanup levels. The

soil associated with the historical naphthalene exceedance was likely removed during previous excavation activities.

Groundwater

Site 27 groundwater is discussed as part of MOC groundwater data in Section 1.4.10.

Long-Term Management

- MNA sampling of groundwater will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met.
- An LUC is required at Site 27 in the form of a Deed Notice to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.
- Periodic reviews are required until RAOs are met.
- Maintenance of monitoring wells will be conducted, as needed, based on periodic reviews.

1.4.29 Site 28 – Drainage Basin

The Site 28 drainage basin is located north of the MOC and drains north into the Suqitughneq River (Figure A-8). The site has been affected by fuel releases from Site 11 and other spills and releases discussed in the DD (USACE 2009a). The site contains wetlands, rolling tundra, ponds, and flowing streams. The most significant sources of surface water are overland flow from the MOC and seeps immediately north of the MOC gravel pad and sporadically throughout the drainage basin.

Sediment

The selected remedy for Site 28 was initiated in 2010. At the time, culverts were either completely removed or cut and sealed with bentonite and a welded steel cap. Culverts were completely removed during subsequent MOC excavation activities. A concrete manhole structure, and metal piping were removed. Following a mapping and sampling effort in 2012, Phase I of the sediment remedy was initiated in Areas 1, 2, and 4 based on exceedance of the RAOs. Sediment removal efforts continued within Areas 3 through 11 in 2013. 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 DD-established sediment cleanup levels. Acenaphthylene, 1-methylnaphthalene, and selenium were also identified; however, there are no established sediment cleanup level in the DD for these compounds. Analytes exceeding the site-specific cleanup levels remained within all 11 sediment removal areas.

Groundwater

Shallow groundwater at Site 28 was investigated in 1994. Monitoring wells were installed within the eastern drainage of the drainage basin and sampling results indicated the potential for DRO and lead contamination. Sampling conducted in 2001 did not identify concentrations of DRO and lead above cleanup levels. No COCs were retained for shallow groundwater at Site 28 (USACE 2009a).

Surface Water

Prior to the signing of the DD, surface water samples were collected from the drainage basin in 1994, 1996, 1998, 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, which are located at the terminus of the former culverts (USACE 2009a).

From 2012 through 2014, surface water samples were collected from three locations adjacent to the MOC in Site 28 to assess the impact on surface water, if any, of removal activities at the MOC. Sampling occurred three times throughout the course of work annually: before, during, and following MOC soil removal activities. Results from surface water samples collected to assess the potential impact of removal activities at the MOC did not exhibit total aromatic hydrocarbon (TAH), TAqH, or petroleum sheen levels above those listed in the DD (0.01 mg/L, 0.015 mg/L, and no sheen, respectively). Surface water samples were collected

from three locations annually at Site 28 to assess the impact of sediment removal activities. Samples collected before, during, and after sediment removal activities were below the cleanup criteria in 2012, 2013, and 2014 (USACE 2013a, 2014b, 2015a).

Long-Term Management

- CERCLA five-year reviews are required until RAOs are met.
- Maintenance of the sedimentation pond will be conducted, as needed, based on CERCLA five-year reviews.

1.4.30 Site 29 – Suqitughneq River

The Suqitughneq River flows north from the Kinipaghulghat Mountains, originating south of the main complex. The Suqitughneq River flows 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 a beach, which is occasionally breached. Several smaller tributaries, including the Site 28 drainage basin, contribute flow to the Suqitughneq River. In 2004, six sediment samples were collected from the estuary; these contained a maximum DRO concentration of 988 mg/kg, which does not exceed the site-specific cleanup level of 3,500 mg/kg (USACE 2009a). The 2004 risk assessment completed for Northeast Cape evaluated the consumption of fish from the vicinity of the Suqitughneq River and indicated potential future carcinogenic risk due to concentrations of arsenic, PCBs, and PAHs. Further evaluation during a health consultation by the Agency for Toxic Substances and Disease Registry concluded that consumption of fish from the waters of Northeast Cape is not likely to result in adverse health effects (USACE 2009a).

Although Site 29 did not pose a risk to human health or the environment and met risk-based cleanup levels, the remedy selected for Site 29 included the removal of incidental debris located in the stream channel that posed an inherent hazard (USACE 2009a). The selected remedy was initiated and completed in 2010 (USACE 2011).

Long-Term Management

- No long-term management is required at Site 29 because the incidental debris has been removed.

1.4.31 Site 30 – Site-Wide

Site 30 is not a contaminated site. This USACE-designated background area was studied during the RI to assess natural conditions and provide information to develop site-specific background levels (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 30 because it is not a contaminated site.

1.4.32 Site 31 – WACS Station

Site 31, the WACS station, 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. The antennas and structures were removed between 2001 and 2006. At the time of the DD, PCBs remained within the former transformer pad excavation at concentrations between 1.53 and 7.09 mg/kg in approximately 110 cubic yards of soil (USACE 2009a).

Soil

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-2). Excavation efforts were guided by field screening samples. Following excavation, confirmation samples indicated PCB concentrations were below the cleanup level. The excavation was backfilled with material from the onsite borrow area and contoured to blend with surrounding topography (USACE 2014b).

Long-Term Management

- The remedy at Site 31 is considered complete (USACE 2015b). No long-term management is required at Site 31.

1.4.33 Site 32 – Lower Tramway

Site 32, the Lower Tramway, is located 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 tram line.

Soil

The buildings, ASTs, and tram structures at Site 32 were demolished and removed in 2003 and 2005. Soil samples collected in 2003 following the building demolition activities identified DRO concentrations between 1,150 and 10,400 mg/kg in the area near the former AST. No other contaminants were identified above cleanup levels (USACE 2009a). In 2014, 53.13 tons of DRO-contaminated soil was removed to complete implementation of the remedy. All confirmation samples from the excavation floor and sidewalls were below site-specific cleanup levels for DRO and RRO. The USACE considers soil removal at Site 32 complete (USACE 2015a).

Long-Term Management

- Periodic reviews are required until RAOs are met.

1.4.34 Site 33 – Upper Tram Terminal

A tramway linked the lower tram building with the radome area located on top of Kangukhsam Mountain (Figure A-2). Site 33 consisted of a tram terminal building connected to the upper camp by an enclosed track man-lift (USACE 2009a). The structures and tram towers were demolished and removed during the 2003 and 2005 field seasons. During the 2001 RI, surface soil samples were collected from stained soil outside the upper tram bay.

DRO concentrations were detected at a maximum of 660 mg/kg, which does not exceed the site-specific cleanup level (USACE 2009a).

Site 33 met risk-based cleanup levels and was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 33.

1.4.35 Site 34 – Upper Camp

Site 34, the upper camp, is located at the top of Kangukhsam Mountain and consisted of a substation transformer pad, two ASTs, a radome building, and the upper quarters building (Figure A-2). Site structures and ASTs were demolished and removed during the 2003 field season. Historical soil sampling indicated the presence of PCBs at a maximum concentration of 1.4 mg/kg in soil adjacent to the concrete transformer pad. During the 2001 investigation, additional surface soil samples were collected from a grid around the former pad. PCBs were detected at a maximum concentration of 1.06 mg/kg (USACE 2009a). Soil samples were also collected from various locations near the ASTs, an outfall pipe, the former drum field, and background locations. DRO was detected at a maximum concentration of 1,100 mg/kg (USACE 2009a).

With a de minimis quantity of impacted soil and no unacceptable risk to human health or the environment, Site 34 was determined to be NFA in 2009 (USACE 2009a).

Long-Term Management

- No long-term management is required at Site 34.

2.0 LAND-USE CONTROLS

The objectives of LUCs at the Northeast Cape sites are to minimize exposure to contamination at a site. LUCs that will be implemented at Northeast Cape sites fall into two categories: engineering controls and institutional controls (ICs). Engineering controls are physical mechanisms that contain or reduce access to contaminated media and/or physical barriers to limit access to property. ICs are made up of proprietary (e.g., easements and restrictive covenants) and administrative (e.g., Deed Notices) controls.

Engineering controls at Northeast Cape include the diversion trench at the Site 9 landfill and landfill caps at the Site 7 and Site 9 landfills. A sediment containment pond (or other appropriate controls) may also be constructed at Site 28. ICs will be implemented at Northeast Cape in the form of Deed Notices containing information regarding groundwater, land-use, and excavations. Deed Notices provide information or notification to local communities and landowners that residual or contained contamination may remain onsite. Deed Notices will play an important role at Northeast Cape, reducing exposure to contamination by limiting land or resource use while allowing re-development and land transfers to proceed. The USACE will coordinate with the landowner to develop Deed Notices. Once finalized, Deed Notices will be implemented through filing a Notice of Environmental Contamination at the State Recorder's Office. Table 2-1 presents the sites and their specific LUCs.

**Table 2-1
Sites Requiring Land-Use Controls**

Site	Control Type	LUC	Media
9	Engineering	Diversion Trench	Not Applicable
7 and 9	Engineering	Landfill Cap	Not Applicable
28	Engineering	Sediment Containment Pond	Sediment
7 and 9	Institutional	Prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.	Not Applicable
8	Institutional	Area should not be used for residential land use without additional investigation and/or cleanup.	Sediment
3, 4, 6, 7, and 9	Institutional	Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Groundwater
10 through 20, 22, 26, and 27 (MOC)	Institutional	Groundwater should not be used as a drinking water source until RAOs are met.	Groundwater

Note:

For definitions, refer to the Acronyms and Abbreviations section.

2.1 CONSTRUCTION/LAND USE

The selected remedy for Sites 7 and 9 both include an engineering control in the form of a landfill cap. Capping provides containment of inert debris and reduces the likelihood of human and animal contact with residual contamination that may be associated with the landfills. A Deed Notice is required for Sites 7 and 9 to inform landowners to prevent future building construction or excavation that could disturb the cap or within the immediate vicinity of the site.

The selected remedy for Site 8 includes MNA of petroleum-contaminated sediment. As a result, a Deed Notice is required to inform landowners that the area should not be used for residential land use without additional investigation and/or cleanup.

2.2 GROUNDWATER USE

Deed Notices applicable to groundwater use will be required at 20 of the Northeast Cape sites. The content of the groundwater Deed Notices is divided between two areas. The extent of the

boundaries for the “Non-Drinking Water Areas” were established by placing each site, or sites, at the center of a conservative buffer area.

Sites 3, 4, 6, 7, and 9

Shallow groundwater within specific areas of Northeast Cape FUDS is not considered a current or reasonably expected potential future drinking water source (USACE 2009a). These areas are characterized by low-lying tundra and include the vicinity of Sites 3, 4, 6, 7, and 9. The shallow groundwater is not consistently encountered, exists in insufficient quantities, and is of poor quality. The groundwater exposure pathway at these areas is considered incomplete because the shallow groundwater does not produce a sufficient quantity of water to be considered a reasonably expected potential future drinking water source. These areas have been classified as “Non-Drinking Water Areas” and are shown in Figure A-2. A Deed Notice will be required to inform landowners that shallow groundwater is not a reasonable potential future drinking water source.

MOC Groundwater (Sites 10 through 20, 22, 26, and 27)

Groundwater at the MOC (Sites 10 through 20, 22, 26, and 27) is reasonably expected to be a potential future drinking water source. During operation of the Northeast Cape facility, four wells at the southeast portion of the MOC supplied the installation with potable drinking water. These wells were decommissioned in 2002 during previous remedial actions at the site (USACE 2009a). A deeper aquifer may be present beneath the MOC and further to the north where it could be tapped as a potential drinking water source (USACE 2009b). To reduce exposure risks to human health and the environment while MNA of groundwater is occurring at selected sites within the MOC, a Deed Notice will be required to inform landowners that groundwater should not be used as a drinking water source until RAOs are met.

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3.0 INSPECTIONS

Onsite inspections are required at 12 Northeast Cape sites. Inspections will be conducted to ensure the implemented remedies remain protective. At each site, inspections will determine and document the following:

- Evaluate remedy status.
- Evaluate the overall site conditions and determine if maintenance is required.
- Evaluate the condition and security of all active monitoring wells (if applicable).
- Observe and maintain the integrity of landfill caps (if applicable).
- Determine whether changes to the remedial or monitoring systems are required.

Table 3-1 presents the type of inspections required at each site.

**Table 3-1
Sites Requiring Inspections**

Site	Inspection Type	Frequency	Duration	Media
7	Landfill cap visual inspection	Periodic	Periodically for up to 30 years ^a	Not Applicable
9	Landfill cap and diversion trench visual inspection	Periodic	Periodically for up to 30 years ^a	Not Applicable
8	Periodic review	Five-year intervals	Until RAOs are met	Sediment
10, 11, 13, 15, 19, and 27 (MOC)	Periodic review	Periodic	Until RAOs are met	Groundwater
21	CERCLA five-year review	Five-year intervals	Until RAOs are met	Soil
28	CERCLA five-year review	Five-year intervals	Until RAOs are met	Sediment
32	Periodic review	Periodic	Until RAOs are met	Soil

Notes:

^a Initial periodic (annual) visual monitoring for a period of five years has been conducted. Additional visual monitoring will be conducted for up to 30 years as deemed necessary based on the results of previous visual inspections.

For definitions, refer to the Acronyms and Abbreviations section.

USACE may conduct unscheduled follow-up inspections in response to threatening or unusual site conditions. Follow-up inspections may be deemed necessary if the following occurs:

- A condition is identified during the routine site inspection or other site visit that requires personnel with specific expertise to return to the site to evaluate the condition.
- USACE is notified that conditions at the site have substantially changed since the previous inspection.

Once a condition or concern is identified at the site, USACE personnel will evaluate the information, notify ADEC, and determine a course of action. Results of follow-up inspections will be included in the next inspection report.

3.1 LANDFILL CAP VISUAL INSPECTIONS

A non-intrusive visual inspection of the capped areas at Sites 7 and 9 for evidence of settlement and erosion was conducted annually for five years. Additional periodic visual monitoring, up to 30 years, will be conducted as deemed necessary based on the results of previous site inspections. Landfill cap visual inspections will include documenting any evidence of cap settlement, cracks, erosion, penetration, or holes. The landfill cap and slopes will be inspected for instability and the amount and quality of vegetative cover. Each site will be inspected for evidence of ponded water within, against, or on the surface of the landfill. At Site 9, the drainage ditch will be inspected to ensure that it continues to provide a preferential pathway for the adjacent pond and minimizes the flow of water through the landfill. Access roads will be inspected and any odors and/or wildlife observed in the vicinity will be noted. Inspections may be facilitated and documented using the inspection checklist provided in Appendix C. Landfill cap visual inspection reports will be reported as part of the periodic reviews.

3.2 PERIODIC REVIEWS

Periodic reviews will be required for landfill sites (7 and 9) and petroleum-contaminated sites (8, 10, 11, 13, 15, 19, 27, and 32). Periodic reviews at landfill sites were conducted annually

for five years. Additional periodic visual monitoring for up to 30 years will be conducted as deemed necessary based on previous inspection results. Periodic reviews at petroleum-contaminated sites will be conducted until RAOs are met.

The purposes of periodic reviews are to ensure that the remedy has been implemented; is performing effectively; and continues to be protective of human health, safety, and the environment. Visual inspections will be conducted to note general site conditions, monitoring well condition (if applicable), early indicators of potential remedy problems, and opportunities for optimization. Inspections may be facilitated and documented using the inspection checklist provided in Appendix C. Periodic reviews may be reported in conjunction with CERCLA five-year reviews and will evaluate the most recent site data.

3.3 CERCLA FIVE-YEAR REVIEWS

Five-year reviews are a post-Superfund Amendments and Reauthorization Act (SARA) statutory requirement under CERCLA. For the Northeast Cape sites where hazardous substances, pollutants, or contaminants remain above levels that allow for Unlimited Use/Unrestricted Exposure (UU/UE), Sites 21 and Sites 28, CERCLA five-year reviews are conducted. The purposes of CERCLA five-year reviews are to ensure that remedies have been implemented; are performing effectively; and continue to be protective of human health, safety, and the environment. The first CERCLA five-year review for Northeast Cape FUDS was completed in September 2014 and subsequent reviews will occur on a five-year basis. Visual inspections will be conducted to note general site conditions, early indicators of potential remedy problems, and opportunities for optimization. Site inspectors will review the *Comprehensive Five-Year Review Guidance* prior to each inspection in order to revise the inspection checklist (if necessary). A generic five-year review inspection checklist is provided in Appendix C. Because of the generic nature of these checklists, they are intended to be modified, as appropriate, to meet the specific conditions and requirements for the site to be inspected. These modified checklists will be provided in the action-specific work plan. Documentation of site inspections, including checklists, field notes, photographs, and other

annotations of inspection findings will be reported every five years. CERCLA five-year reviews will continue until RAOs are met.

4.0 MONITORING

Monitoring will be conducted at Northeast Cape to evaluate the performance and effectiveness of the selected remedies. Trends in contaminant levels will be evaluated to determine if the remedies continue to be effective in achieving remedial goals. The sampling analytes and frequency may be modified under the discretion of USACE in coordination with ADEC. Sampling results and any other information generated during regular monitoring events may be reported as part of the CERCLA five-year reviews. Table 4-1 presents those sites requiring ongoing monitoring.

**Table 4-1
Sites Requiring Monitoring**

Site	Media	Frequency	Duration
8	Sediment	Five-year intervals	Until RAOs are met.
9	Groundwater	Five-year intervals	Six monitoring events over 30 years ^a .
10, 11, 13, 15, 19, and 27 (part of MOC)	Groundwater	Periodic	Until RAOs are met.

Notes:

^aSurface water will be collected to evaluate near-surface groundwater. Surface water results will be compared to groundwater cleanup levels.

For definitions, refer to the Acronyms and Abbreviations section.

4.1 SEDIMENT MONITORING

Sediment monitoring is required at Site 8 to assess the performance of the selected remedy. Whenever possible, sediment monitoring will be conducted during site inspections. Sediment monitoring was conducted in 2010, 2011, and 2013 and may have underestimated the level of contamination in sediment due to the limited number of subsamples collected per decision unit and potential bias introduced by composite sampling (USACE 2015b). In 2016, the extent and magnitude of POL-contaminated sediment will be determined. MNA sampling of sediment will be performed during subsequent five-year reviews.

Ongoing monitoring at Site 8 will occur at five-year intervals for a period of up to 30 years or until RAOs are met. A field sampling plan and quality assurance plan will be provided prior to monitoring. The existing decision units for Site 8 are shown on Figure A-4 in Appendix A.

4.2 GROUNDWATER MONITORING

Groundwater monitoring is required at both Site 9 and selected areas within the MOC (Sites 10, 11, 13, 15, 19, and 27) to assess the performance of the selected remedy. At Site 9, monitoring will be conducted for six events, each spaced five years apart, for a period of 30 years. Long-term monitoring should demonstrate that shallow groundwater, represented by surface water, meets RAOs for a non-drinking water source. Surface water samples will be collected and analyzed for DRO, RRO, and lead during six long-term monitoring events spaced five years apart to demonstrate near-surface groundwater meets RAOs for a non-drinking water source. Results will be compared to Alaska Administrative Code (AAC) Title 18, Chapter 75 (18 AAC 75), Table C Groundwater Cleanup Levels. Previous 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 2014a).

At selected areas within the MOC (Sites 10, 11, 13, 15, 19, and 27), groundwater monitoring will be conducted to monitor natural attenuation. Sampling will be conducted annually for three years following completion of excavation efforts at the MOC. Additional sampling will be conducted at five-year intervals until RAOs are met. Groundwater samples from MOC Sites 10, 11, 13, 15, 19, and 27 will be obtained from the existing monitoring well network in accordance with the *ADEC Field Sampling Guidance* (ADEC 2016). A field sampling plan and quality assurance plan will be developed prior to monitoring. Figure A-7 presents the locations of the groundwater monitoring network at the MOC that was expanded in 2014. Table 4-2 provides the groundwater monitoring locations and proposed analyte list.

**Table 4-2
Groundwater Monitoring Locations and Analytes**

Site	Well	VOC	DRO	RRO	BTEX	PAH	PCB	RCRA 8 Metals	Nickel	Vanadium	Zinc	Ethylene Glycol
9	None ^a		X	X				X ^b				
10, 11, 13, 15, 19, 27 (MOC)	MW10-1	X	X	X	X	X	X	X	X	X	X	X
	MW88-1		X	X	X	X	X	X	X	X	X	
	MW88-3		X	X	X	X	X	X	X	X	X	
	MW88-10		X	X	X	X	X	X	X	X	X	
	14MW01		X	X	X	X	X	X	X	X	X	
	14MW02		X	X	X	X	X	X	X	X	X	
	14MW03		X	X	X	X	X	X	X	X	X	
	14MW04		X	X	X	X	X	X	X	X	X	
	14MW05		X	X	X	X	X	X	X	X	X	
	14MW06	X	X	X	X	X	X	X	X	X	X	X
	14MW07		X	X	X	X	X	X	X	X	X	
	17MW-1		X	X	X	X	X	X	X	X	X	
	20MW-1		X	X	X	X	X	X	X	X	X	
	22MW-2		X	X	X	X	X	X	X	X	X	
26MW1		X	X	X	X	X	X	X	X	X		

Notes:

^a Three surface water locations established in 2014 will be sampled to evaluate near-surface groundwater.

^b Lead only

For definitions, refer to the Acronyms and Abbreviations section.

4.3 SURFACE WATER MONITORING

The selected remedy for Site 9 includes three surface water monitoring events to verify COCs in shallow groundwater are not migrating downgradient and impacting surface waters. The first surface water monitoring event at Site 9 occurred in 2010 and 2011, and the second surface water monitoring event occurred in 2013 (Figure A-5). Results from both sampling events did not identify any analytes at concentrations that exceeded cleanup levels stated in the DD. One additional surface water monitoring event is required at Site 9 (USACE 2009a, 2011, 2014a); samples will be submitted for analysis of BTEX and PAHs. Surface water monitoring will be conducted during the site inspection, if practical. A field sampling plan and quality assurance plan will be provided prior to monitoring. Analytical results from the

final surface water monitoring event will be used to determine if additional monitoring events are necessary.

5.0 MAINTENANCE

Occasional maintenance activities may be required at Northeast Cape. The need for maintenance will be determined through site inspections and may include landfill cap repair; diversion trench clearing and maintenance; monitoring well repair, removal, or maintenance; and clearing or replacing the sediment control system (if installed). The remedies selected for Northeast Cape FUDS do not rely on any mechanical systems, such as sub-slab depressurization systems or air sparge/soil vapor extraction systems; therefore, the operation and maintenance of such components are not included in this LTMP. Table 5-1 presents potential maintenance activities for Northeast Cape FUDS.

**Table 5-1
Sites Potentially Requiring Maintenance**

Site	Maintenance	Frequency
7	Landfill Cap Repair	As needed based on inspection.
9	Drainage Channel Clearing	
	Diversion Trench Repair	
10, 11, 13, 15, 19, and 27 (MOC)	Monitoring Well Repair	
	Monitoring Well Replacement	
	Monitoring Well Removal	
28	Clearing/Replacing Sediment Control System (if constructed).	

Note:

For definitions, refer to the Acronyms and Abbreviations section.

5.1 LANDFILL CAPS

Landfill caps were constructed at Site 7 in 2009 and Site 9 in 2010. If determined necessary, based on inspection results, landfill caps may need to be repaired in order to ensure that the selected remedy continues to be protective of human health and the environment. Outside of necessary repair, there are no ongoing maintenance requirements associated with the landfill gravel caps at Sites 7 and 9.

5.2 DIVERSION TRENCH

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. The diversion trench is approximately 15 feet wide by 160 feet long and is lined with rocks larger than 2 inches in diameter (USACE 2011). If determined necessary, the diversion trench may need repair in order to ensure that the selected remedy remains protective of human health and the environment. Outside of necessary repair, there are no ongoing maintenance requirements associated with the diversion trench at Site 9.

5.3 MONITORING WELL NETWORK

The monitoring well network at the MOC will be used to evaluate MNA in groundwater, as described in Section 4.2. Repairs and/or replacement of wells in the monitoring well network will be performed based on assessments of structural integrity and overall performance. If determined necessary, monitoring wells will be physically agitated/surged and redeveloped. Additionally, monitoring wells will be properly decommissioned and replaced if an event renders the wells unusable. Monitoring personnel will maintain access to sample locations, which may include maintenance of access routes (e.g., gravel repair of paths and roads) and vegetation control around wells and access routes.

5.4 SEDIMENT CONTROL SYSTEM

Following completion of the remedy at Site 28, it is anticipated the existing, natural sedimentation ponds will continue to prevent migration of contaminants above risk-based cleanup levels into the Suqitughneq River. There are no ongoing maintenance requirements associated with Site 28.

6.0 REFERENCES

- ADEC (Alaska Department of Environmental Conservation). 2016 (March). *Field Sampling Guidance*.
- ADEC. 2015 (June). *Oil and Other Hazardous Pollution Control Regulations—Discharge Reporting, Cleanup, and Disposal of Oil and Other Hazardous Substances*. 18 AAC 75.
- Ferrians, O.J. Jr. 1965. Permafrost Map of Alaska: U.S. Geological Survey Miscellaneous Geologic Investigations. Map 445, 1 sheet, scale 1:2,500,000.
- FWEC (Foster Wheeler Environmental Corporation). 2002 (February). *Underground Storage Tank Closure Report for Tanks 13-2, 13-5, and 22-1*. Northeast Cape, St. Lawrence Island, Alaska.
- MWH (Montgomery Watson Harza Americas, Inc.). 2003. *Phase III Remedial Investigation*. Northeast Cape, St. Lawrence Island, Alaska. Final.
- Patton, W. and B. Csejtey. 1980. Geologic map of St. Lawrence Island, Alaska: U.S. Geological Survey Miscellaneous Investigation Series. Map I-1203. 1 sheet, scale 1:250,000.
- USACE (U.S. Army Corps of Engineers). 2015a (April). *2014 Northeast Cape HTRW Remedial Actions, Revision 1*. St. Lawrence Island, Alaska. Prepared by Bristol Environmental Remediation Services, LLC. F10AK096903_xx.xx_yyy_a.
- USACE. 2015b (February). *First Five-Year Review Report, Northeast Cape FUDS*. Final. St. Lawrence Island, Alaska. Prepared by Jacobs Engineering Group Inc.
- USACE. 2015c (February). *First Periodic Review Report, Site 7 Cargo Beach Road Landfill, Northeast Cape FUDS*. Final. St. Lawrence Island, Alaska. Prepared by Jacobs Engineering Group Inc. F10AK096905_07.11_0506_p.
- USACE. 2014a (February). *2013 Sampling Conducted in Conjunction with the 2013 Five-Year Review at Northeast Cape*. Final. St. Lawrence Island, Alaska. Prepared by Jacobs Engineering Group Inc. FRMD Nos. F10AK096903_07.11_0504_p and F10AK096905_07.11_0503_p.
- USACE. 2014b (January). *Northeast Cape HTRW Remedial Actions, Revision 0*. Draft. St. Lawrence Island, Alaska. Prepared by Bristol Environmental Remediation Services, LLC. F10AK09693_xx.xx_xxx_x.
- USACE. 2013a (May). *Northeast Cape Removal Action Report*. Revision 1. St. Lawrence Island, Alaska. Prepared by Bristol Environmental Remediation Services, LLC. F10AK096903_07.08_0505_a.

USACE. 2013b. (May). *Site 28 Phase I Sediment Removal Report*. Revision 2. St. Lawrence Island, Alaska. Prepared by Bristol Environmental Remediation Services, LLC. F10AK096903_07.08_0504_a.

USACE. 2012 (June). *Northeast Cape HTRW Remedial Actions Final Removal Action Report, Northeast Cape, Saint Lawrence Island Alaska*. Prepared by Bristol Environmental Remediation Services, LLC. F10AK096903_07.08_0503_a.

USACE. 2011 (July). *Northeast Cape HTRW Remedial Action Report*. St. Lawrence Island, Alaska. Bristol Environmental Remediation Services, LLC. F10AK096903_07.08_0502_a.

USACE. 2010 (May). *Site 7 Landfill Cap Construction Completion Report*. Northeast Cape, St. Lawrence Island, Alaska. Prepared by USACE-Alaska District, May 2010. F10AK096905_07.08_0500_p.

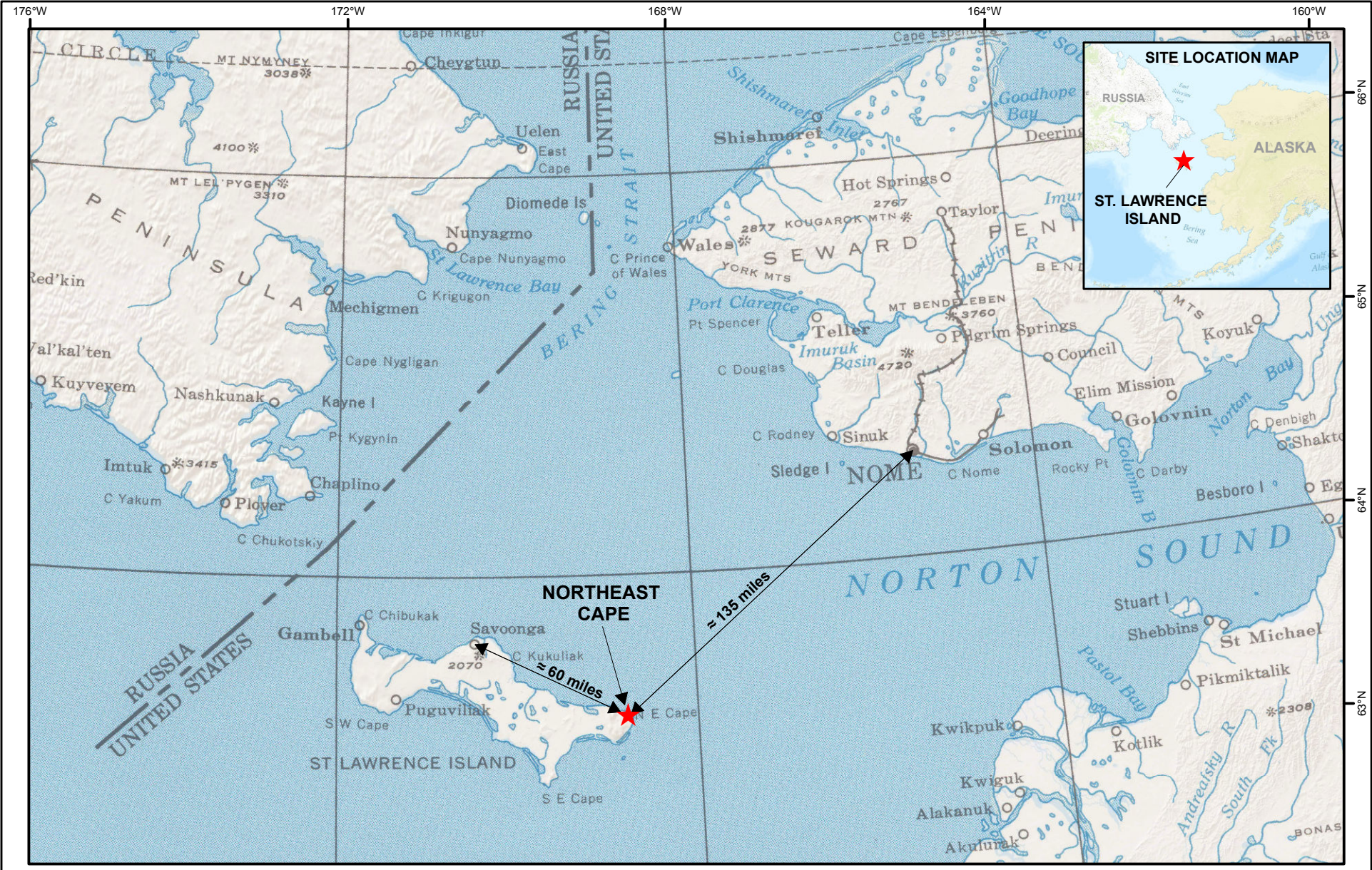
USACE. 2009a (September). *Decision Document: Hazardous, Toxic, and Radioactive Waste (HTRW) Project #F10AK096903*, Northeast Cape Formerly Used Defense Site (FUDS) St. Lawrence Island, Alaska. F10AK09603_05.09_0500_a.

USACE. 2009b (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*. F10AK096905_05.09_0500_a.

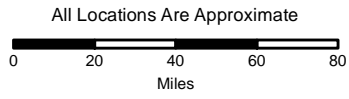
USACE. 2007 (March). *Feasibility Study, Northeast Cape FUDS*, St. Lawrence Island, Alaska. F10AK096904_04.09_0500_a & F10AK096905_0500_a.

USACE. 2004 (March). *Human Health and Ecological Risk Assessment*. Final. Northeast Cape Installation, St. Lawrence Island, Alaska. Prepared by MWH. F10AK096903_03.11_0005_a.

APPENDIX A
Figures



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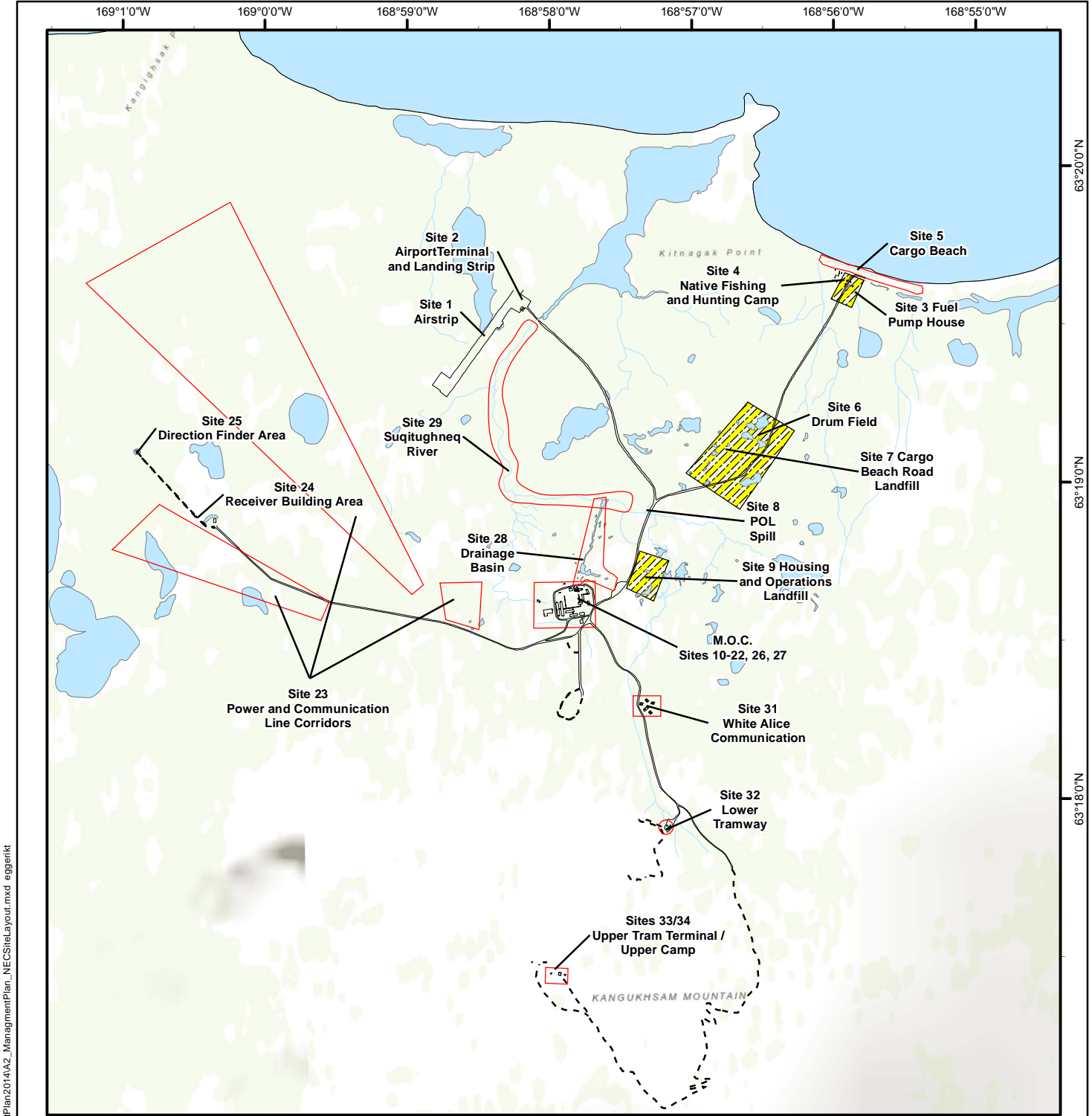


WGS 1984 UTM Zone 2N

**NORTHEAST CAPE
VICINITY MAP**

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE:	PROJECT MANAGER:	FIGURE NO.:
	12 JAN 2016	K. MAHER	A-1



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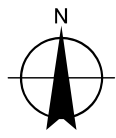


- Non-Drinking Water Areas
- Water Feature
- Road
- Trail
- Remediation Site

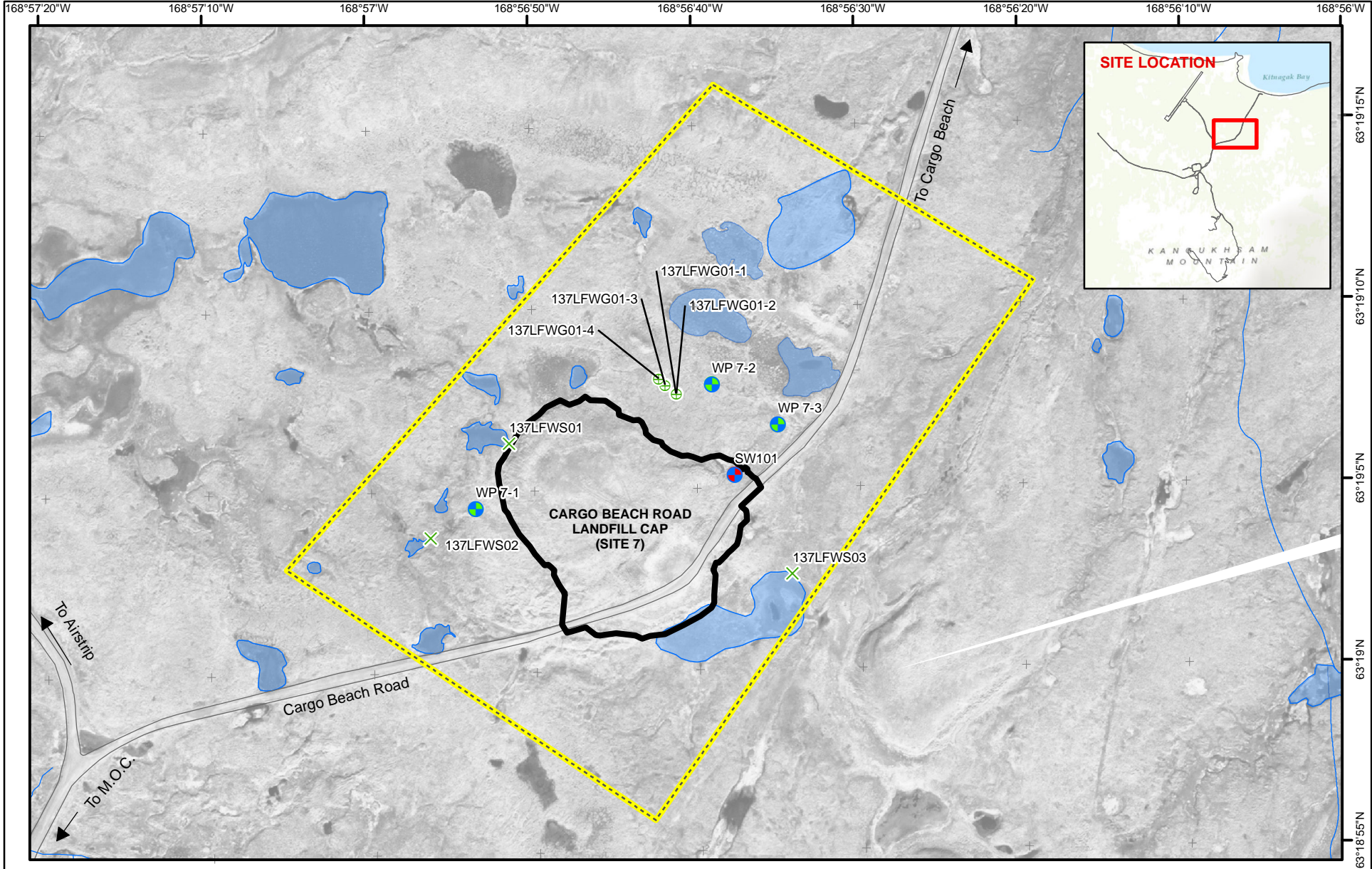
All Locations Are Approximate

Miles

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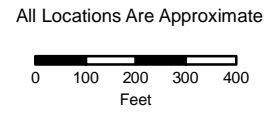


NORTHEAST CAPE MANAGEMENT PLAN SITE LAYOUT			
SAINT LAWRENCE ISLAND, ALASKA			
JACOBS	DATE: 20 SEP 2016	PROJECT MANAGER: K. MAHER	FIGURE NO: A-2



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- ⊕ 2013 Attempted Groundwater Sample
- ⊕ 2001 Historic Monitoring Well (Approx. Location)
- ✕ 2013 Surface Water Sample
- Non-Drinking Water Area
- ⊕ 1994 Historic Monitoring Well (Approx. Location)
- Landfill Cap Boundary
- 💧 Surface Water

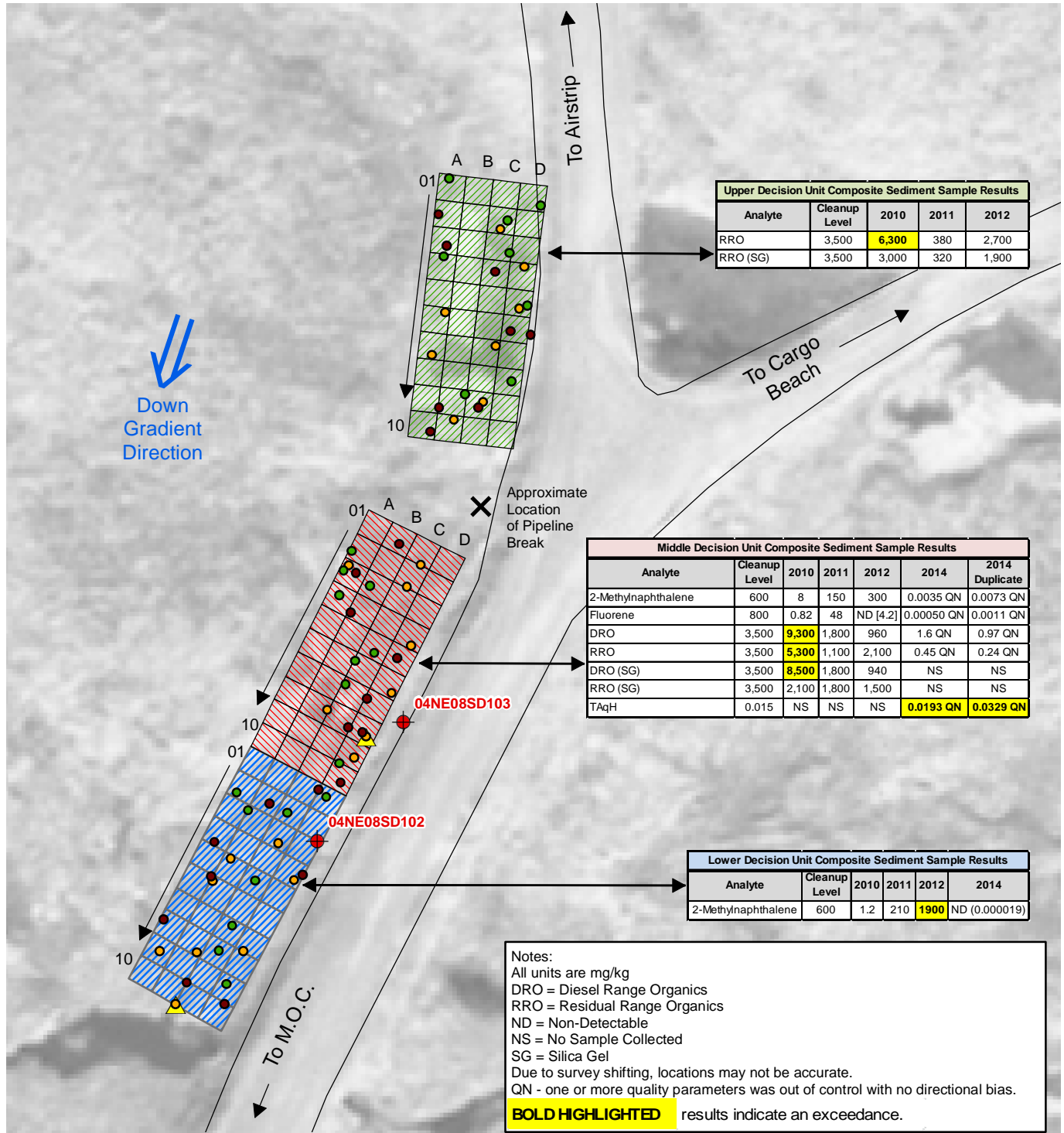


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NORTHEAST CAPE REMEDIAL ACTIONS SITE 7 - CARGO BEACH LANDFILL

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE:	06 JAN 2016	PROJECT MANAGER:	K. MAHER	FIGURE NO.:	A-3



- Historical Sediment Sample Exceedance
- 2012 Sediment & Surface Water Sample Location
- 2011 Sediment & Surface Water Sample Location
- 2010 Sediment & Surface Water Sample Location
- ▲ 2012 & 2014 Surface Water Sample Location
- Road
- Upper Decision Unit
- Middle Decision Unit
- Lower Decision Unit

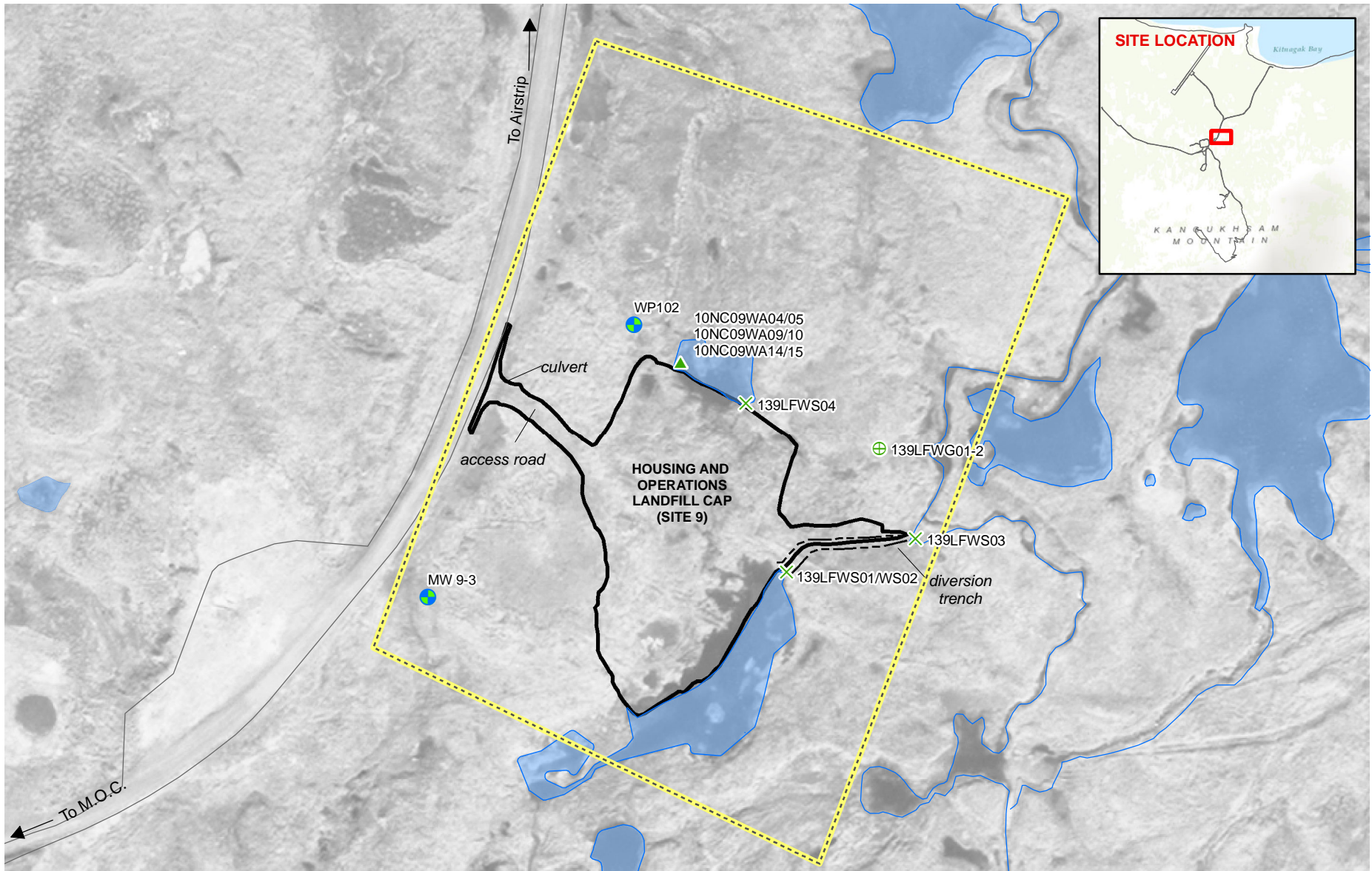
All Locations Are Approximate

0 20 40 60 80
Feet

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Image Date: 26, Aug, 2008

**NORTHEAST CAPE
 SITE 8, PETROLEUM, OIL AND LUBRICANT SPILL
 SAINT LAWRENCE ISLAND, ALASKA**

JACOBS	DATE: 26 MAY 2016	PROJECT MANAGER: K. MAHER	FIGURE NO: A-4
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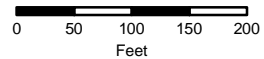


- ▲ 2010 Surface Water Samples (Approximate Location)
- X 2013 Surface Water Sample
- ⊕ 2013 Groundwater Sample
- 2001 Abandoned Monitoring Well (Approx. Location)

- Non-Drinking Water Area
- Surface Water



All Locations Are Approximate



NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

NORTHEAST CAPE SITE 9 - HOUSING AND OPERATIONS LANDFILL

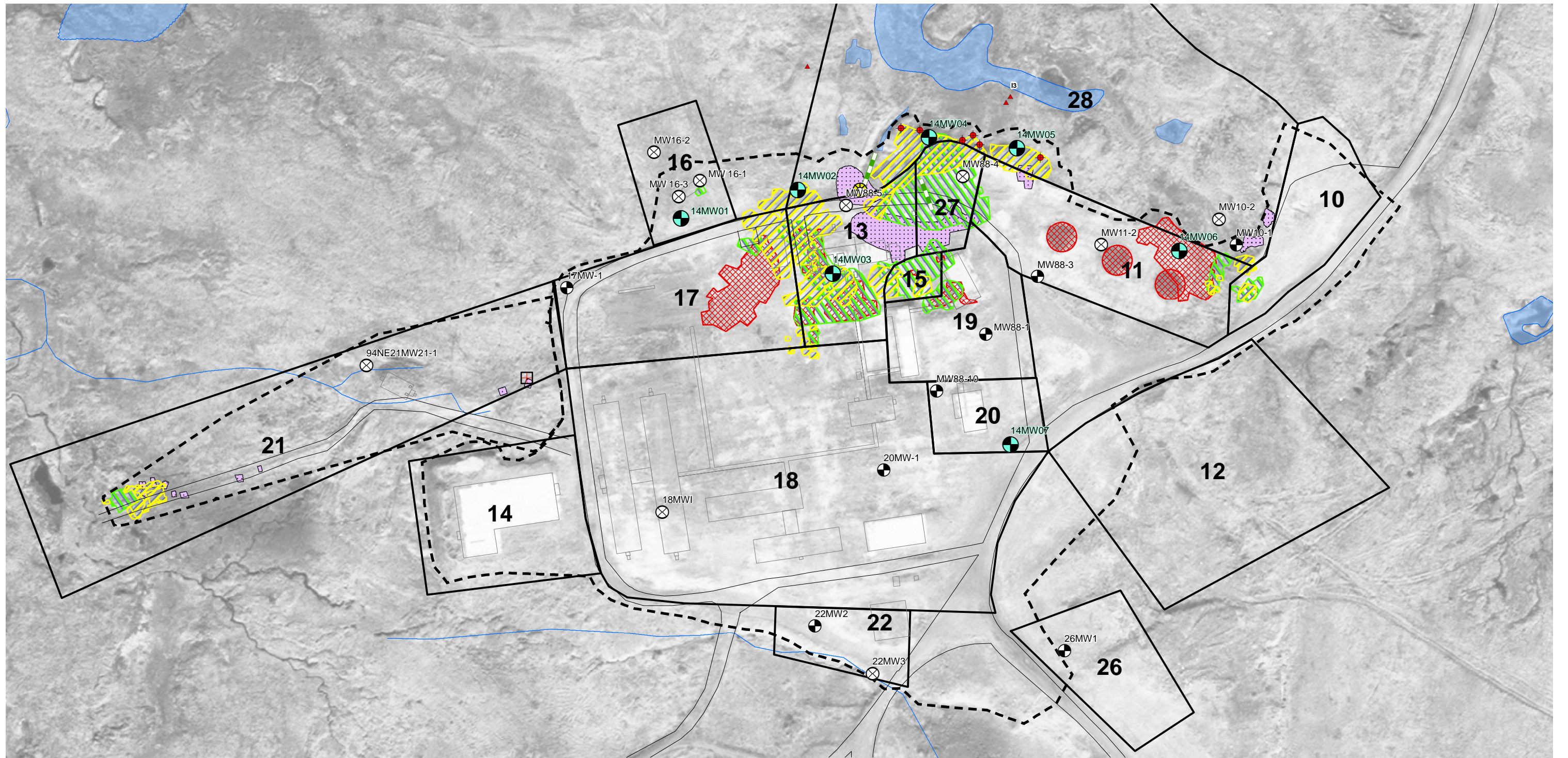
ST. LAWRENCE ISLAND, ALASKA



DATE:
06 JAN 2016

PROJECT MANAGER:
K. MAHER

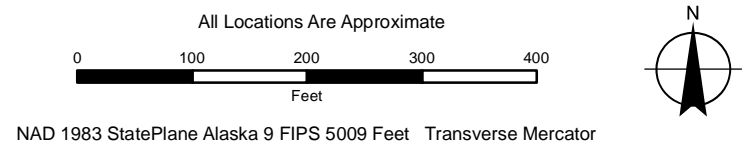
FIGURE NO.:
A-5



P:\SLawrenceIsland\MKD\1009_NorthEastCape\LongTermManagementPlan\2014\A6_MOC_OV_SitLawrence.mxd eggenlkt

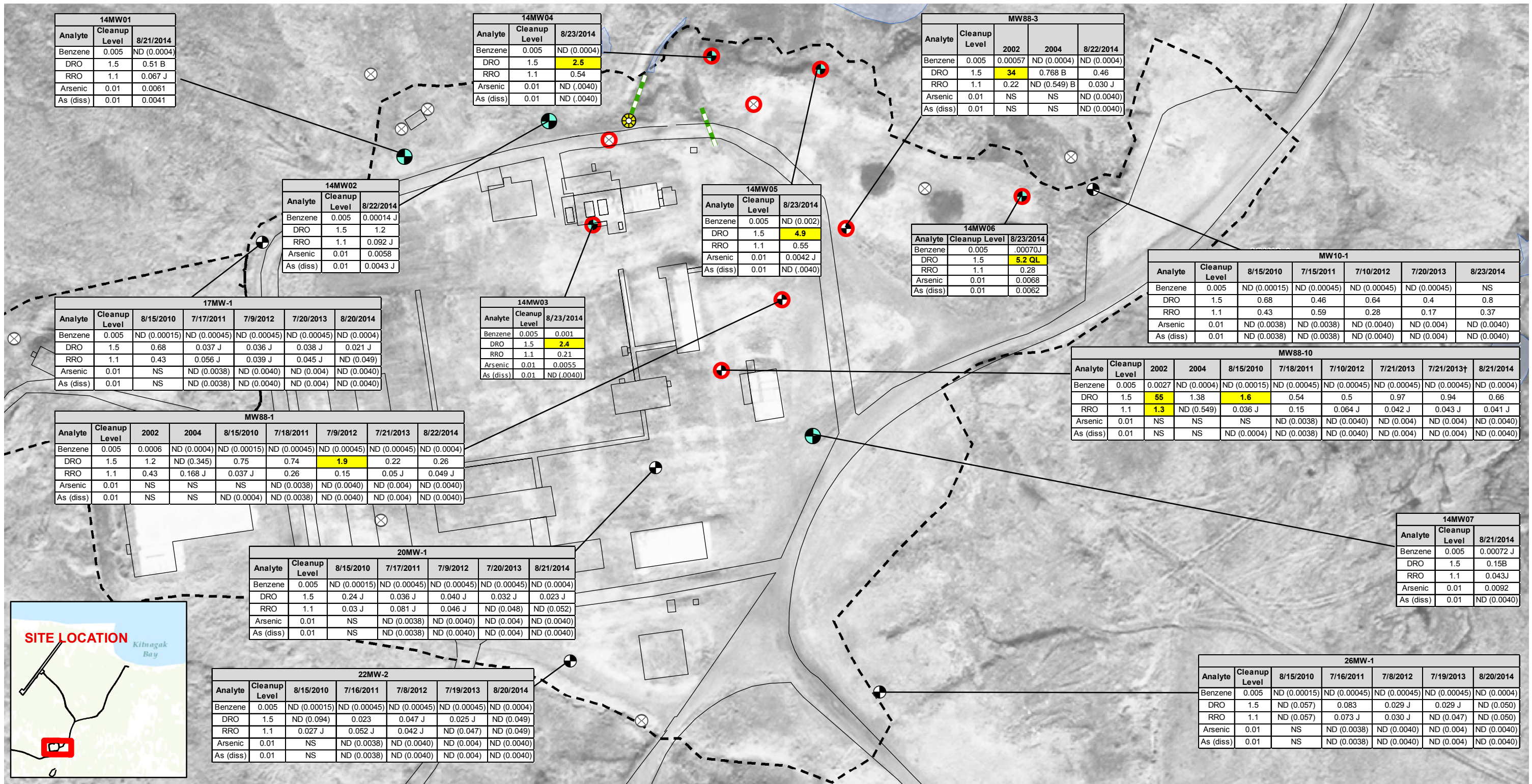


- Monitoring Well Installed in 2014
- Monitoring Well Installed Prior to 2014
- Well Abandoned
- 2013 Soil Confirmation Sample - 1 or More Analytes Exceed Cleanup Levels
- 2013 Sediment Confirmation Sample - 1 or More Analytes Exceed Cleanup Levels
- Former Manhole
- Former Culvert
- Road
- Site Boundaries Surveyed in 2014
- Former Building
- Approximate Site Boundaries from Decision Document
- Surface Water
- 2014 Excavation
- 2013 Excavation
- 2012 Excavation
- 2011 Excavation



NORTHEAST CAPE MAIN OPERATIONS COMPLEX OVERVIEW			
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA			
JACOBS	DATE: 14 JUN 2016	PROJECT MANAGER: K. MAHER	FIGURE NO: A-6

P:\SILawrenceIsland\MXD\1009_NorthEastCapeLongTermManagementPlan2014A7_MOC_MonitoringWells_SpiderDiagram.mxd eggenrik



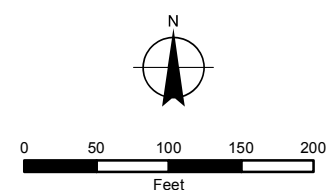
- Wells with Historical or Current Contaminant Concentrations Exceeding Site-Specific Cleanup Levels
- Monitoring Well Installed in 2014
- Monitoring Well Installed Prior to 2014
- ⊗ Abandoned Well
- Former Manhole
- Former Culvert
- Water Feature
- - - Site Boundaries Surveyed in 2014

Notes:

- All units are mg/L
- † indicates duplicate sample results
- NS = not sampled, ND = non-detect
- As (diss) = dissolved arsenic
- DRO = diesel range organics
- RRO = residual range organics
- QL = quality issue with potential low bias
- BOLD HIGHLIGHTED** results indicate exceedances.

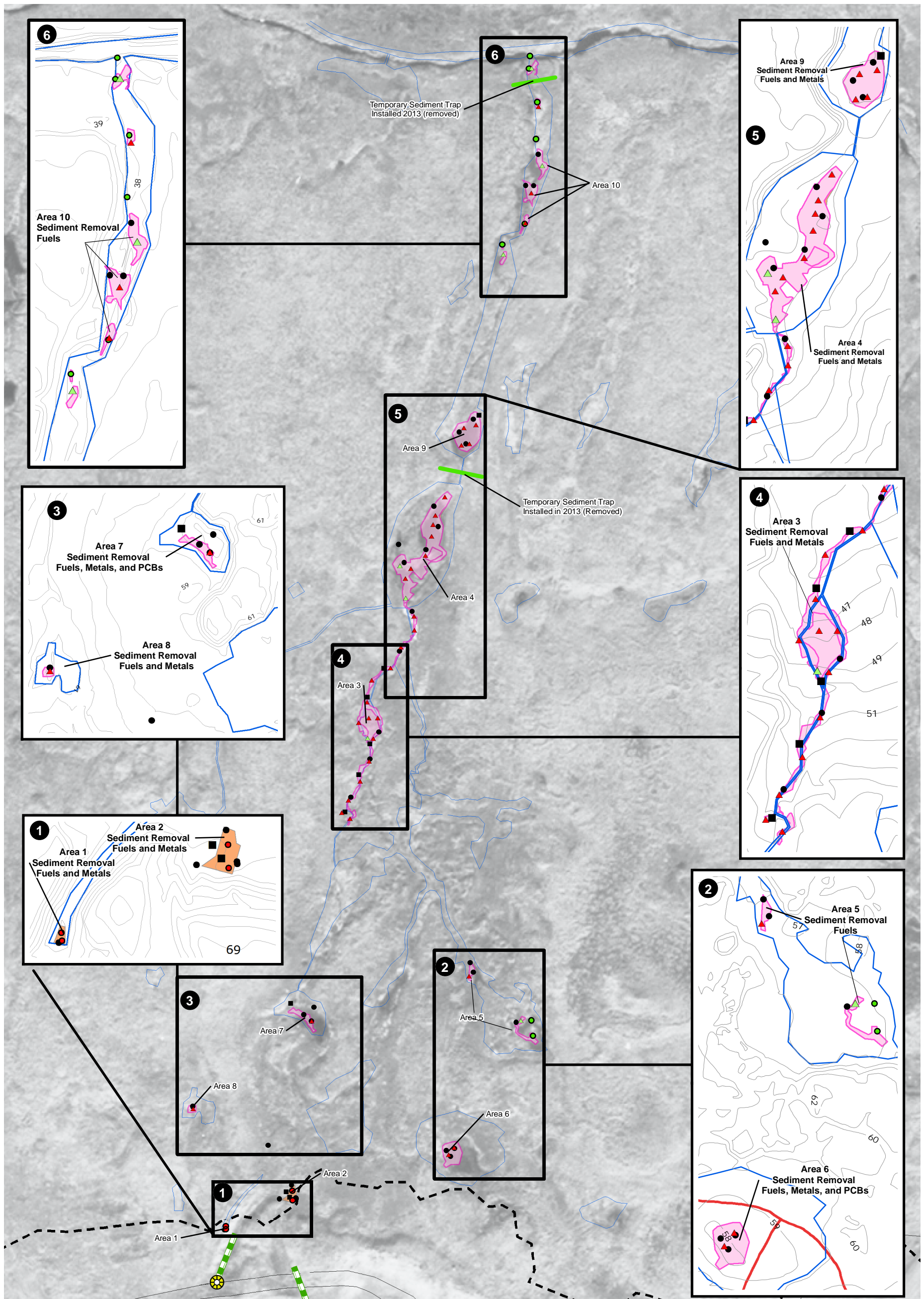
Notes (continued):

- Abandoned wells were decommissioned due to site conditions or demolished during Remedial Actions.
- B = analyte detected in QC blank, sample result may have potential high bias
- J = result is an estimate



NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
All Locations Are Approximate
Due to survey shifting, well locations may not be accurate.

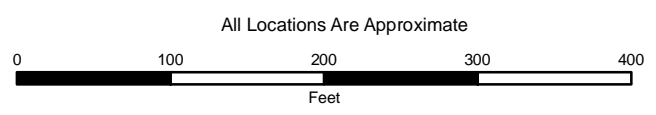
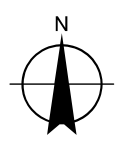
NORTHEAST CAPE MOC MONITORING WELL LOCATIONS AND SELECT SAMPLE RESULTS NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA			
JACOBS	DATE: 20 JUN 2016	PROJECT MANAGER: K. MAHER	FIGURE NO: A-7



Notes: Due to a survey shifting, locations may not be accurate.
 Locations with soil confirmation sample exceedances were not removed during 2014 excavation efforts.



- ▲ 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
- ⊗ Former Manhole
- Former Culvert
- Sediment Trap
- 2013 Sediment Removal
- 2012 Sediment Removal
- Ponded Water
- Site Boundaries Surveyed in 2014
- Road

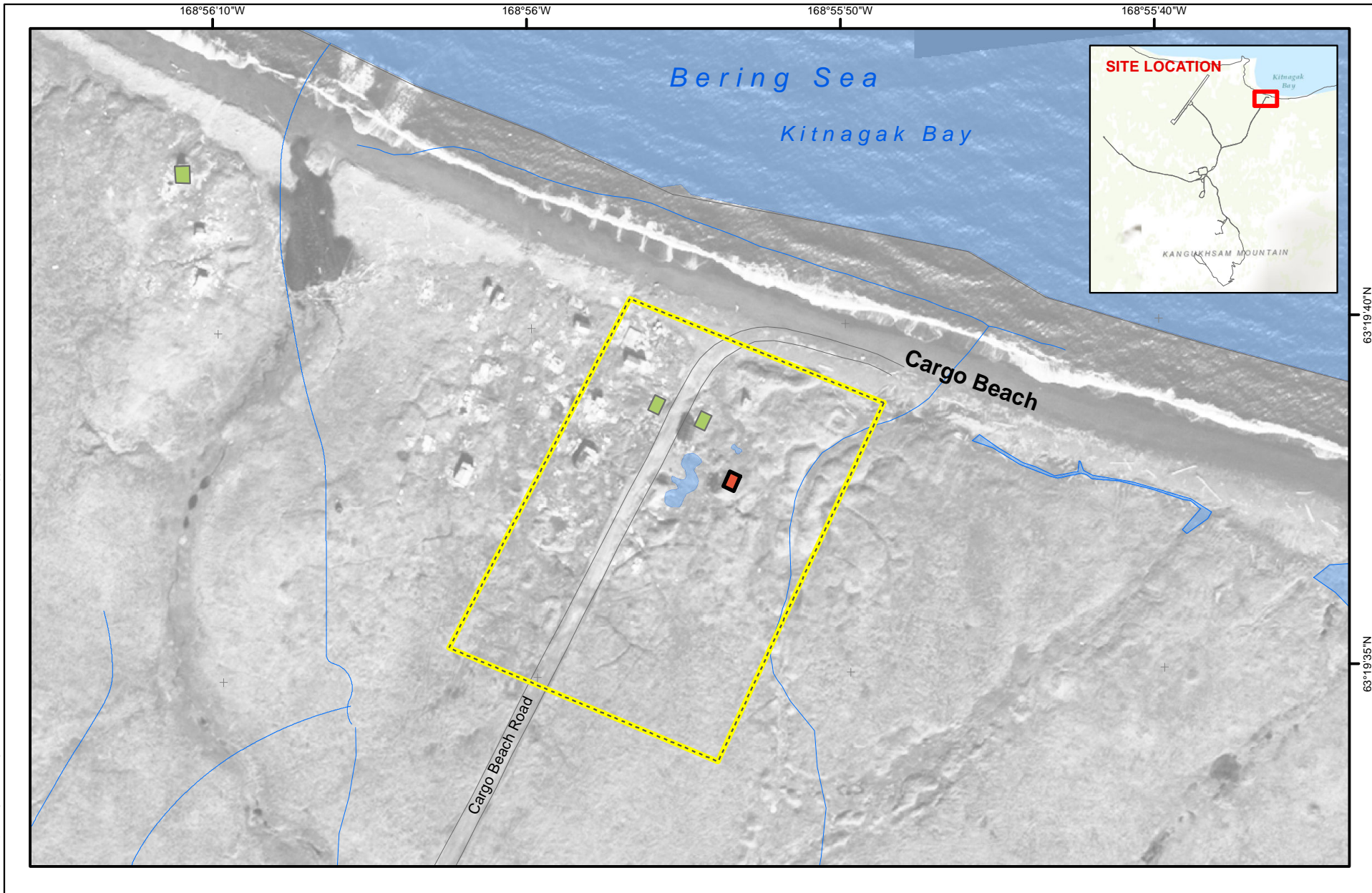


NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet Transverse Mercator

NORTHEAST CAPE SITE 28 - DRAINAGE AND EXCAVATIONS			
NORTHEAST CAPE, SAINT LAWRENCE ISLAND, ALASKA			
JACOBS	DATE: 15 JUN 2016	PROJECT MANAGER: K. MAHER	FIGURE NO: A-8

P:\SLawrenceIsland\MD\T009_NorthEastCape\LongTermManagementPlan\2014\A8_Site28_Drainage_SILawrence_2014_Briso\2014Data.mxd eggerlkt

P:\StLawrenceIsland\IXD\T008_NorthEastCape\LongTermManagementPlan2014\A9_Site03_FuelPumpHouse_StLawrence.mxd eggerkt



- Intact Structure
- Former Fuel Pump House
- Non-Drinking Water Area
- Surface Water



All Locations Are Approximate



NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

NORTHEAST CAPE
SITE 3 - FUEL PUMP HOUSE &
SITE 4 - NATIVE FISHING AND HUNTING CAMP
ST. LAWRENCE ISLAND, ALASKA



DATE:
29 SEP 2016

PROJECT MANAGER:
K. MAHER

FIGURE NO.
A-9

APPENDIX B
Decision Document Cleanup Levels

**Table B-1
Decision Document Cleanup Levels**

Contaminant of Concern	Soil (mg/kg)	Sediment ⁿ (mg/kg)	Groundwater ⁱ (mg/L) ^e	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}	--	--
Polycyclic Aromatic Hydrocarbons				
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 ¹	--	7.8 ^a	--	--
Total HPAH ²	--	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 ³	--	--	--	0.010
TAqH ⁴	--	--	--	0.015

Notes:

-- Cleanup level not specified in the DDs (USACE 2009a,b)

¹ LPAHs are low molecular weight PAHs.

² HPAHs are high molecular weight PAHs.

³ TAH is the sum of BTEX.

⁴ TAqH is the sum of BTEX and PAHs.

^a Washington State Administrative Code (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

^e 18 AAC 75, Table C (as updated 9 October 2008)

^f 18 AAC 75, Table B1 (as updated 9 October 2008)

^g 18 AAC 75, Method 4, risk-based residential cleanup level (USACE 2007)

^h Cleanup levels apply to continuously submerged sediment (including Sites 8, 28, and 29). Intermittently submerged sediment is considered soil.

ⁱ Cleanup levels apply to shallow groundwater in the vicinity of the MOC only.

For definitions, refer to the Acronyms and Abbreviations section.

APPENDIX C
Inspection Checklist

Site Inspection Checklist

I. SITE INFORMATION																									
Site name: _____	Date of Inspection: _____																								
Location and Region: _____	EPA ID: _____																								
Agency, office, or company: _____	Weather/temperature: _____																								
<p>Remedy Includes: (Check all that apply)</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; padding: 2px;"><input type="checkbox"/> Landfill cover/containment</td> <td style="width: 50%; padding: 2px;"><input type="checkbox"/> Monitored natural attenuation</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> Access controls</td> <td style="padding: 2px;"><input type="checkbox"/> Groundwater containment</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> Institutional controls</td> <td style="padding: 2px;"><input type="checkbox"/> Vertical barrier walls</td> </tr> <tr> <td style="padding: 2px;"><input type="checkbox"/> Groundwater pump and treatment</td> <td style="padding: 2px;"><input type="checkbox"/> Surface water collection and treatment</td> </tr> <tr> <td colspan="2" style="padding: 2px;"><input type="checkbox"/> Other: _____</td> </tr> </table>		<input type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation	<input type="checkbox"/> Access controls	<input type="checkbox"/> Groundwater containment	<input type="checkbox"/> Institutional controls	<input type="checkbox"/> Vertical barrier walls	<input type="checkbox"/> Groundwater pump and treatment	<input type="checkbox"/> Surface water collection and treatment	<input type="checkbox"/> Other: _____															
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<input type="checkbox"/> Other: _____																									
<p>Attachments: Inspection team roster attached Site map attached</p>																									
II. INTERVIEWS (CHECK ALL THAT APPLY)																									
<p>1. O&M site manager _____</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 10%; text-align: center;">Date</td> </tr> <tr> <td>Interviewed _____</td> <td>at site _____</td> <td>at office _____</td> <td>by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (Report attached) _____</td> </tr> </table>			Name	Title	Date	Interviewed _____	at site _____	at office _____	by phone (Phone no. _____)	Problems, suggestions (Report attached) _____															
	Name	Title	Date																						
Interviewed _____	at site _____	at office _____	by phone (Phone no. _____)																						
Problems, suggestions (Report attached) _____																									
<p>2. O&M staff _____</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 10%; text-align: center;">Date</td> </tr> <tr> <td>Interviewed _____</td> <td><input type="checkbox"/> at site _____</td> <td>at office _____</td> <td>by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (Report attached) _____</td> </tr> </table>			Name	Title	Date	Interviewed _____	<input type="checkbox"/> at site _____	at office _____	by phone (Phone no. _____)	Problems, suggestions (Report attached) _____															
	Name	Title	Date																						
Interviewed _____	<input type="checkbox"/> at site _____	at office _____	by phone (Phone no. _____)																						
Problems, suggestions (Report attached) _____																									
<p>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.</p> <p>Agency _____</p> <p>Contact _____</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 10%; text-align: center;">Date</td> </tr> <tr> <td>Interviewed _____</td> <td>at site _____</td> <td>at office _____</td> <td>by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (Report attached) _____</td> </tr> </table> <p>_____</p> <p>Agency _____</p> <p>Contact _____</p> <table style="width: 100%; border: none;"> <tr> <td style="width: 30%;"></td> <td style="width: 30%; text-align: center;">Name</td> <td style="width: 30%; text-align: center;">Title</td> <td style="width: 10%; text-align: center;">Date</td> </tr> <tr> <td>Interviewed _____</td> <td>at site _____</td> <td>at office _____</td> <td>by phone (Phone no. _____)</td> </tr> <tr> <td colspan="4">Problems, suggestions (Report attached) _____</td> </tr> </table> <p>_____</p>			Name	Title	Date	Interviewed _____	at site _____	at office _____	by phone (Phone no. _____)	Problems, suggestions (Report attached) _____					Name	Title	Date	Interviewed _____	at site _____	at office _____	by phone (Phone no. _____)	Problems, suggestions (Report attached) _____			
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Problems, suggestions (Report attached) _____																									
	Name	Title	Date																						
Interviewed _____	at site _____	at office _____	by phone (Phone no. _____)																						
Problems, suggestions (Report attached) _____																									
<p>4. Other interviews (optional) (Report attached) _____</p> <p>_____</p> <p>_____</p> <p>_____</p>																									

Site Name: _____

Site Inspection Checklist (2/13)

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: _____ _____				
2. Site-Specific Health and Safety Plan				
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	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: _____ _____				
6. Settlement Monument 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 Inspection Checklist (3/13)

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 _____	

2. O&M Cost Records

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

Total annual cost by year for review period if available

From _____ To _____	_____	Breakdown attached
Date Date	Total cost	
From _____ To _____	_____	Breakdown attached
Date Date	Total cost	
From _____ To _____	_____	Breakdown attached
Date Date	Total cost	
From _____ To _____	_____	Breakdown attached
Date Date	Total cost	

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

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS

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 Name: _____

Site Inspection Checklist (4/13)

V. ACCESS AND INSTITUTIONAL CONTROLS (Continued)

C. Institutional Controls (IC)

1. Implementation and enforcement

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

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

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

Frequency _____

Responsible party/agency _____

Contact _____

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

Reporting is up to date Yes No N/A

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

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

Violations have been reported Yes No N/A

Other problems or suggestions: (Report attached) _____

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

Remarks _____

D. General

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

Remarks _____

2. Land use changes on the site N/A

Remarks _____

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

Remarks _____

VI. GENERAL SITE CONDITIONS

A. Landfill Surface Applicable N/A

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

Remarks _____

B. Other Site Conditions

Remarks _____

Site Inspection Checklist (5/13)

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 _____

Site Inspection Checklist (6/13)

VII. LANDFILL COVERS (Continued)

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

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

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

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

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

1. **Settlement** Location shown on site map No evidence of settlement
 Areal extent _____ Depth _____
 Remarks _____

2. **Material Degradation** Location shown on site map No evidence of degradation
 Material type _____ Areal extent _____
 Remarks _____

3. **Erosion** Location shown on site map No evidence of erosion
 Areal extent _____ Depth _____
 Remarks _____

4. **Undercutting** Location shown on site map No evidence of undercutting
 Areal extent _____ Depth _____
 Remarks _____

5. **Obstructions** Type _____ No obstructions
 Location shown on site map Areal extent _____
 Size _____
 Remarks _____

6. **Excessive Vegetative Growth** Type _____
 No evidence of excessive growth
 Vegetation in channels does not obstruct flow
 Location shown on site map Areal extent _____
 Remarks _____

Site Inspection Checklist (7/13)

VII. LANDFILL COVERS (Continued)			
D. Cover Penetrations		Applicable	N/A
1. Gas Vents	Active	Passive	Properly secured/locked
	Functioning	Routinely sampled	Good condition
	Needs maintenance	Evidence of leakage at penetration	
	N/A		
Remarks _____			

2. Gas Monitoring Probes	Properly secured/locked	Functioning	Routinely sampled
	Good condition	Evidence of leakage at penetration	
	Needs maintenance	N/A	
Remarks _____			

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

4. Leachate Extraction Wells	Properly secured/locked	Functioning	Routinely sampled
	Good condition	Evidence of leakage at penetration	
	Needs maintenance	N/A	
Remarks _____			

5. Settlement Monuments	Located	Routinely surveyed	N/A
Remarks _____			

E. Gas Collection and Treatment		Applicable	N/A
1. Gas Treatment Facilities			
	Flaring	Thermal destruction	Collection for reuse
	Good condition	Needs maintenance	N/A
Remarks _____			

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

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

Site Name: _____

Site Inspection Checklist (8/13)

VII. LANDFILL COVERS (Continued)		
F. Cover Drainage Layer	Applicable	N/A
Remarks _____		
1. Outlet Pipes Inspected	Functioning	N/A
Remarks _____		
2. Outlet Rock Inspected	Applicable	N/A
Remarks _____		
G. Detention/Sedimentation Ponds	Applicable	N/A
Remarks _____		
1. Siltation Areal extent _____ Depth _____		N/A
Siltation not evident		
Remarks _____		
2. Erosion Areal extent _____ Depth _____		
Erosion not evident		
Remarks _____		
3. Outlet Works	Functioning	N/A
Remarks _____		
4. Dam	Functioning	N/A
Remarks _____		
H. Retaining Walls	Applicable	N/A
Remarks _____		
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 Inspection Checklist (9/13)

VII. LANDFILL COVERS (Continued)

I. Perimeter Ditches/Offsite Discharge	Applicable	N/A
1. Siltation	Location shown on site map	Siltation not evident
Areal extent _____	Depth _____	
Remarks _____		
<hr/>		
2. Vegetative Growth	Location shown on site map	N/A
Vegetation does not impede flow		
Areal extent _____	Type _____	
Remarks _____		
<hr/>		
3. Erosion	Location shown on site map	Erosion not evident
Areal extent _____	Depth _____	
Remarks _____		
<hr/>		
4. Discharge Structure	Functioning	N/A
Remarks _____		
<hr/>		

VIII. VERTICAL BARRIER WALLS

	Applicable	N/A
1. Settlement	Location shown on site map	Settlement not evident
Areal extent _____	Depth _____	
Remarks: _____		
<hr/>		
2. Performance Monitoring		
Type of monitoring _____		
Performance not monitored	Frequency _____	
Evidence of breaching		
Head differential _____		
Remarks: _____		
<hr/>		

Site Name: _____

Site Inspection Checklist (10/13)

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 Inspection Checklist (11/13)

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)		
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 _____		

Site Name: _____

Site Inspection Checklist (12/13)

IX. GROUNDWATER/SURFACE WATER REMEDIES (Continued)

D. Monitoring Data

1. Monitoring Data

Is routinely submitted on time

Is of acceptable quality

2. Monitoring data suggests:

Groundwater plume is effectively contained

Contaminant concentrations are declining

E. Monitored Natural Attenuation

1. Monitoring Wells (natural attenuation remedy)

Properly secured/locked

Functioning

Routinely sampled

Good condition

All required wells located

Needs maintenance

N/A

Remarks _____

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

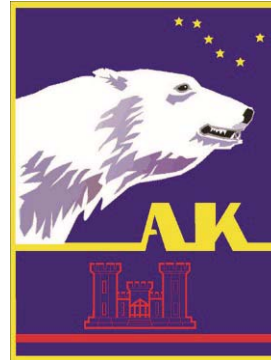
A. Implementation of the Remedy

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.).

APPENDIX D
Public Meeting Notes

26 July 2016 Public Information Session Slides, and Meeting Notes, Attendance Sheet

U.S. Army Corps of Engineers Alaska District



Long-Term Management Plan

for

**Northeast Cape
Formerly Used Defense Site (FUDS)
St. Lawrence Island, Alaska**

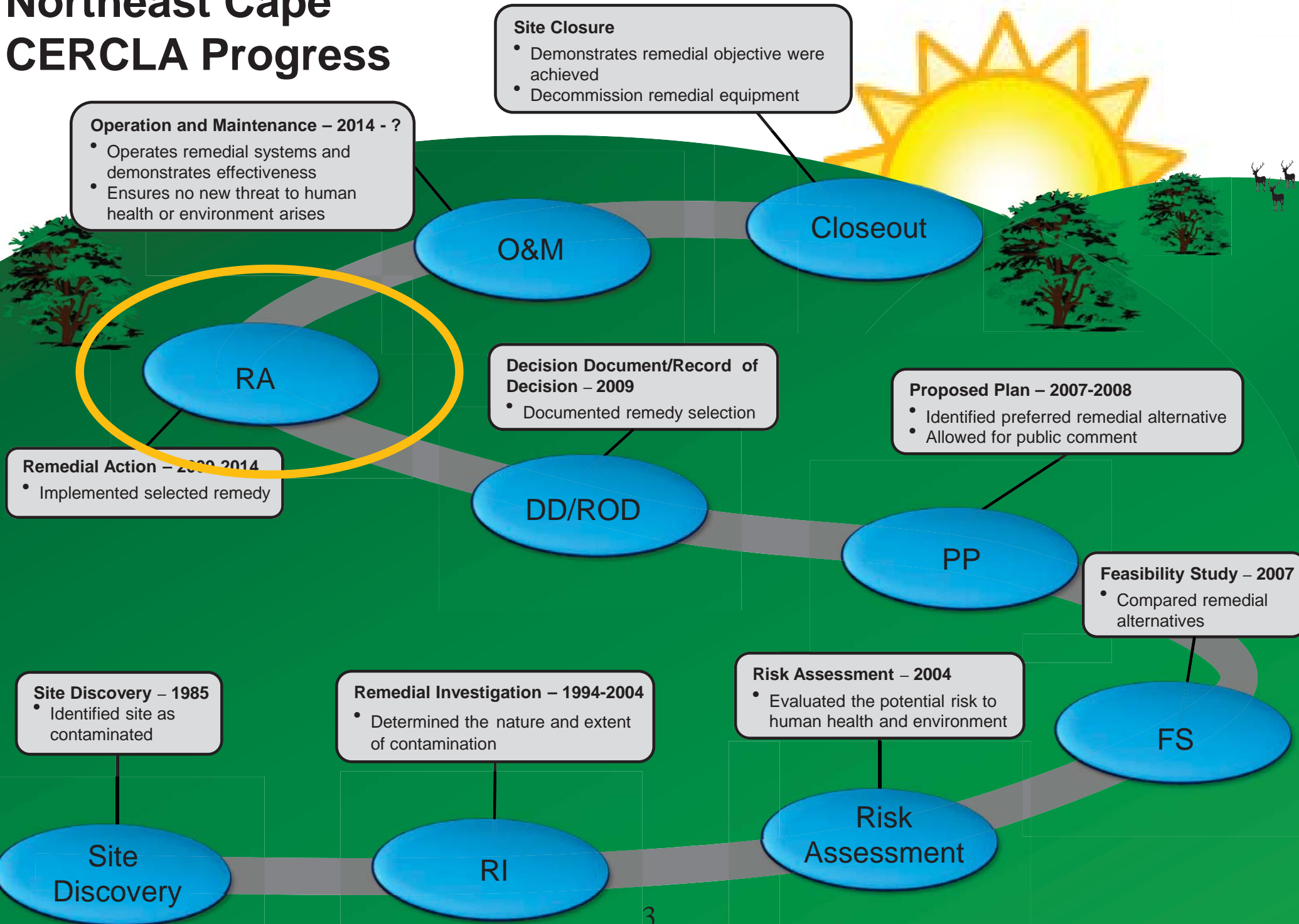
JACOBS

Meeting Purpose

- Present an overview of key items found in the Northeast Cape FUDS Long-Term Management Plan
- Provide the community an opportunity to make in-person comments related to the Long Term Management Plan during the public comment period



Northeast Cape CERCLA Progress

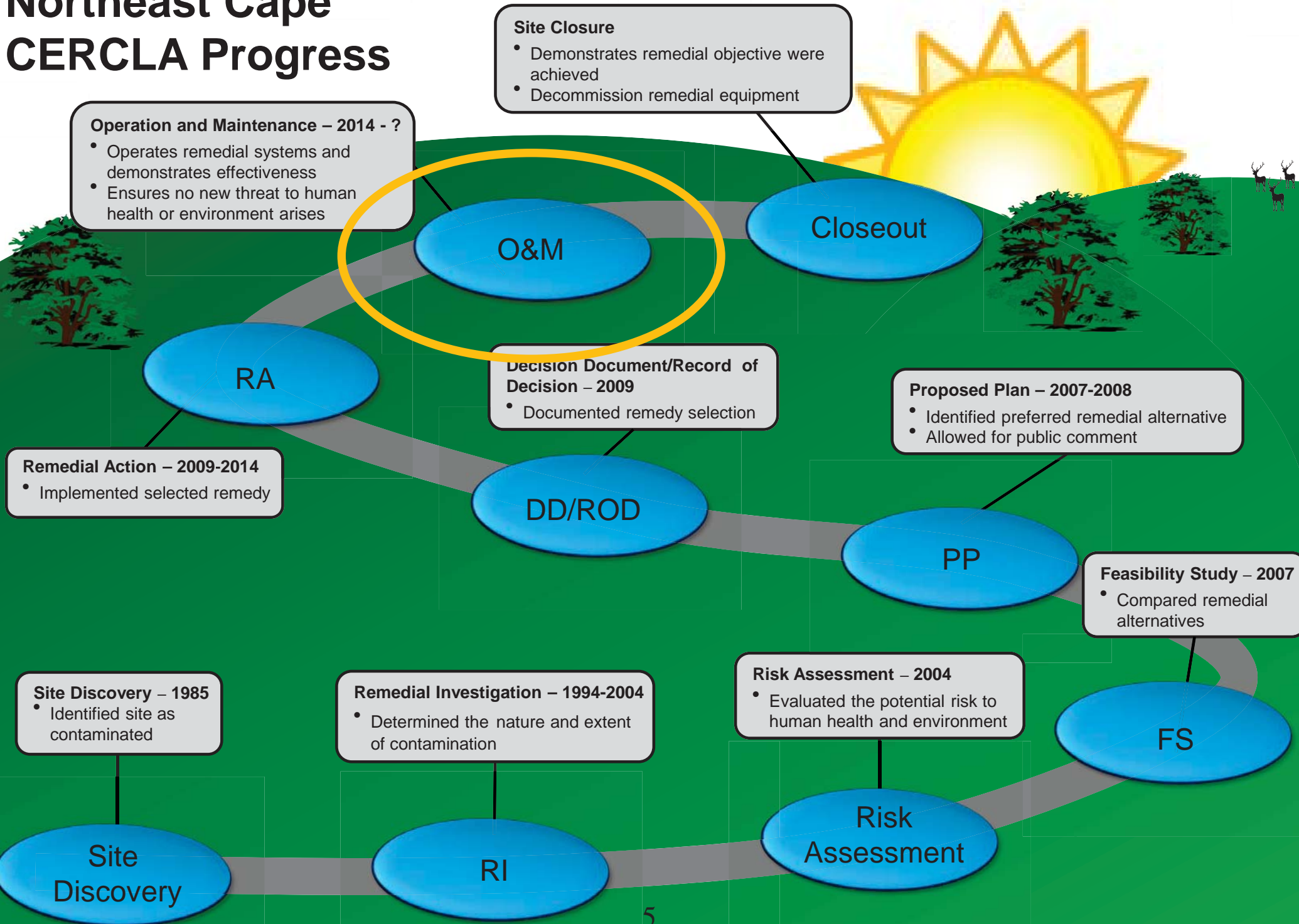


Remedial Actions

- Remedial Actions began at Northeast Cape in 2009 and continued through 2014. These Remedial Actions implemented the remedy selected in the Decision Documents



Northeast Cape CERCLA Progress

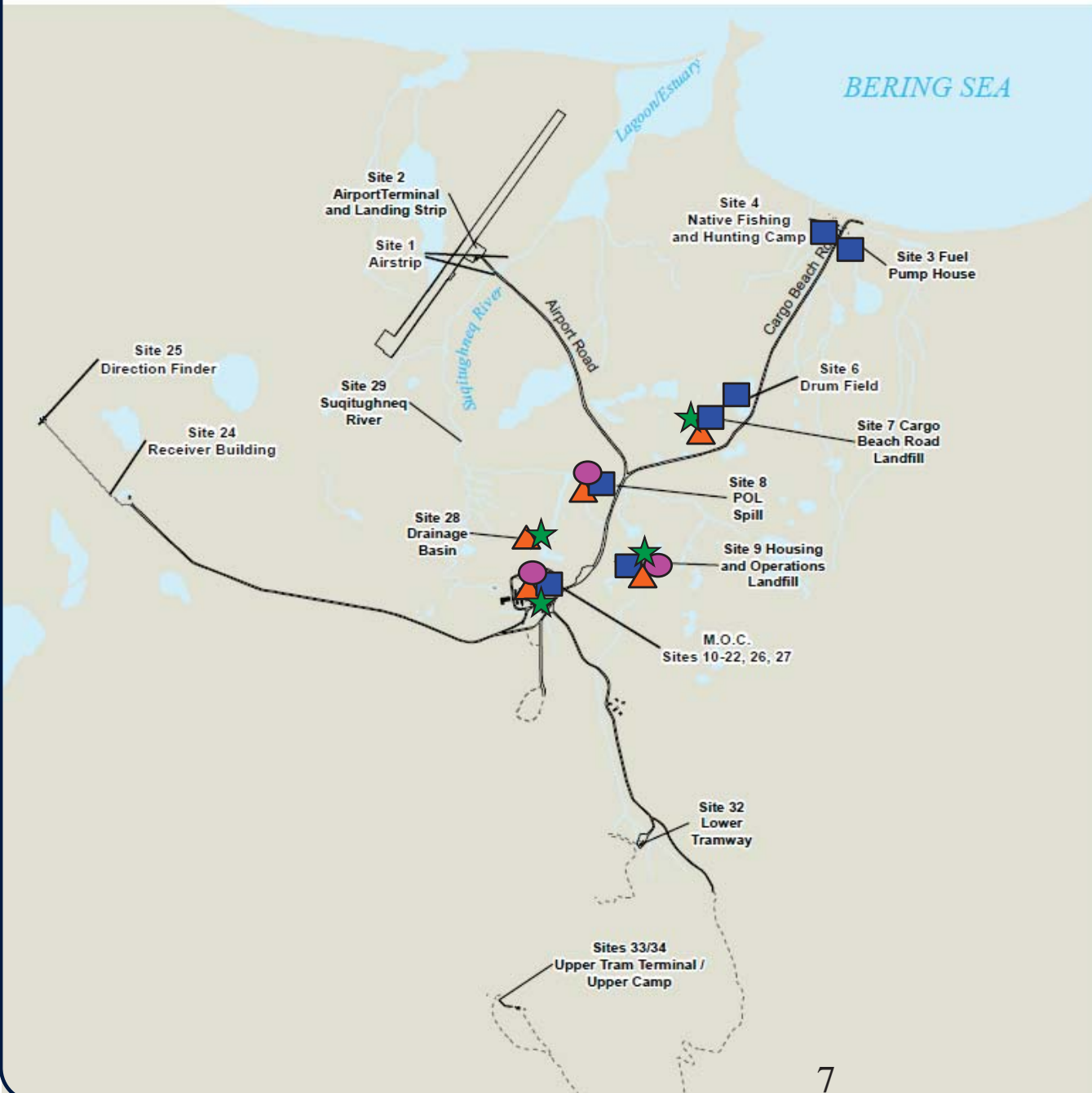


Operations and Maintenance (O&M)

- The Operations and Maintenance (O&M) stage of the CERCLA process is used to operate the remedial systems created during the remedial action and to ensure no new threats to human health or the environment are present
- The following O&M activities are needed at the site based on the remedies selected in the DD:
 - Establishing Land Use Controls (LUCs)
 - Conducting Inspections
 - Conducting Monitoring
 - Conducting Maintenance when needed



Long-Term Management (LTM) at Northeast Cape



Several Northeast Cape sites will require some type of Long-Term Management at this time (Site 3, Site 4, Site 6, Site 7, Site 8, Site 9, and the sites that make up the MOC)

■ Land-Use Controls

▲ Inspections

● Monitoring

★ Maintenance, if needed








Land Use Controls (LUCs)

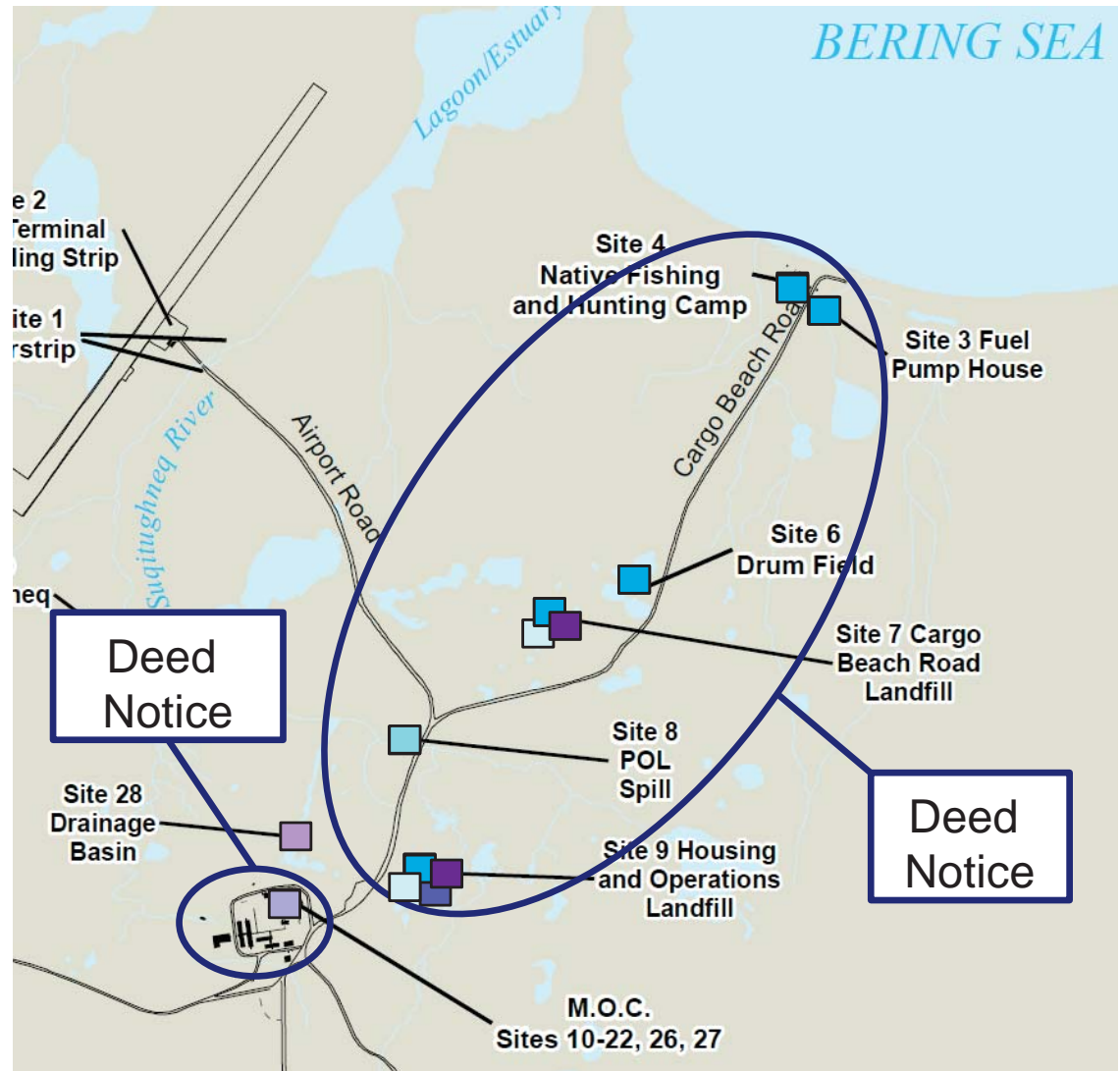
- The objective of Land Use Controls are to reduce the chance for human exposure to contamination
- Engineering Controls (physical items you can see; e.g., landfill cap)
- Institutional Controls (written notices or rules; e.g., deed notice)

Sites Requiring Land Use Controls

Site	Control Type	LUC	Media
9	Engineering	Diversion Trench	Not Applicable
7 and 9	Engineering	Landfill Cap	Not Applicable
28	Engineering	Sediment Containment Pond (if constructed)	Sediment
7 and 9	Institutional	Future building construction or excavation, which could disturb the landfill cap, are not recommended in or within the immediate vicinity of the site.	Not Applicable
8	Institutional	Area should not be used for residential land use without additional investigation and/or cleanup.	Sediment
3, 4, 6, 7, and 9	Institutional	Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water.	Groundwater
10 through 20, 22, 26, and 27 (MOC)	Institutional	Groundwater should not be used as a drinking water source until cleanup levels are met.	Groundwater

Land Use Controls

LUC Type	Description
Engineering	 Diversion Trench
	 Landfill Cap
	 Sediment Containment Pond (if constructed)
Institutional	 Shallow groundwater is not a reasonable potential future drinking water source and is not suitable for drinking water
	 Groundwater should not be used as a drinking water source until cleanup levels are met
	 Future building construction or excavation, which could disturb the landfill cap, are not recommended in or within the immediate vicinity of the site
	 Area should not be used for residential land use without additional investigation and/or cleanup.



Inspections

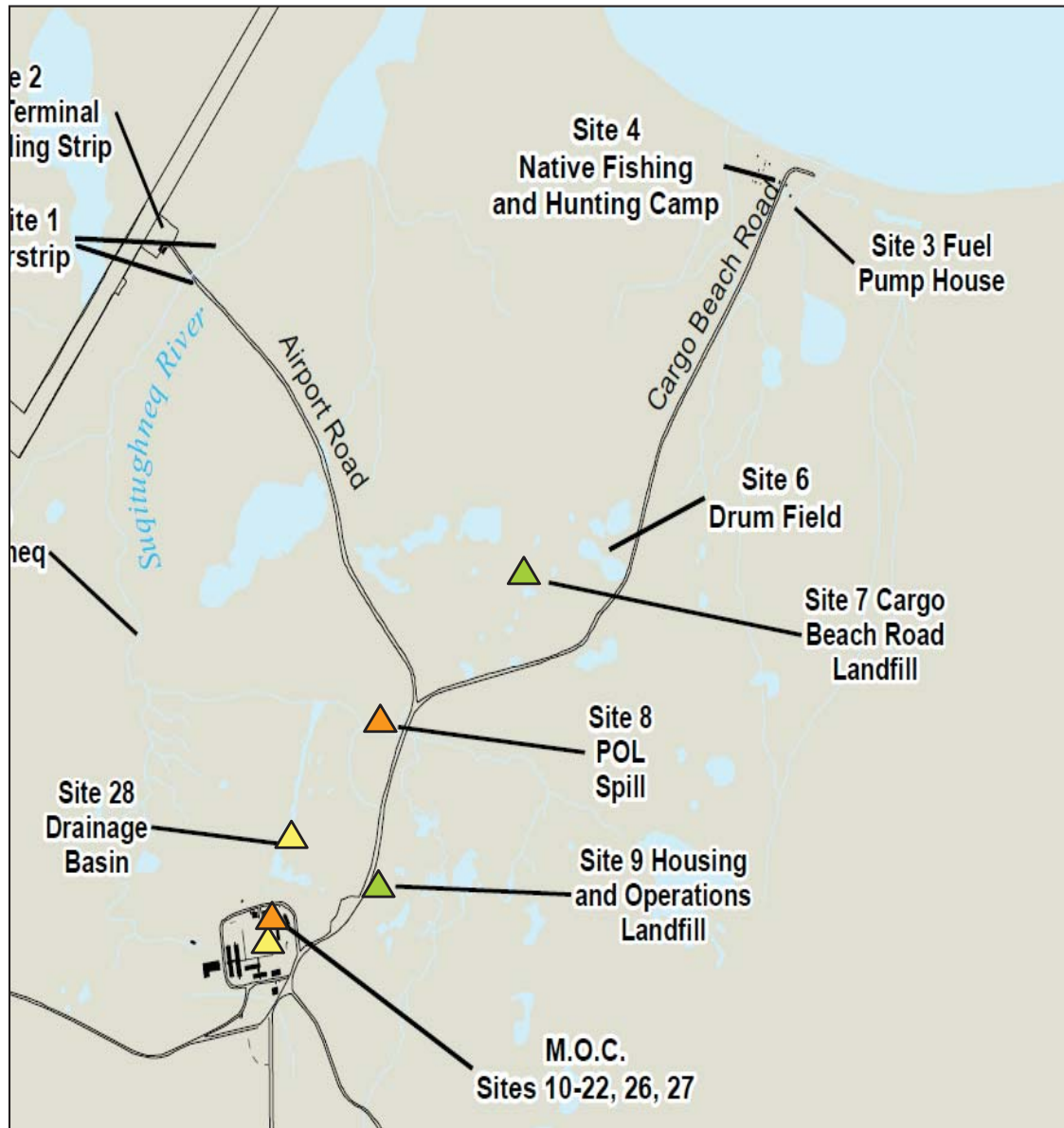
- Inspections are conducted “in-person” to look at the site to:
 - Evaluate current site conditions
 - Complete inspection checklist(s)




Sites Requiring Inspections

Site	Inspection Type	Frequency	Duration	Media
7	Landfill cap visual inspection	Periodic	Periodically for up to 30 years	Not Applicable
9	Landfill cap and diversion trench visual inspection	Periodic	Periodically for up to 30 years	Not Applicable
8	Periodic review	Five-year intervals	Until RAOs* are met	Sediment
10, 11, 13, 15, 19, and 27 (MOC)	Periodic review	Periodic	Until RAOs* are met	Groundwater
21	CERCLA five-year review	Five-year intervals	Until RAOs* are met	Soil
28	CERCLA five-year review	Five-year intervals	Until RAOs* are met	Sediment

* Remedial action objectives (RAOs) are specified in the decision document and they describe what the site cleanup is expected to accomplish.

Inspections



Inspection Type	Description
 CERCLA Five-Year Review	Every five years until RAOs are met.
 Periodic Review	Periodically until RAOs are met
 Landfill Cap Inspection	Periodically for up to 30 years

Monitoring

Monitoring will be conducted at Northeast Cape to:

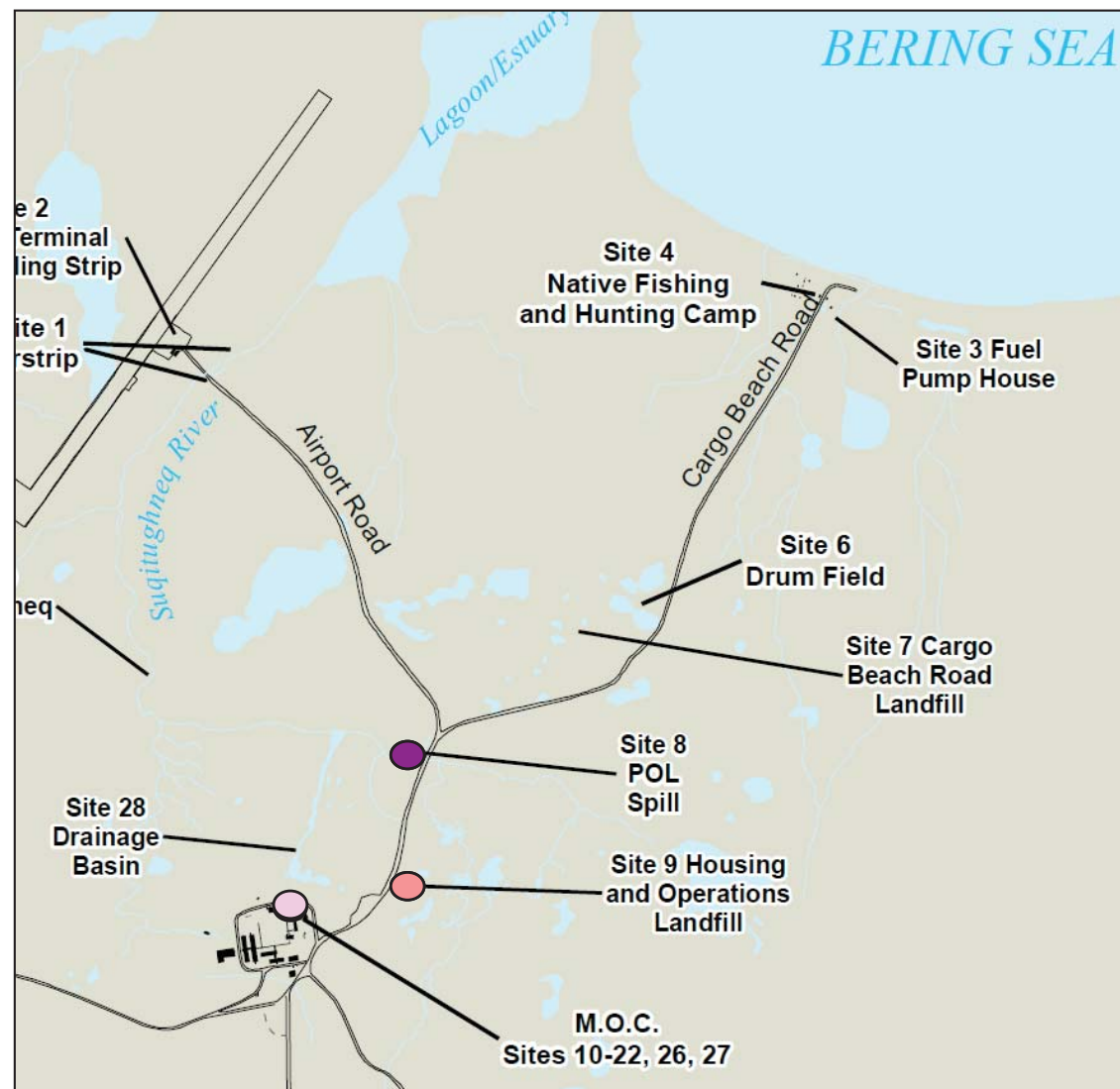
- Evaluate the performance and effectiveness of the selected remedies
- Evaluate trends in contaminant levels

Sites Requiring Monitoring

Site	Media	Frequency	Duration
8	Sediment	Five-year intervals	Until RAOs are met.
9	Groundwater	Five-year intervals	Six monitoring events over 30 years.
10, 11, 13, 15, 19, and 27 (Part of the MOC)	Groundwater	Periodic	Until RAOs are met.

- Groundwater monitoring at the MOC will occur in August 2016
- 2016 sample collection efforts will also include:
 - Soil and sediment at Site 8
 - Sediment and surface water at selected locations in the Suqi River to ensure Site 28 sediment removal activities did not impact the river

Monitoring

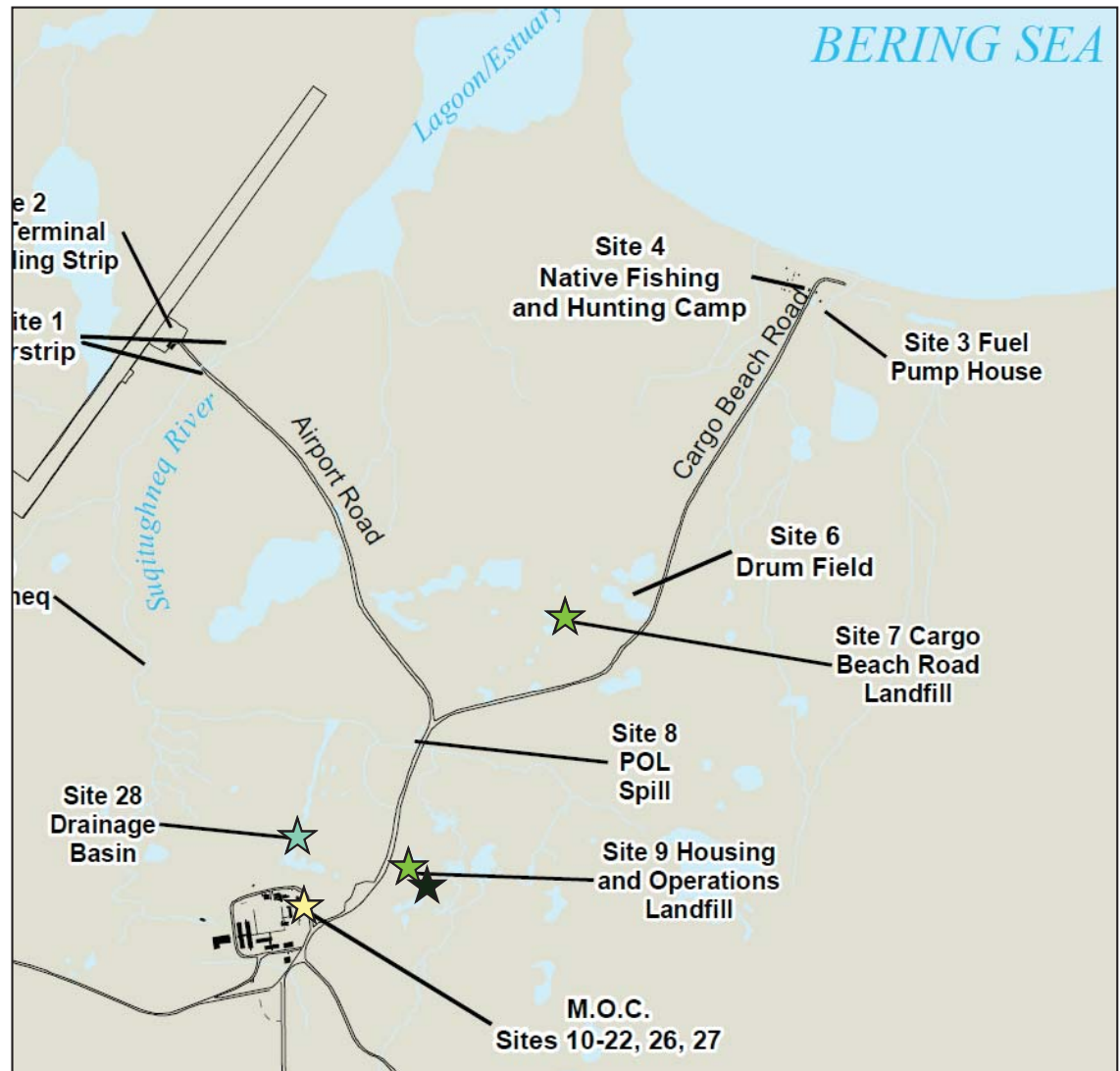


Monitoring Type	Duration
Groundwater/ Surface Water	Six monitoring events to demonstrate groundwater meets cleanup levels
Sediment	Until RAOs are met
Groundwater	Until cleanup levels are met

Maintenance

- Occasional maintenance activities may be required to ensure future protectiveness of the remedy
- Maintenance will be performed as determined necessary

Potential Maintenance Type	
★	Landfill Cap Repair
★	Diversion Trench Clearing and Maintenance
★	Monitoring Well Repair
★	Sediment Control System (if constructed) Clearing or Maintenance



USACE Responsibilities

- Verify human health and the environment remain protected at Northeast Cape until DD established RAOs are met by completing the second Five Year Review in early 2019, and subsequent Five Year reviews
- Assure the selected remedies remain functional and effective until DD established cleanup levels are met
- Retain responsibility for newly discovered Northeast Cape FUDS-related contamination
- Periodically review the Long-Term Management Plan to assess the need for revisions
- Provide project documents to the Northeast Cape FUDS Information Repositories
 - Savoonga City Hall
 - Sivuaq Corporation Building (Lodge) in Gambell

How can the Community be Involved?

- Public Meetings, like this one, and
 - A public meeting will be held sometime in 2018 during the next Five Year Review, and with subsequent Five Year reviews
- Public Comment Period
 - LTM Plan comments are due to the USACE within the 60 day public review period, which ends 19 August
 - Provide written comments to USACE or Jacobs folks here today
 - Call or Email comments to the USACE Project Manager
 - Valerie Palmer (USACE) 907-753-2578
 - Valerie.Y.Palmer@usace.army.mil
- Five Year and Periodic Reviews
 - USACE will seek public comment during Five Year and Periodic Reviews
- If discovered, report new contamination to
 - Valerie Palmer, USACE Project Manager



Questions or Comments?

Long Term Management Plan (LTMP) Public Information Session
Brief Summary Paraphrased Notes Pertaining to the LTMP
July 26, 2016 – 1:00 PM to 3:00 PM

Attendees are recorded on the attached sign-in sheet. Some community members wished to remain anonymous and did not sign in. Three telephone participants included Jaclyn Rosc – R&M Technologies, Vi Waghiyi – Alaska Communities Action on Toxics (ACAT) and Savoonga Tribal Member, and Pam Miller – ACAT

Kevin Maher with Jacobs Engineering presented LTM Plan slides (attached), and Aaron Shewman (AS) with the Army Corps of Engineers, answered questions.

(Approximately Slide 9)

Audience Question: The sediment containment pond at Site 28 is listed as a potential future action. Why is this only potential?

AS Response: Further sampling will happen later this summer to determine if Site 28 cleanup work affected Suqi River water or sediment quality. Natural ponds in Site 28 are already collecting sediment. A manmade pond raises a new host of problems, including disturbance as a result of construction as well as future maintenance. While sediments were being removed from Site 28 in 2013, Site 28 surface water did not exceed cleanup levels, so as long as Site 28 sediment and soil at the MOC are not disturbed, Site 28 surface waters should not exceed cleanup levels.

Audience Question: Which cleanup level standards will be used for groundwater cleanup?

AS Response: The groundwater cleanup levels at the MOC are based on drinking water quality standards.

Audience Question: Why is active remediation for groundwater not being pursued?

AS Response: In terms of active versus passive groundwater remediation, it does not make sense to change the course of action until we know what the area is naturally doing. There is currently no plan for a drinking water source at the MOC. If a new drinking water source was necessary at the MOC in the short-term, then further action, such as installing a drinking water well upgradient of the MOC, would be necessary.

Audience Question: I agree with the previous question, the water at the MOC has been identified as not suitable for drinking. We want to be sure there is nothing else out there that can harm us. I do not find it acceptable that we are leaving this water knowing it is contaminated.

AS Response: Actively cleaning up the groundwater at the MOC was not what was agreed upon in the Decision Document (DD). In the DD it was noted a Deed Notice (institutional control) would be necessary to notify potential users the water is not drinking water quality until cleanup objectives are met.

Audience Question: Are there signs out there that say you should not drink that water?

AS Response: Not yet, but there may be in the next one to two years. If the community wants signs, then we would like to hear from the community where you would like the signs to be.

Audience Response: Post a large sign at the site.

AS Response: We are concerned this will create a hazard for snow-machiners.

Audience Comment: I suggest signs at Gambell and Savoonga, the fish camp, and at the MOC. Snowmachiners will see the signs sticking up out of the tundra and most snowmachines tend to stick to the coast anyway. Making them reflective signs or adding reflective tape can also help add visibility.

Audience Question: We know some of our health issues are a result of the contamination from Northeast Cape and that fish there are contaminated. If the Army Corps is around for 30 more years [per LTM Plan], and we prove the fish are dirty, then will the Army Corp clean up what we find?

AS Response: The Army Corp neither has funding for fish testing nor are there established cleanup levels for fish. Cleanup levels are available for soil, sediment, and water, which can be sources of contamination found in fish.

Audience Comment: Why were the landfills just capped if they can still be a source of contamination? There is still the desire to have a community out by Northeast Cape like there once was and landfills prevent this from being a reality.

Audience Question: What do the inspections involve? Are they just visual or will it be active investigation?

AS Response: The landfill caps will be visually inspected, which means someone will walk over the caps and note their visual condition. The ponds touching the landfill caps have had surface water testing and are not contaminated, so as long as the caps remain in good condition, contamination is not expected in the ponds. We have been unable to find enough groundwater for sampling around the caps, but the surface water ponds adjacent to the caps are the first place contamination should appear. Contamination has not been present in the surface water.

(Approximately Slide 15)

(Presentation Finished)

Audience Question: The Corp has a legal government-to-government obligation to us to address and bring up our issues. The next meeting being held in 2018 is too late, we would like a meeting to describe the 2016 sampling results and to address LTM Plan comments and questions.

AS Response: The next formal public meeting will be held as part of the second five-year review during 2018. A report about 2016 activities will be generated and sent to the community and a teleconference can be held to discuss the report.

Audience Comment: If there are three people from the Corp sampling, why don't you take an IRA member or other local to sampling in order to pass on site knowledge?

AS Response: We'll consider this in 2016, but given the short-notice it may not be possible.

Audience Comment: Government to government communication has not happened. The local government isn't being consulted.

Audience Comment: The tribal government should be invited to participate, but the entire community should be consulted and involved.

End

**Northeast Cape LTMP Meeting - 26 July 2016
Attendance**

	Name	Organization
1	AARON SHENMAN	USACE
2	Kevin Maher	JACOBS
3	KARINA PACKER	JACOBS
4	Jeanette Tyn	Kukulget, Inc.
5	Leslie Imaringan	Kukulget Inc
6	Dean Kulowiji	Local
7	Elmer Angk	City
8	Enrico Padi	City
9	Joseph K. Lopez Jr.	CITY
10	Myron Kingebuk	"
11	Yene Kava	Acad Health Research ^{Lab member}
12	Jon Eiler	IRA
13	Fred Kingebuk	Kukulget
14	Sam Mubio	City
15	Dennis Kulowiji	
16	Asuk	IRA
17	George Tom	IRA
18	Wilson Akom ealenik	IRA
19	Renita Jotic	City
20	Bellbert Pungowiji	N.I.S.
21	Ulyde Padi	City
22	BRYAN ROOKER JR	KUKULGET, INC.
23	LARRY KAVA	NUS
24	Perry Pungowiji	Kukulget Inc.

Northeast Cape LTMP Meeting - 26 July 2016 Attendance

	Name	Organization
25	<i>Patricia D. Zaiter</i>	
26	<i>Christa Thompson</i>	
27	<i>Francine Kaha</i>	
28	<i>Paula Kaha</i>	<i>IRA Council</i>
29	<i>Judith Akuya</i>	
30	<i>Adele Kuyukba</i>	
31	<i>Bertrude Tootin</i>	
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APPENDIX E
Responses to Comments

Alaska Department of Environmental Conservation (ADEC)
Contaminated Sites Program

Document Reviewed: Draft February 2016 Northeast Cape FUDS Long-term Management Plan

Commenter: Curtis Dunkin-ADEC Project Manager

Date Submitted: April 25, 2016; ADEC Received RTCs on July 18, 2016 and Submitted Review Determinations on August 24, 2016

Comment Resolution Meeting: Discussed with USACE and ADEC on September 7, 2016

#	Page #	Section	ADEC Comment	Response
1.	ES-1	Executive Summary	<p>1) Please revise/amend the last sentence of the second paragraph and the first sentence of the third paragraph on this page to clarify that removal action objectives were completed in 2014 and remaining remedial action objectives include i.e. monitoring, inspection, reviews, LUCs, ICs, etc.; including potentially pending future construction (i.e. site 28 sedimentation pond, additional characterization sampling, if needed).</p> <p>2) Please also revise the first sentence of the third paragraph on this page to state: ‘Twenty one of the 34 Northeast Cape sites require...’.</p>	<p>1) Accepted. The third and fourth sentences of the second paragraph on page ES-1 will be revised to state: “Remedial action objectives were completed in 2014. At the time of this LTMP, remaining remedial action objectives as described in the DDs include monitoring, inspection, reviews, LUCs, and ICs (USACE 2009a, 2009b).” ADEC-Accepted August 24, 2016</p> <p>2) Accepted. First sentence of the third paragraph on page ES-1 will be revised to state: “Twenty one of the 34 Northeast Cape sites require some form of LUC as part of the selected remedy.” ADEC-Accepted August 24, 2016</p>
2.	ES-2	Table ES-1	<p>1) Sites 21 and 28 should be included in this table per requirements in the Decision Document as well as due to site-specific post removal action conditions. LUCs and ICs are required to prohibit use of groundwater as a drinking water source and to control residual contamination in soil and/or sediment which was left in place at concentrations which exceed applicable cleanup levels and/or unrestricted use and exposure criteria (UU/UE). ADEC-Noted August 24, 2016; this issue requires evaluation of whether or not a DD amendment, ESD, etc. are necessary. Any site that does not meet the UU/UE criteria requires LUCs and/or ICs. This should be</p>	<p>1) Deferred. Table ES-1 describes sites with LUCs. As per the DD, LUCs are not required at Sites 21 and 28. ADEC August 24, 2016; please see response to the left.</p>

#	Page #	Section	ADEC Comment	Response
			<p>adequately discussed and emphasized in the LTM plan. Further resolution necessary.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made to the 2016 LTM Plan. This issue will be further discussed prior to the second five year review.</p> <p>2) Sediment associated with LTM for site 8 should be clarified (in this table and all other applicable references/sections throughout the document) regarding the occasions during previous investigation and monitoring activities in which the site was not inundated with water; and that seasonal and/or annual variations in site conditions could impact contaminant fate and transport, remedial objectives, etc.</p> <p>ADEC-Accepted August 24, 2016; however this should also be noted as deferred in the final revised LTM plan and noted that it will be reevaluated when possible if the LTM plan is intended to be finalized prior to finalizing the 2016 Monitoring Report.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Information obtained during the 2016 field effort at Site 8 will be provided in a separate report.</p> <p>3) The document references/lists different sites in several locations which are considered to comprise the MOC and should be reconciled and clarified for consistency.</p> <p>4) Please also clarify whether references to ‘MOC’ sites are based upon the DD or what is considered to be the MOC at the time of this draft LTMP based upon sites where NFA determinations have been proposed.</p>	<p>2) Deferred. This information was not captured with enough consistency at the time of fieldwork to provide the basis for the requested update.</p> <p>ADEC-Accepted August 24, 2016; please see response to the left.</p> <p>3) Accepted. Tables ES-1 and ES-2 Site Column will be revised to state: “10, 11, 13, 15, 19, and 27 (part of MOC)”. The following note in Table 1-1 will be deleted: “The following sites are located geographically within the extent of the MOC: 10, 11, 13, 15, 17; 18; 19, 20; 22; 26, and 27; groundwater associated with the MOC is monitored across these sites.”</p> <p>ADEC-Accepted August 24, 2016</p> <p>4) Accepted. Section 1.4.10 Title states “Sites 10 through 20, 22, 26, and 27 – Main Operations Complex”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>Section 1.4.10, first sentence will be revised to state: “The MOC at the Northeast Cape installation is comprised of Sites 10 through 20, 22, 26, and 27 and encompasses what was previously the majority of the site infrastructure, including buildings, heat and power supply, fuel storage tanks, maintenance, and housing quarters (Figures A-2 and A-6).”</p> <p>ADEC-Accepted August 24, 2016</p>

#	Page #	Section	ADEC Comment	Response
				<p>Section 1.4.10, second paragraph, first and second sentences will be revised to state: “In 2010, the selected remedy of chemical oxidation at primarily petroleum contaminated sites (Sites 10, 11, 13, 15, 19, and 27) was determined to be ineffective at the MOC and, in order to implement the contingent remedy of excavation, soil contamination was further delineated through direct-sensing Ultra Violet Optical Screening Tool (UVOST) technology in 2010 (USACE 2011). The areas corresponding to DRO concentrations of 9,200 mg/kg or greater were used to map plume locations and to guide subsequent soil excavations to the extent practicable. ”</p> <p>ADEC-Accepted August 24, 2016</p>
3.	ES-2	Table ES-2	<p>1) Please see and apply comment associated with sediment at site 8 above and throughout the document. ADEC-Accepted August 24, 2016; however this should also be deferred in the final revised LTM plan and noted that it will be reevaluated when possible if the LTM plan is intended to be finalized prior to finalizing the 2016 Monitoring Report.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Information obtained during the 2016 field effort at Site 8 will be provided in a separate report.</p> <p>2) Limited post removal action sampling and analyses of surface water and sediment at site 29 should be included in this plan; to occur at least once within the current five-year review period as agreed upon during the resolution of the first five-year review report. ADEC- Conditionally Accepted August</p>	<p>1) Deferred. This information was not captured with enough consistency at the time of fieldwork to provide the basis for the requested update. ADEC-Accepted August 24, 2016; however please see response on the left.</p> <p>2) Deferred. The upcoming five year review scoping process will identify the path forward for any sampling necessary to evaluate remedy performance.</p>

#	Page #	Section	ADEC Comment	Response
			<p>24, 2016; ADEC emphasized the need to evaluate and determine site-specific LTM needs post-remedy implementation during the FYR comment and resolution process, and that depending on the results of work that was still being completed (i.e. the 2014 RA report, the 2015 Work Plan, etc.), that it may be necessary to amend the DD. Further, ADEC submitted its initial comments in April 2016 prior to the Corps distributing the draft 2016 work plan. The critical issue is to ensure that the LTMP, as a working document, identify and discuss the necessary actions and projected timelines; i.e. all of the ‘deferred’ actions which are to be evaluated and addressed in the upcoming FYR scoping process should be itemized and discussed in detail. The LTMP would then be revised and updated accordingly in the future as needed. Further resolution necessary.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. The LTM Plan will not be the document to describe actions or timelines not currently defined in the Decision Documents.</p> <p>3) Monitoring for site 28 should also be included in the LTMP since it must still be determined whether or not contamination continues to migrate offsite via the surface water and sediment deposition/transport pathways; and whether removal of contaminated sediment as a future maintenance activity will be required.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. It was noted the remedy at Site 28 had not been fully implemented at the time of the first five year review. The second five year review will address post-remedy implementation at Site 28.</p>	<p>ADEC- Conditionally Accepted August 24, 2016; please see response on the left.</p> <p>3) Deferred. The upcoming five year review scoping process will identify the path forward for any sampling necessary to evaluate remedy performance. ADEC- Conditionally Accepted August 24, 2016; please see and apply response to RTC 2) immediately above.</p>
4.	ES-3	Table ES-3	1) ADEC’s position is that some form of inspection and periodic review is required at all sites where residual contamination has been left in place at	1) Deferred. ADEC should provide context for requesting this when the DD

#	Page #	Section	ADEC Comment	Response
			<p>concentrations which exceed the applicable cleanup criteria that is required to achieve UU/UE status in order to ensure that any LUCs, ICs, remedies, etc. are still being implemented, functioning adequately and are still protective..</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made to the 2016 LTM Plan. This issue will be further discussed prior to the second five year review.</p> <p>2) Similar to other related comments below, the manner in which the descriptions and discussions associated with sites 7 and 9 are presented are misleading; some references throughout the document simply state the specific activities that are required but then other references, i.e. table notes a and b state this has already been completed. ADEC commented on this issue in the first five-year review report that it is known that both characterized and uncharacterized contamination from various sources and COCs was left in place at both of the landfills as well as numerous other sites. It was agreed upon further during final resolution of the first five-year review report that ongoing periodic reviews and inspections of these sites would be necessary beyond the first 5-year period and then further in future if determined necessary. The LTMP should revise/reconcile references to ‘completed’ and instead state i.e. ‘conducted’ for applicable sites. ADEC- Accepted August 24, 2016; however references and discussion associated with current and future monitoring, visual inspections, periodic reviews etc. for Sites 7 and 9 need to be very clear and consistent with regard to ‘the initial annual/periodic visual monitoring’ that was required post construction and the periodic monitoring that is planned/may be determined necessary in the future.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. ADEC clarified they do not agree with ceasing landfill cap inspections as described in the Decision Documents.</p>	<p>did not stipulate this action. ADEC- August 24, 2016; further resolution necessary.</p> <p>2) Accepted. At the time of this LTMP, the initial periodic (annual) visual monitoring over a period of five years for settlement and erosion of the capped area at Sites 7 and 9 is complete. ADEC- Accepted August 24, 2016; however please see response on the left.</p> <p>Table ES-3, row “7 & 9”, column “Frequency” will be revised to state: “Initial periodic (annual) visual monitoring of the capped area for settlement and erosion for five years has been conducted. Additional visual monitoring, as necessary, will be based on the results of previous site inspections, and may occur for up to 30 years^a.”. ADEC – Partially Accepted August 24, 2016; please see and apply response to RTC immediately above. ADEC disagrees with the Corps’ stated criteria ‘based on the results of previous site inspections’ since periodic reviews, monitoring, inspection, maintenance, etc. should not be based only on previous results, rather also based upon current</p>

#	Page #	Section	ADEC Comment	Response
			<p>Resolution of this item will be necessary before the USACE ceases landfill cap inspections.</p>	<p>conditions, concerns, regulatory requirements, etc.</p> <p>Table ES-3, note ‘a’ will be revised to state: “^a Initial periodic (annual) visual monitoring for a period of five years has been conducted.”.</p> <p>ADEC-Accepted August 24, 2016; per applying responses to similar/related RTCs immediately above.</p> <p>Section 1.4.7, second bullet under LTM will be revised to state: ” • Periodic reviews and landfill cap visual inspections are required. For five years, initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted. Recommendations made in the First Periodic Review Report (USACE 2015C) for Site 7 include conducting an additional periodic review to evaluate remedy implementation and make recommendations regarding future periodic reviews. Additional visual monitoring will be conducted for up to 30 years as deemed necessary based on the results of previous visual inspections. Maintenance of the landfill cap will be performed if deemed necessary based on previous visual inspections.”</p> <p>ADEC-Accepted August 24, 2016</p>

#	Page #	Section	ADEC Comment	Response
			<p>Section 1.4.9: ADEC- Partially Accepted August 24, 2016; per similar responses above, ADEC does not agree with the criteria ‘based on previous inspections’. This issue requires further discussion and resolution. Please clarify how previous inspections will be adequate in determining whether or not future action is necessary; i.e. if last year’s inspection indicated no current action is necessary, how will that be used to determine whether or not the remedy is protective within the next 30-year period? What criteria will the Corps implement to ensure the remedies at Sites 7 and/or 9 remain protective? Noting that the current 2016 Monitoring Work Plan did not include any activities for either site. This same issue applies to other sites for which the DD does not require FYRs; either this needs to be developed and specified in the LTM plan and/or a DD amendment, ESD, etc.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. ADEC clarified they do not agree with ceasing landfill cap inspections as described in the Decision Documents. Resolution of this item will be necessary before the USACE ceases landfill cap inspections.</p>	<p>Table 3-1, rows ‘7’ and ‘9’, column ‘Duration’ will be revised to state: “Periodically for up to 30 years”. Table 3-1, note ‘a’ will be revised to state: “^a Initial periodic (annual) visual monitoring for a period of five years has been conducted. Additional visual monitoring will be conducted for up to 30 years as deemed necessary based on the results of previous visual inspections”.</p> <p>ADEC-Accepted August 24, 2016 Section 1.4.9, second bullet under LTM will be revised to state: “Periodic reviews and landfill cap visual inspections are required. For five years, initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted. As part of the First Periodic Review Report (USACE 2015b), continuing to monitor the landfill cap for erosion at Site 9 on a five-year basis, up to 30 years, was deemed necessary based on the results of previous site inspections. Maintenance of the landfill cap will be performed if deemed necessary based on previous visual inspections”.</p> <p>ADEC- Partially Accepted August 24, 2016; please see additional response on the left. Section 3.1, first and second sentences revised to state: “A non-intrusive visual</p>

#	Page #	Section	ADEC Comment	Response
				<p>inspection of the capped areas at Sites 7 and 9 for evidence of settlement and erosion was conducted annually for five years. Additional periodic visual monitoring, up to 30 years, will be conducted as deemed necessary based on the results of previous site inspections.”. ADEC- Partially Accepted August 24, 2016; per similar responses immediately above related to ‘previous inspection results’.</p> <p>Section 3.2, second and third sentences revised to state: “Periodic reviews at landfill sites were conducted annually for five years. Additional periodic visual monitoring for up to 30 years will be conducted as deemed necessary based on previous inspection results”.</p> <p>ADEC- Partially Accepted August 24, 2016; per similar responses immediately above related to ‘previous inspection results’.</p>
5.	1-1	1.0	<p>1)This section requires the addition of two statements to clarify: 1) the span of time that this LTMP is intended to cover - which should be limited to the current five-year review period, and 2) that draft work plans detailing the specific work/objectives proposed to be completed each year/mobilization will be submitted for review and approval.</p> <p>2) Please revise the last sentence of this section to state ‘Periodically, as well as whenever determined necessary...’. Please also end this section with the statement that no changes will be made to the LTMP nor implemented in the field without first having notified and obtained approval from ADEC.</p>	<p>1 & 2) Accepted. The last paragraph in Section 1.0 will be revised to state: “This LTMP is a dynamic planning document designed to present an overview of the current and reasonably forecast status of Northeast Cape FUDS. The LTMP will be updated as necessary based on five-year review recommendations. All draft work plans detailing specific objectives proposed to be completed during each mobilization will be submitted to ADEC for review.</p>

#	Page #	Section	ADEC Comment	Response
				<p>Periodically, as well as whenever determined necessary, the USACE will review this LTMP to assess the need for revisions. The USACE will submit the revised plan for ADEC review”.</p> <p>ADEC-Accepted August 24, 2016</p>
6.	1-2	1.1.1	<p>Please revise the first and second sentences of the first paragraph of this section; 1) first sentence to state ‘The primary sources of petroleum contamination...’, and 2) second sentence to state ‘Other primary sources of non-petroleum contamination...’.</p>	<p>Accepted. The first two sentences of Section 1.1.1 will be revised to state: “The primary sources of petroleum contamination at 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. Other primary sources of non-petroleum contamination include electrical transformers, waste stored in 55-gallon drums, batteries, and organic chemicals from paint, solvents, and other miscellaneous facility activities”.</p> <p>ADEC-Accepted August 24, 2016</p>
7.	1-3	1.2.1	<p>Please revise the sentence in the first paragraph of this section to state ‘...Savoonga, the closest community to the Northeast Cape FUDS,...’.</p>	<p>Accepted. Fourth sentence in Section 1.2.1 will be revised to state: “The Native Village of Savoonga, the community closest to the Northeast Cape FUDS, is located approximately 60 miles to the northwest (Figure A-1)”.</p> <p>ADEC-Accepted August 24, 2016</p>
8.	1-6	1.2.3	<p>Please provide more detail regarding the site-specific permafrost conditions and features that have been reported based on observations made during previous remedial activities (i.e. continuous, discontinuous, seasonal active</p>	<p>Accepted. The fifth through tenth sentence of the third paragraph in Section 1.2.3 will be revised to state:</p>

#	Page #	Section	ADEC Comment	Response
			layer, depths observed, etc.); as well as better define ‘frozen soils’ i.e. seasonal variations and extents of the active layer, etc.	<p>“The base of permafrost on the mainland at Nome (135 air miles northeast) is estimated at a depth of 120 feet. Although the depth of permafrost is variable, the U.S. Geological Survey has classified Saint Lawrence Island as an area of moderately thick to thin permafrost (Ferrians 1965). Frozen soils have an effect in retarding groundwater flow throughout most of the year. The insulating effects of thick tundra vegetation have created a relatively shallow (2 to 4 feet bgs) active layer where water is only seasonally present, primarily during summer months. Near the Bering Sea, depth to top of permafrost has been measured from 5 to 10 feet bgs (USACE 2007) and in areas of thin soil and exposed cobbles, the active layer appears to be significantly deeper and permafrost may be discontinuous (USACE 2009b). The deeper, unconsolidated soil deposits at the site are probably permanently frozen, and the shallow soils represent the active layer where soils thaw, primarily during summer months”.</p> <p>ADEC-Accepted August 24, 2016</p>
9.	1-7	1.2.4	This section should also discuss the water resources which are known to be currently used by residents and/or visitors to the site; i.e. onsite surface water, offsite water, etc.	Accepted. Section 1.2.4, sentence will be added to end of first paragraph to state: “Surface water from the

#	Page #	Section	ADEC Comment	Response
				<p>Kangukhsam Mountain spring is used by seasonal visitors to the site.” ADEC-Accepted August 24, 2016</p>
10.	1-7	1.2.5	<p>Please add a statement that field work during the remedial investigation and removal actions for the 2009-2014 field seasons typically involved mobilizing to the site in late June, early July, continuing work through September with demobilization occurring through the month of September and sometimes early October.</p>	<p>Accepted. The following sentences will be appended to the end of the last paragraph in Section 1.2.5: “Field work performed in support of the remedial investigation and remedial actions for the 2009-2014 field seasons typically involved mobilizing to the site in late June and/or early July, continuing work through September, and demobilizing through the month of September and sometimes into early October.” ADEC-Accepted August 24, 2016</p>
11.	1-9	Table 1-1	<p>1) Deed Notices and Notice of Environmental Contamination are required to be filed for all contamination that is left in place at concentrations which exceed the UU/UE criteria. This also applies for sites such as Site 7 soils where contamination and/or contamination sources are known or suspected to be present however have not been thoroughly characterized and/or removed. USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made to the 2016 LTM Plan. This issue will be further discussed prior to the second five year review.</p> <p>2) In the notes column for Site 8 sediment, please provide more detail either in the box or a table note regarding when further sediment sampling is planned. ADEC-Accepted August 24, 2016; however, similar to other related comments and responses, this LTMP needs to capture and discuss these issues. USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Information obtained during the 2016 field effort at</p>	<p>1) Deferred. Issue of UU/UE similar to comment 2-1. ADEC August 24, 2016; further resolution necessary.</p> <p>2) Deferred as this addresses future work that will be detailed in a separate plan. ADEC-Accepted August 24, 2016; however please see and apply additional response on the left.</p> <p>3) Deferred. Issue of UU/UE similar to comment 2-1. Additionally, the USACE does not have the authority to prohibit activities because the USACE is not the landowner. ADEC August 24, 2016; further</p>

#	Page #	Section	ADEC Comment	Response
			<p>Site 8 will be provided in a separate report.</p> <p>3) Re: LUCs to limit/prohibit excavation and/or disturbance of contaminated soils (i.e. landfills and associated caps, residual contamination left in place at concentrations exceeding the UU/UE criteria, etc.), the descriptor ‘are not recommended’ should be replaced throughout the document with i.e. ‘should be prohibited in order to adequately protect human health and the environment’. It should also be noted in table notes and applicable narrative sections throughout the document that subject contaminated soils cannot be excavated and/or relocated without first notifying and obtaining approval from ADEC.</p> <p>USACE Response: Table 1-1 will be updated as follows for Site 7 and Site 9: “Deed Notice: Prevent future building construction or excavation which could disturb the cap or within the immediate vicinity of the site. “</p>	<p>resolution necessary.</p>
12.	1-10	Table 1-1	<p>1) In the notes table of the Site 9 Landfill Cap Visual Inspection, the notes should be revised amended and/or table note added that the ‘final’ visual inspection currently stated is associated with just the initial five years in order to clarify that periodic visual inspections as potentially determined necessary could be conducted for up to 30 years. This rationale should also be applied to similar statements in this and other tables and narratives with regard to describing something as ‘final’.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. ADEC clarified they do not agree with ceasing landfill cap inspections as described in the Decision Documents. Resolution of this item will be necessary before the USACE ceases landfill cap inspections.</p> <p>2) The LTMP should also clarify whether initial inspection and/or maintenance and monitoring years were intended to be considered as part of the 30 year span; for this and other applicable sites.</p> <p>3) The column of DD-Identified Contaminants should include footnotes or some form of noting all other COCs which were confirmed to require remedial</p>	<p>1) Accepted. Table 1-1 for Site 7 ‘duration’ column will be revised to state: “Initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted for five years and completed in 2015. Additional visual monitoring will be conducted for up to 30 years as deemed necessary based on the results of previous site inspections.” and ‘notes’ column will be revised to state: “In 2014, minor cap maintenance was conducted. Initial periodic (annual) visual monitoring for five years completed in 2015”. ADEC- Partially Accepted August 24, 2016 per similar responses/clarification requests above.</p> <p>Table 1-1 for Site 9 ‘duration’ column</p>

#	Page #	Section	ADEC Comment	Response
			<p>action at each site. Site 10 for example had VOCs both in soil and groundwater which should be better emphasized; noting that not all COCs and their extents were known for each respective site at the time of the DD. ADEC had also requested further evaluation as part of the first five-year review report resolution that further monitoring and/or investigation if necessary be conducted to demonstrate the VOC exposure pathways have been mitigated; since this site is comingled with the ‘MOC POL plume’ and MNA associated with the POL is not necessarily the sole driver for reviews and/or periodic evaluations at this site.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan.</p> <p>4) Please see and apply similar comment above to revising references to ‘recommended’ in the LUCs for Site 9 and throughout the document for other similar sites/references as applicable.</p> <p>USACE Response: Table 1-1 will be updated as follows for Site 7 and Site 9: “Deed Notice: Prevent Future building construction or excavation which could disturb the cap or within the immediate vicinity of the site.”</p>	<p>will be revised to state: “Initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted for five years and completed in 2015. Additional visual monitoring will be conducted for up to 30 years as deemed necessary based on the results of previous site inspections.” and ‘notes’ column revised to state: “Initial periodic (annual) visual monitoring for five years completed in 2015”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Accepted. See above.</p> <p>ADEC-Accepted August 24, 2016</p> <p>3) Deferred. The upcoming five year review scoping process will identify the path forward. ADEC-Conditionally Accepted August 24, 2016; per similar responses above re: whether or not these issues will be addressed in the FYR or the LTM plan. Further resolution necessary.</p> <p>4) Deferred. See response to comment #11-3. The USACE does not have the authority to prohibit activities because the USACE is not the landowner.</p> <p>ADEC August 24, 2016; further resolution necessary.</p>
13.	1-12	Table 1-1	<p>Second table note: amend/revise to address the different references throughout the document to groups of sites which are considered part of the MOC; please also apply to other references, listing of sites etc. which are associated with the MOC throughout the document to make them consistent.</p>	<p>Accepted. Table 1-1, second note will be removed. ADEC- Partially Accepted August 24, 2016; noting this</p>

#	Page #	Section	ADEC Comment	Response
				<p>needs to be reconciled throughout the document for all references to MOC sites.</p> <p>USACE-this change has been applied consistently throughout the LTMP.</p>
14.	1-14	1.4.3	<p>Soil/Sediment: the discussion of Silica Gel Cleanup method (SGC) results in the paragraph on this page should be amended to emphasize that ADEC did not approve SGC results to be used for confirmation and/or determination of contamination extents and removals rather only as an evaluation and screening tool. ADEC noted this in its comments on multiple occasions associated with multiple documents throughout the 2009-2015 RI/RAs.</p> <p>ADEC-Noted/Partially Accepted August 24, 2016; please note there is a difference between a document indicating that a specific method will be used and ADEC actually approving use of the data. ADEC’s comments re: the silica gel cleanup issues were consistent in association with all removal action work plans and reports; in which ADEC specified that results would be used for evaluation purposes only and not to determine cleanup levels, screening criteria, whether cleanup levels were achieved, etc. The Corps’ respective RTCs consistently accepted ADEC’s position re: this issue. Further resolution necessary.</p>	<p>Based on the 7 September 2016 Comment Resolution Meeting, the text will be revised as follows:</p> <p>“The selected remedy was excavation with disposal or treatment of petroleum-contaminated soil. Upon completion of the remedy, soil and sediment were re-sampled at Site 3 in 2010 to evaluate biogenic interference using silica gel cleanup (SGC) as an additional line of evidence to support remaining soil and sediment met site-specific cleanup levels. The maximum concentration following SGC in soil for DRO and RRO in 2010 was 3,400 mg/kg and 2,300 mg/kg, respectively. Following SGC in sediment, the maximum concentration DRO and RRO in 2010 was 300 mg/kg and 2,100 mg/kg, respectively. Concentrations of petroleum-related contaminants in soil and sediment at Site 3 were below site-specific cleanup levels when evaluated after SGC (USACE 2011).”</p>
15.	1-15	1.4.4	<p>In the first paragraph of this section and elsewhere throughout the document where applicable, please include discussion to clarify that there are multiple</p>	<p>Accepted.</p> <p>The following text will be added to</p>

#	Page #	Section	ADEC Comment	Response
			contaminated sites associated with Site 4, including what is considered the former Native Village of Northeast Cape and the contaminated sites and COCs which have been identified as part of the Native Village of Savoonga’s NALEMP work; which identified soil, sediment and surface water that was contaminated with multiple COCs at concentrations which exceeded the most stringent UU/UE criteria. The LTM, LUCs, etc. for Site 4 (discussed on page 1-16) should also refer to contamination that remains in place and that future action may be necessary to achieve protectiveness at these sites.	Section 1.4.4, last sentence of first paragraph: “Additional work performed at Site 4 under the Native American Lands Environmental Mitigation Program, which is separate from the FUDS Program, is not described in this LTMP.” ADEC-Accepted August 24, 2016
16.	1-16	1.4.5	<p>This section should discuss the additional site characterization and confirmation sampling that was conducted at the request of ADEC in order to demonstrate whether removal action activities could have resulted in a contaminant release at this site; and discuss the subsequent results which were also part of the final NFA determination. ADEC-Noted August 24, 2016; however, ADEC’s request is to add a few statements that support the NFA, no chemical contamination references; i.e. state that results from MI sampling events conducted in subsequent years confirmed that RAs did not cause a release at the site; results also confirmed that no COCs existed at concentrations which exceeded respective/applicable cleanup criteria – thus the NFA determination.</p> <p>USACE Response: This item was reviewed during the 7 September 2016 Comment Resolution Meeting. The text of Section 1.4.5 will be revised as follows: “MULTI INCREMENT soil samples were collected in accordance with ADEC guidance and analyzed for COPCs to confirm materials staged at the site did not contribute contamination to Site 5 (USACE 2013a, 2015a). Sampling conducted in 2012 indicated DRO and PCBs were below site-specific cleanup levels (USACE 2013a) while sampling conducted in 2014 indicated DRO, GRO, RRO, and BTEX were below site-specific cleanup levels (USACE 2015a).”</p>	Deferred. Results from the requested MI sampling at Cargo Beach are discussed in the remedial action reports. ADEC-Noted August 24, 2016; please see additional response on the left.
17.	1-17	1.4.6	Long-term Management: please amend statements throughout the document associated with ‘not suitable for ingestion’ to emphasize that it is the risk to exposure to contaminants that makes the water not suitable.	Deferred. The draft LTMP inaccurately captures the Decision Document requirements. The phrase “not suitable for ingestion” will be deleted throughout the

#	Page #	Section	ADEC Comment	Response
				<p>document. The DD states: “The shallow groundwater within specific areas of the Northeast Cape Installation is not a current or reasonably expected potential future drinking water source. These areas are characterized by low lying tundra and include the vicinity of the Fuel Pumphouse at Cargo Beach (Sites 3, 4), and the Drum Field and Landfills (Sites 6, 7, 9)...The shallow groundwater is not consistently encountered, exists in insufficient quantities, and is of poor quality. The groundwater exposure pathway at these areas is incomplete because the shallow groundwater does not produce a sufficient quantity of water to be considered a reasonably expected potential future drinking water source.”</p> <p>ADEC-Accepted August 24, 2016 Sections 1.4.3, 1.4.4, 1.4.6, 1.4.7, 1.4.9, and 2.2.</p>
18.	1-18	1.4.7	<p>1) The soil title header should be amended to include sediment.</p> <p>2) The groundwater subsection should be amended to also discuss that due to refusal the subsurface groundwater conditions at the site could not be adequately determined and that the concern re: the potential groundwater to surface water migration pathway was discussed and resolved as part of the first five-year review; given that the LUCs, deed notice, and ICs established for the site, as well as periodic visual inspection and review to be conducted within the next 30 years would include further site sampling and analysis if</p>	<p>1) Accepted. Section 1.4.7 header will be revised to state: “Soil/Sediment”. ADEC-Accepted August 24, 2016</p> <p>2) Deferred. The upcoming periodic review scoping process will identify the path forward for any necessary sampling to evaluate remedy performance. ADEC-Accepted August 24, 2016;</p>

#	Page #	Section	ADEC Comment	Response
			determined necessary.	<p>however the RTC should be included in the applicable narrative sections. Please also apply similarly to other RTCs indicating deferral to future reviews.</p> <p>USACE Response: The RTC will be added as the last sentence of Section 1.4.7</p>
19.	1-19	1.4.7	<p>1) Long-term management: please see and apply similar comments above re: revising references to ‘recommended’, 2) as well as the discussion of the ‘final’ visual inspection in the last paragraph of this section. ADEC’s position, per the resolution of the first five-year review report, is that these initial years of visual inspection (for sites 7 and 9) were associated with the RI/RA phases and not LTM - which requires period evaluation and inspection as determined necessary the next 30 years. ADEC-Noted August 24, 2016; ADEC does not expect the Corps to prohibit specific activities, rather it is the responsible party’s (Corps’) responsibility to develop and implement adequate land use controls that will be accepted and maintained by the landowner. Further resolution necessary.</p> <p>USACE Response: The text of Section 2 will be updated at follows: “The USACE will coordinate with the landowner to develop Deed Notices. Once finalized, Deed Notices will be implemented by filing a Notice of Environmental Contamination at the State Recorder’s Office.”</p> <p>2) ADEC August 24, 2016; the LUC requirement is not solely associated with the extent/availability of groundwater at the site whether or not groundwater is expected to be a potential drinking water source, and/or the quality of the water. The LUCs for Site 7 are required due to the fact that the groundwater is associated with an uncharacterized landfill and because attempts to determine whether deeper groundwater and/or contaminated groundwater is present were unsuccessful. Further resolution necessary.</p> <p>USACE Response: This issue was discussed during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM</p>	<p>1) Deferred. The USACE does not have the authority to prohibit activities because the USACE is not the landowner. ADEC-Noted August 24, 2016; please see response on the left.</p> <p>2) Accepted in part. In order to align with the 2009 Site 7 DD, Section 1.4.7 first LTM bullet, first sentence will be revised to state: “An LUC is required at Site 7 in the form of a Deed Notice to inform landowners that shallow groundwater is not a reasonably expected potential drinking water source due to its limited availability and quantity”.</p> <p>ADEC August 24, 2016; please see response on the left.</p> <p>Section 1.4.7, last two sentences of the last paragraph will be revised to state: “The fifth periodic visual monitoring event was performed in 2015. The First Periodic Review Report for Site 7 recommended an additional periodic</p>

#	Page #	Section	ADEC Comment	Response
			<p>Plan. This issue will be further discussed.</p>	<p>review of Site 7 with a milestone date of 2019 (USACE 2015c)”. ADEC-Accepted August 24, 2016</p>
20.	1-20	1.4.8	<p>1) Sediment section requires some discussion re: the seasonal and annual variations in hydrology conditions at Site 8 to clarify changes in sediment conditions as also noted in another comment above. USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Information obtained during the 2016 field effort at Site 8 will be provided in a separate report.</p> <p>2) Surface water: please insert the word ‘[primary] sample’ to the second sentence of this subsection. Please ensure that samples are always referenced accordingly throughout the document; i.e. confirmation, primary, duplicate, screening, etc.</p>	<p>1) Deferred. This information was not captured with enough consistency at the time of fieldwork to provide the basis for the requested update. ADEC-Accepted August 24, 2016; however please apply similar Site 8 responses to RTCs above.</p> <p>2) Accepted. Section 1.4.8, third and fourth sentence of ‘Sediment’ section will be revised to state: “In 2010, 2011, and 2012, composited primary sediment samples were collected from each decision unit and a composite duplicate sediment samples was collected from one decision unit to establish site trends and possibly degradation rates. During each monitoring event, primary and duplicate sediment samples were composited from eight different locations within each decision unit”. ADEC-Accepted August 24, 2016</p>
21.	1-21	1.4.9	<p>Please see and apply the similar comments above associated with LUCs, visual inspections, and periodic reviews for site 7. ADEC’s position is that the initial years of monitoring through 2015 were not conclusive and that future inspection(s) and/or reviews may be necessary.</p>	<p>Accepted. Section 1.4.9 LTM Subsection bullet one revised to state: “•Periodic reviews and landfill cap visual inspections are required. For five years, initial periodic (annual) visual monitoring of the capped area for settlement and erosion was conducted.</p>

#	Page #	Section	ADEC Comment	Response
22.	1-22	1.4.10	<p>1) As previously commented above, references to sites which comprise the MOC should be reconciled for consistency and explained accordingly in table notes, narratives, etc.</p> <p>2) Please revise the first sentence of this section to state "...encompasses what was previously the...".</p>	<p>ADEC-Accepted August 24, 2016</p> <p>1 & 2) Accepted. Section 1.4.10 sentence one will be revised to state: "The MOC at the Northeast Cape installation is comprised of Sites 10 through 20, 22, 26, and 27 and encompasses what was previously the majority of the site infrastructure, including buildings, heat and power supply, fuel storage tanks, maintenance, and housing quarters (Figures A-2 and A-6)." ADEC-Accepted August 24, 2016</p>
23.	1-23	1.4.10	<p>1) Please revise the second sentence of the first paragraph on this page; it is a broken and incomplete statement and does not make sense.</p> <p>2) Please amend/revise statements/discussion in this paragraph as necessary to clarify that liners were not always used prior to backfilling locations where cleanup levels had not yet been achieved; noting also that in some instances excavations were neither lined nor back filled between seasons/removal actions.</p> <p>3) Please revise/amend the second to last sentence of the first paragraph on this page to clarify that soils used to backfill had other COCs than DRO and PCBs and also which applicable COCs had site-specific alternative cleanup levels vs. the most stringent Method Two. Please also revise the end of the sentence as '...less than...the onsite borrow area' does not make sense.</p>	<p>1) Accepted. Section 1.4.10, second sentence of second paragraph will be revised to state: "The areas corresponding to DRO concentrations of 9,200 mg/kg or greater were used to map plume locations and to guide subsequent soil excavations to the extent practicable." ADEC-Accepted August 24, 2016</p> <p>2) and 3) Deferred. This level of detail was not intended for this plan. This subject is applicable to the upcoming five-year review and potential updates to the site history. The following sentence will be removed from the paragraph: "Following excavations, plastic liner was placed along sidewall soil</p>

#	Page #	Section	ADEC Comment	Response
				<p>confirmation sample locations with laboratory results indicating DRO and/or PCBs, as applicable, remained above the cleanup level prior to backfill of the excavation with overburden soil.”</p> <p>The following sentence on page 1-23 will be updated as follows: “Excavations were backfilled with soil confirmed to be suitable for use as backfill. ADEC-Accepted August 24, 2016</p>
24.	1-23	1.4.10	<p>1) Groundwater: discussion in this section re: exceedances observed over the years in MOC groundwater should include all COCs for which exceedances were observed (lead) and the word ‘occasionally’ should be replaced with a better summary of the number wells and years when exceedances were observed.</p> <p>2) Please make the word ‘trend’ plural: ‘...same trends over time.’.</p> <p>3) Provide more discussion re: why higher groundwater elevations would ‘influence’ benzene results.</p>	<p>1) Accepted. Section 1.4.10, second sentence of the second paragraph in the ‘Groundwater’ Subsection will be revised to include all COCs for which exceedances have been detected since 2010: “DRO, RRO, benzene, arsenic, and lead in groundwater samples have exceeded groundwater cleanup levels in samples collected from at least one MOC monitoring well over the five-year monitoring period.”. ADEC-Accepted August 24, 2016</p> <p>2) Accepted. Section 1.4.10, third sentence of second paragraph will be revised to state: “The contaminant concentrations have not all exhibited the same trends over time”. ADEC-Accepted August 24, 2016</p> <p>3) Deferred. This level of detail was not</p>

#	Page #	Section	ADEC Comment	Response
				<p>intended for this plan. This discussion may be included in the 2016 groundwater monitoring report. The following sentence will be removed from the first paragraph on page 1-24: “The higher groundwater elevation in 2011 appeared to influence the benzene results, but there are too few data points to determine a correlation.”</p> <p>ADEC-Partially Accepted August 24, 2016; with regard to deferring further discussion/clarification to the report, however the statement should be kept in the LTM plan.</p> <p>USACE Response: The sentence referenced above will be returned to the document.</p>
25.	1-24	1.4.10	<p>1) Groundwater; in the first paragraph on this page please define ‘for the first time’ i.e. since monitoring and/or since a specific date since last detected; and clarify for other similar references throughout the document.</p> <p>2) Please revise references to ‘updated’ for the monitoring wells by replacing with i.e. ‘In 2014 changes were made to the monitoring well network at the MOC to...’.</p>	<p>1) Accepted. Section 1.4.10, Subsection ‘MOC Groundwater’ sixth sentence of second paragraph will be revised to state: “In a sample collected in 2012 from well MW88-1, the concentration of DRO exceeded the cleanup level for the first time since monitoring began in 2002, but was significantly below the cleanup level in 2013”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Accepted. Section 1.4.10, Subsection ‘MOC Groundwater’ first sentence of last paragraph will be revised to state: “In 2014, changes were made to the</p>

#	Page #	Section	ADEC Comment	Response
				<p>monitoring well network to continue groundwater monitoring”.</p> <p>ADEC-Accepted August 24, 2016</p>
26.	1-24	1.4.11	<p>Please clarify in the first paragraph of this section, and elsewhere throughout the document where applicable, as well as similarly commented elsewhere, that the COCs and areas/extents of contamination were not all known at the time of the DD and that new COCs and AOCs were identified and removed/remediated since the finalization of the DD and during the implementation of the RI/RAs through 2015.</p> <p>USACE Response: Please see response to Comment 3.</p>	<p>Deferred.</p> <p>The upcoming five year review scoping process will identify the path forward for any necessary revisions to the detailed site histories.</p> <p>ADEC-Conditionally Accepted August 24, 2016; please see additional responses in #3 above. Further resolution necessary.</p>
27.	1-25	1.4.11	<p>1) Soil: This section should discuss that the 2014 soil removal excavations advanced to fractured bedrock and/or refusal.</p> <p>2) Groundwater: either the Site-10 and/or the MOC section(s) need to also discuss other site-specific COCs i.e. VOCs related to the necessary LTM.</p> <p>2) ADEC-Conditionally Accepted August 24, 2016; further resolution necessary re: this and other RTCs which indicate deferring actions to the next FYR due to ADEC and Corps concurrence that these issues would be addressed during this LTM planning and implementation period as well as future FYRs instead of addressing them in the last FYR report.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7</p>	<p>1) Deferred. The upcoming five year review scoping process will identify the path forward for any necessary revisions to the detailed site histories. The text on page 83 of the 2013 Remedial Action Report dated January 2015 indicated excavation continued until bedrock was encountered. The excavation was terminated at bedrock as a result of discussions with the ADEC and the USACE. Section 1.4.11, seventh sentence of Soil Section will be revised to state: “One excavation opened to address ethylene glycol and PCE exceedances was terminated at bedrock per concurrence with USACE and ADEC (USACE 2014c)”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Deferred. The upcoming five year</p>

#	Page #	Section	ADEC Comment	Response
			<p>September 2016 Comment Resolution Meeting. The 2016 LTM plan is a starting point to describe future actions required in the Decision Documents. It was noted the USACE added analytes to the groundwater monitoring program based on recommendations made in the first five year review as well as discussions contained in that report.</p>	<p>review scoping process will identify the path forward for any necessary modifications to monitoring. ADEC-Conditionally Accepted August 24, 2016; please see response on the left.</p>
28.	1-28	1.4.14	<p>1) Soil: please revise the reference to site-specific cleanup levels for PCBs in soil since the cleanup level approved for site wide PCBs in all soils is 1 mg/kg – which is the default most stringent cleanup level as outlined in 18AAC75 and is not a site-specific cleanup level. The DD includes a site-specific cleanup level for PCBs in sediment. Please also revise other references in the document where site-specific cleanup levels are referenced although the cleanup level is actually the most stringent criteria for UU/UE.</p> <p>2) The last paragraph of the soil section should also discuss that the Site 13 POL- and PCB-contaminated soils were comingled and that removal actions were initiated to focus on removing the PCB-contaminated soil first, after which the DRO-contaminated soil was the only COC-driver for determining the extent of remaining removal at the site.</p>	<p>1) Accepted. Section 1.4.14, Subsection ‘Soil’ last sentence of first paragraph will be revised to state: “Confirmation samples were collected from the floor and sidewalls of the excavation and all analytical samples were below the cleanup level for PCBs (USACE 2014b)”.</p> <p>ADEC-Accepted August 24, 2016 Additional change will be made in Section 1.4.13 to third sentence in first paragraph: “Sampling results identified DRO, RRO, and benzene, toluene, ethylbenzene, and xylenes (BTEX) in soil at concentrations below cleanup levels identified in the DD (USACE 2009b)”.</p> <p>ADEC-Accepted August 24, 2016 Section 1.4.17 ‘Soil’ Subsection, last sentence will be revised to state: “Confirmation samples were collected from the excavation floor and indicated all results were below cleanup levels (USACE 2011)”.</p> <p>ADEC-Accepted August 24, 2016</p>

#	Page #	Section	ADEC Comment	Response
				<p>Section 1.4.22 ‘Soil’ Subsection, fifth sentence will be revised to state: “Approximately 10.4 tons of PCB-contaminated soil was excavated, and confirmation samples indicated all samples were below cleanup levels (USACE 2011)”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>Section 1.4.32 ‘Soil’ Subsection third sentence will be revised to state: “Following excavation, confirmation samples indicated PCB concentrations were below the cleanup level”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>Section 1.4.33 ‘Soil’ Subsection, third sentence will be revised to state: “No other contaminants were identified above cleanup levels (USACE 2009b)”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>Section 4.3, last sentence of first paragraph will be revised to state: “Results from both sampling events did not identify any analytes at concentrations that exceeded cleanup levels stated in the DD”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Accepted. Section 1.4.14, following sentence will be added to the end of the first paragraph of Soil Section: “PCB- and DRO-contaminated soils were comingled at Site 13 and removal</p>

#	Page #	Section	ADEC Comment	Response
				<p>actions focused on removing the PCB-contaminated soil first, after which the DRO-contaminated soil was the only driver for excavation.”</p> <p>ADEC-Accepted August 24, 2016</p>
29.	1-29	1.4.15	<p>There should be a section in the beginning of the LTMP that discusses the anticipated timeline for drafting, finalizing, and implementing and/or recording the deed notices and/or LUCs, etc. for all sites where intended. It should also indicate the format of the written notices.</p> <p>USACE Response: This issue was discussed at the 7 September 2016 Comment Resolution Meeting. It was noted predicting a timeline or format is not possible until coordination with the landowners occurs.</p>	<p>Deferred.</p> <p>The timeline for establishing the deed notices and LUCs will be determined by discussions between the USACE and the landowners. The anticipated timeline cannot be predicted at this time.</p> <p>ADEC August 24, 2016; further resolution is necessary.</p>
30.	1-31	1.4.17	<p>Soil: this paragraph should mention the fate of the lead-contaminated soil. Was it confirmed to have been removed; along with PCB-contaminated soil removal?</p>	<p>Based on 7 September 2016 Comment Resolution Meeting, the first two paragraphs in Section 1.4.17 will be revised as follows:</p> <p>“This site consisted of a wood-framed building located on the north side of the perimeter access road surrounding the MOC (Figure A-6). 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 2009a). The selected remedy of excavation and removal of PCB-contaminated soil was initiated and completed in 2010 (USACE 2011). Approximately 5 tons of soil was removed from Site</p>

#	Page #	Section	ADEC Comment	Response
				<p>16. Confirmation samples were collected from the excavation floor and indicated all results were below cleanup levels (USACE 2011)."</p>
31.	1-32	1.4.19	<p>1) In the first sentence on this page, please state the year associated with the RI that then followed by the (USACE 2009b) reference. Please ensure that the actual year of the action/event is stated whenever referencing throughout the document.</p> <p>2) How can NFA be stated when the contaminated groundwater associated with the site is being monitored?</p> <p>USACE Response: The text of Section 1.4.19, Groundwater will be updated as follows: "Site 19 groundwater did not have a specific remedy identified in the Decision Document. Groundwater is monitored as part of MOC groundwater monitoring described in Section 1.4.10."</p> <p>3) Along with other comments associated with NFA statements, NFA should also include any other actions which are or could be done in the future i.e. monitoring, sampling, inspection, periodic review, etc. until RAO are met.</p>	<p>1) Deferred. As discussed during the RTC meeting, this plan will not be the definitive source of the administrative record. ADEC-Accepted August 24, 2016</p> <p>2) The DD lists this site as NFA status on its own. However, the site is geographically positioned within the MOC groundwater monitoring area. ADEC-Accepted August 24, 2016; please include the RTC and clarification in the narrative.</p> <p>3) Deferred. Request to add these items not defined in the DD should be included as part of the upcoming five-year review process. ADEC-Accepted August 24, 2016</p>
32.	1-32	1.4.20	<p>1) The first paragraph of this section should clarify whether any other site-associated COCs were detected at concentrations above respective cleanup levels and/or the confirmation sampling event that confirmed PCBs were the only COC at the site.</p> <p>2) Soil: please revise/amend the discussion and references to the excavation target depth to clarify that the target for this site's COCs was either 15 feet bgs or 2 feet below the existing/seasonal water table – whichever was encountered first. Please also clarify that this criteria was site-specific for POL excavations only and not determination criteria for some other COCs i.e. PCBs in soil.</p>	<p>1) Deferred. As discussed during the RTC meeting, this plan will not be the definitive source of the administrative record. ADEC-Accepted August 24, 2016</p> <p>2) Accepted. The following sentence will be added to the soil section: "Excavation target depth for DRO was either 15 feet bgs or 2 feet below the existing seasonal water table, whichever</p>

#	Page #	Section	ADEC Comment	Response
				<p>was encountered first.” ADEC-Accepted August 24, 2016</p>
33.	1-33	1.4.21	<p>For sites similar to this one, please amend the last statement of the first paragraph to clarify that the contamination in groundwater and/or soils is the result of a release not associated specifically with the building/site feature.</p>	<p>Accepted. Section 1.4.21, text will be revised to clarify. “No soil contamination was identified in the immediate vicinity of the structure (USACE 2009b). Groundwater beneath Site 20 is discussed as part of the MOC groundwater in Section 1.4.10.” Similar changes to the text will be made for Sites 12, 14, 17, 18, 20, 22, and 26. ADEC-Accepted August 24, 2016</p>
34.	1-34	1.4.22	<p>Soil: towards then end of the first paragraph of this section it states removed volumes of soil however, it is not clear if that is a total removal over several years or for that specific year. Please revise amend the wording to clarify this here and elsewhere throughout the document.</p>	<p>Accepted. Section 1.4.22, thirteenth sentence of ‘Soil’ Subsection will be revised to state: “During the 2013 field season, 305.13 tons of arsenic-contaminated soil was removed”. ADEC-Accepted August 24, 2016 Section 1.4.11, eleventh sentence of ‘Soil’ Subsection will be revised to state: “A total of 265.6 tons of soil were removed in 2014”. ADEC-Accepted August 24, 2016 Section 1.4.22, fifth sentence of ‘Soil’ Subsection will be revised to state: “In 2010, approximately 10.4 tons of PCB-contaminated soil was excavated, and confirmation samples indicated all samples were below cleanup levels (USACE 2011)”. ADEC-Accepted August 24, 2016</p>

#	Page #	Section	ADEC Comment	Response
35.	1-35	1.4.22	Surface Water: please also summarize the detection concentration range of the other samples and whether or not it was determined that potential migration of arsenic into surface water was actually occurring – not just whether the results exceeded the cleanup level. Please also clarify whether the results were based on dissolved and/or total arsenic and reference the Table C with the stated cleanup level. “	<p>Based on the 7 September 2016 Comment Resolution Meeting, the text for the Surface Water paragraph in Section 1.4.22 will be revised as follows:</p> <p>“Nine surface water samples were collected in 2014 to monitor the effects of soil removal on surface water. Three samples each were collected prior to excavation, during excavation, and after excavation. Total and dissolved arsenic results were the limit of detection (0.0040 mg/L) for all samples except one total arsenic with a J-flagged sample result of 0.0039 mg/L. The estimated arsenic concentration was from a total arsenic sample. Arsenic was not found above the screening criteria of 0.01 mg/L in any of the samples collected (USACE 2015a). The surface water sampling results demonstrated the soil removals did not adversely impact surface water.”</p>
36.	1-36	1.4.24	Please further clarify what is meant by ‘the quantity of impacted soils that was determined to be de Minimis.’. Which COCs were detected above respective cleanup levels and was contamination left in place at this site?	<p>The terminology ‘determined to be de Minimus’ was taken directly from the DD.</p> <p>Section 1.4.24, last sentence of first paragraph will be revised for consistency with the DD as follows: “Low level PCBs were detected at a single sample location but were not</p>

#	Page #	Section	ADEC Comment	Response
				<p>removed because the quantity of impacted soils was determined to be de minimus (USACE 2009b)". ADEC-Accepted August 24, 2016</p>
37.	1-37	1.4.25	<p>Re: the reference to the antimony source removal, please define what is suspected to be 'potential sources of contamination'. Please state the year/remedial event in which the contaminated location is known to have been removed.</p>	<p>Accepted. Section 1.4.25, last sentence of first paragraph will be revised for consistency with the DD and will state: "Since the 2001 antimony detection was isolated, and potential sources of contamination (e.g., miscellaneous debris) were removed in 2003, the antimony was not considered to pose a significant risk to human health and the environment (USACE 2009b)". ADEC-Accepted August 24, 2016</p>
38.	1-38	1.4.28	<p>Soil: please state the groundwater elevation associated with each respective/referenced removal action that is being discussed.</p>	<p>Deferred. As discussed during the RTC meeting, this plan will not be the definitive source of the administrative record. Specific details regarding groundwater elevations for the POL soil removal at the MOC can be found in the Remedial Action Reports. ADEC-Accepted August 24, 2016</p>
39.	1-39	1.4.28	<p>Soil: please clarify in the second paragraph on this page whether the subject fill material that was present at 12 feet bgs was determined to be fill material placed after the removal action or fill material placed during the facility construction. Please make similar clarification as necessary throughout the document.</p>	<p>The 2014 Remedial Action Report does not provide the level of detail required to determine this with certainty. Section 1.4.28, 'Soil' Subsection, second sentence of second paragraph will be revised to state: "The historical sample location appeared to be in an area where soil excavation occurred in 2013</p>

#	Page #	Section	ADEC Comment	Response
				(USACE 2015a)". ADEC-Accepted August 24, 2016
40.	1-40	1.4.29	<p>1) Sediment: please add discussion that clarifies that the areas selected for removal were based upon RAOs</p> <p>2) and that areas where contaminated sediment were removed were not the only areas containing contaminated sediment; and that contaminated sediment was left in place at other locations across the site mostly due to accessibility and removal impracticality reasons.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. It was noted the remedy at Site 28 had not been fully implemented at the time of the first five year review. The second five year review will address post-remedy implementation at Site 28.</p> <p>3) Surface Water: please add discussion to this subsection re: the surface water sampling and results conducted in-situ during the 2009-2015 RI/RAs and what the status of surface water contamination is as of the last sampling and analyses.</p>	<p>1) Accepted. The following text will be added to the Sediment Section of Section 1.4.29: “Following a mapping and sampling effort in 2012, Phase I of the sediment remedy was initiated in Areas 1, 2, and 4 based on exceedance of the remedial action objectives.” ADEC-Accepted August 24, 2016</p> <p>2) Deferred. Request to add these items not defined in the DD should be included as part of the upcoming five-year review process. ADEC August 24, 2016; further resolution necessary.</p> <p>3) Accepted. A new paragraph will be added to Section 1.4.29, ‘Surface Water’ Subsection and states: “From 2012 through 2014, surface water samples were collected from three locations adjacent to the MOC in Site 28 to assess the impact on surface water, if any, of removal activities at the MOC. Sampling occurred three times throughout the course of work annually: before, during, and following MOC soil removal activities. Results from surface water samples collected to assess the potential impact of removal activities at the MOC did not exhibit TAH, TAqH,</p>

#	Page #	Section	ADEC Comment	Response
				<p>or petroleum sheen levels above those listed in the DD (0.01 mg/L, 0.015 mg/L, and no sheen, respectively). Surface water samples were collected from three locations annually at Site 28 to assess the impact of sediment removal activities. Samples collected before, during, and after sediment removal activities were below the cleanup criteria in 2012, 2013, and 2014 (USACE 2013a, 2014b, 2015a).”.</p> <p>ADEC-Accepted August 24, 2016</p>
41.	1-41	1.4.29	<p>1) Long-term Management: the second bullet as well as the discussions in the preceding narrative paragraphs should be revised/amended to clarify the Corps’ intentions with the potential construction and/or maintenance of a sedimentation pond.</p> <p>ADEC August 24, 2016; rather than deleting it, the issue should be clarified with regard to evaluations and determinations made by the Corps – which from previous project delivery team discussions ADEC understands the Corps’ recommendation is to not construct a sedimentation pond.</p> <p>USACE Response: The LTM bullet will be returned to Section 1.4.29 with changes. Text will state: “Maintenance of the existing, natural sedimentation ponds will be conducted, as needed, based on CERCLA five-year reviews.”</p> <p>2) LTM for Site 28 also needs to include LUCs, deed notice, MNA in addition to the already stated CERCLA five-year reviews and until RAOs are met.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. It was noted the remedy at Site 28 had not been fully implemented at the time of the first five year review. The second five year</p>	<p>1) Accepted. Section 1.4.29, LTM bullet two will be deleted.</p> <p>Section 1.4.29 the last sentence will be deleted. ADEC August 24, 2016; please see response on the left.</p> <p>Additional changes include: Table 1-1, Media revised to “Existing, Natural Sedimentation Ponds” and LTM, Frequency and Duration are None.</p> <p>2) Deferred. Request to add these items not defined in the DD should be included as part of the upcoming five-year review process. ADEC August 24, 2016; further resolution necessary.</p>

#	Page #	Section	ADEC Comment	Response
			review will address post-remedy implementation at Site 28.	
42.	1-41	1.4.30	<p>Long-term Management: It was agreed during the resolution of the first five-year review report that further focused sampling and analyses of sediment and surface water needed to be and would be conducted within the second five-year review period. This should be identified, discussed, and clarified in this and other applicable sections of the document.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. Site 29 was identified as a No Further Action site in the Decision Document. It was noted the remedy at Site 28 had not been fully implemented at the time of the first five year review. The second five year review will address post-remedy implementation at Site 28.</p>	<p>Deferred. Request to add these items not defined in the DD should be included as part of the upcoming five-year review process. ADEC August 24, 2016; further resolution necessary.</p>
43.	1-42	1.4.31	<p>Please discuss/summarize the purpose(s) for conducting the study work at Site 30.</p>	<p>Accepted. Section 1.4.31 will be revised to state: “Site 30 is not a contaminated site. This USACE-designated background area was studied during the RI to assess natural conditions and provide information to develop site-specific background levels (USACE 2009b)”.</p> <p>ADEC-Accepted August 24, 2016</p>
44.	1-42	1.4.32	<p>1) Soil: please see and apply other comments above re: referencing site-specific cleanup levels for PCBs in soil; and also apply throughout the rest of the document.</p> <p>Long-term Management: please indicate the status and proposal to close this site i.e. is it proposed/determined NFA? Please also see other NFA-related comments above.</p>	<p>1) Accepted. See response to Comment #28. ADEC-Accepted August 24, 2016</p> <p>2) Accepted. Section 1.4.32 LTM bullet will be revised to state: “The remedy at Site 31 is considered complete (please reference the First Five-Year Review). No long-term management is required at Site 31”.</p> <p>ADEC-Accepted August 24, 2016</p>

#	Page #	Section	ADEC Comment	Response
45.	1-43	1.4.33	Soil: please amend/revise the discussion in the narrative to clarify that the removal actions at Site 32 were done concurrently with the first five-year review report activities as a pre-five-year review data gap action; and also identify and discuss this for other sites where similar actions/activities were implemented in 2013.	Accepted. The following update will be made to the text of page 1-43 under the soil section: “In 2014, 53.13 tons of DRO-contaminated soil was removed to complete implementation of the remedy.” ADEC-Accepted August 24, 2016
46.	1-43	1.4.34	For clarification purposes, this and other related/applicable site summaries should discuss the status with regard to the migration to groundwater and/or surface water pathways; which per the referenced NFA determination, the pathways should have previously been determined as being no longer complete. USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made to the 2016 LTM Plan. This issue will be further discussed prior to the second five year review.	Deferred. Site 33 was determined to be NFA in the DD. ADEC August 24, 2016; further resolution necessary.
47.	1-44	1.4.35	Please discuss whether any action was taken and/or what the determination rationale to not investigate/remove PCBs further at this site; even though analytical results indicated that concentrations in soil exceeded the cleanup level; given the repeated detections – although low concentrations – indicate that PCBs were released in soils at this site. This should also be discussed re: the NFA determination.	The referenced text is from the DD. See response to Comment #70. ADEC-Accepted August 24, 2016
48.	2-1	2.0	1) Please revise the first sentence of this section by replacing ‘help minimize’ with ‘control and mitigate’. LUCs, ICs, and other controls are also intended to protect the environment, prohibit the removal and/or transport/relocation of contaminated or potentially contaminated material, etc. ADEC August 24, 2016; ADEC recommends using language other than the word(s) ‘help minimize’ since this can be non-specific. The purpose of controls are not to ‘help minimize’ rather to control and/or avoid unacceptable exposure, release, etc. associated with contamination. Further resolution necessary. USACE Response: The term “minimize” was taken directly from the DD.	1) Section 2.0 first sentence will be revised to state: “The objectives of LUCs at the Northeast Cape sites are to minimize exposure to contamination at a site.”. ADEC August 24, 2016; please see comment on the left. 2) The second to last sentence of the last paragraph of Section 2.0 will be updated as follows: “Deed Notices may be

#	Page #	Section	ADEC Comment	Response
			<p>The USACE would prefer to keep the language in the LTM Plan consistent with the DD in this case.</p> <p>2) Please revise the last sentence of this page to also include filing the NEC with ADEC, the landowners, and any other required entity.</p>	<p>implemented through filing a Notice of Environmental Contamination (NEC) at the State Recorder’s Office.”</p> <p>ADEC-Accepted August 24, 2016</p> <p>Please see Comment 19 for updated Section 2 text.</p>
49.	2-2	Table 2-1	<p>1) Please see and apply other similar comments above re: reconciling sites which are referenced as being associated with or part of the MOC.</p> <p>2) All sites where residual contamination is being left in place above the UU/UE criteria require some form of LUCs</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made to the 2016 LTM Plan. This issue will be further discussed prior to the second five year review.</p>	<p>1) Accepted. Table 2-1 lists all sites comprising the MOC and will be updated based on the RTC meeting discussion.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Deferred. ADEC should provide context for requesting this when the DD did not stipulate this action. ADEC August 24, 2016; further resolution necessary.</p>
50.	2-1	2.1	<p>1) Please revise the first sentence of this section to state: ‘The selected remedies for Sites 7 and 9 both include an...’</p> <p>2) This section appears to describe a range of uses for some of the sites but fails to address any of the other sites or at least clarify that Site 8 is not the only site that requires a deed notice to be filed.</p> <p>3) This section should apply ADEC’s previous comment re: elaborating on the time, format, etc. for the deed notices, LUCs, ICs, etc.</p>	<p>1) Accepted. Section 2.1 first sentence will be revised to state: “The selected remedy for Sites 7 and 9 both include an Engineering Control in the form of a landfill cap”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>2) Please see Section 2.2 that discusses other sites that require a deed notice.</p> <p>ADEC August 24, 2016; further resolution necessary.</p> <p>USACE Response: USACE and ADEC Discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan.</p>

#	Page #	Section	ADEC Comment	Response
				<p>Information obtained during the 2016 field effort at Site 8 will be provided in a separate report.</p> <p>3) Deferred.</p> <p>The timeline for establishing the deed notices and LUCs will be determined by discussions between the USACE and the landowners. The anticipated timeline cannot be predicted at this time.</p> <p>ADEC August 24, 2016; further resolution necessary.</p> <p>USACE Response: Deed notices were discussed at the 7 September comment resolution meeting. The text of Section 2 was updated based on that discussion.</p>
51.	2-3	2.2	<p>Sites 3,4,6,7, and 9: for this group of sites, as well as all other sites in which the groundwater pathway is determined incomplete due to quantity/quality reasons, it should still be carried forward and discussed which sites are associated with residual contamination left in place at concentrations which exceed the UU/UE criteria; instead of only stating groundwater quality and quantity as the only reason and that a deed notice will be filed.</p> <p>USACE Response: USACE and ADEC Discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Additional discussions of this issue will occur prior to the second five year review.</p>	<p>Deferred. Issue of UU/UE similar to Comment 2-1. ADEC August 24, 2016; further resolution necessary.</p> <p>See also response to Comment #17. The groundwater exposure pathway at these areas is incomplete because the shallow groundwater does not produce a sufficient quantity of water to be considered a reasonably expected potential future drinking water source.</p> <p>ADEC August 24, 2016; further resolution necessary.</p> <p>Section 2.2, last sentence of Sites 3, 4, 6, 7, and 9 Section will be revised to state: “A Deed Notice will be required</p>

#	Page #	Section	ADEC Comment	Response
				to inform landowners that shallow groundwater is not a reasonable potential future drinking water source.” ADEC August 24, 2016; further resolution necessary. Please see and apply other similar/related responses to RTCs above.
52.	3-1	Table 3-1	<p>1) Site 8 should actually also include soil and groundwater in the five-year reviews and sediment and surface water periodically.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Information obtained during the 2016 field effort at Site 8 will be provided in a separate report.</p> <p>2) Please amend/revise the table note ‘a’ to also state ‘...results and and/or regulatory requirements.’.</p>	<p>1) Deferred. Sediment is the only media described in the DD for Site 8. Request to add these items not defined in the DD should be included as part of the upcoming five-year review process. ADEC- Accepted August 24, 2016; noting that ADEC’s original review and comments were generated prior to receiving the draft 2016 LTM and data gap site investigation work plan.</p> <p>2) See response to Comment #4. ADEC-Accepted August 24, 2016; per additional responses to RTC#4.</p>
53.	3-2	3.0	Please revise the first sentence of the last paragraph of this section to state: ‘...site, USACE will notify ADEC, evaluate...’.	<p>Accepted. First sentence of last paragraph of Section 3.0 will be revised to state: “Once a condition or concern is identified at the site, USACE personnel will evaluate the information, notify ADEC, and determine a course of action”.</p> <p>ADEC-Accepted August 24, 2016</p>
54.	3-2	3.1	1) As previously commented above, please clarify whether statements are being quoted from i.e. the DD and whether or not the work is perceived to be completed. Please see and apply ADEC’s comments above re: its position on	<p>1) Accepted. See response to Comment #4. ADEC-Accepted August 24, 2016; per additional responses to RTC#4.</p>

#	Page #	Section	ADEC Comment	Response
			<p>initial vs long-term visual inspections at several sites.</p> <p>2) Please amend/revise the last sentence on this page to state that other reports will be filed as associated with specific work plans and associated actions.</p>	<p>2) Accepted. Please see response to Comment #5 for the location of this change.</p> <p>ADEC-Accepted August 24, 2016</p>
55.	3-3	3.3	<p>1) Please revise the first sentence of this section by ending the sentence with ‘CERCLA’ and then start a new sentence.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The requested information will not be included in this version of the LTMP. Additional discussion will be necessary at a future date.</p> <p>2) Please see and apply ADEC’s comments above re: contaminants that ‘remain above levels that allow for UU/UE’. The issue re: requiring future periodic vs. CERCLA reviews was resolved as part of the first five-year report that reviews will be conducted at all sites where residual contamination is left in place above the UU/UE criteria until RAOs are met.</p> <p>3) In the last sentence of this section, please state that modified checklists will be provided in the action-specific work plans.</p>	<p>1) Accepted. The first few sentences of Section 3.3 will be revised as follows: “Five-year reviews are a post-Superfund Amendments and Reauthorization Act (SARA) statutory requirement under CERCLA. For the Northeast Cape sites where hazardous substances, pollutants, or contaminants remain above levels that allow for Unlimited Use/Unrestricted Exposure (UU/UE), Sites 21 and Sites 28, five-year reviews are conducted. The purposes of CERCLA...” ADEC-Accepted August 24, 2016; however please see and reconcile other comments/RTCs and applicable LTMP sections, statements, etc. re: which sites require LUCs, ICs, FYRs, etc. Further resolution necessary.</p> <p>2) Deferred. The topic regarding what sites require periodic reviews should be revisited as part of the upcoming five year review scoping process.</p> <p>ADEC-Accepted August 24, 2016</p> <p>3) Accepted. Section 3.3, tenth sentence</p>

#	Page #	Section	ADEC Comment	Response
				<p>will be revised to state: “These modified checklists will be provided in the action-specific work plan”.</p> <p>ADEC-Accepted August 24, 2016</p>
56.	4-1	Table 4-1	<p>Per other ADEC comments above, information should be reconciled to provide consistent references throughout the document; i.e. the sites which are listed as being associated with the MOC, the status of whether work remains in re: to statements that ‘final’ years of inspections, reviews etc. have been completed, etc.</p>	<p>Accepted. Table 4-1 Site Column will be revised to state: “10, 11, 13, 15, 19, and 27 (part of MOC)”.</p> <p>ADEC-Accepted August 24, 2016</p>
57.	4-1	4.1	<p>The proposed sediment sampling objective at Site 8 which is stated to ‘determine the extent of magnitude’ is actually data gap characterization and not monitoring. This should be discussed from the data gap perspective in order to determine adequate long-term monitoring RAOs.</p>	<p>Deferred. Future work will be detailed in a separate plan.</p> <p>ADEC-Accepted August 24, 2016</p>
58.	4-2	4.2	<p>1) Please revise by being more specific on what is referenced as ‘selected areas within the MOC’; be more specific to the actual sites which are impacted and that a POL plume extends across many of these sites.</p> <p>2) Revise the statement in the last paragraph on this page to state ‘...the groundwater monitoring network that was newly established 2015 in accordance...’.</p>	<p>1) Accepted. Section 4.2 first sentence will be revised to state: “Groundwater monitoring is required at both Site 9 and selected areas within the MOC (i.e., Sites 10, 11, 13, 15, 19, and 27) to assess the performance of the selected remedy”.</p> <p>ADEC-Accepted August 24, 2016</p> <p>Section 4.2 first sentence of second paragraph will be revised to state: “At selected areas within the MOC (i.e., Sites 10, 11, 13, 15, 19, and 27), groundwater monitoring will be conducted to monitor natural attenuation”.</p> <p>ADEC- Accepted August 24, 2016</p> <p>Section 4.2 fourth sentence of second paragraph will be revised to state:</p>

#	Page #	Section	ADEC Comment	Response
				<p>“Groundwater samples from MOC Sites 10, 11, 13, 15, 19, and 27 will be obtained from the existing monitoring well network in accordance with the <i>ADEC Field Sampling Guidance</i> (ADEC 2010)”. ADEC-Accepted August 24, 2016; however please note that ADEC’s field sampling guidance was updated in May 2016.</p> <p>USACE-Reference to ADEC’s field sampling guidance will be updated to March 2016.</p> <p>2) Accepted. Section 4.2 sixth sentence of second paragraph will be revised to state: “Figure A-7 presents the locations of the groundwater monitoring network at the MOC that was expanded in 2014.”</p> <p>ADEC-Accepted August 24, 2016</p>
59.		Table 4-2	<p>Why is lead the only metal being included for analysis at one site and all RCRA metals are included for analyses associated with all other sites?</p> <p>All groundwater samples from monitoring wells associated with VOC contamination that was either removed and/or left in place at specific sites should be analyzed for VOCs during LTM; specifically but not limited to Site 10.</p>	<p>Deferred. This topic should be addressed during the upcoming five-year review scoping process. ADEC August 24, 2016; further resolution necessary.</p> <p>USACE Response: RCRA 8 metals are monitored at the MOC for consistency with previous monitoring events. VOC analysis has been included for samples collected from monitoring wells MW10-1 and 14MW06, which are associated with Site 10.</p>

#	Page #	Section	ADEC Comment	Response
60.	4-3	4.3	<p>1) Please revise and amend the discussions in this section since parts of it read as if it is cut and pasted from a previous report, the DD, etc. but does not adequately clarify the status or what is necessary and planned in the future.</p> <p>2) Per other comments above, surface water sampling is also required at Site 29.</p> <p>3) What about monitoring for metals contamination in surface and groundwater at Site 9?</p>	<p>1) Accepted. Please see the revised text of Section 4.3 at the end of this form. ADEC-Partially Accepted August 24, 2016; further resolution necessary.</p> <p>2 and 3) Deferred. These topics should be addressed during the upcoming five-year review scoping process. ADEC August 24, 2016; further resolution necessary.</p>
61.	5-2	5.4	<p>A sediment control system will require maintenance as well as sampling and handling of the accumulated and removed sediment. Potential future sampling and/or removal of contaminated sediments at Site 28 could also be required in the future; as well as other measures/actions in the event inspections indicate ponds and/or stilling basins are refilling with potentially contaminated sediment that could migrate offsite. This and other applicable sections throughout the LTMP for site 28 should discuss this.</p> <p>USACE Response: USACE and ADEC discussed this topic during the 7 September 2016 Comment Resolution Meeting. The 2016 LTM Plan is a starting point to describe future actions required in the Decision Documents. It was noted the remedy at Site 28 had not been fully implemented at the time of the first five year review. The second five year review will address post-remedy implementation at Site 28.</p>	<p>Deferred.</p> <p>Future sediment sampling will be discussed as part of the upcoming five-year review scoping. ADEC August 24, 2016; further resolution necessary.</p> <p>Section 5.4 will be revised to state: “Following completion of the remedy at Site 28, it is anticipated the existing, natural sedimentation ponds will continue to prevent migration of contaminants above risk-based cleanup levels into the Suqitughneq River. There are no ongoing maintenance requirements associated with Site 28”. ADEC August 24, 2016; further resolution necessary.</p>
62.		Figure A-3	<p>The applicable narrative sections of the LTMP should discuss the rationale for selecting the depicted LUC areas i.e. Non-drinking Water Area; gradient, AOC of known residual contamination, etc. Discuss the size, placement of the area in relation to the site boundary, boundary of known contamination above applicable criteria, etc.</p>	<p>Accepted. The following text will be added as the last sentence of the first paragraph of Section 2.2: “The extent of the boundaries for the ‘Non-drinking Water Areas’ were established by placing each site, or sites,</p>

#	Page #	Section	ADEC Comment	Response
				at the center of a conservative buffer area.” ADEC-Accepted August 24, 2016
63.		Figure A-4	Why does the middle decision unit data box title include groundwater? Shouldn't this be surface water? If so then the applicable surface water results should be called out and detailed on the figure.	Accepted. Data boxes in Figure A-4 present sediment results. The title of the Middle Decision Unit data box will be revised to state: “Middle Decision Unit Composite Sediment Sample Results”. ADEC- Accepted August 24, 2016
64.		Figure A-7	A figure note should be added that states that wells depicted as abandoned were either demolished during removal action activities or decommissioned due to site conditions.	Accepted. The following text will be added to the ‘Note’ Section of Figure A-7: “Abandoned wells were decommissioned due to site conditions or demolished during Remedial Actions”. ADEC- Accepted August 24, 2016
65.		Figure A-8	Please clarify the 2013 soil confirmation sample locations which are stated in the legend as having exceeded cleanup levels; whether or not contamination at these locations was removed.	Accepted. Figure will be revised to remove soil confirmation sample locations associated with Main Operations Complex excavations. Figure A-6 will be revised to show soil confirmation sample locations exceeding cleanup levels that remain in place. ADEC- Accepted August 24, 2016
66.		Appendix B	Please revise the title of this Appendix to ‘Decision Document Cleanup Levels’; then clarify in the associated tables and notes which cleanup levels are specific to each matrix and/or site.	Accepted. Appendix B title revised to state: “Decision Document Cleanup Criteria”. ADEC- Accepted August 24, 2016 Two additional footnotes were added to Table B-1 to state: “ ^{dh} Cleanup levels

#	Page #	Section	ADEC Comment	Response
				apply to continuously submerged sediment (including Sites 8, 28, and 29). Intermittently submerged sediment is considered soil” and “ ^d Cleanup levels apply to shallow groundwater in the vicinity of the MOC. ADEC- Accepted August 24, 2016
67.		Table B-1	Please clarify in table notes that the notated ‘—’ for many of the COCs and/or matrices boxes means that a ‘site-specific’ cleanup level was not indicated in the DD for that specific COC and/or matrix. However, that this implies that the most stringent Method Two cleanup levels and UU/UE criteria apply.	Deferred. See also response to comment #2. ADEC- Accepted August 24, 2016; per additional responses to RTCs#2.
			End of ADEC Comments	
			Jacobs Generated Changes	
68.	1-19	1.4.7	Dates for the visual inspections at Site 7 are inconsistent with the first periodic review report.	First sentence of the last paragraph has been revised to state: “The initial four years of annual visual monitoring were completed in 2011 through 2013”. ADEC- Partially Accepted August 24, 2016; note that 2011- 2013 represents 3 field seasons/years which is not consistent with the stated ‘four years’. USACE Response: The text will be revised to state: “The initial three years of annual visual monitoring were completed in 2011 through 2013.”
69.	1-1	1.0	Ensure consistency with Appendix B.	Last sentence of second paragraph has been revised to state: “Cleanup levels established in the DDs are included in Appendix B”. ADEC- Accepted August 24, 2016

#	Page #	Section	ADEC Comment	Response
70.	Var.	Var.	Based on the Comment Discussion, provide justification throughout document for NFA status.	Statements regarding NFA designation have been revised to match text provided in Table 2 of the DD. ADEC- Accepted August 24, 2016
71.	Var.	Var.	Sites that do not require LTM but are not NFA should indicate reason LTM is not required. USACE Response: USACE and ADEC Discussed this topic during the 7 September 2016 Comment Resolution Meeting. No changes will be made the 2016 LTM Plan. Additional discussions of this issue will occur prior to the second five year review.	Section 1.4.1 LTM bullet has been revised to state: “Petroleum contaminated soil with concentrations above the site-specific cleanup level were removed and no long-term management is required at Site 1”. ADEC- Accepted August 24, 2016 Section 1.4.30 LTM bullet has been revised to state: “No long-term management is required at Site 29 because the incidental debris has been removed”. ADEC- Partially Accepted August 24, 2016; however further resolution necessary. Section 1.4.31 LTM bullet has been revised to state: “No long-term management is required at Site 30 because it was not a contaminated site”. ADEC- Accepted August 24, 2016

Response to Comment 60 – Revised text of Section 4.3

“The selected remedy for Site 9 includes three surface water monitoring events to verify COCs in shallow groundwater are not migrating downgradient and impacting surface waters. The first surface water monitoring event at Site 9 occurred in 2010 and 2011, and the second surface water monitoring event occurred in 2013 (Figure A-5). Results from both sampling events did not identify any analytes at concentrations that exceeded cleanup levels presented in the DD. One additional surface water monitoring event is required at Site 9 (USACE 2009b, 2011, 2014a); samples will be submitted for analysis of BTEX and PAHs. Surface water monitoring will be conducted during the site inspection, if practical. A

field sampling plan and quality assurance plan will be provided prior to monitoring. Analytical results from the final surface water monitoring event will be used to determine if additional monitoring events are necessary.”

ADEC-Partially Accepted August 24, 2016; however further resolution necessary per other related/similar comments.

USACE Response: The related/similar comments were reviewed during the 7 September 2016 Comment Resolution Meeting. No additional changes are needed for the revised text for Section 4.3.

Comments on the Corps of Engineers/Jacobs Engineering Long-Term Management Plan (LTMP) for the Northeast Cape Formerly Used Defense Site on St. Lawrence Island

Submitted by Alaska Community Action on Toxics (ACAT)

Prepared by Vi Waghiyi, Native Village of Savoonga Tribal Member, RAB Member, and Environmental Health and Justice Program Director, ACAT; and Pamela Miller, RAB Member, and Executive Director, ACAT

September 9, 2016

Thank you for the extension of time to allow for submission of our comments.

Response: You are welcome.

First, we must express our utter frustration and disappointment that the concerns, observations, and recommendations of the community that have been conveyed over many years in RAB meetings, and in community, tribal and leadership meetings have not been respected, adequately reflected or considered in the development of this LTMP. We also are disturbed that many if not most of the formal and informal comments, as well as results of community-based research published in the peer-reviewed literature provided by us and by the Technical Advisor to the RAB over the years are not addressed in this long-term management plan. The Corps has refused to follow requirements for government-government consultation, ignored the need to include the tribes in the development and inclusion as signatories of the decision documents, made a sham of “public” involvement, and failed to meet legal requirements of CERCLA to protect health and the environment.

Response: The USACE has diligently conducted public outreach activities in accordance with Formerly Used Defense Site (FUDS) Program policies. All documents have been made available for review and comment. The Restoration Advisory Board was formed at the community’s request and periodic public meetings have been held. The Restoration Advisory Board also received assistance from a Technical Assistance for Public Participation (TAPP) Advisor since 2001. Educational outreach and training for the community was provided by the USACE and held during development of the Five-Year Review. Two sessions were held in Savoonga on January 29, 2015 to help community members understand the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) process.

The USEPA conducted an evaluation of the USACE cleanup efforts at Northeast Cape and Gambell and concluded in February 2013 the cleanup is consistent with CERCLA and the National Contingency Plan. The First Five-Year Review (February 2015) was completed while remedy implementation was still ongoing in 2014. The protectiveness determinations for all sites, with the exception of Site 6, were the remedies were 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 including Site 6.

To honor the Government to Government consultation with the Tribal leaderships on St. Lawrence Island, our USACE Project Manager(s) have separately met with the Tribal President and Indian Reorganization Act (IRA) Council Members prior to scheduled Restoration Advisory

Board (RAB) Meetings. In addition, several former Alaska-District Commanders and FUDS Program leaders from USACE Headquarters have met with Tribal Leaders, both on St. Lawrence Island and here on Joint Base Elmendorf-Richardson. These meetings included September 2010 (Colonel Koenig from the Alaska-District and James Balocki from USACE Headquarters) in Savoonga and Gambell, January 2007 (Colonel Wilson from the Alaska-District) in Gambell, April 2006 (Colonel Gallagher from the Alaska-District) in Savoonga, and July 2002 (Lt. Colonel Gingras from the Alaska-District) at [then] Elmendorf Air Force Base (AFB). The USACE also conducted separate meetings with the tribal leadership as part of its government-to-government consultation responsibility when the Proposed Plan was released in July 2009.

Regarding the tribe as signatories to the decision documents (DDs), we have previously responded to these concerns. To reiterate, the USACE cannot seek tribal signatures on Records of Decision (also known as Decision Documents [DDs]) because the tribe does not have jurisdiction over the land itself. CERCLA of 1980 regulations (see 40 Code of Federal Regulations [CFR] 300.515) require Indian tribes have jurisdiction over a site in order to be afforded substantially the same treatment as states. However, the State of Alaska maintains jurisdictional authority over territory other than Native allotments or other lands set aside under the superintendence of the federal government. Therefore, it would not be appropriate to request Tribal signatures on DDs. According to FUDS Program Policy (ER 200-3-1, May 2004), the Department of the Army Assistant Chief of Staff for Installation Management (ACSIM) is the approval authority for all DDs that have a selected remedy with a present worth cost estimate of more than \$10 million. Lt. General Robert Wilson approved the overall cleanup plans (DDs) for the Northeast Cape Air Force Station FUDS on 3 September 2009.

The failure of the Corps to properly clean up the hazardous waste is exemplified by the fact stated in the LTMP that twenty one of the 34 Northeast Cape sites require some form of land-use controls, thus representing on-going sources of harmful exposures to the people of St. Lawrence Island that will persist for decades. We have consistently stated that “monitored natural attenuation” is not an acceptable “remedy” because it allows hazardous contamination to remain in place for decades into the future with no assurance of recovery to safe levels. These will continue to serve as source areas, perpetuating and extending contamination of ground and surface waters, biota, and people. This presents on-going sources of environmental and human exposure. We register our extreme objection to fundamental assumptions made by the Corps in this LTMP and state that the Corps does not (by far) provide measures that properly protect the environment and human health. The document demonstrates the failure of the Corps and their contractors to properly characterize, assess, or conduct remedial actions that are necessary to protect the people and environment of St. Lawrence Island, in particular the entire NE Cape area affected by the military contamination that has been a critical area for traditional fishing and hunting as well as the community displaced by the military actions.

Response: The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. Please refer to our response to your second comment.

In a letter dated April 7, 1951, the Savoonga Tribal Council granted the United States government a land withdrawal for military use at Northeast Cape with clear conditions, including the following provision: ***“Any refuse or garbage will not be dumped in streams or near the beach within the proposed area as this will prove detrimental to the seal breeding grounds.”***

The Army Corps of Engineers has violated this agreement, causing and perpetuating extensive hazardous contamination. As the current governing entity, the Tribe reiterates authority to establish the highest standards that require restoration of the lands and waters damaged by military activities at Northeast Cape. The people of St. Lawrence Island want to re-establish the community at Northeast Cape, but must ensure the health and safety of people, lands, waters and traditional foods prior to relocation. The watershed of the Suqi River is still severely impaired and the contamination prevents the re-establishment and recovery of fish populations including the once plentiful salmon, tomcod, and Dolly Varden. Seal haulouts at the mouth of the river have also never recovered. We have consistently made the point that the people of St. Lawrence Island intend to re-establish the community at NE Cape, however have to be assured that the site is safe and healthy to do so. The tribe should have been accorded the same treatment as the State with respect to provisions of CERCLA, including notification of releases, consultation on remedial actions, access to information, submittal of priorities for remedial action, and in the development and signing of decision documents. The tribe should have been a Party to the Record of Decision, as we have stated previously. We submit that the Corps of Engineers has failed to meet the legal requirements of CERCLA in this and other responsibilities.

[Response: The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. Please refer to our response to your second comment.](#)

Contaminants of concern are present and exceed regulatory clean up levels in numerous locations. Due to the persistent nature of many contaminants, there is no evidence that MNA is effective and contaminants have not degraded over decades. Thus, contaminants will continue to pose an imminent and long-term threat to the health of people on the Island. We question whether determinations of “No Further Action” are warranted for the sites reviewed in the document—there has been inadequate justification for this as we have noted for years. We challenge the assertion that land use controls, monitored natural attenuation, inspections, and monitoring are adequate to protect present and future generations of people on St. Lawrence Island.

[Response: The USACE has followed the requirements of the DD, which included removing contaminated soil in source areas such as the Main Operations Complex \(MOC\). Evaluation of Monitored Natural Attenuation \(MNA\) of petroleum in groundwater at the MOC, and in sediment at Site 8, will require robust data sets, which are currently being collected. The USACE has followed the requirements of the DD, and will continue to follow requirements of the DD in order to remain in compliance with the CERCLA.](#)

Throughout the document and for numerous sites, the Corps makes the false assumption that groundwater at the site is not considered a current or reasonably expected drinking water source,” thus justifying inaction and no further remediation. We challenge this premise as false because shallow groundwater is interconnected with surface waters and possibly deeper levels of groundwater that have been and may in the future be used as drinking water sources. That is, contaminated groundwater sources flow into and are inextricably linked with surface waters and thus have been and can reasonably be considered to be potential drinking water sources. According to the definition in CERCLA: “The term “drinking water supply” means any raw or finished water source that is or may be used by a public water system or as drinking water by one or more individuals.” Thus, the Corps cannot simply justify inaction in the form of monitored natural attenuation, a method that we have consistently objected to. Site specific land use

controls concerning groundwater are meaningless and unprotective. Unless the source areas of contamination are removed, including contaminated groundwater, surface waters and possibly deeper groundwater downgradient that should be considered future drinking water sources are at risk or already contaminated. The entire groundwater system in and around NE Cape should be considered a potential future drinking water source.

Please see our previous responses.

Further, the document fails to account for the effects of climate change on the hydrology of the area, which is likely to result in extensive melting of permafrost, increased storm surges, and sea level rise. This will alter hydrogeology and flow dynamics of ground- and surface waters. It is highly probable that climate warming will exacerbate the mobilization and transport of contaminants. This could result in more extensive ground- and surface water contamination, as well as more widespread contamination of traditionally harvested food and medicinal plants, fish, and marine mammals.

Response: The next Five-Year Review may consider the effects of climate change on potential mobilization and transport of contaminants.

The document states on Page 1-1 that the USACE will be responsible for “assuring that the selected remedies remain functional and effective.” We are not assured that the USACE will “manage remaining contamination to ensure protection of human health and the environment” without proper oversight and authority of the USEPA, ADEC, and including the tribe. All site visits for inspection, monitoring, and other activities require representation from the tribe to directly witness these activities and actively participate in decisions.

Response: The USACE is the lead agency and therefore is responsible for the selection and execution of the remedy. The USACE has worked at the Northeast Cape Air Force Station FUDS in cooperation with the ADEC and other stakeholders as required by the DDs, which were developed in accordance with the CERCLA.

The FUDS program tracks all required CERCLA Five-Year Review requirements and plans and budgets for these tasks in future years. During the Long Term Management Plan public presentation, a request was made for the USACE to bring community members on a site visit during the 2016 sampling event. This request was seriously evaluated, but the USACE was unable to accommodate it for the 2016 event. Mobilizing to Northeast Cape requires a sufficient lead time to plan for transportation needs and safety considerations. In the case of the 2016 event, there was limited ground transportation available. The Contractor had only two ATV's. Visitors would have been forced to walk from the runway to the sites of interest. No USACE representatives would have been on site to lead the site visit. Our contractor did not have a camp on site, so there were no facilities available to site visitors in case of bad weather. Given the unpredictable weather and the fact daily charter flights were being used, an emergency shelter was required. Because there was insufficient time to plan for additional site visitors, adequate emergency shelter was not available. The safety of our contractors and site visitors is a high priority for the USACE, and therefore we were not able to accommodate the request for a site visit during 2016.

The USACE will consider the community's request for a site visit with tribal representatives. The next sampling event will be conducted in 2018. This will allow the USACE time to plan

adequate transportation for community members, consider and mitigate the safety risks associated with conducting a site visit, and develop a plan for a successful, safe visit.

In Section 1.1.1., the document should note that pesticides and additional heavy metals, such as mercury, have been identified as contaminants of concern. These (including DDT and metabolites, HCH/Lindane, HCB, mirex, and mercury) should be monitored in the future. In Section 1.2, it is important to note that the NE Cape FUD site ranked high enough to be included on the NPL.

Response: Based on the remedial investigations, pesticides and mercury were not identified as contaminants of concern. Samples were analyzed for pesticides (DDE/DDD/DDT) in 1994 and not detected. We have no data indicating mirex should be included as a contaminant of concern. The sediment core results previously presented by Ron Scudato show mirex at low levels, which were below screening level concentrations. Mercury has not been detected in soils at the MOC. One estimated result (below the laboratory detection limit) was 0.0156 mg/kg, which is two orders of magnitude lower than the most stringent soil cleanup level, 1.4 mg/kg, promulgated by the ADEC. The levels of DDE, HCB, mercury and mirex do not exceed risk-based cleanup levels.

According to the USEPA's 2013 Evaluation of the Army Corps of Engineers Cleanup of the Formerly Used Defense Sites at NE Cape and Gambell, St. Lawrence Island, Alaska; the listing of these sites on the NPL would not result in additional investigation or cleanup, or get additional funding from the EPA.

In Section 1.2.3., the document notes the poor understanding of groundwater resources. Yet, throughout the document, unwarranted conclusions about the nature of groundwater resources are used to justify inaction on remediation of groundwater source.

Response: Multiple remedial investigations documented groundwater conditions at the site. The findings are summarized in this report section. Although the extent of the fractured bedrock aquifer is not known, the former water supply wells at the MOC were 50 to 75 feet deep and completed in this aquifer.

Section 1.2.4. grossly understates the importance of the NE Cape for traditional subsistence gathering, hunting, and fishing. Medicinal as well as food plants and berries were collected there. Fish species of importance to subsistence include salmon, Dolly Varden, and tomcod. Contamination of the Suqitughneq River destroyed these and other subsistence resources. There is also a commercial halibut fishery located offshore that is vulnerable to contamination.

Response: Current subsistence uses in the area of the Northeast Cape FUDS are noted in this section. A more detailed explanation of site use was included in the DD, which is referenced in the LTMP.

Section 1.2.5. The document acknowledges that air transportation will likely cease with deterioration of the airstrip. The Corps has an obligation to maintain the airstrip to ensure access for future monitoring, inspection, and remedial activities.

Response: It is important for complete understanding of potential future site access concerns and limitations. The USACE will evaluate all options for future site access, including maintenance of the airstrip, if the site becomes inaccessible via fixed-wing aircraft.

Section 1.4.3., 1.4.4, 1.4.5. The document fails to acknowledge that this area is the site of a traditional community that was displaced by the military and thus minimizes its importance and significance. Currently, children play in this area when used as it is now on a seasonal basis, and thus have a high potential for exposure to dangerous contaminants such as PCBs, lead, and petroleum-related compounds. The document and previous risk assessments have failed to take this and the special vulnerability of children into account. Further removal of contaminated soils and sediments are necessary to be protective of human health, including remediation of shallow groundwater due to its connectivity with surface waters.

Response: Petroleum-contaminated soil was removed from Site 3 during 2010. According to the DD, groundwater at Site 3 is not considered a current or reasonably expected future drinking water source.

Debris, drums, and petroleum-stained soils were removed from Site 4 in 2000-2001 and disposed off site. Sample results indicated the maximum concentration of DRO remaining in site soil was less than the site-specific cleanup level. Shallow groundwater at Site 4 is not considered a current or reasonably expected future drinking water source. According to the DD, Site 4 was determined to be a No Further Action (NFA) site in 2009. Subsequent work has been completed at Site 4 under the Native American Lands Environmental Mitigation Program (NALEMP). This work has included additional debris removal, asbestos and lead-based paint abatement, and incidental soil removal and disposal off site. Future work at Site 4 is possible under the NALEMP.

During 2003 and 2005, exposed, inert debris was removed and disposed off site. Site 5 was determined to be NFA in 2009. Subsequent samples were collected and confirmed the temporary storage at the site of supersacks containing contaminated soil had not contaminated the site.

Section 1.4.10. The document does not provide an honest or accurate assessment of the purported failure of chemical oxidation. As stated in previous comments and critiqued by the RAB Technical Advisor, the method was improperly and ineptly applied. It was ineffective because of the poor implementation. In situ chemical oxidation remains a viable remedial action that should be properly applied to treat contaminated sites at NE Cape. Remedial actions are not complete at the MOC. We are concerned about COCs that have and likely will continue to pose a threat to the environment and human health including arsenic, tetrachloroethylene, PCBs, pesticides, PAHs, and others.

Response: In situ chemical oxidation was deemed ineffective at the MOC during the 2009 pilot-scale test as a result of the presence of peat and highly organic peat soil, presence of permafrost or semi-permafrost zones, and observed preferential flow pathways.

The remedy selected in the DD was monitored natural attenuation, which is ongoing. MNA results indicate the following contaminants have been present in MOC groundwater samples above drinking water cleanup levels: diesel range organics (DRO), residual range organics (RRO), total lead, and total and dissolved arsenic.

Section 1.4.12. Active remediation is necessary to prevent continuing contamination downgradient and harm to the environment and human health.

Response: The USACE has followed the requirements of the DD, which was developed in accordance with the CERCLA. Please refer to our response to your second comment.

Section 1.4.17. What about contamination from pesticides?

Response: Based on the remedial investigations, pesticides were not identified as contaminants of concern.

Section 1.4.22. What was the fate of the PCB-contaminated sludge? Further active remediation is warranted at this site due to the elevated levels of arsenic. We are concerned that this site was not properly characterized and may also contain hazardous levels of PCBs in soils, subsurface, and groundwater.

Response: Contaminated sludge was collected and disposed off site. Based on the remedial investigations, PCBs and arsenic in soil were identified as contaminants of concern. PCB-contaminated soil was removed in 2010. Arsenic-contaminated soil was removed during 2010-2014. Upon completion of 2014 soil removal, arsenic remained at one location at a concentration of 13 mg/kg, which exceeded the site-specific cleanup level of 11 mg/kg.

Section 1.4.25. We are not convinced that antimony does not present a significant risk to human health. Further characterization and remedial actions are warranted here.

Response: Based on the remedial investigations, the antimony detection in soil was isolated. The potential sources of contamination (.e.g., miscellaneous debris) were removed in 2003. As a result, antimony was not considered to pose a significant risk to human health and the environment.

Section 1.4.28. MNA, LUC, and periodic reviews not adequate to protect health and environment.

Response: The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. Please refer to our response to your second comment.

Section 1.4.29. It is significant that analytes exceeded cleanup levels following sediment removal actions. This indicates that remedial actions have not been sufficient and that this area is a continuing source of contamination downgradient and will be a factor in preventing the restoration and recovery of fish populations in the Suqi River and hazardous to the environment and health of people on the Island.

Response: The USACE has followed the requirements of the DD, which was developed in accordance with the CERCLA. USACE conducted downgradient sampling in the Suqi River during August 2016 to evaluate the effectiveness of the implemented remedy at Site 28. Results are pending. A draft report including the results will be prepared and be available for stakeholder review.

Section 1.4.30. We maintain, as stated in previous comments, that contamination of the sediments within the Suqi River and continuing flow of contaminated groundwater into the Suqi River will prevent the restoration and recovery of fish habitat and presents an imminent and long-term threat to the people of St. Lawrence Island.

Our community-based research demonstrates elevated levels of PCBs in resident fish as well as endocrine, developmental, and reproductive disruption. This has profound implications, not only for the recovery of fish and fish habitat within the Suqi River, but also for human health.

Response: Remedial investigation results indicated soil containing PCBs above the site-specific cleanup level of 1 mg/kg was present at Site 13 Heat and Power Plant, and Site 31 White Alice Communications Station. The PCB-contaminated soil was removed from these sites during 2010-2013. PCB levels in Site 28 and Site 29 (Suqi River) sediment have not exceeded the site-specific cleanup level.

Section 2.1. Land use and engineering controls proposed for sites 7 and 9 are inadequate. Landfill caps are inappropriate and shallow, as well as insufficiently protective and easily breached with such factors as extreme weather and animal activity. We have maintained for years that the landfills should have been removed rather than allowing hazardous contamination to remain on site. It is a gross injustice to the people of the Island to leave these landfills which will inevitably leak. The measures identified in the LTMP are not protective of human health. If properly removed, institutional controls would not and should not be necessary.

Response: The landfill caps were constructed under approved work plans and in accordance with state guidance. The First Periodic Review (2013) for Site 7 Landfill concluded the landfill cap was in good condition with no apparent signs of erosion or cracking. There was a small amount of debris protruding from the cap on the southern side of the cap near the armored rock. As a result, this debris was removed during 2014.

EPA's 2013 review stated the investigation determined shallow groundwater was slow to recharge and did not produce water in sufficient quantities to provide drinking water. Thus, groundwater monitoring was not necessary. However, monitoring of nearby surface water bodies for contaminants of concern was highly recommended.

USACE conducted additional surface water sampling at three ponds adjacent to the Site 7 landfill cap in the summer of 2013. Surface water samples were analyzed for petroleum hydrocarbons, BTEX, PAH, PCBs, and metals. Analytical results did not exceed the surface water criteria for total aromatic hydrocarbons (TAH)/total aqueous hydrocarbons (TAqH) and no others specified in the DD. Furthermore, the surface water sample results for metals, PCBs, VOCs and PAHs did not exceed any screening criteria for drinking water.

Section 2.2. As stated above, the document does not provide justification to conclude that shallow groundwater within these specific areas of NE Cape are not current or reasonably expected future drinking water sources. This assumption is unwarranted and used to justify further inaction.

Response: These determinations were made in accordance with ADEC regulations.

Section 3.0. Visual inspections for landfill caps and diversion trench (sites 7,9) are inadequate and subjective. Systematic and comprehensive analysis of the effectiveness of the selected remedies at these sites must be performed and documented on a regular basis, including sampling of landfill leachate. "Periodic" review of sites without specifying frequency (for sites 10, 11, 13, 15, 19, and 27) are unacceptable—frequency and a plan of assessment of the effectiveness of remedial activities must be specified.

Response: Visual inspections of Site 7 and 9 landfill caps, and the diversion trench at Site 9, follow standard procedures and are documented using inspection checklists and photographs.

The stated frequency of periodic reviews under CERCLA guidance is every 5 years, which is reflected in the LTMP.

Regarding sampling of landfill leachate – there is no leachate to sample. In particular, at Site 7, EPA’s review stated the investigation determined shallow groundwater was slow to recharge and did not produce water in sufficient quantities to provide drinking water. Thus groundwater monitoring is not necessary. However, monitoring of nearby surface water bodies for contaminants of concern was highly recommended.

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At Site 9, surface water sampling will occur at five year intervals to demonstrate the shallow groundwater meets the remedial action objectives.

Section 4.0. We are not convinced of the adequacy and efficacy of the monitoring plan. It is insufficiently described.

Response: The LTMP accurately summarizes future monitoring requirements in accordance with the DDs. Details of any future field work will be included in action-specific work plans. As in the past, these work plans will be made available for stakeholder review.

Section 4.2. Comments above address our concerns about groundwater and groundwater monitoring. We have also addressed insufficiencies in the groundwater monitoring program in previous comments (e.g. Comments on the U.S. Army Corps of Engineers Alaska District 2016 Groundwater Monitoring at the MOC and Other Field Activities Work Plan Northeast Cape (NEC), St. Lawrence Island, July 2016).

Response: We always appreciate receiving stakeholder input on our plans. Please refer to previously provided responses to your comments in the Final 2016 Groundwater Monitoring at the Main Operations Complex and other Field Activities Work Plan.

Table 4.2. Analytes should include pesticides, mercury, and TCE.

Response: The list of analytes can only include contaminants of concern identified in the DD. Pesticides and mercury have not been identified as contaminants of concern at the MOC or Site 9. TCE is a volatile organic compound (VOC). Samples collected from monitoring wells MW10-1 and 14MW06 at the MOC will include VOC analysis based on the results of the First Five-Year Review (2015).

Congressman Dr. Paul Ruiz issued a press statement today, and although prompted by concern for the Standing Rock Sioux, is relevant to the development of this LTMP. He states: “Tribes

have the right to self-determination and the right to have a say in decisions that impact their health, sacred lands, and cultural preservation. Too often, there is not meaningful or any consultation with tribal communities regarding development on or near tribal lands. That's why I am calling for an investigative report to review and analyze any systemic noncompliance with federal policies that require regular and meaningful consultation with tribes... I urge a complete systemic review of federal agencies' compliance with tribal consultation." He calls for a "review of the federal programs and policies that [are supposed to] protect the health and environmental security of American Indian and Alaska Native communities." The press release states that Dr. Ruiz, who serves as Ranking Member of the House Subcommittee on Indian, Insular and Alaska Native Affairs urged the U.S. Governmental Accountability Office (GAO) to issue an investigative report reviewing the adequacy of federal policies that protect tribal lands and recommendations for how they can be improved. We will communicate with Congressman Ruiz's office concerning the failure of the Corps of Engineers to properly remediate and protect the rights, environment, health and sovereignty of the people of St. Lawrence Island.

Response: We look forward to continuing dialogue with all stakeholders and tribal consultation in accordance with DoD and USACE policies.