U.S. Army Corps of Engineers
Alaska District

2016 SITE 8 AND SUQITUGHNEQ RIVER SURFACE WATER AND SEDIMENT SAMPLING REPORT

NORTHEAST CAPE
ST. LAWRENCE ISLAND, ALASKA

FUDS No. F10AK0969-03

Final
September 2017

F10AK096903_07.11_0510_a
1200C-PERM

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLES

LIST OF PHOTOGRAPHS (IN-TEXT)

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

TABLE OF CONTENTS (Continued)

SECTION **PAGE**

APPENDICES

ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
AAC	Alaska Administrative Code
AC&WS	Aircraft Control and Warning Station
ADEC	Alaska Department of Environmental Conservation
ATV	all-terrain vehicle
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and xylene
DD	decision document
DoD	U.S. Department of Defense
DQA	data quality assessment
DRO	diesel-range organics
ECC	Environmental Compliance Consultants
EPA	U.S. Environmental Protection Agency
ft/sec	feet per second
ft^3/sec	cubic feet per second
FUDS	Formerly Used Defense Site
GAC	granular activated carbon
GPS	Global Positioning System
GRO	gasoline-range organics
HTRW	hazardous, toxic, and radiological waste
IDW	investigation-derived waste
Jacobs	Jacobs Engineering Group Inc.
LDU	lower decision unit
LOD	limit of detection
MDU	middle decision unit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MNA	monitored natural attenuation
MOC	Main Operations Complex
MS/MSD	matrix spike/matrix spike duplicate
NEC	Northeast Cape
NOAA	National Oceanic and Atmospheric Association
NOM	naturally occurring organic material
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl

ACRONYMS AND ABBREVIATIONS (Continued)

PM	Project Manager
POL	petroleum, oil, and lubricants
RI	remedial investigation
RRO	residual-range organics
SOP	standard operating procedure
SSCL	site-specific cleanup level
Suqi River	Suqitughneq River
TAH	total aromatic hydrocarbons
TAqH	total aqueous hydrocarbon
TOC	total organic carbon
UDU	Upper Decision Unit
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
WACS	White Alice Communications System

EXECUTIVE SUMMARY

This report summarizes the 2016 field activities and sample results for the former fuel spill site location (Site 8) and the Suqitughneq River (Suqi River), also known as Site 29, at Northeast Cape (NEC) Formerly Used Defense Site (FUDS) on St. Lawrence Island, Alaska (Alaska Department of Environmental Conservation [ADEC] File No. 475.38.013). Environmental Compliance Consultants and Jacobs Engineering Group Inc. performed the fieldwork and prepared this report for the U.S. Army Corps of Engineers (USACE) under Hazardous, Toxic, and Radiological Waste Contract No. W911KB-16-D-0002. This work was performed under the authority of the Defense Environmental Restoration Program and the Comprehensive Environmental Response, Compensation, and Liability Act. The 2016 activities were completed according to the *2016 Groundwater Monitoring at the Main Operations Complex and Other Field Activities Work Plan* (USACE 2016b). Activities included collection of sediment and soil at Site 8; sampling and analyses of surface water and sediment from the Suqi River and its estuary; and collecting flow and discharge measurements from the Suqi River.

All analytical results were compared to site-specific cleanup levels (SSCLs) established in the decision document (USACE 2009) and Title 18 of the Alaska Administrative Code, Section 75, Tables B1 and B2 (Alaska Department of Environmental Conservation 2016).

The primary findings of the 2016 field observations and sample results at Site 8 include the following:

- At Site 8, sediment was collocated with discontinuous ephemeral surface water and was interspersed with areas of soil found at slightly higher surface elevations.
- Sample locations with concentrations above SSCLs were generally found adjacent to Cargo Beach Road’s western toe at Site 8. Diesel-range organics (DRO) concentrations in sediment and soil ranged from 190 to 11,000 milligrams per kilogram (mg/kg) and 11 mg/kg (qualified J,B) to 19,000 mg/kg, respectively. Residual-range organics (RRO) concentrations in sediment and soil ranged from 1,800 to 11,000 mg/kg and 130 mg/kg (qualified QL) to 8,500 mg/kg, respectively. Sample locations with DRO and RRO exceeding SSCLs were identified outside the historical decision unit boundaries. The eastern edge of elevated DRO soil levels has not been defined and may extend under the shoulder of the road. Concentrations of 2-methylnaphthalene in sediment ranged from not detected to 6.8 mg/kg.

- Naturally occurring organic material in sediment and soil identified in other areas throughout NEC were found at Site 8. Chromatographic interference to DRO and RRO sample concentrations was likely due to the presence of biogenic organics (refer to Section 1.2.1 in Appendix B).

The primary findings of the 2016 field observations and sample results at the Suqi River include the following:

- Surface water and sediment samples collected from the Suqi River and estuary in 2016 did not contain analytes above the SSCLs; this assumes RRO levels are attributed to biogenic organics (refer to Section 1.2.1 in Appendix B). In surface water samples, total aromatic hydrocarbons concentrations were 0.0007 mg/L and total aqueous hydrocarbon concentrations ranged from 0.000807 to 0.0008233 mg/L. In sediment samples, DRO concentrations ranged from 110 mg/kg (qualified QJ, QN) to 670 mg/kg, RRO concentrations ranged from 930 to 5,700 mg/kg, 2-methylnaphthalene ranged from not detected to 0.71 mg/kg (qualified J,QL,QN), arsenic ranged from 1.27 to 5.82 mg/kg, chromium ranged from 3.42 to 22.7 mg/kg, lead ranged from 3.95 to 22.7 mg/kg, zinc ranged from 14.4 to 42.2 mg/kg. The remaining analytes with SSCLs were not detected.
- Channel width, depth, bed characteristics, mean velocity, and discharge vary considerably along the Suqi River channel due to its limited depth and convoluted flow path.

1.0 INTRODUCTION

This report presents investigation results and conclusions from the sample collection effort conducted in August 2016 at the Northeast Cape (NEC) Formerly Used Defense Site (FUDS) on St. Lawrence Island, Alaska (Alaska Department of Environmental Conservation [ADEC] File No. 475.38.013). Environmental Compliance Consultants (ECC) and Jacobs Engineering Group Inc. (Jacobs) performed the fieldwork and prepared this report for the U.S. Army Corps of Engineers (USACE) under Hazardous, Toxic, and Radiological Waste (HTRW) Contract No. W911KB-16-D-0002.

Field activities were performed in accordance with the *2016 Groundwater Monitoring at the Main Operations Complex and Other Field Activities Work Plan* (USACE 2016b), with the exception of deviations noted in Section 4.0.

1.1 PROJECT GOALS AND OBJECTIVES

The 2016 field effort, sample results, and observations satisfied the project goals. Project goals specific to Site 8 and the Suqi River were defined in the work plan (USACE 2016b). Goals for Site 8 were to collect sediment and soil samples. Goals for the Suqitughneq (Suqi) River were to collect surface water and sediment samples from the Suqi River and estuary, and measure river flow. All planned samples were collected. The sample results and observations were used to determine if the historical Site 8 decision units encompassed the lateral extent of petroleum, oil, and lubricant (POL) affected sediment and soil at Site 8, to assess Suqi River and estuary sediment and surface water quality following remedial actions at the Site 28 Drainage Basin performed from 2010 through 2013, and to compare 2016 Suqi River surface water discharge measurements with measurements collected during previous remedial investigations (RIs).

1.2 REPORT ORGANIZATION

This report contains the following components:

- Section 1.0 introduces the project, describes the project goals, and outlines the report organization.

- Section 2.0 provides a physical description of the site and summarizes the site history.
- Section 3.0 lists key personnel and their responsibilities.
- Section 4.0 details deviations to the 2016 work plan (USACE 2016b).
- Section 5.0 defines project mobilization, sampling activities, land survey, waste management, and demobilization activities.
- Section 6.0 presents investigation results and discussion.
- Section 7.0 presents conclusions derived from the field investigation and analytical data review.
- Section 8.0 lists the references cited in this document.

In addition to the main report, the following appendices contain further information:

- Appendix A provides figures of the site and sampling locations.
- Appendix B provides a data quality assessment (DQA), including the sample summary, analytical results, qualified data tables, and the laboratory deliverables (provided as electronic files on the accompanying CD).
- Appendix C presents cross-sections of the Suqi River channel.
- Appendix D provides copies of the field logbooks.
- Appendix E provides a photograph log for the 2016 activities described in this report.
- Appendix F summarizes the site survey.
- Appendix G presents an evaluation of the Silica gel cleanup technique.
- Appendix H presents comments on the draft version of the document and responses to the comments.

2.0 SITE DESCRIPTION AND HISTORY

The following sections describe the location of NEC, information about the physical and ecological setting, site history, and previous investigations at Site 8 and the Suqi River.

2.1 SITE DESCRIPTION

St. Lawrence Island, Alaska is in the western portion of the Bering Sea, approximately 135 air miles southwest of Nome. The NEC FUDS is 9 miles west of the northeastern cape of the island at 63°19’ N, 168°58’ W. The NEC FUDS property originally encompassed approximately 4,800 acres (7.5 square miles) bordered by Kitnagak Bay to the northeast, Kangighsak Point to the northwest, and the Kinipaghulghat Mountains to the south (USACE 2015a).

NEC 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 sea level roughly 3 miles from the coastline. The NEC FUDS is not connected to other permanent communities on the island by road and is only accessible by air, water, or all-terrain vehicle (ATV) trails. The closest community is the Native Village of Savoonga, located approximately 60 miles to the northwest (Figure A-1).

2.1.1 Climate

St. Lawrence Island has a cool, moist, subarctic maritime climate, with some continental influences during winter when much of the Bering Sea is covered with pack ice. Winds and fog are common, and precipitation occurs approximately 300 days per year as light rain, mist, or snow. Annual snowfall is approximately 80 inches per year. Total annual precipitation is about 16 inches per year, and more than half falls as light rain between June and September. Summer temperatures average between 34 and 48 degrees Fahrenheit (°F), with a record high of 65°F. Winter temperatures range from -2 to 10° F, with an extreme low of -30 °F. Freeze-up on the island normally occurs in October or November, and breakup normally occurs in June (USACE 2015b).

2.1.2 Geology

St. Lawrence Island consists of isolated bedrock highlands of igneous, metamorphic, and older sedimentary rocks surrounded by unconsolidated surficial deposits overlying a relatively shallow erosional bedrock surface (USACE 2009). The Main Operations Complex (MOC) is located at approximately 100 feet above sea level. In the MOC area, shallow unconsolidated surficial materials overlie quartz monzonitic rocks of the Kinipaghulghat Pluton (Patton and Csejtey 1980). The pluton forms the mountainous area south of the NEC FUDS, which includes Kangukhsam Mountain. The Suqi River drainage has created an erosional valley in the Kinipaghulghat Pluton and deposited an alluvial fan of unconsolidated sediments. NEC is located on this alluvial fan, which protrudes north from the mountain front toward the Bering Sea. Granitic bedrock is 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 NEC is characterized by silt near the surface, overlying more sand-dominated soils below the surface. The dark brown silt (in outcrops) to dark green, aqua, blue, and mottled silt contains varying quantities of clay/sand/gravel, and varies from 0 to 10 feet in thickness. The sand below the surface layer contains varying degrees of silt/gravel/cobbles and ranges 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 the NEC FUDS is unknown (USACE 2009).

2.1.3 Hydrogeology

The aquifer at the NEC FUDS is associated with the unconsolidated alluvial material that underlies the area. Select regions, consisting of areas where bedrock blocks are breaking off to form talus fields flanking the Kinipaghulghat Mountains, are likely capable of transmitting large volumes of groundwater. 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, alluvial, and glacial deposits. Based on the topography and geology of the site, the regional groundwater flow direction is expected to flow north from the mountainous recharge area south of the site toward the Bering Sea (USACE 2015b).

The shallow subsurface groundwater found in many areas of Site 8 is likely seasonally thawed water that can be spatially and temporally intermittent depending on variations to yearly levels of precipitation.

Key factors influencing seasonal groundwater flow at Site 8 are permafrost and frozen soils, which render the unconsolidated materials effectively impermeable in some areas. The U.S. Geological Survey (USGS) has classified St. Lawrence Island as an area of moderately thick to thin permafrost. Although the St. Lawrence Island permafrost depth is unknown, the permafrost base on the mainland at Nome (135 air miles to the northeast) is estimated to be 120 feet deep on average. The deeper, unconsolidated deposits at the site are likely permafrost, and the shallow soils represent the active layer where soils are frozen and thawed seasonally. Frozen soils have a profound effect in retarding groundwater flow during most of the year (USACE 2015b).

In addition to the Bering Sea bordering the NEC FUDS to the north, area surface water consists of small streams, small- to moderate-sized lakes, and marshy areas. Surface water generally flows northward from highland areas to the south. Small surface waterbodies are common throughout the area. The primary stream drainage in the area, the Suqi River, is fed by runoff from the prominent drainage of the Kinipaghulghat Mountain Valley in the lower mountain area south of the former installation. Several smaller tributaries, originating from two small unnamed lakes, feed the Suqi River as it flows north into Kitnagak Bay. Area surface water flow is highly dynamic, changing significantly over time.

2.1.4 Vegetation

The area around NEC features several major habitat types, including moist tundra dominated by heaths, grasses, sedges, mosses, and lichens, with shrubs that include bearberry, dwarf birch, narrow-leaf Labrador tea, and willow. These plants typically grow in 1 to 3 feet of undecayed organic mat over saturated and frozen soil. Alpine tundra plants (dwarf, prostrate plants that include heaths and tundra species adapted to dry, thin soil conditions) grow on the slopes and exposed ridges of the nearby mountains. The NEC area has many low-lying areas with lakes, bogs, and poorly-drained soils (USACE 2015b).

2.1.5 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 NEC area. Local subsistence hunting camp structures are located adjacent to Site 3 and are seasonally occupied (USACE 2009). Currently, there are no permanent NEC residents; however, representatives of Savoonga have indicated a desire to re-establish a permanent residential community at the site in the future (USACE 2015a).

St. Lawrence Island supports habitats for the following endangered or threatened species: polar bear (threatened), spectacled eider (endangered), Steller's eider (threatened), and the western distinct population segment of Steller sea lion (endangered). Walrus are protected under the Marine Mammal Protection Act. Harvesting berries and subsistence hunting for reindeer occurs around NEC. The Suqi River is used for subsistence fishing. The ocean surrounding NEC is used extensively for subsistence activities including hunting of whales, walrus, seals, and sea birds, and fishing (USACE 2015a).

2.2 SITE HISTORY

NEC FUDS was constructed as an Aircraft Control and Warning Station (AC&WS) during 1950 and 1951 to provide radar coverage and surveillance for the Alaskan Air Command and later for the North American Air Defense Command, as part of the Alaska Early Warning System. The site was activated in 1952 and a White Alice Communications System (WACS) station was added to the site in 1954. The AC&WS and WACS operations were supported by 212 personnel and were terminated in 1969 and 1972, respectively. The majority of military personnel were removed from the site by the end of 1969 (USACE 2015a).

The NEC FUDS included areas for housing site personnel, power plant facilities, fuel storage tanks, distribution lines, maintenance shops, wastewater treatment facilities, and landfills. The buildings and majority of furnishings and equipment related to the AC&WS were initially abandoned in place due to the high cost of off-island transport (USACE 2015a).

In 1971, the villages of Gambell and Savoonga opted out of the Alaska Native Claims Settlement Act, which allowed them to claim title to 1.136 million acres of land in the former St. Lawrence Island Reindeer Reserve, established in 1903. The Gambell Native Corporation and Savoonga Native Corporation (now known as Sivuqaq, Inc. and Kukulget, Inc., respectively) received titles to all of St. Lawrence Island (except U.S. Surveys 4235, 4237, 4340, 4369, and 3728) by Interim Conveyance No. 203, dated 21 June 1979 and finalized 2 December 1980. In 1982, the Navy obtained approximately 26 acres of land containing the former WACS. The land transfer was later deemed invalid and property ownership reverted to Sivuqaq, Inc. and Kukulget, Inc.

Demolitions of the buildings and the majority of other structures were completed under multiple USACE contracts. The runway, improved gravel roads, and concrete slabs of some of the former structures remain intact. Four RIs were conducted at 34 individual sites grouped by environmental concerns between 1994 and 2004 (USACE 2015a). Following completion of the 2007 Feasibility Study (USACE 2007), and the 2009 Decision Document (DD) (USACE 2009), remedial actions occurred through 2014 (USACE 2015b).

2.2.1 Site 8 (Pipeline Break Site)

Site 8, also known as the pipeline break site, is located southwest of the intersection of the access roads to Cargo Beach and the airstrip (Figure A-2). The POL spill resulted from a surface pipeline break that occurred in wetland underlain by sand and cobbles covered with a thick surface vegetative mat that sloped southward toward the Suqi River. The exact location of the break is unknown and the general area was identified by information obtained from community members. The pipeline transferred fuel from the Site 3 pump house to the Site 11 bulk storage tanks in the MOC. The surface pipeline and tanks were drained and removed in 2000

(USACE 2015a). In 2004, two sediment samples and one surface water sample were collected at Site 8 to assess the potential fuel impacts to the area. Sediment samples were collected 50 to 100 feet downgradient of the suspected location pipeline break. Diesel-range organics (DRO) was identified above cleanup levels in sediment at concentrations of 6,700 milligrams per kilogram (mg/kg) (04NE08SD103) and 19,500 mg/kg (04NE08SD102); no exceedances were identified in surface water (USACE 2015a).

Surface Water

Surface water sampling occurred at Site 8 from 2010 through 2012 and in 2014. Samples collected from 2010 through 2012 were analyzed for DRO, residual-range organics (RRO), and polycyclic aromatic hydrocarbons (PAHs) and results were below ADEC surface water standard criteria. In 2010, 2011, and 2013, only DRO and RRO were detected in the surface water samples collected from the Lower Decision Unit (LDU). DRO was found at concentrations of 0.064 mg/L (qualified J) in 2010 (USACE 2011a), 0.061 mg/L (qualified J) in 2011 (USACE 2012), and 0.031 mg/L (qualified J) in 2012 (USACE 2013). RRO concentrations were 0.055 mg/L (qualified J) in 2010 (USACE 2011a), 0.058 mg/L (qualified J) in 2011 (USACE 2012), and 0.039 mg/L (qualified J) in 2012 (USACE 2013). While the 2010 primary and field duplicate surface water samples from the Middle Decision Unit (MDU) had detectable concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, DRO, and RRO, PAH results were estimated below ADEC surface water standard criteria and DRO and RRO concentrations were below ADEC surface water standard criteria ranging from 0.38 to 0.44 mg./L and 0.56 and 0.7 mg/L, respectively (USACE 2011a). In 2011, although benzene, toluene, ethylbenzene, and xylene (BTEX) and PAHs were not detected, the primary and field duplicate samples collected from the MDU had DRO and RRO in concentrations ranging from 0.19 mg/L (qualified QN) to 0.28 mg/L (qualified QN) and 0.28 mg/L (qualified QN) to 0.44 mg/L (qualified QN), respectively (USACE 2012). In 2012, m&p xylenes, o-xylene, toluene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorine, naphthalene, phenanthrene, pyrene, gasoline-range organics (GRO), DRO, and RRO were detected in the primary and field duplicate surface water samples collected from the MDU (refer to Table H15 in Appendix H of the remedial actions report [USACE 2013]). DRO concentrations ranged from 0.97 mg/L (qualified QN) to 1.6 mg/L (qualified QN) and RRO concentrations ranged from 0.24 mg/L (qualified QN) to 0.45 mg/L (qualified QN) (USACE 2013). In 2014, surface water samples were analyzed for GRO, DRO, RRO, BTEX, and PAHs. Two surface water samples (one primary and one duplicate) were collected from the MDU and one surface water sample was collected from the LDU at the same locations as the 2012 surface water samples. The primary and field duplicate surface water samples from the MDU contained total aqueous hydrocarbon (TAqH) levels of 0.0193 and 0.0329 milligrams per liter (mg/L), respectively. The TAqH levels exceeded the site-specific cleanup levels (SSCLs) of 0.015 mg/L. The TAqH level in the sample from the LDU closest to the Suqi River at 0.00242 mg/L did not exceed the SSCL. The total aromatic hydrocarbon (TAH) levels from both the MDU and LDU were below the SSCL of 0.01 mg/L at 0.0088 and 0.002 mg/L, respectively. No surface water sheen was observed at either location at the time of sample collection (USACE 2015b).

Sediment

The DD-selected remedy of monitored natural attenuation (MNA) of petroleum-contaminated sediment was initiated in 2010. Three decision units were established in the area of the suspected the pipeline break (Figures A-3 and A-4) so that representative samples could be collected to monitor the progress of natural attenuation: the Upper Decision Unit (UDU), upgradient of the source area; the MDU, encompassing the likely pipeline release point; and the LDU, downgradient of the suspected release point. Each decision unit was subdivided into a sample grid four columns wide by ten rows long, creating 40 grid squares measuring approximately 10 feet by 10 feet (USACE 2011a). Figure A-4 presents the locations of composited samples for each decision unit by year (USACE 2015a).

From 2010 through 2012, discrete samples were collected from eight random grid nodes in each decision unit and composited to provide one representative sample from each decision unit; these samples were analyzed for both DRO and RRO before and after silica gel cleanup, PAHs, and total organic carbon (TOC). Samples were inconsistently referred to as sediment and/or soil during this time so the application of the appropriate DD-specified SSCLs is not possible.

Samples collected from the MDU and LDU exceeded the SSCLs for sediment identified in the DD (USACE 2009) for DRO (3,500 mg/kg), RRO (3,500 mg/kg), and 2-methylnaphthalene (0.6 mg/kg) in 2010 and 2012 as follows:

- In 2010, the MDU primary sample exceeded the sediment SSCL for 2-methylnaphthalene at 7.5 mg/kg (USACE 2011a). The MDU primary sample contained DRO at 7,100 mg/kg and RRO at 3,300 mg/kg (below the sediment SSCL).
- In 2010, the MDU field duplicate exceeded the sediment SSCL for DRO at 9,300 mg/kg, RRO at 5,300 mg/kg, and 2-methylnaphthalene at 7.6 mg/kg.
- In 2010, the LDU sample contained 2-methylnaphthalene at 1.2 mg/kg (USACE 2011a).
- In 2012, the LDU primary and field duplicate samples contained for 2-methylnaphthalene at 1.7 and 1.9 mg/kg, respectively (USACE 2013).

For sediment and soil samples collected from Site 8, all analytes in 2011 and the remaining analytes in 2010 and 2012 were below sediment SSCLs. Most analytes were either not detected or present in concentrations of less than 10 percent of the SSCL or not detected; however, 2-methylnaphthalene, anthracene, naphthalene, and fluorine were detected at greater than 10 percent of the sediment SSCLs (refer to Table F3 in Appendix F of the remedial actions report [USACE 2013]).

In 2014, the first five-year review conducted at Site 8 indicated that the composite sampling conducted in 2010, 2011, and 2012 may have under-represented the decision units due to the limited number of subsamples collected per decision unit. The first five-year review recommended establishing the average decision unit concentration using a multi-incremental sampling approach (USACE 2015a).

Historical exceedances for samples without silica gel cleanup are presented in Table 2-1. Some samples were analyzed following silica gel cleanup. Samples collected from the MDU and LDU in 2010 and analyzed for DRO and RRO following silica gel cleanup were lower than reported concentrations without silica gel cleanup (USACE 2011a). Sediment samples collected from all three decision units in 2011 were below SSCLs before and after silica gel cleanup (USACE 2012). In 2012, concentrations decreased following silica gel cleanup (USACE 2013).

Table 2-1
Historical Exceedances in Sediment and Soil at Site 8

Sample ID/ Decision Unit	Sample Type	Year	DRO (mg/kg)	RRO (mg/kg)	2-Methylnaphthalene (mg/kg)
		Sediment SSCL	**3,500**	**3,500**	**0.6**
		Soil SSCL	**9,200**	**9,200**	**--**
04NE08SD102	Discrete	2004	19,500	3,880	NA
04NE08SD103	Discrete	2004	6,700	4,360	NA
UDU	Composite	2010	660[1]	6,300[1]	0.0068
		2011	58[1]	380[1]	0.0035
		2012	290[1]	2,700[1]	ND (0.0039)
MDU	Composite	2010	7,100[1]	3,300[1]	7.5
			9,300*[1]	5,300*[1]	7.6*
		2011	1,800	1,100	0.15
		2012	960[1]	2,100[1]	0.3
LDU	Composite	2010	2,800	1,600[1]	1.2
		2011	550	820	0.210
			1,500	690	0.092
		2012	2,900[1]	2,400[1]	1.7
			2,500*[1]	2,200*[1]	1.9*

Notes:
-- = not specified
* = field duplicate sample
NA = not analyzed
ND = not detected
[1] Concentration decreased after application of silica gel cleanup.
For definitions, refer to the Acronyms and Abbreviations section.

2.2.2 Suqi River

The Suqi River (Figure A-2) flows north from the Kinipaghulghat Mountains, originating south of the MOC. The Suqi River flows through tundra to a lagoon and estuary where it drains into Kitnagak Bay (Bering Sea) east of the NEC airstrip. The lagoon and estuary can be intermittently separated from the Bering Sea by a sand berm that forms at the beach by wave action and storm surges. The berm is occasionally breached. Several smaller tributaries, including the drainage basin (Site 28), contribute flow to the Suqi River.

RIs conducted at the Suqi River, also known as Site 29, between 1994 and 2004 identified DRO as the only contaminant of potential concern. These investigations are summarized in the DD as follows (USACE 2009):

- In 1994, surface water samples were analyzed for GRO, DRO, and BTEX. Surface water samples did not exceed drinking water cleanup levels.
- In 1996, sediment and surface water samples were analyzed for DRO and polychlorinated biphenyls (PCBs). Sediment samples contained DRO at 25,000 mg/kg approximately 850 feet downgradient of the Drainage Basin (Site 28). Subsequent sampling efforts in 1998 and 2001 in this area did not duplicate this contamination level in sediment. Surface water samples did not exceed drinking water cleanup levels.
- In 1998, sediment samples were analyzed for DRO, RRO, BTEX, and PAHs, and contained DRO ranging from 11 to 2,200 mg/kg. Surface water samples did not exceed drinking water cleanup levels.
- In 2001, sediment samples were analyzed for DRO, RRO, PAHs, PCBs, TOC, total solids, chromium, lead, and zinc while surface water samples were analyzed for DRO, RRO, and PCBs. Sediment contained DRO ranging from 15 to 1,400 mg/kg. Surface water samples did not exceed drinking water cleanup levels.
- In 2004, sediment samples were analyzed for GRO, DRO, RRO, BTEX, PAHs, PCBs, pesticides, TOC, and mercury while surface water samples were analyzed for GRO, DRO, RRO, BTEX, PAHs, and PCBs. Sediment samples contained DRO ranging from 157 to 988 mg/kg. Surface water samples did not exceed drinking water cleanup levels.

Evaluation by the Agency for Toxic Substances and Disease Registry concluded consumption of fish from NEC waters is not likely to result in adverse health effects (U.S. Department of Health and Human Services 2006).

3.0 KEY PERSONNEL AND RESPONSIBILITIES

The following table lists key project personnel that participated in the field effort.

Table 3-1
Key Field Personnel

Title	Organizational Affiliation	Name	Responsibilities
Site Manager	Prime Contractor (ECC)	Kris Reidt	Implemented, oversaw, and coordinated project activities and ensured objectives were met. Supported PM as needed.
Site Safety and Health Officer	Prime Contractor (ECC)	Stanley Seegars	Developed, implemented, and oversaw all safety and health-related project aspects.
Technical Lead/Lead Field Sampler	Subcontractor (Jacobs)	Hollee McLean	Collected field screening and analytical samples and managed and shipped analytical samples.
Project Chemist	Subcontractor (Jacobs)	Candace Ede Angela DiBerardino	Coordinated with the laboratory, reviewed data, and ensured data quality objectives were met.
Analytical Laboratory PM	Laboratory Subcontractor (ALS Environmental)	Greg Salata	Analyzed the samples in accordance with contract and QC requirements.
Emergency Medical Professional	Medical Subcontractor (Total Safety)	Christopher Carson	Provided medical services in accordance with contract.

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

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4.0 WORK PLAN DEVIATIONS

Deviations from the 2016 work plan (USACE 2016b) occurred during the execution of fieldwork. None of the deviations significantly affected the data usability. The work plan deviations were as follows:

- Project Wide:
  - In the absence of DD-based SSCLs for soil, USACE requested analytical results from soil samples collected in 2016 to be screened against Title 18 of the Alaska Administrative Code (AAC), Section 75 (18 AAC 75) Tables B1 and B2, promulgated in November 2016 (ADEC 2016). The November guidance was published after the 2016 work plan (USACE 2016a) was accepted. The 2016 WP referenced 18 AAC 75 Tables B1 and B2, which was promulgated in January 2016. For all soil analytes measured as part of the 2016 field effort, the November 2016 values presented in Tables B1 and B2 (ADEC 2016) were more stringent than those referenced in the 2016 WP (USACE 2016a).
  - Some final sampling locations at Site 8 and the Suqi River estuary were not surveyed using a real-time kinematic global positioning system (GPS) or mapping grade GPS. ECO-Land LLC performed an initial survey stakeout of all planned sampling locations on 13 August 2016. During sampling, it was determined that some sample locations would need to be moved. ECO-Land LLC returned to NEC on 18 August 2016. Because the survey gear was left in Nome and with ADEC's approval, sample collection point locations were re-established using the swing-tie method at Site 8 and a compass and tape measure at the Suqi River (Photograph No. 14 in Appendix E). High water levels from heavy rainfall made a follow-up survey impossible. For additional information, see below.
- Site 8:
  - Soil and sediment PAH samples were analyzed by ALS Environmental using U.S. Environmental Protection Agency (EPA) Method SW8270D instead of EPA Method SW8270-SIM due to laboratory error. While the limits of detection (LODs) for soil samples were greater than ADEC evaluation criteria, all LODs were less than SSCLs (USACE 2009). For additional information, refer to the DQA in Appendix B.
  - A Site 8 equipment blank was not collected and submitted for laboratory analysis. The 2016 WP required one equipment blank sample be collected following the decontamination of hand tools used to collect soil samples at Site 8. For additional information, refer to the DQA in Appendix B.
  - Some sample locations were relocated to target potentially contaminated material. Although sample locations were originally selected across and adjacent to the three decision units with the intent of sampling potentially contaminated soil, six proposed locations were several feet into the roadbed and could not be accessed with hand tools (Photographs No. 29 and 30 in Appendix E). After discussions with the USACE, Site 8 sample locations 004, 013, 021, 039, 073, and 075 were relocated so that no more than

approximately 1 foot of roadbed would need to be moved to access the soil most likely to be affected by potential contamination. Due to large cobbles encountered at 2 feet below ground surface (bgs), similar to those lining the toe of the road, sample location 054 was also relocated.

- Suqi River:
  - The original stakeout did not match the locations proposed in the 2016 work plan (USACE 2016a). In order to collect sediment samples adjacent to historical sample locations, sample locations 005, 006, and 007 were not collected in the surveyed location. Using a compass and tape measure, an attempt was made to collect samples in the proposed locations; these sample locations are estimated (Photograph No. 14 in Appendix E).
  - Due to heavy rainfall during the field effort, survey lath installed on 13 and 15 August 2016, marking sediment sample locations in the Suqi River estuary were left in place. At the time of attempted retrieval on 23 August 2016, survey lath for samples 004 through 010 were underwater and could not be safely retrieved due to water depth.
  - Flow measurements were collected from the Suqi River at two points at cross-section S29-002 (Figure A-6.2). Although flow measurements were collected from the midpoint of the Suqi River channel, the midpoint at this location had an eddy (Photograph No. 21 in Appendix E). An additional velocity measurement was collected 1 foot closer to the right edge of water (when facing downstream) from the midpoint and used to calculate discharge at this location.

5.0 FIELD INVESTIGATION ACTIVITIES

Field activities at the NEC FUDS took place from 4 through 23 August 2016.

5.1 MOBILIZATION AND DEMOBILIZATION

Mobilization and demobilization occurred during August 2016. Jacobs personnel traveled from Anchorage to Nome via commercial airline on 4 August 2016; ECC and Total Safety traveled from Anchorage to Nome via commercial airline on 5 August 2016. Most of the field gear was transported to NEC on 8 August 2016 and from NEC on 23 August 2016 via Bering Air charter in a CASA 212-200 Aviocar aircraft (Photograph 5-1).

Personnel commuted from Nome to NEC via Bering Air charter in a Piper RA31-350 Navajo aircraft daily when weather permitted. At all times, the charter Navajo aircraft remained on standby at NEC while personnel were performing field activities. Travel while onsite at NEC was performed using ATVs.

Photograph 5-1: Field gear unloaded from the Bering Air charter aircraft on 08 August 2016. View facing north.

A 12-foot by 20-foot weatherport shelter was erected on 8 August 2016 to serve as an emergency shelter and to stage emergency supplies and field equipment (Photographs 5-2 and 5-3) in accordance with EM 385-1-1 (USACE 2014b). Emergency supplies included food and water, bedding, utilities, and fuel. Fire safety and first aid supplies and two satellite phones were present at NEC at all times. The shelter was also used for onsite sample management activities. A Davis Weather Wizard III weather station was erected to monitor NEC weather conditions. The shelter was dismantled on 23 August 2016 after fieldwork was complete.

Photograph 5-2: Emergency weather port shelter, weather station, and ATV on 08 August 2016. View facing northeast.

Photograph 5-3: Emergency and field gear stored inside weather port shelter on 08 August 2016. View inside.

Due to inclement weather that reduced visibility, there was no travel from Nome to NEC on 6, 7, 9, 19, and 21 August 2016. On 12 August 2016, personnel flew towards NEC via Bering Air charter Beechcraft King Air 200 but were unable to land due to low ground fog at NEC FUDS and returned to Nome.

5.2 SAMPLING ACTIVITIES

NEC sampling activities occurred from 10 through 22 August 2016. Groundwater sampling activities at the MOC occurred from 10 through 16 August and are presented under separate cover (USACE 2017). Soil, sediment, and surface water sampling activities occurred from 13 through 22 August 2016. ECO-Land LLC staked the proposed sample locations on 13 August 2013. Copies of the field logbooks are provided in Appendix D.

All samples were collected, labeled, stored, and shipped in accordance with Jacobs standard operating procedures (SOPs) JE-SOP-2000, JE-SOP-3000, JE-SOP-4000, JE-SOP-5010, JE-SOP-5030, and JE-SOP-7000 provided in the 2016 work plan (USACE 2016b). All samples were shipped via Alaska Airlines Goldstreak priority cargo from Nome to ALS Environmental of Kelso, Washington. Chain-of-custody documents are provided electronically in Appendix B, Attachment B-4. Site 8 sediment and soil samples were shipped the day after sample collection. Suqi River and estuary surface water and sediment samples were shipped within three days following sample collection. Samples were thermally preserved in the field using gel ice immediately after collection until receipt by the offsite laboratory.

Reusable sampling tools were decontaminated before use with Alconox and deionized water rinses (Photograph 5-4) and one-time-use equipment was disposed of after use. Decontamination water was collected and treated onsite using a granulated activated carbon (GAC) filter drum prior to discharge onsite (Section 5.4).

Photograph 5-4: Decontaminating sample collection equipment during sediment and soil sampling at Site 8 on 17 August 2016. View facing west.

5.2.1 Site 8

A total of 83 samples (44 soil and 39 sediment) were collected from 75 sample locations at Site 8 on 17, 18, and 22 August 2016. Shovels, a hand auger, sampling spoons, and gloved hands were used to collect soil and sediment samples (Photograph 5-6). Sample locations were the center point of either 20-foot or 10-foot sample grids that spanned across the three historical decision units and adjacent areas. Samples were collected at surveyed locations (Section 4.0). Samples were typically collected from 1 to 2 feet bgs from depths immediately below the vegetative mat (Photograph 5-5); however, the vertical extent of the vegetative mat exhibited local variation. In order to collect soil or sediment and not vegetative material, sample depths ranged from 0.5 feet to 2.5 feet bgs. No specific evidence of anthropogenic disturbance was noted below the vegetative mat.

Photograph 5-5: Typical depth of samples (1 to 2 feet bgs) collected from Site 8 on 17 August 2016; this sample was collected southwest of the UDU and northwest of the MDU from SS-045. View facing down.

Photograph 5-6: Collecting sample SS-020 at Site 8, a saturated surface soil of coarse gravel and sand below cobbles on 18 August 2016; this sample was collected from the LDU near the MDU boundary. View facing down.

Each sample collected from Site 8 was classified as either sediment or soil based on visual observations. Although sediment and soil appeared to be evenly distributed throughout the sampling area at Site 8, the topography and discontinuous ephemeral surface water correlates with the distribution of sediment and soil throughout Site 8. While sediment was typically in areas of low elevation, soil was in areas of both low elevation without surface water and higher elevation. A total of 35 primary samples were classified as sediment and 40 primary samples were classified as soil. Field personnel used the definition of sediment as all loose submerged material (mineral and organic) except for that which is actively growing vegetation or part of the vegetative mat to classify samples per the 2016 work plan (USACE 2016b). Sample classification, sample ID, sample depth, USGS soil classifications, and other observations were recorded in field logbooks (Appendix D).

Sediment and soil samples collected from Site 8 were analyzed for DRO by Alaska Method 102 (AK102), RRO by AK103, and PAH by EPA Method SW8270D.

5.2.2 Suqi River

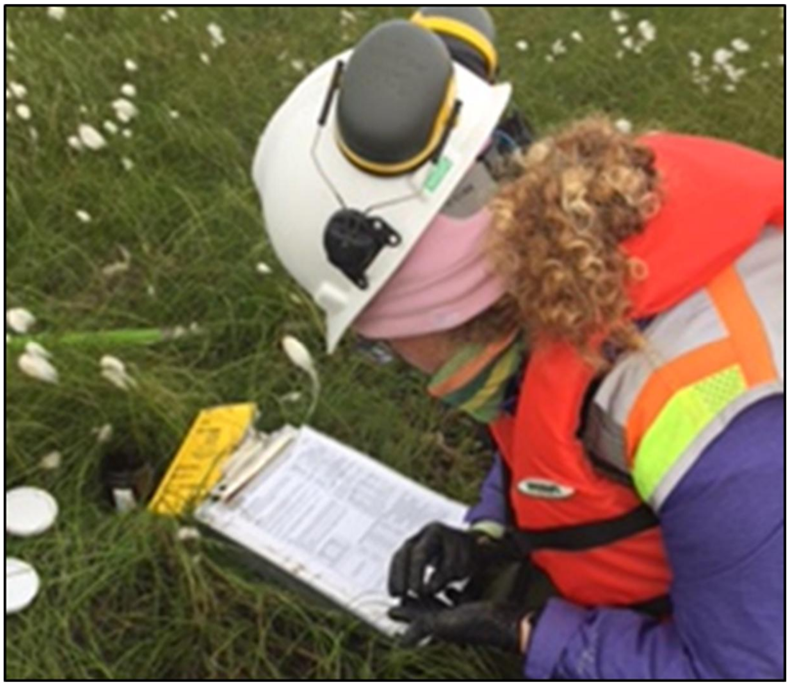
A total of 11 sediment and five surface water samples at the Suqi River and estuary and field measurements at four stream cross-sections at the Suqi River were collected on 15 and 16 August 2016. Collocated sediment and surface water samples were collected from four locations along the Suqi River (Figure A-5) starting with the furthest downstream location (S29-004) and working upstream; these sampling locations were also collocated with the four cross-section measurement locations. Six sediment samples were collected from the Suqi River estuary (Figure A-5) near historical samples 29SD104 through 29SD109 collected under the Phase IV RI (USACE 2005). All samples were collected at surveyed locations whenever possible (Section 4.0). Surface water samples were collected by carefully wading into the river channel. After visual evidence of substrate disturbance subsided, samples were collected upstream from the sampler and transferred directly into jars provided by the laboratory. Following surface water collection, sediment samples were collected using shovels, a hand auger, a clam shell, and sampling spoons (Photographs 5-7 and 5-8).

Photograph 5-7: Collecting sediment from cross-section S29-SD-010 with a hand auger on 15 August 2016. View facing south, flow to the northeast.

Photograph 5-8: Organic layer encountered and removed prior to sampling sediment at S29-SD-009 on 15 August 2016. View facing down.

A total of 14 primary samples were collected from the Suqi River and estuary. Four primary surface water samples (plus one field duplicate and one matrix spike/matrix spike duplicate [MS/MSD] sample) were collected from four collocated sediment locations along the Suqi River. A total of 10 primary sediment samples were collected from the Suqi River and estuary.

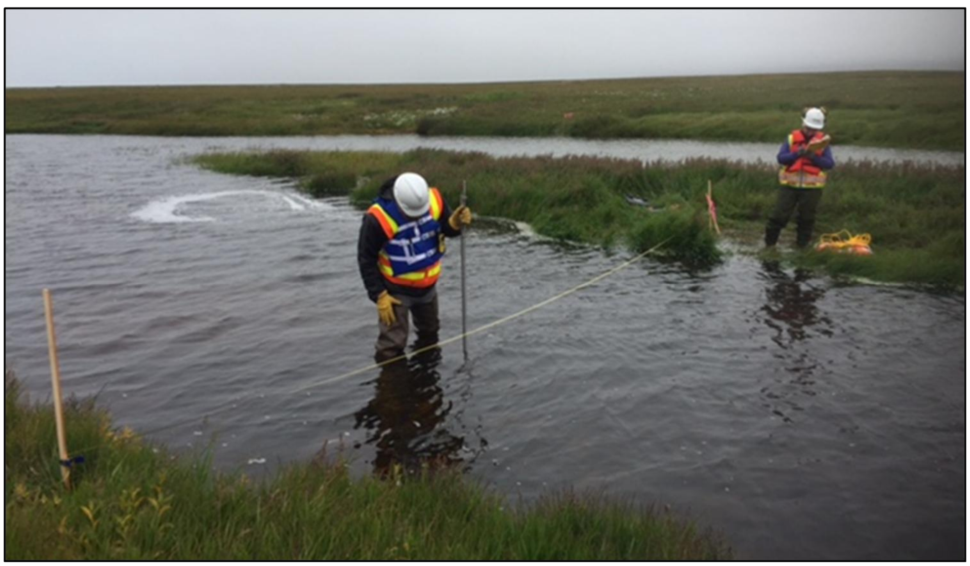
Four primary sediment samples (plus one field duplicate and one MS/MSD sample) were collected from four collocated surface water locations and six sediment samples were collected from the Suqi River estuary. Sample details and observations were recorded in field logbooks, as shown in Photograph 5-9. Logbooks are included in Appendix D.



Photograph 5-9: Classifying sediment using the USCS chart at Cross-Section S29-010 on 15 August 2016. View facing down.

The analytical suite for samples collected from the Suqi River varied based on matrix. Surface water samples were analyzed for PAHs by EPA Method SW8270-SIM, and BTEX by EPA Method SW8260 based on the DD SSCLs for surface water. Sediment samples were analyzed for DRO by AK102, RRO by AK103, PAHs by EPA Method SW8270D, PCBs by EPA Method SW8082, and metals including arsenic, chromium, lead, and zinc by EPA Method SW6020A. The sediment analytes included constituents with DD-specified SSCLs for sediment and/or that exceeded soil evaluation criteria for soil following sediment removal activities at Site 28.

After collecting collocated surface water and sediment samples, surface water discharge measurements were collected on 16 August 2016 from four locations along the Suqi River channel (Figure A-6.1). Measurements were compared to previous surface water discharge measurements collected during RI activities in 2001, 2002 (USACE 2003), and 2005 (USACE 2005). Starting with the furthest downstream location (S29-004) and working upstream, surface water discharge measurements were acquired using a Marsh McBirney model Hach FH950 handheld flow meter with a top-setting wading rod. Using a 50-foot metallic measuring tape, a tag line was set perpendicular to stream flow. Facing downstream, the tag line was set from the right edge of water to the left edge of water at each location (Photograph 5-10). Depths were measured from the right to the left edges of the water in 1-foot increments and recorded in the field logbooks, along with other observations (Appendix D). Velocity measurements were collected from four depths at the midpoint of each cross-section (Photograph 5-11). Velocity measurements were collected at 20, 40, 60, and 80 percent of the midpoint stream depth. At sampling locations S29-001 and S29-002, the depth of the Suqi River exceeded 3 feet. Additionally, surface water sheen was observed at S29-002 and S29-003.



Photograph 5-10: Collecting depth measurements along the tag line at Cross-Section S29-004 on 16 August 2016; while the source of the downstream foam was not investigated, it is likely the result of natural decomposition. View facing northeast, flow to the northeast.

Photograph 5-11: Collecting flow measurements at the midpoint of the Suqi River at Cross-Section S29-002 on 16 August 2016. View facing down, flow to the west (right).

5.3 LAND SURVEYING

A survey was performed in order to identify proposed sampling locations. Surveying was conducted by ECO-Land, LLC, a professional land surveyor subcontracted by ECC. Horizontal data are presented in decimal degrees using the World Geodetic System 1984 coordinate system. Survey data tables relevant to sampling locations and compliant with the *Manual for Electronic Deliverables* (USACE 2011b) are included in Appendix F. Refer to Section 4.0 for a summary of survey deviations from the 2016 work plan (USACE 2016b).

5.4 WASTE MANAGEMENT

Investigation-derived waste (IDW) was transported and disposed of in accordance with all applicable local, state, and federal regulations. IDW included used personal protective equipment, sampling spoons, decontamination water, and general refuse. Solid wastes were stored in contractor bags and four bags of approximately 5 cubic feet each were disposed of by ECC in accordance with the Resource Conservation and Recovery Act and state waste regulations. Wastewater generated during decontamination was collected in a 5-gallon bucket.

The liquid waste was transferred to a GAC filter drum and gravity-fed through the filter prior to discharge on-site (Table 5-1). Discharge was performed downgradient of adjacent sampling. After use, the GAC filter drum was transported to Anchorage via Northern Air Cargo and returned to ECC for re-use. Sanitary waste collected from the portable toilet system was collected and disposed of by ECC (USACE 2016b).

Table 5-1
Site 8 and Suqi River Project-Specific Waste Quantities[1]

<table>
<tr><th>Waste Type</th><th>Date</th><th>Approximate Disposal Quantity</th></tr>
<tr><td rowspan="2">Non-hazardous decontamination wastewater</td><td>18 August 2016</td><td>8 gallons</td></tr>
<tr><td>22 August 2016</td><td>7 gallons</td></tr>
<tr><td rowspan="3">IDW</td><td>17 August 2016</td><td>5 cubic feet</td></tr>
<tr><td>18 August 2016</td><td>5 cubic feet</td></tr>
<tr><td>22 August 2016</td><td>5 cubic feet</td></tr>
<tr><td>General refuse</td><td>17 August 2016</td><td>5 cubic feet</td></tr>
</table>

<u>Note:</u>
[1] Although general refuse was collected together from concurrent projects (soil, sediment, and surface water sampling at Site 8 and the Suqi River and groundwater sampling at the MOC), waste quantities presented in Table 5-1 are project specific.
For definitions, refer to the Acronyms and Abbreviations section.

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6.0 INVESTIGATION RESULTS AND DISCUSSION

This section summarizes and interprets analytical results and field measurements for the 2016 sampling activities conducted at NEC by Jacobs and ECC. The sample summary table, complete analytical results, and DQA are included in Appendix B.

6.1 DATA QUALITY ASSESSMENT

Data quality was assessed using the laboratory case narrative, laboratory data deliverables, and ADEC checklists. Reviews of the analytical results and associated quality control samples were performed by the Jacobs Project Chemist, as per the 2016 work plan (USACE 2016b).

Data quality was evaluated against the following requirements: U.S. Department of Defense (DoD) Quality Systems Manual, version 5.0 (DoD 2013); ADEC and EPA analytical methods (ADEC 2009; EPA 2014); and laboratory limits. Qualifiers were applied to sample results that did not meet the data quality objectives. Qualified results are considered estimated and, whenever possible, indicated as biased high or low. For data qualifier definitions, refer to Section 1.1 of the DQA (Appendix B).

Biogenic interference from naturally occurring organic material (NOM) likely contributed to DRO and RRO concentrations in sediment and soil and biased the analytical results (refer to Section 1.2.1 in Appendix B). NOM in soil and sediment has been reported in previous sampling efforts at NEC. The NOM adds to high levels of DRO and RRO and is likely to bias the results. All DRO and RRO chromatograms were reviewed. After comprehensive review of all chromatograms, DRO exceedances of the SSCL presented in the text are attributable to POL contamination. Biogenic interference likely contributed to all RRO results because no distinguishable residual-range distillate product fingerprint was observed when sample chromatograms were compared to calibration chromatograms. Therefore, RRO exceedances are not discussed in this section. Refer to the DQA (Appendix B) for a detailed discussion.

Two PAH extraction batches associated with Site 8 had PAH surrogates outside of quality control goals due to non-target analytes. The laboratory confirmed the recovery issues outside of the sample hold times. The DQA found the overall quality of the project data to be acceptable and no results were rejected. The complete dataset and details of the data validation are provided in the DQA (Appendix B).

6.2 SITE 8

The purpose of the 2016 field investigation at Site 8 was to: (1) classify the distribution of sediment and soil at Site 8, and (2) to determine the nature and lateral extent of POL contamination in sediment and soil at Site 8.

6.2.1 Distribution of Sediment and Soil at Site 8

In 2016, samples were collected within and adjacent to the Site 8 Decision Units (Figure A-3). The eastern edge of the sampling area was bounded by Cargo Beach Road and several samples in the southeastern portion of the sample area were collected below roadbed material (Photograph 6-1). Tussocks were encountered more frequently throughout the lower two-thirds of the sampling area (Photograph 6-2).

Photograph 6-1: Extent of the road toe along the MDU and LDU on 18 August 2016. View facing south.

Photograph 6-2: Sampling a tussock at SS-024 near the southwestern edge of the MDU at Site 8 on 18 August 2016. View facing northwest.

Samples were classified as sediment or soil using the definition of sediment stated in the 2016 work plan (USACE 2016b) as all loose submerged material (mineral and organic) except for that which is actively growing vegetation is part of the vegetative mat. Sediment was often collocated with discontinuous ephemeral surface water scattered throughout Site 8 (Photograph 6-3); sediment collected from Site 8 does not appear to be recently deposited sediment. In low areas without surface water, water and sediment were consistently encountered below the vegetative mat (Photograph 6-4). Although the final day of sediment and soil sampling at Site 8 occurred after a known heavy rainfall event (Photograph No. 37 in Appendix E), no specific change in the general Site 8 conditions were noted at that time by the field team. Figure A-3 in Appendix A shows the distribution of samples classified as soil or sediment.

Photograph 6-3: Discontinuous ephemeral surface water at the UDU at Site 8 on 17 August 2016. View facing east.

Photograph 6-4: Water present below the vegetative mat at Site 8 sample SS-020 in the LDU on 18 August 2016. View facing down.

6.2.2 Nature and Lateral Extent of POL Contamination at Site 8

Target analytes exceeding DD-based SSCLs at Site 8 were present downgradient of the suspected pipeline break and along the western toe of the road shoulder in 2016 soil and sediment samples. Target analytes did not exceed DD-specified SSCLs within or adjacent to the UDU. Figure A-4 in Appendix A shows historical and 2016 sample locations exceeding the SSCLs. Sample locations that exceeded ADEC Table B cleanup levels are not shown on Figure A-4; however, they are identified in Tables B-1-2 and B-1-3 (Appendix B).

In 2016, sediment samples exceeded the SSCLs of 3,500 mg/kg for DRO, 3,500 mg/kg for RRO, and 0.6 mg/kg for 2-methylnaphthalene. For analytes with sediment SSCLs, sample concentrations of DRO ranged from 190 to 11,000 mg/kg, RRO ranged from 1,800 to 11,000 mg/kg, 2-methylnaphthalene ranged from not detected to 6.8 mg/kg, fluorene ranged from not detected to 0.41 mg/kg J, naphthalene ranged from not detected to 0.69 mg/kg (qualified J), and phenanthrene ranged from not detected to 0.25 mg/kg (qualified J); acenaphthene, benzo(g,h,i)perylene, fluoranthene, and indeno(1,2,3-cd)pyrene were not detected (refer to Table B-1-3 in Appendix B). Although RRO exceeded the sediment SSCL from 22 of the sample locations, there is no record of anthropogenic RRO sources at Site 8 and all RRO detections are likely to be biogenic in nature. Comparison of 2016 sample chromatograms to chromatograms of instrument calibration standards indicated that the chromatographic patterns in most samples were not consistent with patterns of typical middle distillate or residual-range fuel products (refer to Section 1.2.1 in Appendix B).

In 2016, soil samples exceeded the SSCL of 9,200 mg/kg for DRO (Table 6-1). For analytes with soil SSCLs, sample concentrations of DRO ranged from 11 mg/kg (qualified J,B) to 19,000 mg/kg, RRO ranged from 130 mg/kg (qualified QL) to 8,500 mg/kg, and naphthalene ranged from not detected to 3.2 mg/kg (qualified J,QH) (See Table B-1-2 in Appendix B).

Table 6-1
2016 SSCL Exceedances in Sediment and Soil at Site 8

Sample Location	Matrix	DRO (mg/kg)	2-Methylnaphthalene (mg/kg)
Sediment SSCL		**3,500**	**0.6**
S08-SD-026	Sediment	**11,000**	ND [0.2]
S08-SD-068		**7,600**	**6.8**
Soil SSCL		**9,200**	**--**
S08-SS-013	Soil	**19,000**	7.5 QH,QN
S08-SS-0139*		**17,000**	3.8 QH,QN
S08-SS-030		**14,000**	14

Notes:
-- = not specified
* = field duplicate sample
Bold = exceeded SSCL
ND = not detected
No RRO exceedances are presented in Table 6-1.
For definitions, refer to the Acronyms and Abbreviations section.
For data qualifiers, refer to the DQA (Appendix B).

In 2016, DRO exceeded the sediment SSCL in S08-SD-026 and S08-SD-068 at 11,000 and 7,600 mg/kg, respectively. Both samples were silty, fine sand, in close proximity to the historical sediment samples collected in 2004, and within the boundaries of the decision units.

In 2016, DRO exceeded the soil SSCL in S08-SS-013 and S08-SS-030 at 19,000 and 14,000 mg/kg, respectively. While a notable fuel odor was present during the collection of both samples, a visible sheen was observed on water that accumulated within the sample boring during the collection of S08-SS-013. Location S08-SS-013 was slightly east of the LDU and approximately 20 feet downgradient of the 2004 DRO exceedance of 19,500 mg/kg. Composite samples were collected in 2010 and 2012 nearby S08-SS-013. Location S08-SS-030 was east of the LDU along the toe of Cargo Beach Road and upgradient of a 2004 DRO exceedance of 6,700 mg/kg.

The ADEC soil migration to groundwater cleanup levels for DRO is lower than the SSCLs defined in the DD (USACE 2009). However, the ADEC migration to groundwater cleanup level is not human health based. ADEC's human health based DRO cleanup level is higher than the DD-based DRO SSCL.

6.2.3 Recommendations for Future MNA Sampling at Site 8

The 2016 Site 8 sampling effort did not identify the eastern extent of DRO SSCL exceedances adjacent to the MDU and LDU. Additional sample collection from beneath the road would be necessary to determine the eastern extent. Future sampling events in this area may require equipment other than hand tools in order to collect samples from beneath the road.

Silica gel or other cleanup techniques can be evaluated in more relevant detail for the purpose of determining actual biogenic contribution to DRO and RRO results. Results from NEC FUDS samples with the silica gel cleanup typically indicated a significant reduction in both DRO and RRO across NEC, and at Site 8 by 6 and 42 percent, respectively (Appendix G) (USACE 2011a, 2012, 2013).

6.3 SUQI RIVER

The purpose of the 2016 field investigation at the Suqi River was to: (1) gather analytical surface water and sediment data to perform a comparative analysis in areas with historical exceedances, (2) collect flow measurement for a comparison with historical flow measurements collected in 2001 and 2002 prior to the 2010 through 2013 remedial actions at the Site 28 Drainage Basin, and (3) provide channel discharge information in the event contaminants were found during the 2016 sampling effort.

6.3.1 Nature and Lateral Extent of Contamination at Suqi River

A total of five surface water and 11 sediment samples collected from the Suqi River and estuary in 2016 did not exceed SSCLs (Figure A-5). For analytes with surface water SSCLs, surface water concentrations of TAH were 0.0007 mg/L and TAqHs ranged from 0.000807 to 0.000823 mg/L (refer to Table B-1-5 in Appendix B). For analytes with sediment SSCLs, sample concentrations of DRO ranged from 110 mg/kg (qualified QL,QN) to 670 mg/kg (qualified QL,QN), RRO ranged from 930 to 5,700 mg/kg, 2-methylnaphthalene ranged from not detected to 0.71 mg/kg (qualified J,QL,QN), arsenic ranged from 1.27 to 5.82 mg/kg, chromium ranged from 3.42 to 22.7 mg/kg, lead ranged from 3.95 to 15.3 mg/kg, and zinc ranged from

14.4 to 42.2 mg/kg; PCBs, benzo(g,h,i)perylene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene were not detected (refer to Table B-1-4 in Appendix B). Although RRO exceeded the sediment SSCL of 3,500 mg/kg, at three sample locations collected from the Suqi River estuary in 2016, RRO is likely attributed to biogenic interference (refer to Section 1.2.1 in Appendix B). Comparison of 2016 sample chromatograms to chromatograms of instrument calibration standards indicated that the chromatographic patterns in most samples were not consistent with patterns of typical middle distillate or residual-range fuel products.

Sediment sampling results from 2016 did not confirm remaining contamination. Historical sampling of the Suqi River was performed before SSCLs were documented in the 2009 DD (USACE 2009). However, when comparing historical sediment and surface water results to SSCLs, one sediment sample collected in 1996 exceeded the DRO SSCL of 3,500 mg/kg at 25,000 mg/kg. Subsequent sampling efforts in 1998 and 2001 near the DRO exceedance were unable to replicate the high DRO concentration (USACE 2009).

While isolated pools of surface water sheen were observed at S29-002 and S29-003 (Photograph 6-5) prior to disturbance or sample collection, the source and whether or not the sheen was biogenic or petrogenic were unknown; results from the 2016 sampling effort for TAH and TAqH in surface water do not support an anthropogenic source for sheen. Surface water TAH and TAqH results were below SSCLs. Sheens have been observed during past sampling efforts as a result of sediment or streambank material disturbance.

Remedial action efforts have been conducted from 2010 through 2013 at the Site 28 Drainage Basin and it has been determined that remaining sources of contamination are not contributing to contaminant migration via the surface water pathway at the time of sampling. However, remaining MOC and Site 28 contamination are potential ongoing sources of contaminant migration to downgradient areas, including the Suqi River or its estuary.

Photograph 6-5: Sheen observed prior to collecting sediment sample S29-SD-003 on 15 August 2016. View facing down.

6.3.2 Suqi River Channel Discharge

Flow measurements were collected from the Suqi River to compare to measurements collected in 2001 and 2002 prior to the 2010 through 2013 remedial actions at the Site 28 Drainage Basin and provide channel discharge information in the event contaminants were found during the 2016 sampling effort (Figure A-6.1). Measurements were collected immediately upstream and downstream of the Drainage Basin confluence from 21 through 22 August 2001 and on 14 August 2002. Additional measurements were collected upstream from the Suqi River culvert near the airstrip in 2002; no measurements were collected downstream of the Suqi River culvert near the airstrip in 2002 because no active flow was recorded. The Phase II RI noted the difference in the Suqi River water level between 2001, a year of high Suqi River water level, and 2002, a year of low Suqi River water level (USACE 2003). In 2016, flow measurements were recorded on 16 August 2016 from approximately 100 feet upstream and downstream from the Drainage Basin confluence (cross-sections S29-001 and S29-002 as shown on Figure A-6.2), and upstream and downstream from the Suqi River culvert near the airstrip (cross-sections S29-003 and S29-004 as shown on Figure A-6.3), respectively. Photographs taken at the time of the 2016 flow measurement collection (Photographs No. 20 through 23 in Appendix E) indicate that the Suqi River water level was below the ordinary high water level.

Mean flow velocity and discharge were calculated for each cross-section. Mean flow velocity was calculated using the "0.2, 0.4, 0.8 Method" published in the *Open Channel Profiling Handbook* (Marsh-McBirney 2001). The velocities recorded at 20 and 80 percent of the total depth at the channel midpoint were averaged together; the resulting average velocity was calculated with the velocity recorded at 40 percent of the total depth to result in the mean velocity at the midpoint of the Suqi River. Total discharge was calculated using mean velocity and total area of each cross-section.

Observations and data recorded from each cross-section in 2016 indicated that channel width, depth, bed characteristics, mean velocity, and discharge varied considerably along the course of the Suqi River (Table 6-2). The channel was deep and narrow near the confluence of the drainage basin, and wide and shallow near the estuary.

Cross-section S29-001, located 100 feet upstream of the drainage basin, had a rocky streambed, organic lined silty sides, and the lowest discharge at 7.0 cubic feet per second (ft^3/sec). Field personnel noted vegetation just below the water surface approximately 2 feet upstream from the midpoint of the Suqi River; the vegetation may have affected stream flow velocity near the surface as the recorded velocity was less than the velocity near the center depth (Appendix C).

Cross-section S29-002 was a smooth gravel and silt streambed, located in the Suqi River approximately 100 feet downstream of the confluence of the Site 28 Drainage Basin with the Suqi River. This cross-section was the narrowest and deepest channel measured, at 8 feet across and a maximum depth of 3.4 feet (Appendix C). Noting an eddy in the midpoint of the channel, field personnel measured velocity and discharge 1 foot from the midpoint closer to the right edge of the water (Section 4.0). This point had the greatest mean velocity at 1.31 feet per second (ft/sec) and discharge at 21.88 ft^3/sec. Although the instantaneous velocities were measured 1 foot from the midpoint closer to the right edge of the water, the eddy may have affected the velocity measurements.

Cross-section S29-003, located downstream of the drainage basin and approximately 100 feet upstream from the Suqi River culvert near the airstrip, was a shallow, boulder-lined streambed (Appendix C). The maximum depth was 1.6 feet, the mean velocity was 0.99 ft/sec, and the discharge was 12.70 ft^3/sec.

Cross-section S29-004, located approximately 100 feet downstream from the Suqi River culvert near the airstrip, was a shallow, boulder-lined streambed measuring 22 feet across (Appendix C). The mean velocity was 0.37 ft/sec, and the discharge was 10.17 ft^3/sec. While the Suqi River was observed to be flowing past the cross-section S29-004, the sand berm at the terminus of the Suqi River estuary may have affected the velocity measurements.

Table 6-2
Suqitughneq River Cross-Sections

Cross Section	Location	Width (feet)	Midpoint (feet)	Depth at Midpoint (feet)	Mean Velocity (ft/sec)	Discharge (ft^3/s)	Bed Characteristics
S29-001	100-feet upstream of the Site 28 Drainage Basin confluence	8.5	4.25	3.2	0.43	7.00	Rocky bed; sides silty with organics
S29-002	100-feet downstream of the Site 28 Drainage Basin confluence	8	4	3.2	1.31[1]	21.88	Smooth gravel and silt bed
S29-003	100-feet upstream of the culvert on the Suqi River near the airstrip	10.5	5.25	1.2	0.99	12.70	Boulder bed
S29-004	100-feet downstream of the culvert on the Suqi River near the airstrip	22	11	1.2	0.37	10.17	Boulder bed

Notes:
[1] Mean velocity measured at 3 feet from the right edge of the water due to eddy at channel midpoint.
All measurements were made on 16 August 2016 within a three-hour period.
For definitions, refer to the Acronyms and Abbreviations section.

Channel width, depth, mean flow velocity, and discharge from the Suqi River have changed since 2001 and 2002. While both velocity and discharge increased in the Suqi River downstream of the Site 28 Drainage Basin confluence as a result of in-flow from the drainage basin, discharge upstream of the confluence remains lower than downstream cross-sections.

The channel deepened approximately 100 feet downstream of the drainage basin, the velocity more than doubled, and discharge was over eight times greater than it was in 2002. In 2001 and 2002, the drainage basin contributed 41 and 43 percent of the total Suqi River flow, respectively (USACE 2003). In 2016, the drainage basin contributed 66 percent to the Suqi River flow. Although channel depth approximately 100 feet upstream of the Suqi River culvert near the airstrip remains shallow, depth increased slightly and discharge increased by a factor of 5 since 2002 (USACE 2003). Downstream of the culvert near the airstrip, the Suqi River is wide; the channel is almost three times wider than cross-section S29-002 near the drainage basin confluence.

A sand berm at the mouth of the Suqi River several feet high prevented direct tidal influence in the estuary. As stated in the Scope of Work and Phase IV RI (USACE 2005), the Bering Sea breaches the sand berm every few years, typically in the fall. Field personnel observed the sand berm on 15 August 2016 and after a storm event on 23 August 2016. As shown in Photographs 6-6 and 6-7, the height and shape of the berm changed after the storm.

Photograph 6-6: Terminus of Suqi River estuary berm, and Bering Sea on 15 August 2016. View facing east.

Estimated low tide (0.1 feet mean lower low water) at 4:09 pm on 15 August 2016 and high tide (1.8 feet mean lower low water at 1:15 am on 16 August 2016 (National Oceanic and Atmospheric Association [NOAA] 2015).

Photograph 6-7: Terminus of Suqi River estuary, berm, and Bering Sea on 23 August 2016 after storm event. View facing east.

Estimated low tide (0.2 feet mean lower low water) at 9:36 am on 23 August 2016 and high tide (2.2 feet mean lower low water) at 3:39 pm on 23 August 2016 (NOAA 2015).

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7.0 CONCLUSIONS

The findings and conclusions from the 2016 Site 8 field effort are based on sediment and soil sampling results from Site 8 as follows:

- Although future evaluation of sediment and soil at Site 8 is ongoing, the definition of sediment as Site 8 should remain all loose submerged material (mineral and organic) except for that which is actively growing vegetation is part of the vegetative mat.
- The topography and discontinuous ephemeral surface water correlates with the distribution of sediment and soil throughout Site 8. Sediment is typically in areas of low elevation while soil is typically in areas of higher elevation.
- At Site 8, POL contamination exceeding SSCLs is present downgradient of the suspected pipeline break and along the eastern edge of both the MDU and LDU and the western toe of the road. 2016 sediment samples exceeded the SSCLs for DRO, RRO, and 2-methylnaphthalene. 2016 soil samples exceeded the SSCL for DRO only. Although sediment exceeded the RRO SSCL, there is no record of anthropogenic sources of RRO at Site 8. Based on chromatogram interpretation, RRO is likely the result of biogenic interference of NOM.
- Elevated DRO and RRO concentrations in sediment and soil at Site 8 indicate that natural attenuation of POL-contaminants at Site 8 will be slow. Removing impacted sediment and soil at Site 8 may be a more effective remedy. Although some elevated DRO and RRO concentrations in sediment and soil can be attributed to POL contamination, review of the chromatograms indicate that the relatively high NOM in sediment and soil found throughout NEC may interfere with laboratory analysis resulting in biased high concentrations of DRO and RRO. In order to remove the suspected contributions from biogenic interference, the silica gel cleanup method is recommended as part of the analytical protocol when analyzing DRO and RRO in sediment and soil samples collected in the future.

The findings and conclusions from the 2016 Suqi River field effort are based on sediment and surface water sampling results from the Suqi River and estuary, and flow measurements from the Suqi River as follows:

- Surface water and sediment in the Suqi River and estuary did not exceed SSCLs in 2016. Although RRO exceeded the sediment SSCL of 3,500 mg/kg at three sample locations collected from the Suqi River estuary, elevated RRO concentrations were likely the result of biogenic interference.
- Channel width, depth, bed characteristics, mean velocity, and discharge vary along the course of the Suqi River. While both velocity and discharge increases downstream of the Site 28 Drainage Basin confluence as a result of in-flow from the Site 28 Drainage Basin, discharge upstream of the confluence remains lower than downstream cross-sections. In 2016, the contribution to Suqi River flow from the drainage basin was 66 percent. A sand

berm was present at the mouth of the Suqi River estuary, preventing direct tidal influence in the estuary.

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APPENDIX A
Figures

All Locations Are Approximate

N

0 25 50 75 100

Miles

WGS 1984 UTM Zone 2N

NORTHEAST CAPE
LOCATION AND VICINITY

ST. LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
20 DEC 2016	K. MAHER	A-1

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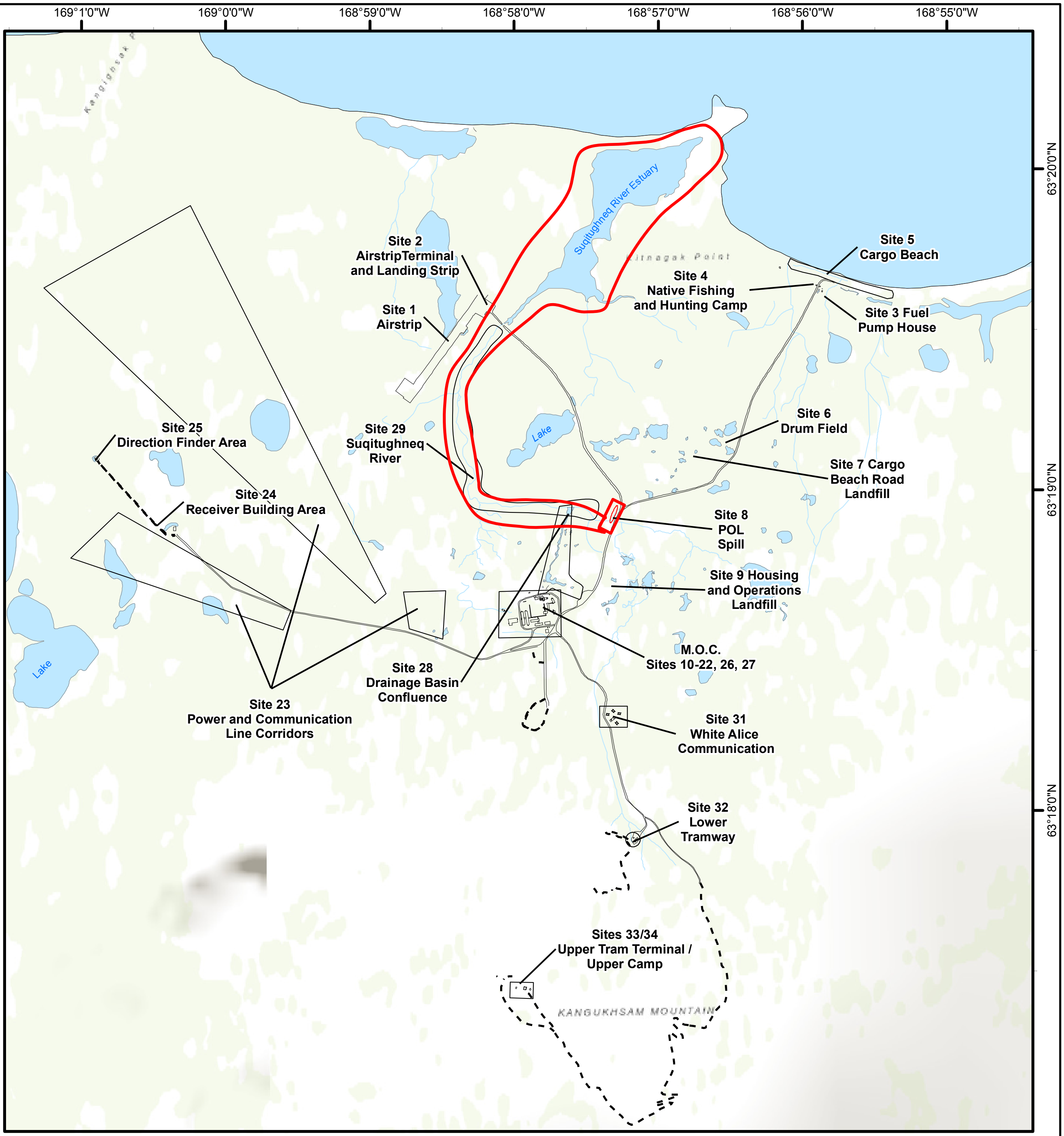

Road
Trail
Water Feature
2016 Area of Interest
Remediation Site

0 0.25 0.5 0.75 1
Miles

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet

N

NORTHEAST CAPE
SITE LAYOUT

SAINT LAWRENCE ISLAND, ALASKA

JACOBS

DATE:	PROJECT MANAGER:	FIGURE NO:
09 JUN 2017	K. MAHER	A-2

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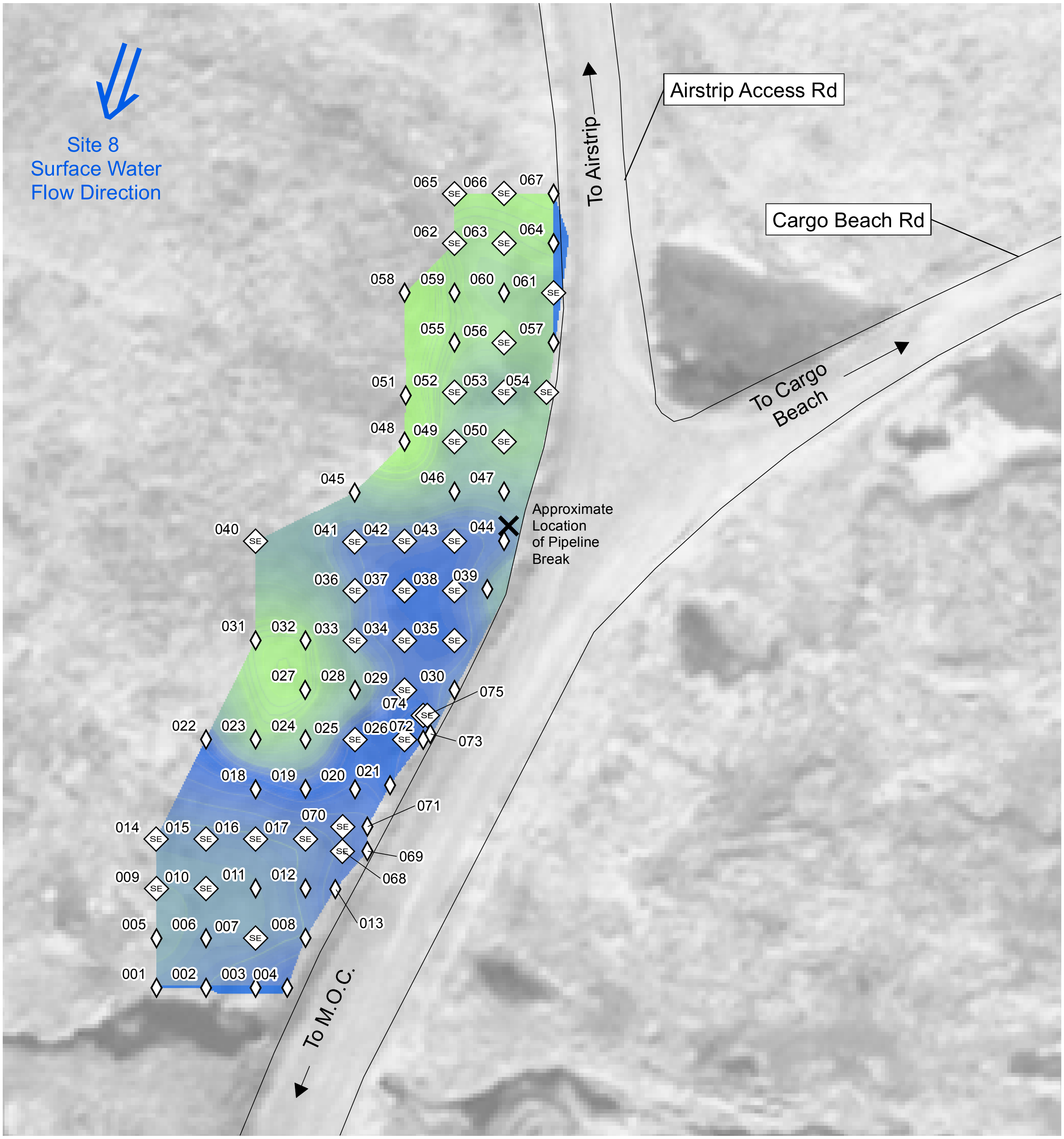

Note: Samples designated as sediment or soil based on field observations at the time of sample collection.

SE 2016 Sediment Sample (39)

2016 Surface Soil Sample (43)

Road

Feet Above Mean Sea Level

41

48

50

N

1 inch = 60 feet

0 20 40 60 80 100

Feet

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

NORTHEAST CAPE
2016 DISTRIBUTION OF SEDIMENT AND SURFACE SOIL SAMPLES AT SITE 8
ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 29 AUG 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-3

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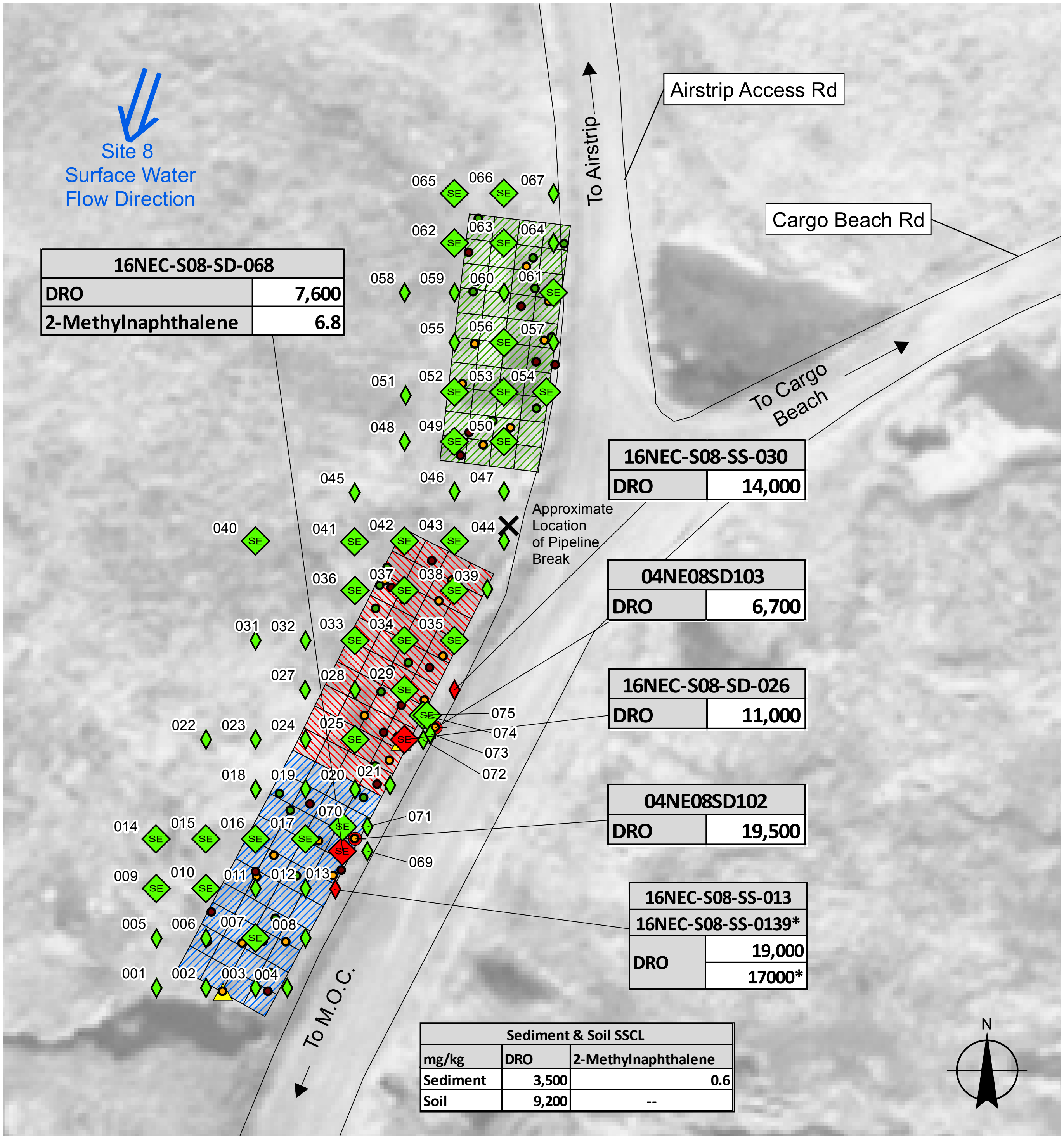


Sediment & Soil SSCL		
mg/kg	DRO	2-Methylnaphthalene
Sediment	3,500	0.6
Soil	9,200	--

Notes: All results in mg/kg, mg/kg = milligram per kilogram * = Duplicate Sample, -- = Not Specified. Sediment and soil sample depths ranged from 0.5 to 2.5 feet below ground surface.

SE 2016 Sediment Sample, No Exceedance (37)

SE 2016 Sediment Sample, Exceedance (2)

2016 Surface Soil Sample, No Exceedance (41)

2016 Surface Soil Sample, Exceedance (2)

2012 Sediment/Soil & Surface Water Sample Location (24)

2011 Sediment/Soil & Surface Water Sample Location (24)

2010 Sediment/Soil & Surface Water Sample Location (26)

2012 & 2014 Surface Water Sample Location (2)

2004 Sediment/Soil Sample Exceedance (2)

Road

Upper Decision Unit (UDU)

Middle Decision Unit (MDU)

Lower Decision Unit (LDU) (40)

1 inch = 60 feet

0 20 40 60 80 100

Feet

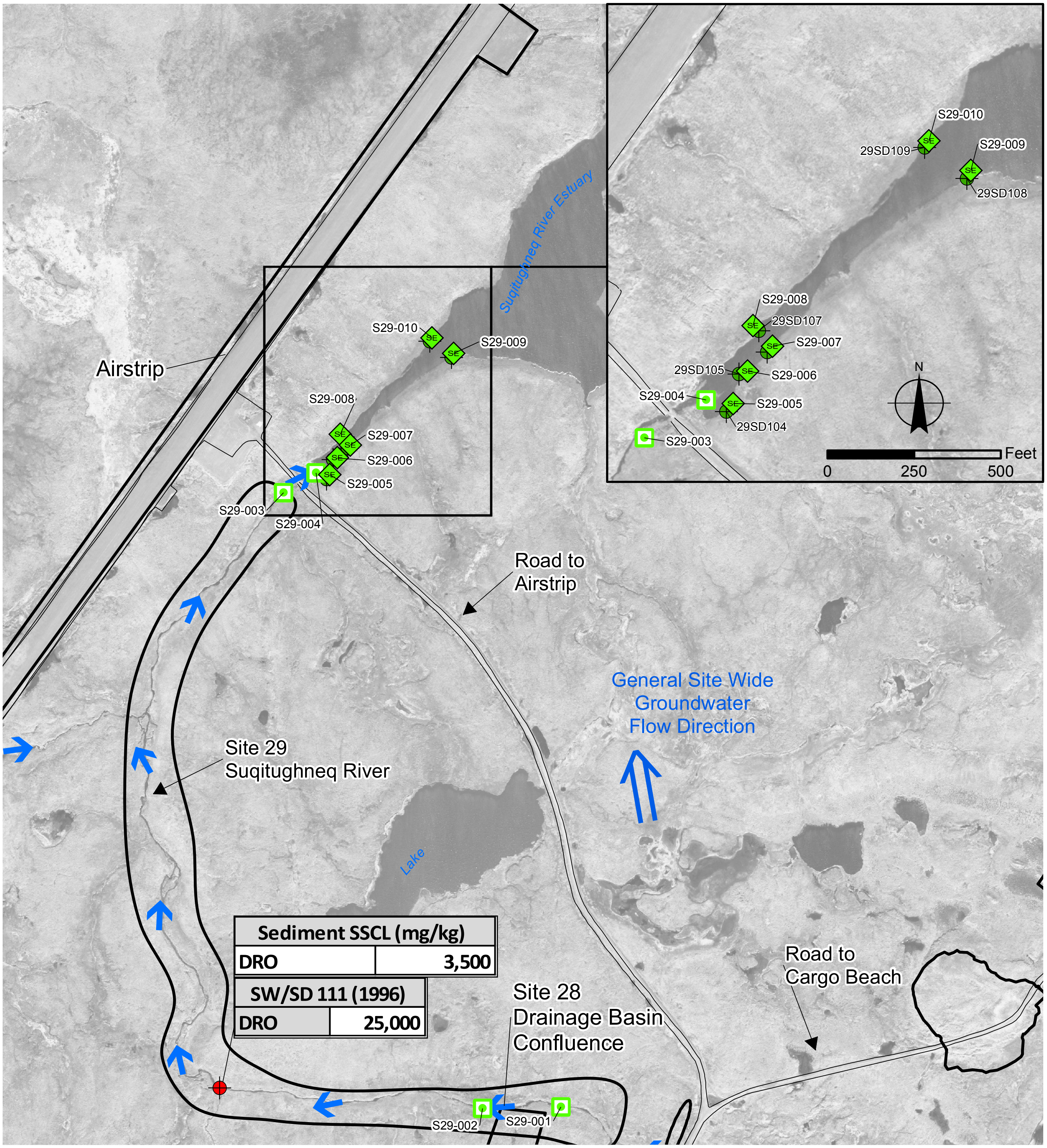
NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26, Aug, 2008

NORTHEAST CAPE
2016 SITE 8 SEDIMENT AND SURFACE SOIL EXCEEDANCES

ST. LAWRENCE ISLAND, ALASKA

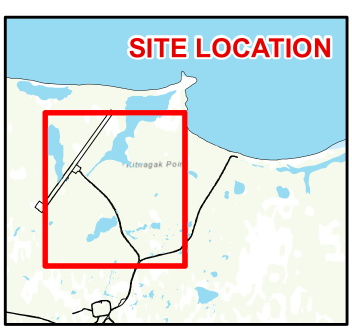
JACOBS	DATE: 29 AUG 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-4

P:\StLawrenceIsland\MXD\AEECC_TO02_2016WP\S08_S29\A4_Site_8_Sediment_And_Surface_Soil_Results.mxd tamasa



Sediment SSCL (mg/kg)	
DRO	3,500

SW/SD 111 (1996)	
DRO	25,000



- 2016 Sediment Sample Location, No Exceedance
- 2016 Sediment/Surface Water Sample, No Exceedance
- 1996 Sediment/Soil Sample, Exceedance
- 2004 Sediment/Soil Sample, No Exceedance
- Localized Stream/Surface Water Flow Direction
- Road
- Remediation Site

Notes:
All results in mg/kg
mg/kg = milligram per kilogram
Sample locations S29-005, S29-006, and S29-007 are approximate. All other locations shown in figure represent actual sample locations.

0 250 500 750 1,000
Feet
1 inch = 800 feet
N

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

NORTHEAST CAPE - 2016 SUQITUGHNEQ RIVER SURFACE WATER & SEDIMENT EXCEEDANCES

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 29 AUG 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-5

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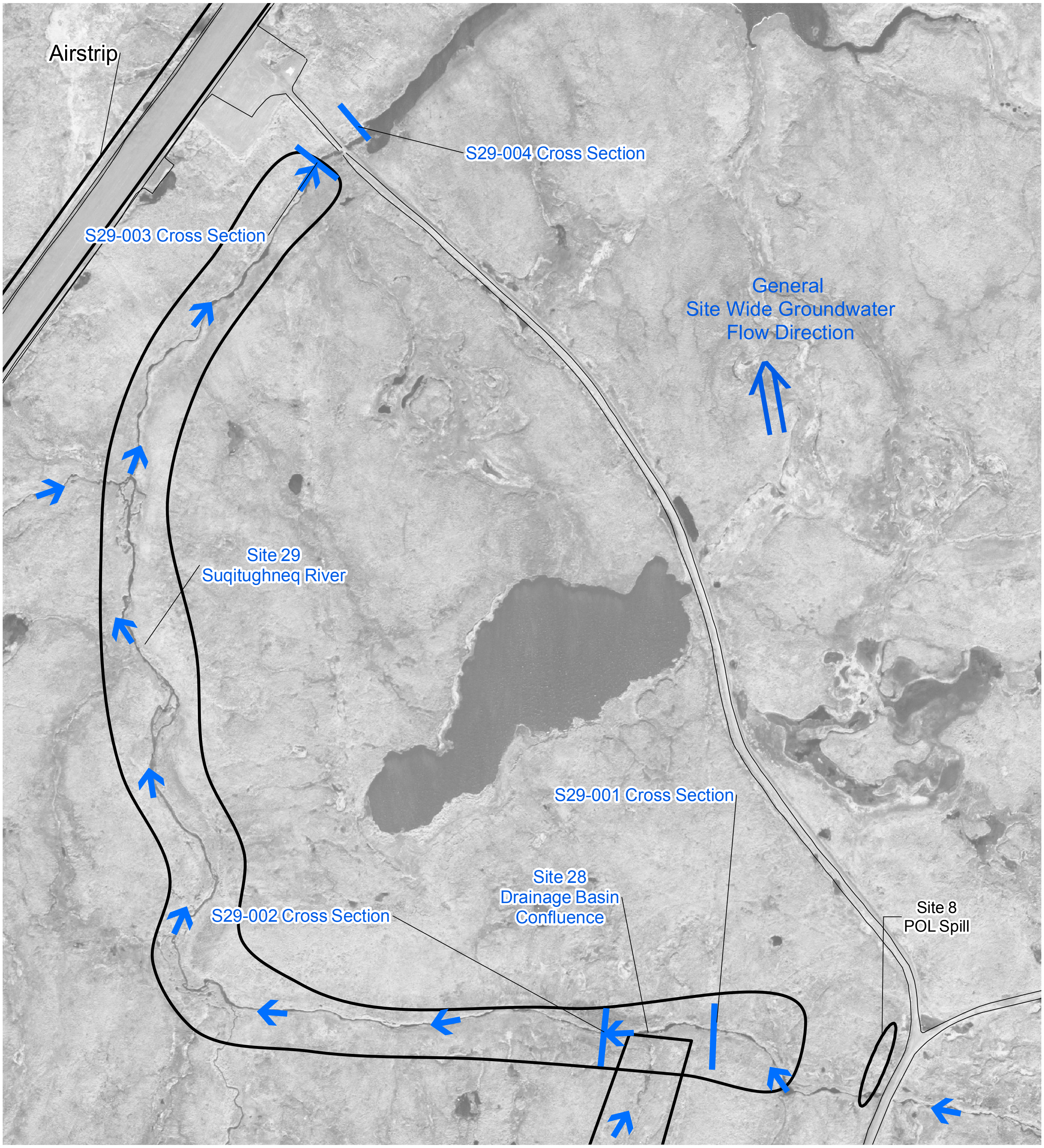

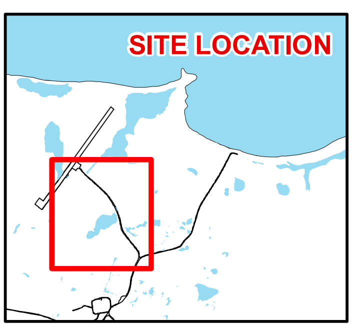

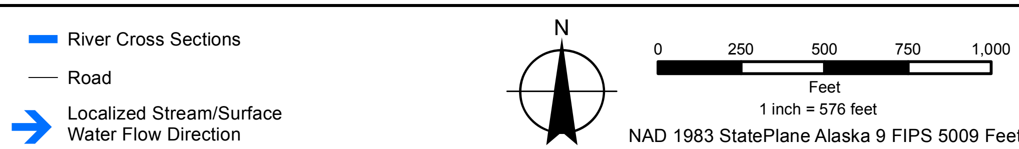

NAD 1983 StatePlane Alaska 9 FIPS 5009 Feet
Image Date: 26, Aug, 2008

NORTHEAST CAPE
2016 SUQITUGHNEQ RIVER CROSS SECTIONS

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 05 SEP 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-6.1

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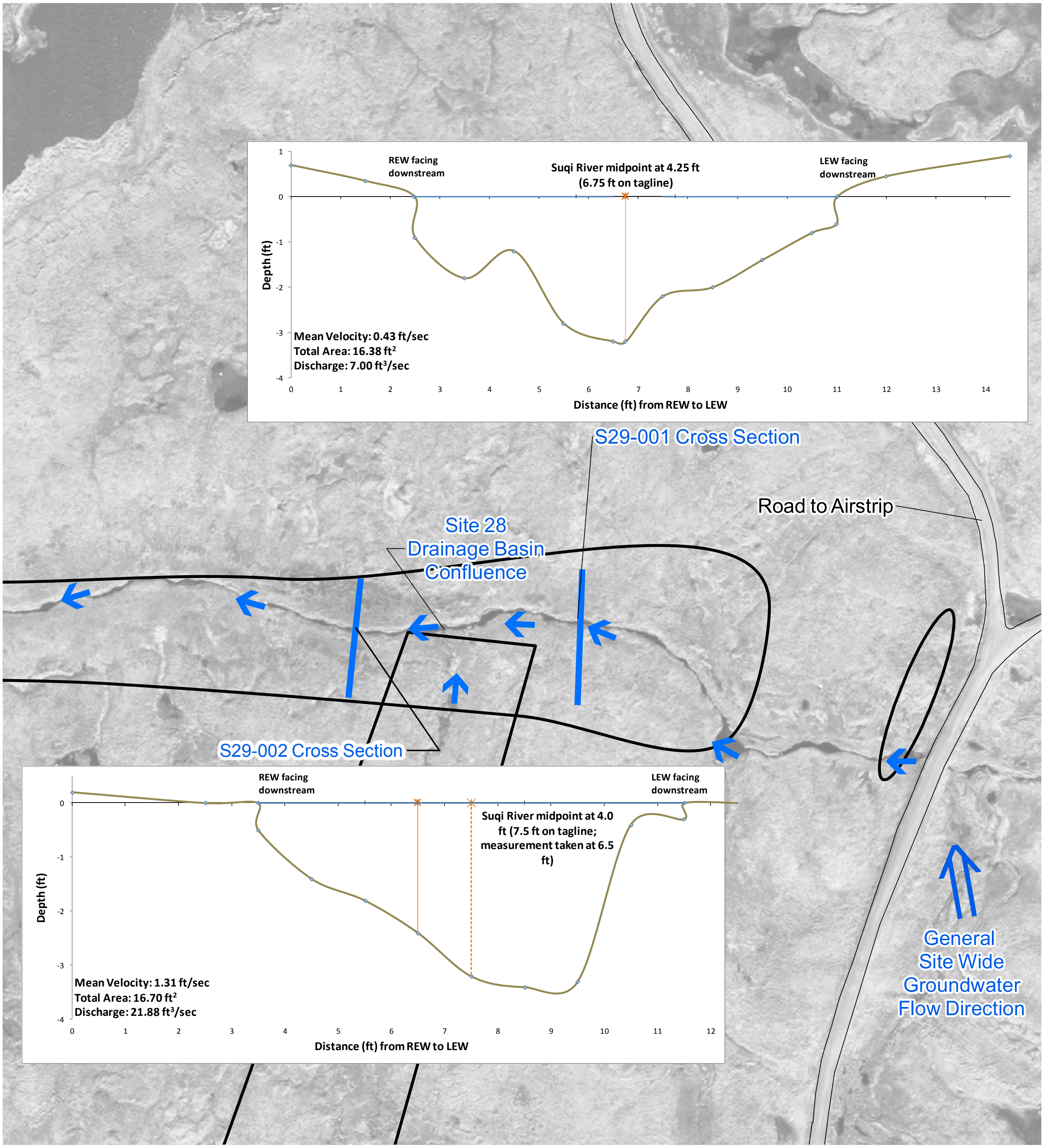

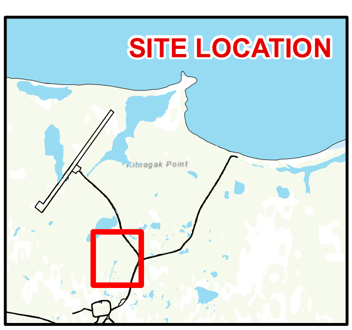

River Cross Sections

Localized Stream/Surface Water Flow Direction

Road

Remediation Site

N

Notes:
LEW = left edge of water facing downstream
REW = right edge of water facing downstream
ft = feet

0 250 500
Feet
1 inch = 281 feet

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

NORTHEAST CAPE
2016 SUQITUGHNEQ RIVER CROSS SECTIONS

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 29 AUG 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-6.2

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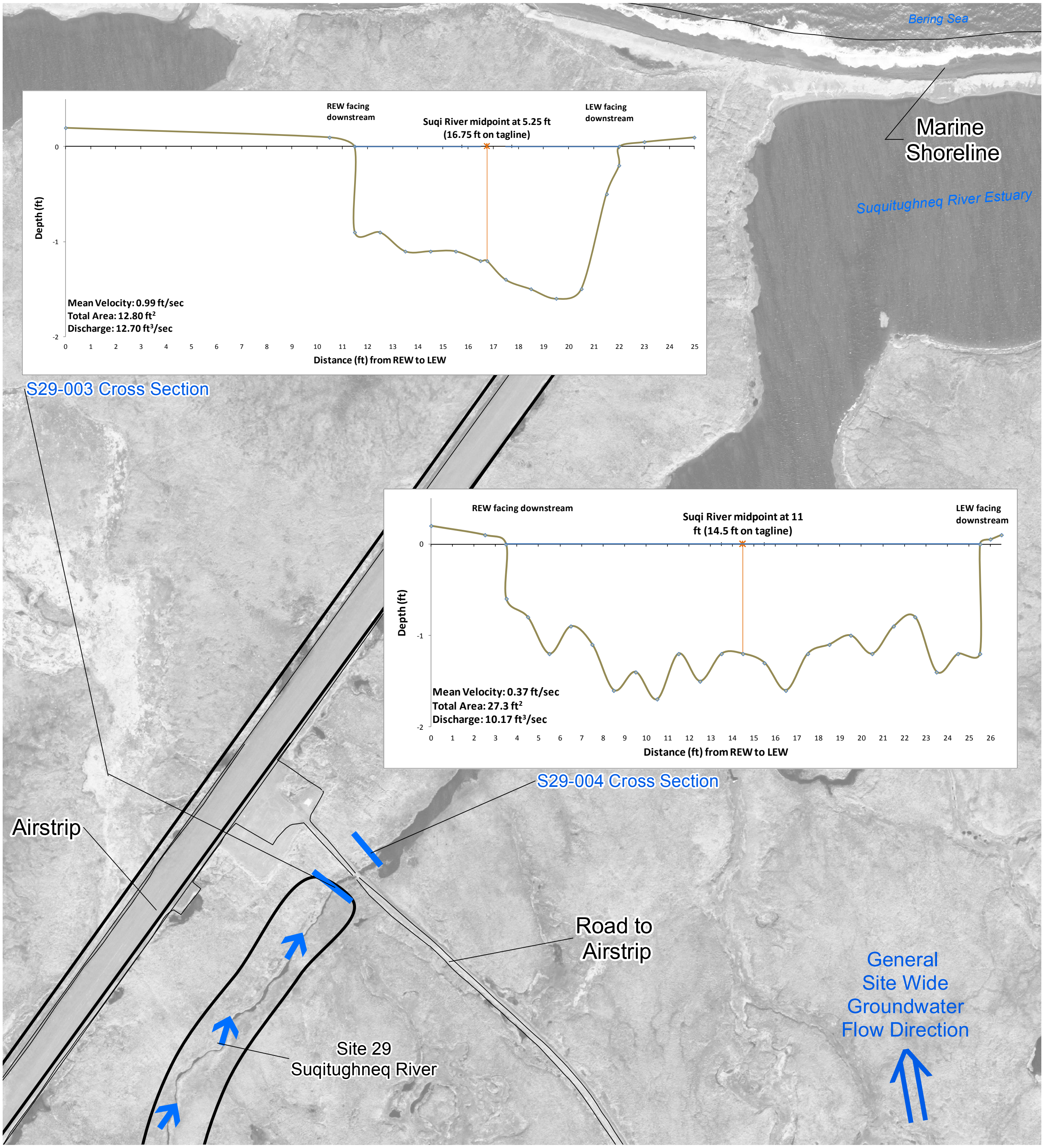

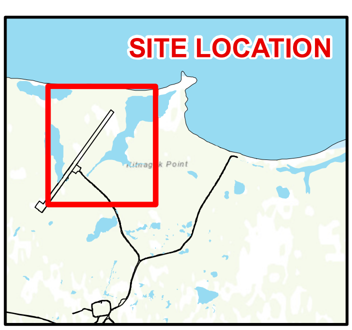

River Cross Sections

Road

Localized Stream/Surface Water Flow Direction

Remediation Site

N

Notes:
LEW = left edge of water facing downstream
REW = right edge of water facing downstream
ft = feet

0 250 500 750 1,000
Feet
1 inch = 625 feet

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

NORTHEAST CAPE
SUQITUGHNEQ RIVER CROSS SECTIONS

ST. LAWRENCE ISLAND, ALASKA

JACOBS	DATE: 29 AUG 2017	PROJECT MANAGER: K. MAHER	FIGURE NO: A-6.3

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APPENDIX B
Data Quality Assessment

U.S. Army Corps of Engineers
Alaska District

2016 SITE 8 AND SUQI RIVER
SURFACE WATER AND SEDIMENT
SAMPLING REPORT

NORTHEAST CAPE
ST. LAWRENCE ISLAND, ALASKA

FUDS No. F10AK0969-03

APPENDIX B
DATA QUALITY ASSESSMENT

FINAL
SEPTEMBER 2017

TABLE OF CONTENTS

SECTION **PAGE**

TABLE

ATTACHMENTS

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ACRONYMS AND ABBREVIATIONS

°C	degrees Celsius
ADEC	Alaska Department of Environmental Conservation
ALS	ALS Environmental
CCV	continuing calibration verification
DF	dilution factor
DL	detection limit
DoD	U.S. Department of Defense
DQA	Data Quality Assessment
DQO	data quality objectives
DRO	diesel-range organics
EPA	U.S. Environmental Protection Agency
FD	field duplicate
ID	identification number
Jacobs	Jacobs Engineering Group Inc.
LCL	lower control limit
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOD	limit of detection
LOQ	limit of quantitation
MB	method blank
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
ND	nondetect
NEC	Northeast Cape
PAH	polycyclic aromatic hydrocarbon
PARCCS	precision, accuracy, representativeness, completeness and comparability
QAPP	quality assurance project plan
QC	quality control
QSM	Quality Systems Manual
RPD	relative percent difference
RRO	residual-range organics
SDG	sample data group
SIM	selective ion monitoring
SVOC	semi-volatile organic compound

ACRONYMS AND ABBREVIATIONS (Continued)

TB	test blank
UCL	upper control limit
USACE	U.S. Army Corps of Engineers

1.0 INTRODUCTION

The following data quality assessment (DQA) and Alaska Department of Environmental Conservation (ADEC) laboratory data review checklists assess the overall quality and usability of data from the 2016 Remedial Action Operations at Sites 08 and Suqi River at the Northeast Cape (NEC) Formerly Used Defense Site on St. Lawrence Island, Alaska (Alaska Department of Environmental Conservation [ADEC] file number 475.38.013).

The 2016 fieldwork at NEC was conducted in August 2016. ALS Environmental (ALS) of Kelso, Washington provided analytical services for the test methods, sample types, and matrices summarized in Table B-1. The laboratory delivered the results in electronic formats.

The attachments to this DQA contain the sample summary table and analytical data tables (Attachment B-1), tables of sample results that did not meet the project data quality objectives (DQOs) (Attachment B-2), ADEC laboratory data review checklists (Attachment B-3), and laboratory deliverables (Attachment B-4). Table B-1 presents the number and types of samples collected during the NEC 2016 fieldwork.

Table B-1
Field Quality Control Sample Quantities

Method	Analyte	Matrix	Primary	Duplicate	MS/MSD
Site 8					
SW8270D	PAH	Soil	40	4	2
AK102/103	DRO/RRO		40	4	2
SW8270D	PAH	Sediment	35	4	2
AK102/103	DRO/RRO		35	4	2
Site 29					
SW8260B	VOC	Surface Water	4	1	1
SW8270SIM	PAH		4	1	1
SW6020A	Metals	Sediment	10	1	1
SW8082A	PCB		10	1	1
SW8270D	PAH		10	1	1
AK102/103	DRO/RRO		10	1	1

Notes:
For definitions, refer to the Acronyms and Abbreviations section.
A total of 8 duplicates were collected for soil and sediment at Site 8.

1.1 QUALITY CONTROL CRITERIA

Jacobs Engineering Group Inc. (Jacobs) performed this DQA and completed ADEC laboratory data review checklists for records associated with the analytical data, as per the *2016 Groundwater Monitoring at the Main Operations Complex and Other Field Activities Work Plan* (U.S. Army Corps of Engineers [USACE] 2016). Data quality was evaluated against the following requirements: U.S. Department of Defense (DoD) quality systems manual (QSM), version 5.0 (DoD 2013); ADEC and U.S. Environmental Protection Agency (EPA) analytical methods (ADEC 2009, 2014; EPA 2014); and laboratory limits.

Soil sample results were evaluated against the corresponding ADEC 18 AAC 75 Tables B1 and B2 Method Two-Soil Cleanup Levels, under 40-inch zone human health or migration to groundwater (ADEC 2016), and site-specific criteria defined in the NEC Decision Document (USACE 2009). Sediment and surface water samples were evaluated against the site-specific Decision Document (USACE 2009) criteria.

The Jacobs Project Chemist performed a completeness check of the electronic data to verify that data packages and electronic files included all of the requested information. All analytical data were reviewed, including the chain-of-custody and sample receipt records, laboratory case narratives, and laboratory data. Analytical data were reviewed for methodology, sample holding times, laboratory blanks, limits of quantitation (LOQs), limits of detection (LODs), detection limits (DLs), surrogate recoveries, laboratory control sample (LCS) and LCS duplicate (LCSD) recoveries, matrix spike (MS) and MS duplicate (MSD) recoveries, and precision. Other quality control (QC) parameters (initial calibration, continuing calibration, tuning, internal standards, interference check solutions, post-digestion spikes, and serial dilutions) were reviewed by means of the laboratory case narrative. These QC parameters met acceptance criteria; any sample results outside QC parameters are listed below (Section 1.2) or in the associated ADEC laboratory data review checklist (Attachment B-3). Analytical DQOs were considered met when the quality of the sample data met precision, accuracy, representativeness, completeness, comparability, and sensitivity (PARCCS) requirements. The overall quality of the data was acceptable as qualified. Qualified data are considered usable but estimated.

The following data qualifiers are applicable to the 2016 NEC analytical data:

J Analyte result was considered an estimated value because the level was below the laboratory LOQ but above the DL.

B Analyte result was considered a high estimated value due to contamination present in the method or trip blank.

QH Analyte result was considered an estimated value (biased high) due to a QC failure.

QL Analyte result was considered an estimated value (biased low) due to a QC failure.

QN Analyte result was considered an estimated value (unknown bias) due to a QC failure.

Qualification was not required in the following circumstances:

- Surrogate or MS/MSD recoveries were outside QC limits, and the sample was diluted by a factor of 5 or greater.
- MS/MSD recoveries were outside QC limits, and the spiked concentration was less than that of the parent sample.
- An analyte was detected in the method blank, but there was no detection in the sample.
- MS or LCS recoveries exceeded UCLs, and there was no detection in the associated sample(s).

1.2 DATA QUALITY SUMMARY

In general, the overall quality of project data was acceptable. Data quality was evaluated using PARCCS requirements and are discussed in the applicable sections.

All analytical results were 100 percent complete (no results were rejected), and the completeness goal of 95 percent was met for all parameters. Complete details of the evaluation and associated samples are provided in the ADEC laboratory review checklists (Attachment B-3). The tables in Attachment B-2 include analytical results that did not meet project DQOs and required qualification.

The following anomalies were identified during the data review process as follows:

- Biogenic interference
- Reporting limit assessment

- Sample handling/preservation
- Holding time
- Method blank contamination
- LCS accuracy and precision
- MS accuracy and precision
- Surrogate spike accuracy
- Field duplicate (FD) precision
- Representativeness
- Comparability

Sections 1.2.1 through 1.2.11 describe anomalies and their effects on data quality and usability.

1.2.1 Biogenic Interference

Naturally occurring organic compounds in soil and sediment have been reported in previous sampling efforts at NEC. The naturally occurring organics add to high levels of DRO and RRO and are likely to bias the results. This biogenic interference was likely observed in Site 8 soil and sediment samples and Suqi River sediment samples. For 2016 Site 8 and Suqi River samples, the chromatograms for the AK102/103 analysis were visually evaluated and compared to calibration chromatograms to determine if biogenic interference was significantly contributing to reported concentrations. All RRO results appear to be significantly affected by biogenic interference and no distinguishable residual-range distillate product (i.e., motor oil) fingerprint was observed. For the DRO range, a discernable middle distillate product (i.e., diesel fuel) was observed in some Site 8 and Suqi River samples. If the chromatogram contained a flat baseline with occasional peaks inconsistent with the DRO pattern observed in higher concentration samples, the primary contribution of the DRO results was identified as biogenic interference. Table B-2 lists samples where the DRO result was attributed to the biogenic interference.

Table B-2
DRO Results affected by Significant Biogenic Contribution

SDG	Lab Sample ID	Sample ID	Location ID	Analyte	Results (mg/kg)
K1609649	K160964901	16NEC-S08-SS-0649	S08-064	DRO	690
K1609649	K160964902	16NEC-S08-SD-065	S08-065	DRO	300
K1609649	K160964903	16NEC-S08-SD-066	S08-066	DRO	570
K1609649	K160964904	16NEC-S08-SS-067	S08-067	DRO	950
K1609649	K160964905	16NEC-S29-SD-001	S29-001	DRO	110
K1609649	K160964909	16NEC-S29-SD-004	S29-004	DRO	230
K1609649	K160964910	16NEC-S29-SD-005	S29-005	DRO	310
K1609649	K160964911	16NEC-S29-SD-006	S29-006	DRO	210
K1609649	K160964912	16NEC-S29-SD-007	S29-007	DRO	630
K1609649	K160964913	16NEC-S29-SD-008	S29-008	DRO	410
K1609649	K160964914	16NEC-S29-SD-009	S29-009	DRO	230
K1609649	K160964915	16NEC-S29-SD-010	S29-010	DRO	410
K1609653	K160965302	16NEC-S08-SS-002	S08-002	DRO	120
K1609653	K160965303	16NEC-S08-SS-003	S08-003	DRO	110
K1609653	K160965307	16NEC-S08-SS-045	S08-045	DRO	360
K1609653	K160965308	16NEC-S08-SS-046	S08-046	DRO	380
K1609653	K160965309	16NEC-S08-SS-047	S08-047	DRO	330
K1609653	K160965310	16NEC-S08-SS-048	S08-048	DRO	190
K1609653	K160965311	16NEC-S08-SD-049	S08-049	DRO	270
K1609653	K160965312	16NEC-S08-SD-050	S08-050	DRO	350
K1609653	K160965313	16NEC-S08-SD-0509	S08-050	DRO	420
K1609653	K160965314	16NEC-S08-SS-051	S08-051	DRO	87
K1609653	K160965315	16NEC-S08-SD-052	S08-052	DRO	320
K1609653	K160965316	16NEC-S08-SD-053	S08-053	DRO	260
K1609653	K160965317	16NEC-S08-SD-0539	S08-053	DRO	300
K1609653	K160965318	16NEC-S08-SD-054	S08-054	DRO	450
K1609653	K160965319	16NEC-S08-SS-055	S08-055	DRO	310
K1609653	K160965320	16NEC-S08-SD-056	S08-056	DRO	270
K1609653	K160965321	16NEC-S08-SS-057	S08-057	DRO	280
K1609653	K160965322	16NEC-S08-SS-058	S08-058	DRO	280
K1609653	K160965323	16NEC-S08-SS-0589	S08-058	DRO	270
K1609653	K160965324	16NEC-S08-SS-059	S08-059	DRO	130
K1609653	K160965325	16NEC-S08-SS-060	S08-060	DRO	180
K1609653	K160965326	16NEC-S08-SD-061	S08-061	DRO	440
K1609653	K160965327	16NEC-S08-SD-062	S08-062	DRO	190
K1609653	K160965328	16NEC-S08-SD-063	S08-063	DRO	200

Table B-2
DRO Results affected by Significant Biogenic Contribution (Continued)

SDG	Lab Sample ID	Sample ID	Location ID	Analyte	Results (mg/kg)
K1609653	K160965329	16NEC-S08-SS-064	S08-064	DRO	540
K1609742	K160974201	16NEC-S08-SS-006	S08-006	DRO	430
K1609742	K160974208	16NEC-S08-SD-016	S08-016	DRO	680
K1609742	K160974209	16NEC-S08-SD-017	S08-017	DRO	650
K1609742	K160974210	16NEC-S08-SS-018	S08-018	DRO	530
K1609742	K160974211	16NEC-S08-SS-0189	S08-018	DRO	600
K1609742	K160974212	16NEC-S08-SS-019	S08-019	DRO	520
K1609742	K160974214	16NEC-S08-SS-022	S08-022	DRO	180
K1609742	K160974215	16NEC-S08-SS-023	S08-023	DRO	610
K1609742	K160974216	16NEC-S08-SS-024	S08-024	DRO	300
K1609742	K160974218	16NEC-S08-SS-027	S08-027	DRO	180
K1609742	K160974219	16NEC-S08-SS-028	S08-028	DRO	270
K1609742	K160974220	16NEC-S08-SS-031	S08-031	DRO	460
K1609742	K160974221	16NEC-S08-SD-036	S08-036	DRO	480
K1609742	K160974222	16NEC-S08-SD-0369	S08-036	DRO	450
K1609742	K160974223	16NEC-S08-SD-040	S08-040	DRO	230
K1609742	K160974224	16NEC-S08-SD-041	S08-041	DRO	580
K1609847	K160984705	16NEC-S08-SD-025	S08-025	DRO	630
K1609847	K160984706	16NEC-S08-SD-029	S08-029	DRO	780
K1609847	K160984708	16NEC-S08-SS-032	S08-032	DRO	590
K1609847	K160984709	16NEC-S08-SD-033	S08-033	DRO	600
K1609847	K160984710	16NEC-S08-SD-034	S08-034	DRO	300
K1609847	K160984715	16NEC-S08-SS-039	S08-039	DRO	380
K1609847	K160984716	16NEC-S08-SD-042	S08-042	DRO	750
K1609852	K160985205	16NEC-S08-SD-074	S08-074	DRO	710

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

1.2.2 Reporting Limit Assessment

Laboratory LODs for nondetect sample results were evaluated against the corresponding ADEC 18 AAC 75 Tables B1 and B2 Method Two Soil Cleanup Levels, under 40-inch zone human health or migration to groundwater (ADEC 2016) for soil samples, and site-specific Decision Document (USACE 2009) criteria for sediment and surface water samples. The confidence level at the LOD was 99 percent (1 percent false negative rate) as per the DoD

QSM definition. This level of uncertainty was deemed acceptable for the purpose of the report.

Soil laboratory LODs for method SW8270D were greater than the ADEC cleanup levels due to sample dilutions and the laboratory did not analyze the requested method of SW8270SIM, which contributed to these elevated reporting limits. However, all LODs were less than the site-specific decision document criteria (USACE 2009).

Nondetect sample results that had LODs exceeding the ADEC cleanup level are shown in italics and highlighted in Attachment B-1 (all tables) and presented in Table B-2-8 (Attachment B-2).

1.2.3 Sample Handling/Preservation

Seven coolers were shipped to ALS over the course of the 2016 NEC sampling events. Sample temperatures of 4 ± 2 degrees Celsius (°C) were considered acceptable for the chilled coolers. Several coolers were received at the laboratory with a sample temperature below 2°C. The laboratory did not identify any frozen samples in any of the coolers received below the acceptable temperature range and no results were qualified.

Multiple samplers were utilized at Site 8. The sampling team consisted of soil diggers, container labeler, compositor, and classifier. The team worked cohesively and in a timely manner. There was no impact to the data.

1.2.4 Holding Time

Soil and sediment samples were extracted out of the method SW8270D specified hold time by one day. Sample results were qualified QL, indicating a low bias. The samples and results are presented in Table B-2-1 (Attachment B-2). Data quality is minimally affected since a majority of the results were nondetect with LODs significantly less than the site specific criteria.

1.2.5 Method Blank and Trip Blank Contamination

All method blanks and trip blanks were evaluated to the DL. Sample results that were within 10 times the concentration detected in the method blank and/or trip blank were qualified B. Results that were qualified B may be false positives or biased high.

One sample (16NEC-S08-SS-069) required qualification for diesel-range organics (DRO) in SDG K1609847. The method blank had a detection of 2.2 mg/kg and the sample result was 11 mg/kg. Data usability was minimally affected. The result qualified B was less than the ADEC cleanup level and the site-specific criteria.

1.2.6 Laboratory Control Sample Accuracy and Precision

LCS/LCSD (laboratory QC) were used to evaluate accuracy and precision for each analytical method. The SW8270D LCSD recovery for the fluoranthene and phenanthrene in Sample Data Group (SDG) KWG1607693 was less than the lower control limit (LCL) of 50 percent. The AK102 LCSD for DRO in SDG KWG1607415 was also less than the LCL of 75 percent with a percent recovery of 55 percent. Associated fluoranthene, phenanthrene, and DRO sample results are considered estimated and biased low and were qualified QL. The effect was minimal for the SW8270 samples since the qualified results were nondetect and the LODs for the qualified sample results were an order of magnitude less than the ADEC cleanup levels. The effect was minimal for the AK102 samples since the sediment concentrations were significantly less than the site-specific criteria and the soil concentrations were greater than ADEC cleanup levels and less than site specific criteria.

The LCS/LCSD relative percent difference (RPD) in SDG KWG1607693 for the SW8270SIM analytes were outside of the QC criteria (greater than 20 percent RPD). The LCS/LCSD RPD in SDG KWG1607415 and KWG1607743 for the AK102 and AK103 analytes were also outside of the QC criteria. Associated sample results were qualified QN indicating an unknown bias. The effect was minimal since the qualified results or the LODs for nondetect results were either significantly less or greater than the associated site-specific criteria. Two of these SDGs were associated with the low LCSD described above.

Table B-2-2 (Attachment B-2) provides a summary of the LCSD recovery outliers and the affected sample results and Table B-2-3 (Attachment B-2) provides a summary of the LCS/LCSD RPD outliers and the affected sample results.

1.2.7 Matrix Spike Accuracy and Precision

MS/MSDs were collected to evaluate the accuracy and precision of matrix and/or laboratory procedures. Table B-1 provides a summary of the MS/MSD quantities, summarized by analytical method and matrix. The MS/MSD recoveries and RPDs for several analytes and analyses were outside the QC criteria. Sample results with MS/MSD recoveries that were outside QC criteria were qualified as estimated except in the following cases: nondetect samples with high recoveries, samples with concentrations greater than the spike amount, or samples with a dilution factor of 5 or greater.

MS/MSD recovery for DRO in parent sample 16NEC-S08-SD-065 was greater than the UCL and 16NEC-S08-SS-002 was less than the LCL. MS/MSD recoveries for the majority of SW8270 analytes in parent samples 16NEC-S08-SS-002 and 16NEC-S08-SS-064 were less than the DoD QSM LCL. MS/MSD recoveries for chromium and zinc in sample 16NEC-S29-SD-001 were slightly less than the DoD QSM LCL. Affected parent samples were qualified QL or QH, indicating biased low or biased high. The impact was minimal since the biased low qualified sample results were less than the site-specific criteria or were nondetect with LODs less than the site-specific criteria. The DRO soil sample qualified with a biased high DRO was significantly greater than the ADEC criteria and less than the site-specific criteria.

MS/MSD RPDs for Methods AK102, AK103, and SW8270D were outside QC criteria (greater than 20 percent RPD) for the following samples: 16NEC-S29-SD-0039, 16NEC-S08-SS-006, 16NEC-S08-SD-070, 16NEC-S08-SS-064, and 16NEC-S08-SS-002. Associated sample results were qualified QN to indicate an estimated result due to MS/MSD precision outliers. The impact was minimal since the qualified SW8270D sample results were nondetect and associated with the MS/MSD accuracy outliers listed above. The impact was minimal to the DRO and RRO results that were not associated with the accuracy outliers; the recoveries for these samples were within required QC limits.

Table B-2-4 (Attachment B-2) provides a summary of the MS and/or MSD recovery outliers and the affected sample results, Table B-2-5 (Attachment B-2) provides a summary of the MS/MSD RPD outliers and the affected sample results.

1.2.8 Surrogate Spike Accuracy

Sample results with surrogates outside of QC criteria were qualified as estimated except in the following cases: nondetect samples with high surrogate recoveries or samples with a dilution factor of 5 or greater. Sample results with low surrogate recoveries were qualified QL, and may be biased low. Sample results with high surrogate recoveries were qualified QH, and may be biased high.

For sample results qualified QL, the effect was minimal since the qualified results were nondetect or significantly less than the associated site-specific criteria. Sample 16NEC-S08-SD-014 was noted in the case narrative to have a spiking error (zero percent recoveries); therefore, the sample results were not rejected. There were three sample results qualified QH: 16NEC-S29-SD-010 (AK103), 16NEC-S08-SS-013 (SW8270D), and 16NEC-S08-SS-0139 (SW8270D). Results were either greater or less than the site-specific criteria. It was mentioned in the case narrative that the affected samples had matrix interferences which most likely caused the surrogate outliers.

Table B-2-6 (Attachment B-2) provides a summary of the surrogate recovery outliers and the affected sample results.

1.2.9 Field Duplicate Precision

FDs were collected to evaluate the precision of matrix and/or laboratory procedures. Table B-1 provides a summary of the FD quantities, summarized by analytical method and matrix. The frequency criterion of at least one FD per 10 primary samples was met.

FD precision was evaluated against the recommended RPD limit of 50 percent for soil, and 30 percent for water, as stated in the ADEC laboratory data review checklists (ADEC 2009). RPD values for sample pair results, where one was nondetect and the other was detected, were calculated using the LOD value for the nondetect result. Results were qualified as estimated (QN) in two sets of samples due to high FD RPD values. The high RPD values can likely be attributed to the sample matrix or non-homogeneity. The higher value between the sample and the FD will be used for reporting. The effect was minimal since all the QN-qualified results were either both less than or greater than the associated ADEC cleanup level or site-specific criteria.

Table B-2-7 (Attachment B-2) provides a summary of sample results that were qualified QN due to high FD RPD values.

1.2.10 Representativeness

The following was reviewed to evaluate representativeness for this project:

- Sample quantities and locations
- Sampling procedures and equipment
- Sample chains-of-custody and field logbooks
- Holding times and preservation (discussed in Sections 1.2.3 and 1.2.4)

All proposed sample locations and quantities were collected in accordance with the proper sampling techniques and equipment, per the work plan (Appendix A - Sampling and Analysis Plan [USACE 2016]).

Sample chains-of-custody were reviewed as received by the laboratory. Soil and sediment samples were originally requested to be analyzed for polycyclic aromatic hydrocarbons (PAHs) by EPA method SW8270SIM; however, the laboratory analyzed all soil and sediment samples by EPA method SW8270 instead (previously discussed in Section 1.2.2).

1.2.11 Comparability

ALS Environmental provided all analytical services for this project and laboratory SOPs were followed throughout the project.

1.2.12 Equipment Blank

A Site 8 equipment blank was not collected and submitted for laboratory analysis. The 2016 WP required one equipment blank sample be collected following the decontamination of hand tools used to collect soil samples at Site 8. Decontamination procedures were followed using laboratory-grade detergent, potable water, and deionized water rinses; however, these procedures were not verified with an equipment blank sample. The data quality is affected since the decontamination procedures for Site 8 were not verified.

2.0 CONCLUSIONS

In general, the overall quality of project data was acceptable. The completeness goal of 95 percent for all parameters was met; no sample results were rejected. All reported data were considered usable for the remedial action operations at Site 8 and Suqi River; limitations are discussed in this DQA and ADEC laboratory data review checklists (Attachment B-3). The qualifications applied during data validation did not adversely affect data usability. Several samples were qualified low due to extraction holding times, LCS accuracy, and surrogate recoveries. In most cases the detected results and reporting limits were well below the associated criteria.

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3.0 REFERENCES

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ATTACHMENT B-1
Sample Summary Table and Analytical Data Tables

Northeast Cape FUDS 2016 Sampling at Site 08 and Suqi River
Table B-1-1 - Sample Summary Table

COC Sample ID	Location ID	Collection Date	Collection Time	Sampler	Qty	Container Type	Container Vol	Preservative	Matrix	Analytical Method Requested	QC Type	TAT	Notes	Site	COC Number	Cooler Name	Cooler Date	Lab	SDG Number	Sample Start Depth	Sample End Depth
16NEC-S29-WS-001	S29-001	16-Aug-16	1340	SS,HM	3	VOA vial	40 mL	4°C, HCl	WS	SW8260	Primary	30	BTEX	S29-001	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-0019	S29-001	16-Aug-16	1340	SS,HM	3	VOA vial	40 mL	4°C, HCl	WS	SW8260	Dup	30	BTEX	S29-001	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-002	S29-002	16-Aug-16	1230	SS,HM	3	VOA vial	40 mL	4°C, HCl	WS	SW8260		30	BTEX	S29-002	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-003	S29-003	15-Aug-16	1910	SS,HM	9	VOA vial	40 mL	4°C, HCl	WS	SW8260	MS/MSD	30	BTEX	S29-003	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-004	S29-004	15-Aug-16	1803	SS,HM	3	VOA vial	40 mL	4°C, HCl	WS	SW8260		30	BTEX	S29-004	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-TB04	TB04	15-Aug-16	0900	SS,KR,CC,HM	8	VOA vial	40 mL	4°C, HCl	WG	SW8260B, AK101, RSK 175	TB	30	BTEX, GRO, Methane	14MW05	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-TB05	TB05	16-Aug-16	0905	SS,KR,CC,HM	8	VOA vial	40 mL	4°C, HCl	WG	SW8260B, AK101, RSK 175	TB	30	BTEX, GRO, Methane	MW88-3	2016NEC10	Whatchamacallit	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-001	S29-001	16-Aug-16	1340	SS,HM	2	glass amber	1 L	4°C	WS	SW8270DSIM	Primary	30	PAHs	S29-001	2016NEC12	O'Henry	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-0019	S29-001	16-Aug-16	1340	SS,HM	2	glass amber	1 L	4°C	WS	SW8270DSIM	Dup	30	PAHs	S29-001	2016NEC12	O'Henry	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-002	S29-002	16-Aug-16	1230	SS,HM	2	glass amber	1 L	4°C	WS	SW8270DSIM		30	PAHs	S29-002	2016NEC12	O'Henry	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-003	S29-003	15-Aug-16	1910	SS,HM	6	glass amber	1 L	4°C	WS	SW8270DSIM	MS/MSD	30	PAHs	S29-003	2016NEC13	3 Musketeers	17-Aug-16	ALS	K1609581		
16NEC-S29-WS-004	S29-004	15-Aug-16	1803	SS,HM	2	glass amber	1 L	4°C	WS	SW8270DSIM		30	PAHs	S29-004	2016NEC13	3 Musketeers	17-Aug-16	ALS	K1609581		
16NEC-S08-SS-001	S08-001	17-Aug-16	1840	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-001	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SS-002	S08-002	17-Aug-16	1835	SS,KR,CC,HM	2	clear glass	8 oz	4°C	SS	AK102/103, SW8270	MS/MSD	30	DRO/RRO, PAH	S08-002	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SS-003	S08-003	17-Aug-16	1742	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-003	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	0.75	1.00
16NEC-S08-SS-004	S08-004	22-Aug-16	1338	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-004	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SS-005	S08-005	17-Aug-16	1829	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-005	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	1.75
16NEC-S08-SS-006	S08-006	18-Aug-16	1440	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-006	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.75	2.25
16NEC-S08-SD-007	S08-007	17-Aug-16	1813	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-007	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.75	2.00
16NEC-S08-SS-008	S08-008	17-Aug-16	1806	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-008	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.25	1.75
16NEC-S08-SD-009	S08-009	18-Aug-16	1425	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-009	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.75	2.25
16NEC-S08-SD-010	S08-010	18-Aug-16	1422	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-010	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S29-SD-001	S29-001	16-Aug-16	1350	SS,HM	6	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020	MS/MSD	30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-001	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	1.50
16NEC-S29-SD-002	S29-002	16-Aug-16	1235	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-002	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.50	2.00
16NEC-S29-SD-003	S29-003	15-Aug-16	1925	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020	Primary	30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-003	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	1.50
16NEC-S29-SD-0039	S29-003	15-Aug-16	1925	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020	Dup	30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-003	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	1.50
16NEC-S29-SD-004	S29-004	15-Aug-16	1810	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-004	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.50	2.00
16NEC-S29-SD-005	S29-005	15-Aug-16	1420	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-005	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	0.50	1.00
16NEC-S29-SD-006	S29-006	15-Aug-16	1445	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-006	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	2.00
16NEC-S29-SD-007	S29-007	15-Aug-16	1520	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-007	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	0.50	1.00
16NEC-S29-SD-008	S29-008	15-Aug-16	1350	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-008	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	1.50
16NEC-S29-SD-009	S29-009	15-Aug-16	1555	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-009	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.50	2.00
16NEC-S29-SD-010	S29-010	15-Aug-16	1310	SS,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270, SW8082, SW6020		30	DRO/RRO, PAH, PCB, Metals (As, Cr, Pb, Zn)	S29-010	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.00	1.50
16NEC-S08-SS-011	S08-011	18-Aug-16	1415	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-011	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SS-012	S08-012	18-Aug-16	1432	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-012	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.75	2.25
16NEC-S08-SS-013	S08-013	22-Aug-16	1343	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-013	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SS-0139	S08-013	22-Aug-16	1343	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-013	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SD-014	S08-014	18-Aug-16	1449	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-014	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SD-015	S08-015	18-Aug-16	1638	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-015	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SD-016	S08-016	18-Aug-16	1632	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-016	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SD-017	S08-017	18-Aug-16	1626	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-017	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SS-018	S08-018	18-Aug-16	1459	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-018	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SS-0189	S08-018	18-Aug-16	1459	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-018	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SS-019	S08-019	18-Aug-16	1643	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-019	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SS-020	S08-020	18-Aug-16	1715	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-020	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.25	1.50
16NEC-S08-SS-021	S08-021	22-Aug-16	1404	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-021	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SS-022	S08-022	18-Aug-16	1510	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-022	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.00	1.50
16NEC-S08-SS-023	S08-023	18-Aug-16	1749	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-023	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SS-024	S08-024	18-Aug-16	1737	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-024	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.50
16NEC-S08-SD-025	S08-025	22-Aug-16	1330	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-025	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	0.50	1.00
16NEC-S08-SD-026	S08-026	18-Aug-16	1720	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-026	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.00	1.25
16NEC-S08-SS-027	S08-027	18-Aug-16	1517	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-027	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SS-028	S08-028	18-Aug-16	1801	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-028	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SD-029	S08-029	22-Aug-16	1645	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-029	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SS-030	S08-030	22-Aug-16	1655	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-030	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SS-031	S08-031	18-Aug-16	1526	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-031	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.00	1.50
16NEC-S08-SS-032	S08-032	22-Aug-16	1616	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-032	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SD-033	S08-033	22-Aug-16	1622	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-033	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.00	1.50
16NEC-S08-SD-034	S08-034	22-Aug-16	1630	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-034	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SD-035	S08-035	22-Aug-16	1639	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-035	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SD-036	S08-036	18-Aug-16	1533	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-036	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00
16NEC-S08-SD-0369	S08-036	18-Aug-16	1533	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-036	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	1.50	2.00

Northeast Cape FUDS 2016 Sampling at Site 08 and Suqi River
Table B-1-1 - Sample Summary Table

COC Sample ID	Location ID	Collection Date	Collection Time	Sampler	Qty	Container Type	Container Vol	Preservative	Matrix	Analytical Method Requested	QC Type	TAT	Notes	Site	COC Number	Cooler Name	Cooler Date	Lab	SDG Number	Sample Start Depth	Sample End Depth
16NEC-S08-SD-037	S08-037	22-Aug-16	1608	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-037	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	2.00	2.50
16NEC-S08-SD-0379	S08-037	22-Aug-16	1608	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-037	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	2.00	2.50
16NEC-S08-SD-038	S08-038	22-Aug-16	1601	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-038	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SS-039	S08-039	22-Aug-16	1522	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-039	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	2.00	2.50
16NEC-S08-SD-040	S08-040	18-Aug-16	1543	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-040	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SD-041	S08-041	18-Aug-16	1616	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-041	2016NEC16	5th Avenue	19-Aug-16	ALS	K1609742	2.00	2.50
16NEC-S08-SD-042	S08-042	22-Aug-16	1553	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-042	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SD-043	S08-043	22-Aug-16	1541	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-043	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SS-044	S08-044	22-Aug-16	1537	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-044	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	2.00	2.50
16NEC-S08-SS-045	S08-045	17-Aug-16	1712	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-045	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.25	1.75
16NEC-S08-SS-046	S08-046	17-Aug-16	1717	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-046	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	1.75
16NEC-S08-SS-047	S08-047	17-Aug-16	1726	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-047	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SS-048	S08-048	17-Aug-16	1704	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-048	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SD-049	S08-049	17-Aug-16	1651	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-049	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.25	1.75
16NEC-S08-SD-050	S08-050	17-Aug-16	1656	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-050	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	0.90	1.25
16NEC-S08-SD-0509	S08-050	17-Aug-16	1656	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-050	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	0.90	1.25
16NEC-S08-SS-051	S08-051	17-Aug-16	1442	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-051	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.40	1.75
16NEC-S08-SD-052	S08-052	17-Aug-16	1459	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-052	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SD-053	S08-053	17-Aug-16	1620	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-053	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SD-0539	S08-053	17-Aug-16	1620	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-053	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.50
16NEC-S08-SD-054	S08-054	17-Aug-16	1636	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-054	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SS-055	S08-055	17-Aug-16	1438	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-055	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.70	2.10
16NEC-S08-SD-056	S08-056	17-Aug-16	1432	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-056	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.75	2.25
16NEC-S08-SS-057	S08-057	17-Aug-16	1427	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-057	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SS-058	S08-058	17-Aug-16	1336	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-058	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SS-0589	S08-058	17-Aug-16	1336	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-058	2016NEC15	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SS-059	S08-059	17-Aug-16	1345	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-059	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	1.75
16NEC-S08-SS-060	S08-060	17-Aug-16	1403	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-060	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	1.80
16NEC-S08-SD-061	S08-061	17-Aug-16	1412	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-061	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.70	2.20
16NEC-S08-SD-062	S08-062	17-Aug-16	1330	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-062	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.50	2.00
16NEC-S08-SD-063	S08-063	17-Aug-16	1320	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-063	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.00	1.66
16NEC-S08-SS-064	S08-064	17-Aug-16	1310	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Primary	30	DRO/RRO, PAH	S08-064	2016NEC14	Baby Ruth	18-Aug-16	ALS	K1609653	1.30	2.00
16NEC-S08-SS-0649	S08-064	17-Aug-16	1310	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270	Dup	30	DRO/RRO, PAH	S08-064	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.30	2.00
16NEC-S08-SD-065	S08-065	17-Aug-16	1245	SS,KR,CC,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270	MS/MSD	30	DRO/RRO, PAH	S08-065	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.50	1.75
16NEC-S08-SD-066	S08-066	17-Aug-16	1253	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-066	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.50	1.75
16NEC-S08-SS-067	S08-067	17-Aug-16	1305	SS,KR,CC,HM	2	clear glass	8 oz	4°C	SS	AK102/103, SW8270	MS/MSD	30	DRO/RRO, PAH	S08-067	2016NEC14	Hersheys	18-Aug-16	ALS	K1609649	1.30	2.00
16NEC-S08-SD-068	S08-068	22-Aug-16	1423	SS,KR,CC,HM	2	clear glass	8 oz	4°C	SD	AK102/103, SW8270	MS/MSD	30	DRO/RRO, PAH	S08-068	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	1.50	2.00
16NEC-S08-SS-069	S08-069	22-Aug-16	1353	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-069	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609847	0.50	1.00
16NEC-S08-SD-070	S08-070	22-Aug-16	1430	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-070	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	1.50	2.00
16NEC-S08-SS-071	S08-071	22-Aug-16	1412	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-071	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	1.50	2.00
16NEC-S08-SS-072	S08-072	22-Aug-16	1442	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-072	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	1.00	1.50
16NEC-S08-SS-073	S08-073	22-Aug-16	1456	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SS	AK102/103, SW8270		30	DRO/RRO, PAH	S08-073	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	2.00	2.50
16NEC-S08-SD-074	S08-074	22-Aug-16	1504	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-074	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	1.00	1.50
16NEC-S08-SD-075	S08-075	22-Aug-16	1512	SS,KR,CC,HM	1	clear glass	8 oz	4°C	SD	AK102/103, SW8270		30	DRO/RRO, PAH	S08-075	2016NEC17	Mr Goodbar	23-Aug-16	ALS	K1609852	1.50	2.00

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-001	S08-002	S08-003	S08-004
				Sample ID	16NEC-S08-SS-001	16NEC-S08-SS-002	16NEC-S08-SS-003	16NEC-S08-SS-004
				Lab Sample ID	K160965301	K160965302	K160965303	K160984701
				SDG	K1609653	K1609653	K1609653	K1609847
				Sample Date	8/17/16	8/17/16	8/17/16	8/22/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	66.4	60.5	62.9	48.4
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**270 [50] J**	120 [11] QL	110 [11]	**850 [140]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	2300 [130]	1300 [28]	1200 [27]	2900 [350] J
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [1.9] QL*	*ND [2.1] QL, QN*	*ND [2] QL*	*ND [5.1]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	0.95 [0.27] J
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Anthracene	mg/kg	390	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	*ND [0.27]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.12] QL	ND [0.13] QL, QN	ND [0.12] QL	ND [0.31]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Chrysene	mg/kg	82	-	ND [0.057] QL	ND [0.062] QL, QN	ND [0.06] QL	ND [0.16]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	*ND [0.27]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Fluorene	mg/kg	36	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.23] QL	ND [0.25] QL, QN	ND [0.24] QL	ND [0.62]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.096] QL*	*ND [0.11] QL, QN*	*ND [0.11] QL*	*ND [0.27]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]
SW8270D	Pyrene	mg/kg	87	-	ND [0.096] QL	ND [0.11] QL, QN	ND [0.11] QL	ND [0.27]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-005	S08-006	S08-008	S08-011
				Sample ID	16NEC-S08-SS-005	16NEC-S08-SS-006	16NEC-S08-SS-008	16NEC-S08-SS-011
				Lab Sample ID	K160965304	K160974201	K160965306	K160974204
				SDG	K1609653	K1609742	K1609653	K1609742
				Sample Date	8/17/16	8/18/16	8/17/16	8/18/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	69.6	61.1	47.8	58.5
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**320 [48]**	**430 [54]**	**2100 [35]**	**400 [56]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	2900 [120]	3600 [140] QN	2100 [86]	3600 [150]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [1.8] QL*	*ND [4.1]*	**15 [2.6]**	*ND [4.3]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.092] QL	ND [0.21]	**3.5 [0.14]**	ND [0.22]
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.092] QL	ND [0.21]	0.28 [0.14] J	ND [0.22]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.092] QL	ND [0.21]	ND [0.27]	ND [0.22]
SW8270D	Anthracene	mg/kg	390	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	ND [0.092] QL	*ND [0.21]*	ND [0.14]	*ND [0.22]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.11] QL	ND [0.25]	ND [0.16]	ND [0.26]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]
SW8270D	Chrysene	mg/kg	82	-	ND [0.054] QL	ND [0.13]	ND [0.078]	ND [0.13]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	ND [0.092] QL	*ND [0.21]*	ND [0.14]	*ND [0.22]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]
SW8270D	Fluorene	mg/kg	36	-	ND [0.092] QL	ND [0.21]	0.69 [0.14] J	ND [0.22]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.22] QL	ND [0.5]	ND [0.32]	ND [0.52]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.092] QL*	*ND [0.21]*	**0.57 [0.14] J**	*ND [0.22]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.092] QL	ND [0.21]	0.44 [0.14] J	ND [0.22]
SW8270D	Pyrene	mg/kg	87	-	ND [0.092] QL	ND [0.21]	ND [0.14]	ND [0.22]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

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Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

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SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-012	S08-013	S08-013	S08-018
				Sample ID	16NEC-S08-SS-012	16NEC-S08-SS-013	16NEC-S08-SS-0139	16NEC-S08-SS-018
				Lab Sample ID	K160974205	K160984702	K160984703	K160974210
				SDG	K1609742	K1609847	K1609847	K1609742
				Sample Date	8/18/16	8/22/16	8/22/16	8/18/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Duplicate	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	61.2	73.3	75	58.8
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**950 [54]**	**19000 [88]**	**17000 [88]**	**530 [56]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	3900 [140]	1300 [220] J	1300 [230] J	6600 [150]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [4]*	**13 [3.4] QH, QN**	**7 [3.3] QH, QN**	*ND [4.2]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	0.14 [0.21] J	**7.5 [0.18] QH, QN**	**3.8 [0.17] QH, QN**	ND [0.22]
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.21]	0.83 [0.18] J, QH	0.76 [0.17] J, QH	ND [0.22]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.21]	0.93 [0.18] J, QH, QN	0.54 [0.17] J, QH, QN	ND [0.22]
SW8270D	Anthracene	mg/kg	390	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.21]*	ND [0.18] QH	ND [0.17] QH	*ND [0.22]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.25]	ND [0.21] QH	ND [0.2] QH	ND [0.26]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]
SW8270D	Chrysene	mg/kg	82	-	ND [0.13]	ND [0.11] QH	ND [0.1] QH	ND [0.13]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.21]*	ND [0.18] QH	ND [0.17] QH	*ND [0.22]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]
SW8270D	Fluorene	mg/kg	36	-	ND [0.21]	2.4 [0.18] J, QH, QN	1.4 [0.17] J, QH, QN	ND [0.22]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.49]	ND [0.41] QH	ND [0.4] QH	ND [0.51]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.21]*	**3.2 [0.18] J, QH**	**2 [0.17] J, QH**	*ND [0.22]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.21]	2.3 [0.18] J, QH	1.4 [0.17] J, QH, QN	ND [0.22]
SW8270D	Pyrene	mg/kg	87	-	ND [0.21]	ND [0.18] QH	ND [0.17] QH	ND [0.22]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

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Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

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SO - Soil

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Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-018	S08-019	S08-020	S08-021
				Sample ID	16NEC-S08-SS-0189	16NEC-S08-SS-019	16NEC-S08-SS-020	16NEC-S08-SS-021
				Lab Sample ID	K160974211	K160974212	K160974213	K160984704
				SDG	K1609742	K1609742	K1609742	K1609847
				Sample Date	8/18/16	8/18/16	8/18/16	8/22/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Duplicate	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	59.9	66.2	79.3	77.1
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**600 [55]**	**520 [50]**	**1400 [42]**	**7100 [43]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	7900 [140]	6700 [130]	1300 [110]	920 [110] J
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [4.2]*	*ND [3.8]*	*ND [3.2]*	*ND [3.3]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.22]	ND [0.2]	ND [0.17]	0.31 [0.17] J
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Anthracene	mg/kg	390	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.22]*	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.25]	ND [0.23]	ND [0.19]	ND [0.2]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Chrysene	mg/kg	82	-	ND [0.13]	ND [0.12]	ND [0.095]	ND [0.098]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.22]*	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Fluorene	mg/kg	36	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.5]	ND [0.46]	ND [0.38]	ND [0.39]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.22]*	*ND [0.2]*	*ND [0.17]*	**0.17 [0.17] J**
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.22]	ND [0.2]	ND [0.17]	0.28 [0.17] J
SW8270D	Pyrene	mg/kg	87	-	ND [0.22]	ND [0.2]	ND [0.17]	ND [0.17]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

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SO - Soil

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Northeast Cape FUDS 2016 Sampling

Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-022	S08-023	S08-024	S08-027
				Sample ID	16NEC-S08-SS-022	16NEC-S08-SS-023	16NEC-S08-SS-024	16NEC-S08-SS-027
				Lab Sample ID	K160974214	K160974215	K160974216	K160974218
				SDG	K1609742	K1609742	K1609742	K1609742
				Sample Date	8/18/16	8/18/16	8/18/16	8/18/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	45.8	44.6	69.8	44.8
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	180 [72] J	**610 [74]**	**300 [47]**	180 [15]
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	2100 [180]	8500 [190]	3500 [120]	2300 [37]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [5.4]*	*ND [5.6]*	*ND [3.6]*	*ND [5.6]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Anthracene	mg/kg	390	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.28]	*ND [0.29]*	ND [0.19]	*ND [0.29]*
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.28]*	*ND [0.29]*	ND [0.19]	*ND [0.29]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.33]	ND [0.34]	ND [0.22]	ND [0.34]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Chrysene	mg/kg	82	-	ND [0.17]	ND [0.17]	ND [0.11]	ND [0.17]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.28]*	*ND [0.29]*	ND [0.19]	*ND [0.29]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Fluorene	mg/kg	36	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.66]	ND [0.67]	ND [0.43]	ND [0.67]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.28]*	*ND [0.29]*	*ND [0.19]*	*ND [0.29]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]
SW8270D	Pyrene	mg/kg	87	-	ND [0.28]	ND [0.29]	ND [0.19]	ND [0.29]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-028	S08-030	S08-031	S08-032
				Sample ID	16NEC-S08-SS-028	16NEC-S08-SS-030	16NEC-S08-SS-031	16NEC-S08-SS-032
				Lab Sample ID	K160974219	K160984707	K160974220	K160984708
				SDG	K1609742	K1609847	K1609742	K1609847
				Sample Date	8/18/16	8/22/16	8/18/16	8/22/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	46.1	75.6	63.6	46.6
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**270 [72] J**	**14000 [87]**	**460 [52]**	**590 [71]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	3300 [180]	3700 [220]	4500 [130]	6300 [180]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [5.4] QL*	**9.5 [3.3]**	*ND [3.9]*	**6.4 [5.3]**
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.28] QL	**14 [0.17]**	ND [0.2]	**9 [0.28]**
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.28] QL	0.39 [0.17] J	ND [0.2]	0.57 [0.28] J
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Anthracene	mg/kg	390	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.28] QL*	ND [0.17]	ND [0.2]	*ND [0.28]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.33] QL	ND [0.2]	ND [0.24]	ND [0.32]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Chrysene	mg/kg	82	-	ND [0.17] QL	ND [0.099]	ND [0.12]	ND [0.16]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.28] QL*	ND [0.17]	ND [0.2]	*ND [0.28]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]
SW8270D	Fluorene	mg/kg	36	-	ND [0.28] QL	2 [0.17] J	ND [0.2]	0.93 [0.28] J
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.65] QL	ND [0.4]	ND [0.48]	ND [0.64]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.28] QL*	**0.93 [0.17] J**	*ND [0.2]*	**0.85 [0.28] J**
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.28] QL	1.9 [0.17] J	ND [0.2]	0.46 [0.28] J
SW8270D	Pyrene	mg/kg	87	-	ND [0.28] QL	ND [0.17]	ND [0.2]	ND [0.28]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-039	S08-044	S08-045	S08-046
				Sample ID	16NEC-S08-SS-039	16NEC-S08-SS-044	16NEC-S08-SS-045	16NEC-S08-SS-046
				Lab Sample ID	K160984715	K160984718	K160965307	K160965308
				SDG	K1609847	K1609847	K1609653	K1609653
				Sample Date	8/22/16	8/22/16	8/17/16	8/17/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	60.7	48.2	45.4	38.4
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**380 [54]**	**730 [68]**	**360 [37]**	**380 [43]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	4600 [140]	7700 [170]	4500 [92]	4300 [110]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [4.1]*	*ND [5.2]*	*ND [27]*	*ND [32]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.21]	0.59 [0.27] J	*ND [1.4]*	*ND [1.7]*
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Anthracene	mg/kg	390	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.21]	ND [0.27]	*ND [1.4]*	*ND [1.7]*
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.21]*	*ND [0.27]*	*ND [1.4]*	*ND [1.7]*
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.25]	ND [0.32]	ND [1.7]	ND [2]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Chrysene	mg/kg	82	-	ND [0.13]	ND [0.16]	ND [0.82]	ND [0.97]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.21]*	*ND [0.27]*	*ND [1.4]*	*ND [1.7]*
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Fluorene	mg/kg	36	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.5]	ND [0.63]	*ND [3.3]*	*ND [3.9]*
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.21]*	**0.47 [0.27] J**	*ND [1.4]*	*ND [1.7]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]
SW8270D	Pyrene	mg/kg	87	-	ND [0.21]	ND [0.27]	ND [1.4]	ND [1.7]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-047	S08-048	S08-051	S08-055
				Sample ID	16NEC-S08-SS-047	16NEC-S08-SS-048	16NEC-S08-SS-051	16NEC-S08-SS-055
				Lab Sample ID	K160965309	K160965310	K160965314	K160965319
				SDG	K1609653	K1609653	K1609653	K1609653
				Sample Date	8/17/16	8/17/16	8/17/16	8/17/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	44.4	71	66.1	80.4
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**330 [37]**	190 [23]	87 [5] QL	**310 [41]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	3700 [93]	1600 [58]	980 [13] QL	2700 [110]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [14]*	*ND [3.5]*	*ND [3.8]*	*ND [1.6] QL*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Anthracene	mg/kg	390	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	*ND [0.72]*	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	*ND [0.72]*	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.85]	ND [0.22]	ND [0.23]	ND [0.093] QL, QN
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Chrysene	mg/kg	82	-	ND [0.43]	ND [0.11]	ND [0.12]	ND [0.047] QL, QN
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	*ND [0.72]*	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Fluorene	mg/kg	36	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [1.7]	ND [0.43]	ND [0.45]	ND [0.19] QL, QN
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.72]*	*ND [0.18]*	*ND [0.2]*	*ND [0.079] QL, Q N*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN
SW8270D	Pyrene	mg/kg	87	-	ND [0.72]	ND [0.18]	ND [0.2]	ND [0.079] QL, QN

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

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SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-057	S08-058	S08-058	S08-059
				Sample ID	16NEC-S08-SS-057	16NEC-S08-SS-058	16NEC-S08-SS-0589	16NEC-S08-SS-059
				Lab Sample ID	K160965321	K160965322	K160965323	K160965324
				SDG	K1609653	K1609653	K1609653	K1609653
				Sample Date	8/17/16	8/17/16	8/17/16	8/17/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Duplicate	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	74.1	76.7	76.7	78.2
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	**280 [23]**	**280 [22]**	**270 [22]**	130 [4.2] QL
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	2900 [56]	2900 [54]	2700 [54]	1500 [11]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [1.7]*	*ND [1.7]*	*ND [1.7]*	*ND [1.6]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QNN	ND [0.082] QNN
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.086] QN	ND [0.083] QNN	ND [0.083] QN	ND [0.082] QN
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Anthracene	mg/kg	390	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.11] QN	ND [0.098] QN	ND [0.098] QN	ND [0.096] QN
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Chrysene	mg/kg	82	-	ND [0.051] QN	ND [0.049] QN	ND [0.049] QN	ND [0.048] QN
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.086] QL, QN	ND [0.083] QL, QN	ND [0.083] QL, QN	ND [0.082] QL, QN
SW8270D	Fluorene	mg/kg	36	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.21] QN	ND [0.2 QN	ND [0.2] QN	ND [0.2] Q
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.086] Q N*	*ND [0.083] QN*	*ND [0.083] QN*	*ND [0.082] QN*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.086] QL, QN	ND [0.083] QL, QN	ND [0.083] QL, QN	ND [0.082] QL, QN
SW8270D	Pyrene	mg/kg	87	-	ND [0.086] QN	ND [0.083] QN	ND [0.083] QN	ND [0.082] QN

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-060	S08-064	S08-064	S08-067
				Sample ID	16NEC-S08-SS-060	16NEC-S08-SS-064	16NEC-S08-SS-0649	16NEC-S08-SS-067
				Lab Sample ID	K160965325	K160965329	K160964901	K160964904
				SDG	K1609653	K1609653	K1609649	K1609649
				Sample Date	8/17/16	8/17/16	8/17/16	8/17/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Duplicate	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	73.2	68.2	68	61.7
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	180 [4.6] QL	**540 [48]**	**690 [24] QL, QN**	**950 [54] QL, QN**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	1900 [12]	6400 [120]	7100 [61]	9100 [140]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [1.7]*	*ND [1.9] QL*	ND [0.37] QL	*ND [0.8]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.087] QNN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Anthracene	mg/kg	390	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.11] QN	ND [0.11] QL, QN	ND [0.022] QL	ND [0.049]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Chrysene	mg/kg	82	-	ND [0.051] QN	ND [0.055] QL, QN	ND [0.011] QL	ND [0.025]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.087] QL, QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Fluorene	mg/kg	36	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.21] Q	ND [0.22] QL, QN	ND [0.044] QL	ND [0.097]
SW8270D	Naphthalene	mg/kg	0.038	120	*ND [0.087] QN*	*ND [0.094] QL, QN*	ND [0.019] QL	*ND [0.042]*
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.087] QL, QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]
SW8270D	Pyrene	mg/kg	87	-	ND [0.087] QN	ND [0.094] QL, QN	ND [0.019] QL	ND [0.042]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-2 - Soil Sample Results Site 08

				Location ID	S08-069	S08-071	S08-072	S08-073
				Sample ID	16NEC-S08-SS-069	16NEC-S08-SS-071	16NEC-S08-SS-072	16NEC-S08-SS-073
				Lab Sample ID	K160984720	K160985202	K160985203	K160985204
				SDG	K1609847	K1609852	K1609852	K1609852
				Sample Date	8/22/16	8/22/16	8/22/16	8/22/16
				Matrix	SO	SO	SO	SO
				Laboratory	ALGK	ALGK	ALGK	ALGK
				QA/QC	Primary	Primary	Primary	Primary
Method	Analyte	Units	2016 ADEC[1]	Site Specific[2]				
E160.3M	Total Solids	Percent	-	-	83.6	55.7	76.9	73.1
AK102	Diesel Range Organics (C10-C25)	mg/kg	250	9200	11 [4] J, B	**2200 [59]**	**8300 [22]**	**2500 [44]**
AK103	Residual Range Organics (C25-C36)	mg/kg	10000	9200	130 [9.9]	7400 [150]	1200 [54]	7000 [120]
SW8270D	1-Methylnaphthalene	mg/kg	0.41	-	*ND [0.6]*	*ND [4.5]*	*ND [3.2]*	*ND [3.4]*
SW8270D	2-Methylnaphthalene	mg/kg	1.3	-	ND [0.034]	0.28 [0.23] J	ND [0.17]	**2.4 [0.18] J**
SW8270D	Acenaphthene	mg/kg	37	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Acenaphthylene	mg/kg	18	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Anthracene	mg/kg	390	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Benzo(a)anthracene	mg/kg	0.28	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Benzo(a)pyrene	mg/kg	0.2	-	ND [0.034]	*ND [0.23]*	ND [0.17]	ND [0.18]
SW8270D	Benzo(b)fluoranthene	mg/kg	2	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Benzo(g,h,i)perylene	mg/kg	2300	-	ND [0.04]	ND [0.27]	ND [0.2]	ND [0.21]
SW8270D	Benzo(k)fluoranthene	mg/kg	20	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Chrysene	mg/kg	82	-	ND [0.02]	ND [0.14]	ND [0.097]	ND [0.11]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	0.2	-	ND [0.034]	*ND [0.23]*	ND [0.17]	ND [0.18]
SW8270D	Fluoranthene	mg/kg	590	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]
SW8270D	Fluorene	mg/kg	36	-	ND [0.034]	ND [0.23]	ND [0.17]	0.14 [0.18] J
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	2	-	ND [0.08]	ND [0.54]	ND [0.39]	ND [0.42]
SW8270D	Naphthalene	mg/kg	0.038	120	ND [0.034]	*ND [0.23]*	*ND [0.17]*	**0.34 [0.18] J**
SW8270D	Phenanthrene	mg/kg	39	-	ND [0.034]	ND [0.23]	ND [0.17]	0.12 [0.18] J
SW8270D	Pyrene	mg/kg	87	-	ND [0.034]	ND [0.23]	ND [0.17]	ND [0.18]

Notes:

[1] 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016)

[2] Decision Document (USACE 2009)

bold = Analytical results exceed the 2016 ADEC Criteria.

Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding 2016 ADEC Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SO - Soil

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-007	S08-009	S08-010
			Sample ID	16NEC-S08-SD-007	16NEC-S08-SD-009	16NEC-S08-SD-010
			Lab Sample ID	K160965305	K160974202	K160974203
			SDG	K1609653	K1609742	K1609742
			Sample Date	8/17/16	8/18/16	8/18/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	48.8	61.5	58.7
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	350 [34]	450 [54]	690 [56]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	2400 [85]	**3900 [140]**	**3700 [140]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [2.6]	ND [0.81]	ND [0.84]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	0.15 [0.13] J	0.043 [0.042] J	0.32 [0.043] J
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Anthracene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.16]	ND [0.049]	ND [0.051]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Chrysene	mg/kg	-	ND [0.077]	ND [0.025]	ND [0.026]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Fluoranthene	mg/kg	2	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Fluorene	mg/kg	0.8	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.31]	ND [0.098]	ND [0.11]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.13]	ND [0.042]	0.055 [0.043] J
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.13]	ND [0.042]	ND [0.043]
SW8270D	Pyrene	mg/kg	-	ND [0.13]	ND [0.042]	ND [0.043]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-014	S08-015	S08-016
			Sample ID	16NEC-S08-SD-014	16NEC-S08-SD-015	16NEC-S08-SD-016
			Lab Sample ID	K160974206	K160974207	K160974208
			SDG	K1609742	K1609742	K1609742
			Sample Date	8/18/16	8/18/16	8/18/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	66.1	70.2	53.9
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	290 [50] J	220 [47] J	680 [61]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	2400 [130]	2100 [120]	**7400 [160]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [3.8] QL	ND [3.6]	ND [4.6]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Anthracene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.23] QL	ND [0.22]	ND [0.28]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Chrysene	mg/kg	-	ND [0.12] QL	ND [0.11]	ND [0.14]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Fluoranthene	mg/kg	2	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Fluorene	mg/kg	0.8	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.46] QL	ND [0.43]	ND [0.56]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.2] QL	ND [0.19]	ND [0.24]
SW8270D	Pyrene	mg/kg	-	ND [0.2] QL	ND [0.19]	ND [0.24]

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-017	S08-025	S08-026
			Sample ID	16NEC-S08-SD-017	16NEC-S08-SD-025	16NEC-S08-SD-026
			Lab Sample ID	K160974209	K160984705	K160974217
			SDG	K1609742	K1609847	K1609742
			Sample Date	8/18/16	8/22/16	8/18/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	55.2	66.2	66.4
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	650 [59]	630 [50]	**11000 [99]**
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**7100 [150]**	**5900 [130]**	2700 [250] J
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [4.5]	ND [3.8]	ND [3.8]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	0.22 [0.24] J	ND [0.2]	ND [0.2]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Anthracene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.28]	ND [0.23]	ND [0.23]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Chrysene	mg/kg	-	ND [0.14]	ND [0.12]	ND [0.12]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Fluoranthene	mg/kg	2	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Fluorene	mg/kg	0.8	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.55]	ND [0.46]	ND [0.46]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.24]	ND [0.2]	ND [0.2]
SW8270D	Pyrene	mg/kg	-	ND [0.24]	ND [0.2]	ND [0.2]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-029	S08-033	S08-034
			Sample ID	16NEC-S08-SD-029	16NEC-S08-SD-033	16NEC-S08-SD-034
			Lab Sample ID	K160984706	K160984709	K160984710
			SDG	K1609847	K1609847	K1609847
			Sample Date	8/22/16	8/22/16	8/22/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	71.1	68.4	74.2
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	780 [47]	600 [49]	300 [44]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**6200 [120]**	**6000 [130]**	3300 [120]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [3.5]	ND [3.7]	ND [3.4]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Anthracene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.21]	ND [0.22]	ND [0.21]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Chrysene	mg/kg	-	ND [0.11]	ND [0.11]	ND [0.11]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Fluoranthene	mg/kg	2	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Fluorene	mg/kg	0.8	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.42]	ND [0.44]	ND [0.41]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.18]	ND [0.19]	ND [0.18]
SW8270D	Pyrene	mg/kg	-	ND [0.18]	ND [0.19]	ND [0.18]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-035	S08-036	S08-036
			Sample ID	16NEC-S08-SD-035	16NEC-S08-SD-036	16NEC-S08-SD-0369
			Lab Sample ID	K160984711	K160974221	K160974222
			SDG	K1609847	K1609742	K1609742
			Sample Date	8/22/16	8/18/16	8/18/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Duplicate
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	69.2	69.3	69
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	750 [96]	480 [48] Q	450 [48] Q
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**5000 [240]**	**5500 [120] Q**	**5100 [120] Q**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [3.6]	ND [3.6]	ND [3.6]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	0.29 [0.19] J	ND [0.19]	ND [0.19]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.22]	ND [0.22]	ND [0.22]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Chrysene	mg/kg	-	ND [0.11]	ND [0.11]	ND [0.11]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Fluoranthene	mg/kg	2	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Fluorene	mg/kg	0.8	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.43]	ND [0.44]	ND [0.44]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.19]	ND [0.19]	ND [0.19]
SW8270D	Pyrene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.19]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-037	S08-037	S08-038
			Sample ID	16NEC-S08-SD-037	16NEC-S08-SD-0379	16NEC-S08-SD-038
			Lab Sample ID	K160984712	K160984713	K160984714
			SDG	K1609847	K1609847	K1609847
			Sample Date	8/22/16	8/22/16	8/22/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Duplicate	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	67.7	68.4	70.9
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	420 [49]	420 [95] J	430 [93] J
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**3800 [130]**	**3900 [240]**	**5000 [240]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [3.7]	ND [3.6]	ND [3.5] QL
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.19]	ND [0.19]	0.3 [0.18] J, QL
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Acenaphthylene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.22]	ND [0.22]	ND [0.22] QL
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Chrysene	mg/kg	-	ND [0.11]	ND [0.11]	ND [0.11] QL
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Fluoranthene	mg/kg	2	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Fluorene	mg/kg	0.8	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.44]	ND [0.44]	ND [0.43] QL
SW8270D	Naphthalene	mg/kg	1.7	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.19]	ND [0.19]	ND [0.18] QL
SW8270D	Pyrene	mg/kg	-	ND [0.19]	ND [0.19]	ND [0.18] QL

Notes:
[1] Decision Document (USACE 2009)
Bold Analytical results exceed the Site Specific Criteria.
Italics Nondetect results with LODs exceeding Site Specific Criteria
[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-040	S08-041	S08-042
			Sample ID	16NEC-S08-SD-040	16NEC-S08-SD-041	16NEC-S08-SD-042
			Lab Sample ID	K160974223	K160974224	K160984716
			SDG	K1609742	K1609742	K1609847
			Sample Date	8/18/16	8/18/16	8/22/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	61.9	55.5	42.8
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	230 [27] Q	580 [60] Q	750 [160] J
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	2800 [67] Q	**7600 [150] Q**	**11000 [390]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [4]	ND [4.5]	ND [5.8]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Anthracene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.25]	ND [0.27]	ND [0.35]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Chrysene	mg/kg	-	ND [0.13]	ND [0.14]	ND [0.18]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Fluoranthene	mg/kg	2	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Fluorene	mg/kg	0.8	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.49]	ND [0.54]	ND [0.7]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.21]	ND [0.23]	ND [0.3]
SW8270D	Pyrene	mg/kg	-	ND [0.21]	ND [0.23]	ND [0.3]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

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ALGK - ALS Environmental, Kelso, WA.
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For Data Qualifiers, refer to Section 1.1 of the DQA

Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-043	S08-049	S08-050
			Sample ID	16NEC-S08-SD-043	16NEC-S08-SD-049	16NEC-S08-SD-050
			Lab Sample ID	K160984717	K160965311	K160965312
			SDG	K1609847	K1609653	K1609653
			Sample Date	8/22/16	8/17/16	8/17/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	51.4	62.3	73.4
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	820 [65]	270 [27]	350 [45]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**10000 [170]**	2600 [67]	3200 [120]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [4.9]	ND [4]	ND [3.4]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Anthracene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.3]	ND [0.24]	ND [0.21]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Chrysene	mg/kg	-	ND [0.15]	ND [0.12]	ND [0.11]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Fluoranthene	mg/kg	2	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Fluorene	mg/kg	0.8	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.59]	ND [0.48]	ND [0.41]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.25]	ND [0.21]	ND [0.18]
SW8270D	Pyrene	mg/kg	-	ND [0.25]	ND [0.21]	ND [0.18]

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection

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mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-050	S08-052	S08-053
			Sample ID	16NEC-S08-SD-0509	16NEC-S08-SD-052	16NEC-S08-SD-053
			Lab Sample ID	K160965313	K160965315	K160965316
			SDG	K1609653	K1609653	K1609653
			Sample Date	8/17/16	8/17/16	8/17/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Duplicate	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	72.9	74.7	76.9
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	420 [45]	320 [8.9]	260 [43]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**3800 [120]**	3200 [23]	2200 [110]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [3.4]	ND [3.4]	ND [3.3]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Anthracene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.21]	ND [0.21]	ND [0.2]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Chrysene	mg/kg	-	ND [0.11]	ND [0.11]	ND [0.097]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Fluoranthene	mg/kg	2	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Fluorene	mg/kg	0.8	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.41]	ND [0.41]	ND [0.39]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.18]	ND [0.18]	ND [0.17]
SW8270D	Pyrene	mg/kg	-	ND [0.18]	ND [0.18]	ND [0.17]

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

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Northeast Cape FUDS 2016 Sampling

Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-053	S08-054	S08-056
			Sample ID	16NEC-S08-SD-0539	16NEC-S08-SD-054	16NEC-S08-SD-056
			Lab Sample ID	K160965317	K160965318	K160965320
			SDG	K1609653	K1609653	K1609653
			Sample Date	8/17/16	8/17/16	8/17/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Duplicate	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	77.2	72.9	77.9
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	300 [43]	450 [45]	270 [42]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	2500 [110]	**4000 [120]**	2500 [110]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [1.6] QL	ND [1.7]	ND [1.6]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Acenaphthylene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Anthracene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.097] QL, QN	ND [0.11] QN	ND [0.096] QN
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Chrysene	mg/kg	-	ND [0.049] QL, QN	ND [0.052] QN	ND [0.048] QN
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Fluoranthene	mg/kg	2	ND [0.082] QL, QN	ND [0.087] QL, QN	ND [0.081] QL, QN
SW8270D	Fluorene	mg/kg	0.8	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.2] QL, QN	ND [0.21] QN	ND [0.2] QN
SW8270D	Naphthalene	mg/kg	1.7	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.082] QL, QN	ND [0.087] QL, QN	ND [0.081] QL, QN
SW8270D	Pyrene	mg/kg	-	ND [0.082] QL, QN	ND [0.087] QN	ND [0.081] QN

Notes:

[1] Decision Document (USACE 2009)

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Italics Nondetect results with LODs exceeding Site Specific Criteria

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SDG - Sample Delivery Group

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Northeast Cape FUDS 2016 Sampling

Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-061	S08-062	S08-063
			Sample ID	16NEC-S08-SD-061	16NEC-S08-SD-062	16NEC-S08-SD-063
			Lab Sample ID	K160965326	K160965327	K160965328
			SDG	K1609653	K1609653	K1609653
			Sample Date	8/17/16	8/17/16	8/17/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	71.1	75.7	72.9
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	440 [47]	190 [22]	200 [23]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**4600 [120]**	1800 [55]	2200 [57]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [1.8] QL	ND [17]	ND [3.4] QL
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.09] QL, QN	*ND [0.84] QN*	ND [0.18] QL, QN
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.09] QL, QN	*ND [0.84] QN*	ND [0.18] QL, QN
SW8270D	Acenaphthylene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Anthracene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.11] QL, QN	ND [0.99] QN	ND [0.21] QL, QN
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Chrysene	mg/kg	-	ND [0.053] QL, QN	ND [0.5] QN	ND [0.11] QL, QN
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Fluoranthene	mg/kg	2	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Fluorene	mg/kg	0.8	ND [0.09] QL, QN	*ND [0.84] QN*	ND [0.18] QL, QN
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.21] QL, QN	ND [2] QN	ND [0.41] QL, QN
SW8270D	Naphthalene	mg/kg	1.7	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN
SW8270D	Pyrene	mg/kg	-	ND [0.09] QL, QN	ND [0.84] QN	ND [0.18] QL, QN

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

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SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling
Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-065	S08-066	S08-068
			Sample ID	16NEC-S08-SD-065	16NEC-S08-SD-066	16NEC-S08-SD-068
			Lab Sample ID	K160964902	K160964903	K160984719
			SDG	K1609649	K1609649	K1609847
			Sample Date	8/17/16	8/17/16	8/22/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	71.1	64.2	60.1
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	300 [9.2] QL, QH, Q	570 [26] QL, Q	**7600 [110]**
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	3200 [24]	**5800 [64]**	**6900 [280]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [0.7]	ND [0.39]	5.3 [4.1]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.036]	ND [0.02]	**6.8 [0.22]**
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.036]	ND [0.02]	0.39 [0.22] J
SW8270D	Acenaphthylene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Anthracene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.042]	ND [0.024]	ND [0.25]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Chrysene	mg/kg	-	ND [0.021]	ND [0.012]	ND [0.13]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Fluoranthene	mg/kg	2	ND [0.036]	ND [0.02]	ND [0.22]
SW8270D	Fluorene	mg/kg	0.8	ND [0.036]	ND [0.02]	0.41 [0.22] J
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.084]	ND [0.047]	ND [0.5]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.036]	ND [0.02]	0.69 [0.22] J
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.036]	ND [0.02]	0.25 [0.22] J
SW8270D	Pyrene	mg/kg	-	ND [0.036]	ND [0.02]	ND [0.22]

Notes:
[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/kg - milligram per kilogram
SDG - Sample Delivery Group
SE - Sediment
For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-3 - Sediment Sample Results Site 08

			Location ID	S08-070	S08-074	S08-075
			Sample ID	16NEC-S08-SD-070	16NEC-S08-SD-074	16NEC-S08-SD-075
			Lab Sample ID	K160985201	K160985205	K160985206
			SDG	K1609852	K1609852	K1609852
			Sample Date	8/22/16	8/22/16	8/22/16
			Matrix	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]			
E160.3M	Total Solids	Percent	-	59.6	64.9	72.1
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	740 [56] Q	710 [51]	760 [46]
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	**7100 [140] Q**	**4900 [130]**	**5800 [120]**
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [4.2] QL	ND [3.8] QL	ND [3.5]
SW8270D	2-Methylnaphthalene	mg/kg	0.6	0.35 [0.22] J, QL	0.19 [0.2] J, QL	ND [0.18]
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Acenaphthylene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Anthracene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.26] QL	ND [0.23] QL	ND [0.21]
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Chrysene	mg/kg	-	ND [0.13] QL	ND [0.12] QL	ND [0.11]
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Fluoranthene	mg/kg	2	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Fluorene	mg/kg	0.8	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.51] QL	ND [0.46] QL	ND [0.42]
SW8270D	Naphthalene	mg/kg	1.7	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.22] QL	ND [0.2] QL	ND [0.18]
SW8270D	Pyrene	mg/kg	-	ND [0.22] QL	ND [0.2] QL	ND [0.18]

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

Italics Nondetect results with LODs exceeding Site Specific Criteria

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-4 - Sediment Sample Results at Suqi River

Method	Analyte	Units	Site Specific[1]	S29-001	S29-002	S29-003	S29-003	S29-004
			Location ID	S29-001	S29-002	S29-003	S29-003	S29-004
			Sample ID	16NEC-S29-SD-001	16NEC-S29-SD-002	16NEC-S29-SD-003	16NEC-S29-SD-0039	16NEC-S29-SD-004
			Lab Sample ID	K160964905	K160964906	K160964907	K160964908	K160964909
			SDG	K1609649	K1609649	K1609649	K1609649	K1609649
			Sample Date	8/16/16	8/16/16	8/15/16	8/15/16	8/15/16
			Matrix	SE	SE	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary	Duplicate	Primary
E160.3M	Total Solids	Percent	-	57.7	51.2	60.7	63.4	54.8
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	110 [5.7] QL, QN	540 [13] QL, QN	420 [5.4] QL, QN	470 [5.2] QL, QN	230 [6.1] QL, QN
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	930 [15]	2500 [33]	1800 [14]	1700 [14] QN	1100 [16]
SW6020A	Arsenic	mg/kg	93	4.44 [0.11]	2.67 [0.12]	1.76 [0.11]	1.27 [0.1]	2.73 [0.08]
SW6020A	Chromium	mg/kg	270	14.1 [0.22] QL	13.6 [0.24]	3.42 [0.21]	5.48 [0.19]	8.98 [0.17]
SW6020A	Lead	mg/kg	530	15.3 [0.06]	14.2 [0.06]	5.21 [0.05]	4.42 [0.05]	12.5 [0.04]
SW6020A	Zinc	mg/kg	960	37.4 [0.6] QL	31.2 [0.6]	20.1 [0.5]	15 [0.5]	38.7 [0.4]
SW8082A	PCB-1016 (Aroclor 1016)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1221 (Aroclor 1221)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1232 (Aroclor 1232)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1242 (Aroclor 1242)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1248 (Aroclor 1248)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1254 (Aroclor 1254)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	ND [0.013]
SW8082A	PCB-1260 (Aroclor 1260)	mg/kg	0.7	ND [0.013]	ND [0.014]	ND [0.012]	ND [0.012]	0.015 [0.013] J
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [4.3]	ND [0.49]	ND [0.81] QL	ND [0.78] QL	ND [0.9] QL
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.22]	ND [0.025]	0.071 [0.042] J, QN, QL	0.032 [0.04] J, QN, QL	ND [0.047] QL
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Acenaphthylene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Anthracene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.26]	ND [0.03]	ND [0.049] QL	ND [0.047] QL	ND [0.055] QL
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Chrysene	mg/kg	-	ND [0.13]	ND [0.015]	ND [0.025] QL	ND [0.024] QL	ND [0.028] QL
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Fluoranthene	mg/kg	2	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Fluorene	mg/kg	0.8	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.52]	ND [0.059]	ND [0.098] QL	ND [0.094] QL	ND [0.11] QL
SW8270D	Naphthalene	mg/kg	1.7	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL
SW8270D	Pyrene	mg/kg	-	ND [0.22]	ND [0.025]	ND [0.042] QL	ND [0.04] QL	ND [0.047] QL

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-4 - Sediment Sample Results at Suqi River

Method	Analyte	Units	Location ID	S29-005	S29-006	S29-007	S29-008	S29-009	S29-010
			Sample ID	16NEC-S29-SD-005	16NEC-S29-SD-006	16NEC-S29-SD-007	16NEC-S29-SD-008	16NEC-S29-SD-009	16NEC-S29-SD-010
			Lab Sample ID	K160964910	K160964911	K160964912	K160964913	K160964914	K160964915
			SDG	K1609649	K1609649	K1609649	K1609649	K1609649	K1609649
			Sample Date	8/15/16	8/15/16	8/15/16	8/15/16	8/15/16	8/15/16
			Matrix	SE	SE	SE	SE	SE	SE
			Laboratory	ALGK	ALGK	ALGK	ALGK	ALGK	ALGK
			QA/QC	Primary	Primary	Primary	Primary	Primary	Primary
			Site Specific[1]						
E160.3M	Total Solids	Percent	-	62.3	61.9	61.9	57.1	63.3	70.6
AK102	Diesel Range Organics (C10-C25)	mg/kg	3500	310 [11] QL, QN	210 [11] QL, QN	630 [27] QL, QN	410 [12] QL, QN	230 [11] QL, QN	410 [9.3] QL, QN
AK103	Residual Range Organics (C25-C36)	mg/kg	3500	2700 [27]	2100 [27]	**5700 [67]**	**3500 [29]**	2600 [26]	**4200 [24] QH**
SW6020A	Arsenic	mg/kg	93	4.22 [0.09]	3.86 [0.12]	4.41 [0.07]	5.82 [0.1]	3.42 [0.09]	4.63 [0.08]
SW6020A	Chromium	mg/kg	270	14.2 [0.17]	13 [0.23]	15.9 [0.15]	20.8 [0.2]	8.23 [0.18]	22.7 [0.16]
SW6020A	Lead	mg/kg	530	5.99 [0.04]	10.3 [0.06]	7.71 [0.04]	9.46 [0.05]	3.95 [0.05]	9.34 [0.04]
SW6020A	Zinc	mg/kg	960	17 [0.4]	37.1 [0.6]	22.1 [0.4]	41.8 [0.5]	14.4 [0.5]	42.2 [0.4]
SW8082A	PCB-1016 (Aroclor 1016)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1221 (Aroclor 1221)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1232 (Aroclor 1232)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1242 (Aroclor 1242)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1248 (Aroclor 1248)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1254 (Aroclor 1254)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8082A	PCB-1260 (Aroclor 1260)	mg/kg	0.7	ND [0.012]	ND [0.012]	ND [0.012]	ND [0.013]	ND [0.012]	ND [0.0099]
SW8270D	1-Methylnaphthalene	mg/kg	-	ND [0.4] QL	ND [4] QL	ND [0.8] QL	ND [0.87] QL	ND [0.78] QL	ND [3.5] QL
SW8270D	2-Methylnaphthalene	mg/kg	0.6	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Acenaphthene	mg/kg	0.5	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Acenaphthylene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Anthracene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Benzo(a)anthracene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Benzo(a)pyrene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Benzo(b)fluoranthene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Benzo(g,h,i)perylene	mg/kg	1.7	ND [0.024] QL	ND [0.24] QL	ND [0.049] QL	ND [0.053] QL	ND [0.048] QL	ND [0.22] QL
SW8270D	Benzo(k)fluoranthene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Chrysene	mg/kg	-	ND [0.012] QL	ND [0.12] QL	ND [0.025] QL	ND [0.027] QL	ND [0.024] QL	ND [0.11] QL
SW8270D	Dibenzo(a,h)anthracene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Fluoranthene	mg/kg	2	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Fluorene	mg/kg	0.8	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Indeno(1,2,3-cd)pyrene	mg/kg	3.2	ND [0.048] QL	ND [0.48] QL	ND [0.097] QL	ND [0.11] QL	ND [0.095] QL	ND [0.43] QL
SW8270D	Naphthalene	mg/kg	1.7	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Phenanthrene	mg/kg	4.8	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL
SW8270D	Pyrene	mg/kg	-	ND [0.021] QL	ND [0.21] QL	ND [0.042] QL	ND [0.045] QL	ND [0.041] QL	ND [0.18] QL

Notes:

[1] Decision Document (USACE 2009)

Bold Analytical results exceed the Site Specific Criteria.

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/kg - milligram per kilogram

SDG - Sample Delivery Group

SE - Sediment

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-5 - Surface Water Sample Results at Suqi River

			Location ID	S29-001	S29-001	S29-002	S29-003	S29-004
			Sample ID	16NEC-S29-WS-001	16NEC-S29-WS-0019	16NEC-S29-WS-002	16NEC-S29-WS-003	16NEC-S29-WS-004
			Lab Sample ID	K160958105	K160958106	K160958107	K160958108	K160958109
			SDG	K1609581	K1609581	K1609581	K1609581	K1609581
			Sample Date	8/16/16	8/16/16	8/16/16	8/15/16	8/15/16
			Matrix	WS	WS	WS	WS	WS
			Laboratory	ALGK	ALGK	ALGK	ALGK	ALGK
			QA/QC	Primary	Duplicate	Primary	Primary	Primary
Method	Analyte	Units	Site Specific[1]					
8270SIM	1-Methylnaphthalene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	2-Methylnaphthalene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Acenaphthene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Acenaphthylene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Anthracene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Benzo(a)anthracene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	0.0000026 [0.000005] J	ND [0.0000053]
8270SIM	Benzo(a)pyrene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Benzo(b)fluoranthene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Benzo(g,h,i)perylene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Benzo(k)fluoranthene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Chrysene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Dibenzo(a,h)anthracene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Fluoranthene	mg/L	-	ND [0.00002]	ND [0.00002]	ND [0.000023]	ND [0.00002]	ND [0.000022]
8270SIM	Fluorene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Indeno(1,2,3-cd)pyrene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Naphthalene	mg/L	-	0.000004 [0.000005] J	0.0000043 [0.000005] J	0.0000043 [0.0000056] J	0.0000047 [0.000005] J	0.0000045 [0.0000053] J
8270SIM	Phenanthrene	mg/L	-	ND [0.000005]	ND [0.000005]	ND [0.0000056]	ND [0.000005]	ND [0.0000053]
8270SIM	Pyrene	mg/L	-	ND [0.00001]	ND [0.00001]	ND [0.000012]	ND [0.00001]	ND [0.000011]
SW8260C	Benzene	mg/L	-	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]
SW8260C	Ethylbenzene	mg/L	-	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]
SW8260C	o-Xylene	mg/L	-	ND [0.0002]	ND [0.0002]	ND [0.0002]	ND [0.0002]	ND [0.0002]
SW8260C	Toluene	mg/L	-	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	-	ND [0.0002]	ND [0.0002]	ND [0.0002]	ND [0.0002]	ND [0.0002]
SW8260C	TAH[2]	mg/L	0.01	0.0007	0.0007	0.0007	0.0007	0.0007
SW8260C / 8270SIM	TAqH[2]	mg/L	0.015	0.000809	0.0008093	0.0008233	0.0008073	0.000817

Notes:

[1] Decision Document (USACE 2009)

[2] Total aromatic hydrocarbons (TAH) is the sum of the SW8260 BTEX concentrations. Total aqueous hydrocarbons (TAqH) is the sum of the SW8260 BTEX and 8270 SIM PAH concentrations. If the analyte was ND, the LOD was used for the analyte concentration

[ ] - limit of detection

ALGK - ALS Environmental, Kelso, WA.

mg/L - milligram per liter

SDG - Sample Delivery Group

WS - Surface Water

For Data Qualifiers, refer to Section 1.1 of the DQA

Northeast Cape FUDS 2016 Sampling

Table B-1-5 - Surface Water Sample Results at Suqi River

			Location ID Sample ID Lab Sample ID SDG Sample Date Matrix Laboratory QA/QC	TB05 16NEC-TB05 K160958111 K1609581 8/16/16 WG ALGK Trip Blank
Method	Analyte	Units	Site Specific[1]	
8270SIM	1-Methylnaphthalene	mg/L	-	-
8270SIM	2-Methylnaphthalene	mg/L	-	-
8270SIM	Acenaphthene	mg/L	-	-
8270SIM	Acenaphthylene	mg/L	-	-
8270SIM	Anthracene	mg/L	-	-
8270SIM	Benzo(a)anthracene	mg/L	-	-
8270SIM	Benzo(a)pyrene	mg/L	-	-
8270SIM	Benzo(b)fluoranthene	mg/L	-	-
8270SIM	Benzo(g,h,i)perylene	mg/L	-	-
8270SIM	Benzo(k)fluoranthene	mg/L	-	-
8270SIM	Chrysene	mg/L	-	-
8270SIM	Dibenzo(a,h)anthracene	mg/L	-	-
8270SIM	Fluoranthene	mg/L	-	-
8270SIM	Fluorene	mg/L	-	-
8270SIM	Indeno(1,2,3-cd)pyrene	mg/L	-	-
8270SIM	Naphthalene	mg/L	-	-
8270SIM	Phenanthrene	mg/L	-	-
8270SIM	Pyrene	mg/L	-	-
SW8260C	Benzene	mg/L	-	ND [0.0001]
SW8260C	Ethylbenzene	mg/L	-	ND [0.0001]
SW8260C	o-Xylene	mg/L	-	ND [0.0002]
SW8260C	Toluene	mg/L	-	ND [0.0001]
SW8260C	Xylene, Isomers m & p	mg/L	-	ND [0.0002]
SW8260C	TAH[2]	mg/L	0.01	-
SW8260C / 8270SIM	TAqH[2]	mg/L	0.015	-

Notes:
[1] Decision Document (USACE 2009)
[2] Total aromatic hydrocarbons (TAH) is the sum of the SW8260 BTEX concentrations. Total aqueous hydrocarbons (TAqH) is the sum of the SW8260 BTEX and 8270 SIM PAH concentrations. If the analyte was ND, the LOD was used for the analyte concentration
[ ] - limit of detection
ALGK - ALS Environmental, Kelso, WA.
mg/L - milligram per liter
SDG - Sample Delivery Group
WS - Surface Water
For Data Qualifiers, refer to Section 1.1 of the DQA

ATTACHMENT B-2
Qualified Sample Results Tables

Table B-2-1
Sample Results Qualified QL due to Hold Time Exceedance

Sample ID	Lab Sample ID	Method	Analyte	QC Batch	Result (mg/L)	LOD (mg/L)	Qualifier	Sample Date	Extraction Date	Analyzed Date
16NEC-14MW06-WG	K160943404	AK102	DRO	KWG1607446	1.4	0.021	QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW06-WG-9	K160943405	AK102	DRO	KWG1607446	1.4	0.02	QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW07-WG	K160943409	AK102	DRO	KWG1607446	0.12	0.021	J, B, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-17MW1-WG	K160943412	AK102	DRO	KWG1607446	0.092	0.021	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-20MW-1-WG	K160943413	AK102	DRO	KWG1607446	0.09	0.021	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-22MW2-WG	K160943414	AK102	DRO	KWG1607446	0.1	0.021	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-26MW1-WG	K160943411	AK102	DRO	KWG1607446	0.11	0.022	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-MW10-1-WG	K160943403	AK102	DRO	KWG1607446	0.49	0.021	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW10-1-DVW	K160943406	AK102	DRO	KWG1607446	0.08	0.021	J, B, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW88-1-WG	K160943407	AK102	DRO	KWG1607446	0.52	0.021	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW88-10-WG	K160943410	AK102	DRO	KWG1607446	0.3	0.021	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW03-WG	K160958101	AK102	DRO	KWG1607446	0.99	0.021	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-14MW04-WG	K160958102	AK102	DRO	KWG1607446	2.2	0.021	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-14MW05-WG	K160958103	AK102	DRO	KWG1607446	3.2	0.021	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-MW88-3-WG	K160958104	AK102	DRO	KWG1607446	0.49	0.021	J, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-14MW06-WG	K160943404	AK103	RRO	KWG1607446	0.55	0.051	QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW06-WG-9	K160943405	AK103	RRO	KWG1607446	0.47	0.05	QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW07-WG	K160943409	AK103	RRO	KWG1607446	0.093	0.052	J, B, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-17MW1-WG	K160943412	AK103	RRO	KWG1607446	0.13	0.052	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-20MW-1-WG	K160943413	AK103	RRO	KWG1607446	0.13	0.052	J, B, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-22MW2-WG	K160943414	AK103	RRO	KWG1607446	0.36	0.052	J, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-26MW1-WG	K160943411	AK103	RRO	KWG1607446	0.79	0.053	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-MW10-1-WG	K160943403	AK103	RRO	KWG1607446	0.32	0.053	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW10-1-DVW	K160943406	AK103	RRO	KWG1607446	0.11	0.051	J, B, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW88-1-WG	K160943407	AK103	RRO	KWG1607446	0.23	0.053	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-MW88-10-WG	K160943410	AK103	RRO	KWG1607446	0.16	0.051	J, QL	8/13/2016	8/25/2016	10/6/2016
16NEC-14MW03-WG	K160958101	AK103	RRO	KWG1607446	0.16	0.053	J, QL	8/14/2016	8/25/2016	10/6/2016
16NEC-14MW04-WG	K160958102	AK103	RRO	KWG1607446	0.61	0.052	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-14MW05-WG	K160958103	AK103	RRO	KWG1607446	0.61	0.052	QL	8/14/2016	8/25/2016	10/6/2016
16NEC-MW88-3-WG	K160958104	AK103	RRO	KWG1607446	0.15	0.053	J, QL	8/14/2016	8/25/2016	10/6/2016

Notes:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-2
Sample Results Qualified due to Method Blank and Trip Blank Contamination

SDG	QC Batch	Method	Analyte	QC sample	MB/TB Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	Qualifier
K1609581	511210	A2320B	Alkalinity, Total	Method Blank	6	16NEC-14MW03-WG	28	B
K1609434	511209	A2320B	Alkalinity, Total	Method Blank	6	16NEC-20MW-1-WG	21	B
K1609317	510534	A2320B	Alkalinity, Total	Method Blank	6	16NEC-14MW02-WG	40	B
K1609317	510534	A2320B	Alkalinity, Total	Method Blank	6	16NEC-14MW02-WG-9	40	B
K1609581	511210	A2320B	Alkalinity, Total	Method Blank	6	16NEC-14MW05-WG	47	B
K1609434	KWG1607320	SW8260C	Carbon disulfide	Method Blank	0.00011	16NEC-14MW06-WG	0.00007	B
K1609434	KWG1607320	SW8260C	Carbon disulfide	Method Blank	0.00011	16NEC-14MW06-WG-9	0.00007	B
K1609434	KWG1607320	SW8260C	Carbon disulfide	Method Blank	0.00011	16NEC-TB02	0.00009	B
K1609434	KWG1607320	SW8260C	Methylene chloride	Method Blank	0.00011	16NEC-TB02	0.00014	B
K1609317	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-14MW01-WGF	0.00035	B
K1609317	269412	SW6020A	Chromium	Method Blank	0.0001	16NEC-14MW01-WG	0.00078	B
K1609317	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-14MW02-WGF	0.00034	B
K1609317	269412	SW6020A	Chromium	Method Blank	0.0001	16NEC-14MW02-WG	0.00053	B
K1609317	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-14MW02-WG-9F	0.00035	B
K1609317	269412	SW6020A	Chromium	Method Blank	0.0001	16NEC-14MW02-WG-9	0.00051	B
K1609581	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-14MW05-WGF	0.00046	B
K1609434	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-22MW2-WGF	0.0003	B
K1609434	269412	SW6020A	Chromium	Method Blank	0.0001	16NEC-22MW2-WG	0.00033	B
K1609581	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-MW88-3-WGF	0.00028	B
K1609581	269412	SW6020A	Chromium	Method Blank	0.0001	16NEC-MW88-3-WG	0.00042	B
K1609581	269412	SW6020A	Chromium (Dissolved)	Method Blank	0.0001	16NEC-14MW03-WGF	0.00065	B
K1609434	269412	SW6020A	Vanadium (Dissolved)	Method Blank	0.00003	16NEC-22MW2-WGF	0.00005	B
K1609434	269412	SW6020A	Vanadium	Method Blank	0.00003	16NEC-22MW2-WG	0.00006	B
K1609581	269412	SW6020A	Vanadium (Dissolved)	Method Blank	0.00003	16NEC-MW88-3-WGF	0.00012	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-14MW07-WG	0.12	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-17MW1-WG	0.092	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-20MW-1-WG	0.09	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-22MW2-WG	0.1	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-26MW1-WG	0.11	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-MW10-1-DVW	0.08	B
K1609434	KWG1607446	AK102	DRO	Method Blank	0.043	16NEC-MW88-10-WG	0.3	B
K1609581	KWG1607340	SW8082A	PCB-1260 (Aroclor 1260)	Method Blank	0.0000063	16NEC-14MW03-WG	0.0000029	B
K1609317	KWG1607329	AK103	RRO	Method Blank	0.027	16NEC-14MW01-WG	0.12	B
K1609317	KWG1607329	AK103	RRO	Method Blank	0.027	16NEC-14MW02-WG	0.18	B
K1609317	KWG1607329	AK103	RRO	Method Blank	0.027	16NEC-14MW02-WG-9	0.17	B
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-14MW07-WG	0.093	B
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-17MW1-WG	0.13	B
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-20MW-1-WG	0.13	B
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-MW10-1-DVW	0.11	B

Table B-2-2
Sample Results Qualified due to Method Blank and Trip Blank Contamination

SDG	QC Batch	Method	Analyte	QC sample	MB/TB Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	Qualifier
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-MW88-1-WG	0.23	B
K1609434	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-MW88-10-WG	0.16	B
K1609581	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-14MW03-WG	0.16	B
K1609581	KWG1607446	AK103	RRO	Method Blank	0.027	16NEC-MW88-3-WG	0.15	B
K1609434	KWG1607320	SW8260C	Carbon disulfide	16NEC-TB02	0.00009	16NEC-14MW06-WG-9	0.00007	B
K1609434	KWG1607320	SW8260C	Carbon disulfide	16NEC-TB02	0.00009	16NEC-14MW06-WG	0.00007	B
K1609434	KWG1607320	SW8260C	Chloroform	16NEC-TB02	0.00009	16NEC-MW10-1-DVW	0.0001	B

Notes:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-3
Sample Results Qualified due to Surrogate Accuracy

SDG	Sample ID	Lab Sample ID	QC Batch	Method	Analyte	Percent Recovery	Result (mg/L)	LOD (mg/L)	LCL (%)	UCL (%)	Qualifier
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	1,2-Dichloroethane-d4	119	-	-	81	118	
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	Naphthalene	-	0.00034	0.0003	-	-	J, QH
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	Carbon disulfide	-	0.00007	0.0002	-	-	J, B, QH
K1609581	16NEC-14MW03-WG	K160958101	KWG1607370	SW8260C	Toluene-d8	115	-	-	89	112	
K1609581	16NEC-14MW03-WG	K160958101	KWG1607370	SW8260C	Ethylbenzene	-	0.00025	0.0001	-	-	J, QH
K1609581	16NEC-14MW04-WG	K160958102	KWG1607370	SW8260C	Toluene-d8	114	-	-	89	112	
K1609581	16NEC-14MW04-WG	K160958102	KWG1607370	SW8260C	Benzene	-	0.00013	0.0001	-	-	J, QH
K1609581	16NEC-14MW05-WG	K160958103	KWG1607370	SW8260C	Toluene-d8	116	-	-	89	112	
K1609581	16NEC-14MW05-WG	K160958103	KWG1607370	SW8260C	Xylene, Isomers m & p	-	0.00018	0.0002	-	-	J, QH
K1609581	16NEC-14MW05-WG	K160958103	KWG1607370	SW8260C	Ethylbenzene	-	0.00021	0.0001	-	-	J, QH
K1609581	16NEC-MW88-3-WG	K160958104	KWG1607370	SW8260C	Toluene-d8	114	-	-	89	112	
K1609581	16NEC-MW88-3-WG	K160958104	KWG1607370	SW8260C	Ethylbenzene	-	0.00005	0.0001	-	-	J, QH
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	Decachlorobiphenyl	22	-	-	40	135	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1260 (Aroclor 1260)	-	ND	0.0002	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1254 (Aroclor 1254)	-	ND	0.0002	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1248 (Aroclor 1248)	-	ND	0.0002	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1242 (Aroclor 1242)	-	ND	0.0002	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1232 (Aroclor 1232)	-	ND	0.0002	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1221 (Aroclor 1221)	-	ND	0.0004	-	-	QL
K1609581	16NEC-14MW04-WG	K160958102	KWG1607648	SW8082A	PCB-1016 (Aroclor 1016)	-	ND	0.0002	-	-	QL

Notes:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-4
CCV Recoveries Less than True Value

SDG	Sample ID	Lab Sample ID	QC Batch	Method	Analyte	% Difference	Result (mg/L)	LOD (mg/L)	Qualifier
K1609434	CCV	-	KWG1607320	SW8260C	Dichlorodifluoromethane	-25	-	-	-
K1609434	CCV	-	KWG1607320	SW8260C	Chloromethane	-22	-	-	-
K1609434	CCV	-	KWG1607320	SW8260C	Carbon disulfide	-23	-	-	-
K1609434	16NEC-TB02	K160943401	KWG1607320	SW8260C	Dichlorodifluoromethane	-	ND	0.0002	QL
K1609434	16NEC-TB02	K160943401	KWG1607320	SW8260C	Chloromethane	-	ND	0.0002	QL
K1609434	16NEC-TB02	K160943401	KWG1607320	SW8260C	Carbon disulfide	-	0.00009	0.0002	J, B, QL
K1609434	16NEC-MW10-1-WG	K160943403	KWG1607320	SW8260C	Dichlorodifluoromethane	-	ND	0.0002	QL
K1609434	16NEC-MW10-1-WG	K160943403	KWG1607320	SW8260C	Chloromethane	-	ND	0.0002	QL
K1609434	16NEC-MW10-1-WG	K160943403	KWG1607320	SW8260C	Carbon disulfide	-	ND	0.0002	QL
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	Dichlorodifluoromethane	-	ND	0.0002	QL
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	Chloromethane	-	ND	0.0002	QL
K1609434	16NEC-14MW06-WG	K160943404	KWG1607320	SW8260C	Carbon disulfide	-	0.00007	0.0002	J, B, QH, QL
K1609434	16NEC-14MW06-WG-9	K160943405	KWG1607320	SW8260C	Dichlorodifluoromethane	-	ND	0.0002	QL
K1609434	16NEC-14MW06-WG-9	K160943405	KWG1607320	SW8260C	Chloromethane	-	ND	0.0002	QL
K1609434	16NEC-14MW06-WG-9	K160943405	KWG1607320	SW8260C	Carbon disulfide	-	0.00007	0.0002	J, B, QL
K1609434	16NEC-MW10-1-DVW	K160943406	KWG1607320	SW8260C	Dichlorodifluoromethane	-	ND	0.0002	QL
K1609434	16NEC-MW10-1-DVW	K160943406	KWG1607320	SW8260C	Chloromethane	-	ND	0.0002	QL
K1609434	16NEC-MW10-1-DVW	K160943406	KWG1607320	SW8260C	Carbon disulfide	-	ND	0.0002	QL

Note:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-5
Sample Results Qualified due to Field Duplicate Precision

Method	Analyte	Primary Sample ID	Primary Lab Sample ID	Duplicate Sample ID	Duplicate Lab Sample ID	Primary Result (mg/L)	Duplicate Result (mg/L)	RPD (%)	Qualifier
SW6020A	Silver (Total)	16NEC-14MW02-WG	K160931702	16NEC-14MW02-WG-9	K160931703	0.00001	0.000005	67	QN
SW6020A	Cadmium (Dissolved)	16NEC-14MW02-WGF	K160931702F	16NEC-14MW02-WG-9F	K160931703F	0.000018	0.000029	47	QN
SW6020A	Lead (Dissolved)	16NEC-14MW02-WGF	K160931702F	16NEC-14MW02-WG-9F	K160931703F	0.000054	0.000083	42	QN
8270SIM	Acenaphthene	16NEC-14MW06-WG	K160943404	16NEC-14MW06-WG-9	K160943405	0.000017	ND [0.000005]	109	QN
8270SIM	Naphthalene	16NEC-14MW06-WG	K160943404	16NEC-14MW06-WG-9	K160943405	0.00006	0.000033	58	QN
SW8260C	Naphthalene	16NEC-14MW06-WG	K160943404	16NEC-14MW06-WG-9	K160943405	0.00034	0.00025	31	QN
SW8082A	PCB-1260 (Aroclor 1260)	16NEC-14MW06-WG	K160943404	16NEC-14MW06-WG-9	K160943405	0.0000015	0.0000026	54	QN
SW6020A	Cadmium (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.00008	0.000049	48	QN
SW6020A	Chromium (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.00034	0.00017	67	QN
SW6020A	Lead (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.000649	0.000208	103	QN
SW6020A	Selenium (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	ND [0.001]	0.0005	67	QN
SW6020A	Silver (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.00001	0.000004	86	QN
SW6020A	Vanadium (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.00054	0.00035	43	QN
SW6020A	Zinc (Dissolved)	16NEC-14MW06-WGF	K160943404F	16NEC-14MW06-WG-9F	K160943405F	0.00734	0.00412	56	QN

Notes:

[ ] - limit of detection

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-6
Nondetect Sample Results with LODs Greater than ADEC Criteria

SDG	Sample ID	Location ID	Lab Sample ID	Method	Analyte	2016 ADEC Evaluation Criteria[1] (mg/L)	Result (mg/L)	LOD (mg/L)	DF
K1609434	16NEC-TB02	TB02	K160943401	SW8260C	1,2-Dibromoethane	0.000075	ND	0.0002	1
K1609434	16NEC-TB02	TB02	K160943401	SW8260C	1,2,3-Trichloropropane	0.0000075	ND	0.0005	1
K1609434	16NEC-MW10-1-WG	MW10-1	K160943403	SW8260C	1,2-Dibromoethane	0.000075	ND	0.0002	1
K1609434	16NEC-MW10-1-WG	MW10-1	K160943403	SW8260C	1,2,3-Trichloropropane	0.0000075	ND	0.0005	1
K1609434	16NEC-14MW06-WG	14MW06	K160943404	SW8260C	1,2-Dibromoethane	0.000075	ND	0.0002	1
K1609434	16NEC-14MW06-WG	14MW06	K160943404	SW8260C	1,2,3-Trichloropropane	0.0000075	ND	0.0005	1
K1609434	16NEC-14MW06-WG-9	14MW06	K160943405	SW8260C	1,2-Dibromoethane	0.000075	ND	0.0002	1
K1609434	16NEC-14MW06-WG-9	14MW06	K160943405	SW8260C	1,2,3-Trichloropropane	0.0000075	ND	0.0005	1
K1609434	16NEC-MW10-1-DVW	MW10-1-DVW	K160943406	SW8260C	1,2-Dibromoethane	0.000075	ND	0.0002	1
K1609434	16NEC-MW10-1-DVW	MW10-1-DVW	K160943406	SW8260C	1,2,3-Trichloropropane	0.0000075	ND	0.0005	1

Notes:

[1] Groundwater compared to 18 AAC 75 ADEC Table C. Groundwater Human Health Cleanup Level (ADEC 2016).

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-7
Sample Results Qualified due to Dual Column Confirmation

SDG	Sample ID	Lab Sample ID	Method	Analyte	Primary	Confirmation	RPD	Qualifier
K1609434	16NEC-20MW-1-WG	K160943413	8082A	Aroclor 1260	0.0000023	0.0000035	41	QN
K1609434	16NEC-MW88-10-WG	K160943410	8082A	Aroclor 1260	0.0000027	0.0000044	48	QN
K1609581	16NEC-14MW03-WG	K160958101	8082A	Aroclor 1260	0.0000029	0.0000044	41	QN

Note:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

Table B-2-8
Sample Results Qualified due to Equipment Blank Contamination

SDG	Method	Analyte	Equipment Blank Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	LOD (mg/L)	Qualifier
K1609434	8270SIM	2-Methylnaphthalene	0.0000042	16NEC-MW10-1-WG	0.0000049	0.000005	J, B
K1609581	8270SIM	2-Methylnaphthalene	0.0000042	16NEC-14MW03-WG	0.000015	0.0000056	J, B
K1609581	8270SIM	2-Methylnaphthalene	0.0000042	16NEC-14MW05-WG	0.000029	0.000005	B
K1609581	8270SIM	2-Methylnaphthalene	0.0000042	16NEC-MW88-3-WG	0.0000058	0.000005	J, B
K1609434	AK102	DRO	0.08	16NEC-14MW07-WG	0.12	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-17MW1-WG	0.092	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-20MW-1-WG	0.09	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-22MW2-WG	0.1	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-26MW1-WG	0.11	0.022	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-MW10-1-WG	0.49	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-MW88-10-WG	0.3	0.021	J, B, QL
K1609434	AK102	DRO	0.08	16NEC-MW88-1-WG	0.52	0.021	J,B, QL
K1609581	AK102	DRO	0.08	16NEC-MW88-3-WG	0.49	0.021	J, B, QL
K1609317	AK103	RRO	0.11	16NEC-14MW01-WG	0.12	0.051	J, B
K1609317	AK103	RRO	0.11	16NEC-14MW02-WG	0.18	0.053	J, B
K1609317	AK103	RRO	0.11	16NEC-14MW02-WG-9	0.17	0.053	J, B
K1609581	AK103	RRO	0.11	16NEC-14MW03-WG	0.16	0.053	J, B, QL
K1609581	AK103	RRO	0.11	16NEC-14MW04-WG	0.61	0.052	B, QL
K1609581	AK103	RRO	0.11	16NEC-14MW05-WG	0.61	0.052	B, QL
K1609434	AK103	RRO	0.11	16NEC-14MW06-WG	0.55	0.051	B, QL
K1609434	AK103	RRO	0.11	16NEC-14MW06-WG-9	0.47	0.05	B, QL
K1609434	AK103	RRO	0.11	16NEC-14MW07-WG	0.093	0.052	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-17MW1-WG	0.13	0.052	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-20MW-1-WG	0.13	0.052	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-22MW2-WG	0.36	0.052	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-26MW1-WG	0.79	0.053	B, QL
K1609434	AK103	RRO	0.11	16NEC-MW10-1-WG	0.32	0.053	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-MW88-10-WG	0.16	0.051	J, B, QL
K1609434	AK103	RRO	0.11	16NEC-MW88-1-WG	0.23	0.053	J, B, QL
K1609581	AK103	RRO	0.11	16NEC-MW88-3-WG	0.15	0.053	J, B, QL
K1609317	SW8260C	Ethylbenzene	0.00006	16NEC-14MW01-WG	0.0005	0.0001	B
K1609581	SW8260C	Ethylbenzene	0.00006	16NEC-14MW03-WG	0.00025	0.0001	J, B, QH
K1609581	SW8260C	Ethylbenzene	0.00006	16NEC-14MW05-WG	0.00021	0.0001	J,B, QH
K1609581	SW8260C	Ethylbenzene	0.00006	16NEC-MW88-3-WG	0.00005	0.0001	J, B, QH
K1609581	8270SIM	Naphthalene	0.000011	16NEC-14MW04-WG	0.000022	0.000005	B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-14MW06-WG	0.00006	0.000005	B, Q
K1609434	8270SIM	Naphthalene	0.000011	16NEC-14MW06-WG-9	0.000033	0.000005	B, Q
K1609434	8270SIM	Naphthalene	0.000011	16NEC-14MW07-WG	0.0000061	0.000005	J, B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-17MW1-WG	0.0000076	0.000005	J, B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-20MW-1-WG	0.0000054	0.000005	J, B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-26MW1-WG	0.0000045	0.000005	J, B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-MW10-1-WG	0.0000046	0.000005	J, B

Table B-2-8
Sample Results Qualified due to Equipment Blank Contamination

SDG	Method	Analyte	Equipment Blank Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	LOD (mg/L)	Qualifier
K1609434	8270SIM	Naphthalene	0.000011	16NEC-MW88-10-WG	0.0000088	0.000005	J, B
K1609434	8270SIM	Naphthalene	0.000011	16NEC-MW88-1-WG	0.0000071	0.000005	J, B
K1609581	8270SIM	Naphthalene	0.000011	16NEC-MW88-3-WG	0.000035	0.000005	B
K1609434	SW8260C	Tetrachloroethene (PCE)	0.0024	16NEC-MW10-1-WG	0.0092	0.0002	B
K1609317	SW8260C	Xylene, Isomers m & p	0.00028	16NEC-14MW01-WG	0.00038	0.0002	J, B
K1609317	SW8260C	Xylene, Isomers m & p	0.00028	16NEC-14MW02-WG	0.0006	0.0002	B
K1609317	SW8260C	Xylene, Isomers m & p	0.00028	16NEC-14MW02-WG-9	0.00055	0.0002	B
K1609581	SW8260C	Xylene, Isomers m & p	0.00028	16NEC-14MW05-WG	0.00018	0.0002	J, B, QH
K1609317	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW01-WGF	0.00035	0.00005	B
K1609317	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW02-WGF	0.00034	0.00005	B
K1609317	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW02-WG-9F	0.00035	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-MW10-1-WGF	0.00026	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW06-WGF	0.00034	0.00005	B, Q
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW06-WG-9	0.00017	0.00005	J, B, Q
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-MW88-1-WGF	0.00018	0.00005	J, B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW07-WGF	0.00024	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-MW88-10-WGF	0.0002	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-26MW1-WGF	0.00031	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-17MW1-WGF	0.00021	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-20MW-1-WGF	0.00033	0.00005	B
K1609434	SW6020A	Chromium (Dissolved)	0.00012	16NEC-22MW2-WGF	0.0003	0.00005	B
K1609581	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW03-WGF	0.00065	0.00005	B
K1609581	SW6020A	Chromium (Dissolved)	0.00012	16NEC-14MW05-WGF	0.00046	0.00005	B
K1609581	SW6020A	Chromium (Dissolved)	0.00012	16NEC-MW88-3-WGF	0.00028	0.00005	B
K1609317	SW6020A	Chromium (Total)	0.00012	16NEC-14MW01-WG	0.00078	0.00005	B
K1609317	SW6020A	Chromium (Total)	0.00012	16NEC-14MW02-WG	0.00053	0.00005	B
K1609317	SW6020A	Chromium (Total)	0.00012	16NEC-14MW02-WG-9	0.00051	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-MW10-1-WG	0.0009	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-14MW06-WG	0.0002	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-14MW06-WG-9	0.00016	0.00005	J, B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-MW88-1-WG	0.00016	0.00005	J, B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-14MW07-WG	0.00045	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-MW88-10-WG	0.00048	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-17MW1-WG	0.00025	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-20MW-1-WG	0.00053	0.00005	B
K1609434	SW6020A	Chromium (Total)	0.00012	16NEC-22MW2-WG	0.00033	0.00005	B
K1609581	SW6020A	Chromium (Total)	0.00012	16NEC-14MW05-WG	0.001	0.00005	B
K1609581	SW6020A	Chromium (Total)	0.00012	16NEC-MW88-3-WG	0.00042	0.00005	B
K1609317	SW6020A	Lead (Dissolved)	0.000021	16NEC-14MW01-WGF	0.000159	0.00001	B
K1609317	SW6020A	Lead (Dissolved)	0.000021	16NEC-14MW02-WGF	0.000054	0.00001	B, Q
K1609317	SW6020A	Lead (Dissolved)	0.000021	16NEC-14MW02-WG-9F	0.000083	0.00001	B, Q
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-14MW06-WG-9	0.000208	0.00001	B, Q

Table B-2-8
Sample Results Qualified due to Equipment Blank Contamination

SDG	Method	Analyte	Equipment Blank Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	LOD (mg/L)	Qualifier
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-14MW07-WGF	0.000052	0.00001	B
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-17MW1-WGF	0.000045	0.00001	B
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-22MW2-WGF	0.000026	0.00001	B
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-26MW1-WGF	0.000025	0.00001	B
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-MW10-1-WGF	0.000042	0.00001	B
K1609434	SW6020A	Lead (Dissolved)	0.000021	16NEC-MW88-1-WGF	0.000075	0.00001	B
K1609581	SW6020A	Lead (Dissolved)	0.000021	16NEC-MW88-3-WGF	0.000158	0.00001	B
K1609434	SW6020A	Lead (Total)	0.000021	16NEC-22MW2-WG	0.000085	0.00001	B
K1609434	SW6020A	Manganese (Dissolved)	0.000173	16NEC-17MW1-WGF	0.00156	0.000013	B
K1609434	SW6020A	Manganese (Dissolved)	0.000173	16NEC-22MW2-WGF	0.000535	0.000013	B
K1609434	SW6020A	Manganese (Dissolved)	0.000173	16NEC-26MW1-WGF	0.000754	0.000013	B
K1609317	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW01-WGF	0.00124	0.00005	B
K1609317	SW6020A	Nickel (Total)	0.00034	16NEC-14MW01-WG	0.00105	0.00005	B
K1609317	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW02-WGF	0.00094	0.00005	B
K1609317	SW6020A	Nickel (Total)	0.00034	16NEC-14MW02-WG	0.00111	0.00005	B
K1609317	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW02-WG-9F	0.00105	0.00005	B
K1609317	SW6020A	Nickel (Total)	0.00034	16NEC-14MW02-WG-9	0.00106	0.00005	B
K1609581	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW03-WGF	0.00332	0.00005	B
K1609581	SW6020A	Nickel (Total)	0.00034	16NEC-14MW03-WG	0.00289	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW06-WGF	0.00201	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-14MW06-WG	0.00175	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-14MW06-WG-9	0.0018	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-14MW06-WG-9	0.00166	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-17MW1-WGF	0.0023	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-17MW1-WG	0.0008	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-20MW-1-WGF	0.00167	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-20MW-1-WG	0.00114	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-22MW2-WGF	0.001	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-22MW2-WG	0.00028	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-26MW1-WGF	0.00126	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-26MW1-WG	0.00112	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-MW10-1-WGF	0.00122	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-MW10-1-WG	0.00135	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-MW88-10-WGF	0.00312	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-MW88-10-WG	0.00242	0.00005	B
K1609434	SW6020A	Nickel (Dissolved)	0.00034	16NEC-MW88-1-WGF	0.00104	0.00005	B
K1609434	SW6020A	Nickel (Total)	0.00034	16NEC-MW88-1-WG	0.00091	0.00005	B
K1609581	SW6020A	Nickel (Dissolved)	0.00034	16NEC-MW88-3-WGF	0.00246	0.00005	B
K1609581	SW6020A	Nickel (Total)	0.00034	16NEC-MW88-3-WG	0.00217	0.00005	B
K1609317	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-14MW01-WGF	0.00034	0.00005	B
K1609581	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-14MW03-WGF	0.00034	0.00005	B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-14MW06-WG	0.00039	0.00005	B

Table B-2-8
Sample Results Qualified due to Equipment Blank Contamination

SDG	Method	Analyte	Equipment Blank Contamination (mg/L)	Associated Sample	Associated Result (mg/L)	LOD (mg/L)	Qualifier
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-14MW06-WG-9	0.00035	0.00005	B, Q
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-14MW06-WG-9	0.00037	0.00005	B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-14MW07-WGF	0.00003	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-14MW07-WG	0.00016	0.00005	J, B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-17MW1-WGF	0.00005	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-17MW1-WG	0.00017	0.00005	J, B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-20MW-1-WGF	0.00012	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-20MW-1-WG	0.00037	0.00005	B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-22MW2-WGF	0.00005	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-22MW2-WG	0.00006	0.00005	J, B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-26MW1-WGF	0.00006	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-26MW1-WG	0.00021	0.00005	B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-MW10-1-WGF	0.00008	0.00005	J, B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-MW88-10-WGF	0.00007	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-MW88-10-WG	0.00035	0.00005	B
K1609434	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-MW88-1-WGF	0.00005	0.00005	J, B
K1609434	SW6020A	Vanadium (Total)	0.00004	16NEC-MW88-1-WG	0.00006	0.00005	J, B
K1609581	SW6020A	Vanadium (Dissolved)	0.00004	16NEC-MW88-3-WGF	0.00012	0.00005	J, B
K1609581	SW6020A	Vanadium (Total)	0.00004	16NEC-MW88-3-WG	0.00032	0.00005	B
K1609317	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW01-WGF	0.00313	0.0005	B
K1609317	SW6020A	Zinc (Total)	0.00063	16NEC-14MW01-WG	0.00322	0.0005	B
K1609317	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW02-WGF	0.00259	0.0005	B
K1609317	SW6020A	Zinc (Total)	0.00063	16NEC-14MW02-WG	0.00254	0.0005	B
K1609317	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW02-WG-9F	0.0034	0.0005	B
K1609317	SW6020A	Zinc (Total)	0.00063	16NEC-14MW02-WG-9	0.00237	0.0005	B
K1609581	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW03-WGF	0.00516	0.0005	B
K1609581	SW6020A	Zinc (Total)	0.00063	16NEC-14MW03-WG	0.00587	0.0005	B
K1609434	SW6020A	Zinc (Total)	0.00063	16NEC-14MW06-WG	0.00331	0.0005	B
K1609434	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW06-WG-9	0.00412	0.0005	B, Q
K1609434	SW6020A	Zinc (Total)	0.00063	16NEC-14MW06-WG-9	0.00301	0.0005	B
K1609434	SW6020A	Zinc (Dissolved)	0.00063	16NEC-14MW07-WGF	0.00394	0.0005	B
K1609434	SW6020A	Zinc (Total)	0.00063	16NEC-14MW07-WG	0.00384	0.0005	B
K1609434	SW6020A	Zinc (Dissolved)	0.00063	16NEC-22MW2-WGF	0.00343	0.0005	B
K1609434	SW6020A	Zinc (Total)	0.00063	16NEC-22MW2-WG	0.00196	0.0005	B
K1609434	SW6020A	Zinc (Dissolved)	0.00063	16NEC-26MW1-WGF	0.00273	0.0005	B
K1609434	SW6020A	Zinc (Total)	0.00063	16NEC-26MW1-WG	0.00218	0.0005	B

Note:

For definitions, refer to the Acronyms and Abbreviations section in the DQA.

For qualifier definitions, refer to the Quality Control Criteria section in the DQA.

ATTACHMENT B-3
ADEC Laboratory Data Review Checklists

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/16/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609581
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**

   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   ALS Kelso transferred samples for method RSK175 to ALS Simi Valley.

2. **Chain of Custody (CoC)**

   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. **Laboratory Sample Receipt Documentation**

a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

Cooler Whatchamacaulit Temperature blank – 0.9°C Cooler Temperature – 0.4°C Cooler 3 Musketeers Temperature blank – 0.9°C Cooler Temperature – 0.3°C Cooler Pay Day Temperature blank – 3.9°C Cooler Temperature – 3.0°C Cooler O'Henry Temperature blank – 2.9°C Cooler Temperature – 0.2°C Transferred Cooler to Simi Valley Temperature blank – 3.0°C

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition with the exception of headspace in 3 of 8 40 mL vials for 16NEC-TB04 and 1 of 8 40 mL vials for 16NEC-TB05.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

No discrepancies were noted.

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

4. **Case Narrative**

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All other discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The lab indicated in the case narrative that the DRO samples needed re-analysis.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. <u>Samples Results</u>

a. Correct analyses performed/reported as requested on COC?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

c. All soils reported on a dry weight basis?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

Only water samples were submitted with this sample group.

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table C. Groundwater Human Health Cleanup Level (ADEC 2016).

e. Data quality or usability affected?

Comments:

Data quality and usability was not affected. All results are below the ADEC or significantly greater than ADEC criteria.

6. <u>QC Samples</u>

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All method blank results were non-detect for the methods SW8270SIM and SW8260.

iii. If above PQL, what samples are affected?

Comments:

NA

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

v. Data quality or usability affected? (please explain)

Comments:

The data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

A LCS and MS/MSD (sample 16NEC-S29-WS-003) were performed for method SW8270SIM and SW8260 (BTEX).

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All LCS and LCSD and MS/MSD recoveries were within required QC limits.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All LCS/LCSD and MS/MSD are within QC criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No samples were affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples required qualification.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

Data quality and usability were not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

PCB – surrogate decachlorobiphenyl for sample 16NEC-14MW04-WG was lower than QC criteria at 22%. SW8260 – Surrogate Toluene-d8 recovery for samples 16NEC-S29-WS-001, 16NEC-S29-WS-0019, 16NEC-S29-WS-003 and 16NEC-S29-WS-004 was greater than QC criteria.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

SW8260 – All VOC results for the associated samples were non-detect therefore no qualifier is required for high surrogate recovery.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

VOC – The effect is minimal since the bias was high and results were less than ADEC criteria.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Trip blank sample ID 16NEC-TB04

iii. All results less than PQL?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

NA

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Primary 16NEC-S29-WS-001 Duplicate 16NEC-S29-WS-0019

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The RPDs were all less than 30%.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability were not affected.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

Not submitted with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Qualifiers are defined in the DQA

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/17/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609649
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**
   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☐ No ☑ NA (Please explain.) Comments

   No samples were transferred.

2. **Chain of Custody (CoC)**
   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Cooler Hershey's
   Temperature blank – 3.6°C
   Cooler Temperature – 3.7°C

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The lab received 4 x 8 oz jars instead of the amount of 6 listed on the chain of custody.

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

4. **Case Narrative**

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

DRO/RRO – The original analysis reported had a low LCS/LCSD. The reanalysis was performed past the analytical hold time. The original analysis was reported as the primary result with a low bias. See 6.b. for more details.

PCB – The ICV for Aroclor 1221 did not meet the primary evaluation criteria. The ICV was reported from the acceptable column. Data was not affected.

All other discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The lab indicated in the case narrative that the DRO samples needed re-analysis.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. **Samples Results**

a. Correct analyses performed/reported as requested on COC?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The laboratory did not analyze samples by the requested method of SW8270SIM, the lab analyzed samples by method SW8270D.

b. All applicable holding times met?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The samples were re-extracted due to low LCS out of hold. However, the samples from original analysis were reported.

PAH – Several samples (16NEC-S29-SD-003, 16NEC-S29-SD-0039, 16NEC-S29-SD-004, 16NEC-S29-SD-005, 16NEC-S29-SD-006, 16NEC-S29-SD-007, 16NEC-S29-SD-008, 16NEC-S29-SD-009) were extracted past the holding time by 1 day. Sample results are flagged QL indicating a low bias.

c. All soils reported on a dry weight basis?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016) for soil and site specific criteria for sediment.

PAH – The LODs for analytes 1-methylnaphthalene and naphthalene were greater than ADEC criteria in sample 16NEC-S08-SS-067. The laboratory did not analyze samples by the requested method of SW8270SIM which contributed to these elevated reporting limits.

e. Data quality or usability affected?

Comments:

Data quality and usability is minimally affected due to the reporting limit since the MDL was lower than the ADEC criteria.

The PAH results may be biased low. Majority of results are nondetect with reporting limits significantly less than the site specific criteria; therefore, data quality is minimally affected.

6. <u>QC Samples</u>

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The method blank had detections for DRO and RRO.

iii. If above PQL, what samples are affected?

Comments:

Samples within 10 times the method blank detection were qualified.

No samples affected.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples affected.

v. Data quality or usability affected? (please explain)

Comments:

Data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

A LCS and MS/MSD were performed for the metals analysis.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

LCS anomalies:
DRO – The LCSD was less than QC criteria at 55%.

MS/MSD anomalies:
Metals – The 16NEC-S29-SD-001 MS and MSD recoveries for zinc and chromium were slightly less than QC criteria.
DRO – The MS and MSD were greater than QC criteria for sample 16NEC-S08-SD-065 and the MSD was less than QC criteria for sample 16NEC-S29-SD-0039

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

LCS/LCSD anomaly:
DRO – The LCS/LCSD RPD was 35%

MS/MSD anomaly
RRO – The 16NEC-S29-SD-0039 MS/MSD RPD was 57%

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

LCS/LCSD anomaly: DRO – All samples were affected by the low LCSD. MS/MSD anomaly: DRO -The parent sample 16NEC-S08-SD-065 and 16NEC-S29-SD-0039 were affected. Metals – parent sample 16NEC-S29-SD-001 was affected

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

LCS/LCSD anomaly: DRO – All samples were qualified QL MS/MSD anomaly: DRO - The 16NEC-S08-SD-065 parent sample was qualified QH and the 16NEC-S29-SD-0039 parent sample was qualified QL (result previously already qualified due to LCS/LCSD recoveries) Metals – The 16NEC-S29-SD-001 parent sample results were qualified QL for zinc and chromium. RPD anomaly: DRO for all associated samples in batch KWG1607415 was qualified QN due to RPD outliers (note: all results were also qualified QL due to low LCS recoveries). RRO for sample 16NEC-S29-SD-0039 was qualified QN due to RPD outliers

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

DRO - Data quality was affected. The samples qualified due to the biased low LCSD are minimally affected. All soil and sediment samples are significantly less than the site specific criteria. The soil samples are greater than the ADEC criteria. Metals - The parent sample qualified QL is order of magnitudes less than the site specific criteria data quality is minimally affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

RRO - n-triacontane was greater than criteria in sample 16NEC-S29-SD-010. PAH – Surrogates were lower than QC criteria in the following samples: 16NEC-S08-SS-0649 and 16NEC-S29-SD-004

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

RRO – The sample was qualified QH indicating a high bias

PAH –Samples were qualified QL for the potential low bias.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

RRO - Data quality was minimally affected since the result was significantly greater than site specific criteria and a high bias.

PAH – All results were nondetect with a low bias; however, the reporting limits were less than associated criteria.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.): Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No volatile samples were submitted with this SDG.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

iii. All results less than PQL?

☐ Yes ☑ No ☑ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Primary 16NEC-S29-SD-003 Duplicate 16NEC-S29-SD-0039 Primary 16NEC-S08-SS-064 Duplicate 16NEC-S08-SS-0649

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The following RPD was greater than 50% and qualified QN 16NEC-S29-SD-003/16NEC-S29-SD-0039 PAH – 2-Methylnaphthalene

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality is minimally affected since all qualified results are less than site specific criteria.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No blanks were collected with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. <u>Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)</u>

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Qualifiers are defined in the DQA

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/17/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609653
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**
   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☐ No ☑ NA (Please explain.) Comments

   No samples were transferred.

2. **Chain of Custody (CoC)**
   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. **Laboratory Sample Receipt Documentation**
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Cooler Baby Ruth
   Temperature blank – 3.1°C
   Cooler Temperature – 4.4°C

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

There were no discrepancies noted..

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

4. **Case Narrative**

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☐ Yes ☐ No ☐ NA (Please explain.) Comments

DRO/RRO – The original analysis reported had low surrogate recoveries. The reanalysis was performed past the analytical hold time. The original analysis was reported as the primary result with a low bias. See 6.c. for more details.

PAH - The original analysis reported had low surrogate recoveries, a re-extraction and reanalysis was performed.

All other discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The lab indicated in the case narrative that samples needed re-analysis for DRO and PAH.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. **Samples Results**

a. Correct analyses performed/reported as requested on COC?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The laboratory did not analyze samples by the requested method of SW8270SIM, the lab analyzed samples by method SW8270D.

b. All applicable holding times met?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The samples were re-extracted out of hold due to low surrogates. However, the samples from original analysis were reported for the low surrogate see section 6.c.

c. All soils reported on a dry weight basis?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016) for soil and site specific criteria for sediment. PAH – The soil LODs for analytes 1-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and naphthalene were greater than ADEC criteria in one or more samples. The laboratory did not analyze samples by the requested method of SW8270SIM which contributed to these elevated reporting limits. The sediment LODs for analytes acenaphthene, fluorene, and 2-methylnaphthalene were greater than site specific criteria in sample 16NEC-S08-SD-062 due to dilution.

e. Data quality or usability affected?

Comments:

Data quality and usability is affected due to the reporting limit; however, all LODs were less than site specific criteria with the exception of sample 16NEC-S08-SD-062. Majority of samples needed dilution due to the presence of elevated levels of non-target analytes and extracts that were viscous.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The method blank had detections for DRO and RRO.

iii. If above PQL, what samples are affected?

Comments:

Samples within 10 times the method blank detection were qualified. No samples affected.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples affected.

v. Data quality or usability affected? (please explain)

Comments:

Data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No metals were submitted with this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

LCS anomalies:
PAH – The LCSD was less than QC criteria for fluoranthene and phenanthrene in QC batch KWG1607693.

MS/MSD anomalies:
DRO – The 16NEC-S08-SS-002 MS was less than QC criteria. The 16NEC-S08-SS-059 (re-extracted) MS was greater than QC criteria. This result is not used for reporting purposes.
PAH – The 16NEC-S08-SS-002 and 16NEC-S08-SS-064 MS and MSD for majority analytes were lower than QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

LCS/LCSD anomaly:
PAH – The LCS/LCSD RPD for all analytes in QC batch KWG1607693 was greater than QC criteria.

MS/MSD anomaly
PAH – The 16NEC-S08-SS-002 MS/MSD RPD for all analytes in QC batch KWG1607692 and and the 16NEC-S08-SS-64 MS/MSD RPD for all analytes in QC batch KWG1607693 were greater than QC criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

LCS/LCSD anomaly:
PAH – All samples associated with this batch were affected by the low LCSD and the LCS/LCSD RPD.

MS/MSD anomaly:
DRO -The parent sample 16NEC-S08-SS-002 was affected.
PAH – parent samples 16NEC-S08-SS-002 and 16NEC-S08-SS-064 were affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

LCS/LCSD anomaly: PAH – All samples were qualified QL for fluoranthene and phenanthrene MS/MSD anomaly: DRO - The parent sample was qualified QL PAH – The parent samples were qualified QL LCS/LCSD and MS/MSD RPD: Associated samples were qualified QN

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

LCS/LCSD anomaly: PAH – All associated samples were nondetect for fluoranthene and phenanthrene and the reporting limits were orders of magnitude less than ADEC and site specific criteria. Data is minimally affected. MS/MSD anomaly: DRO - Data quality was minimally affected. The parent sample qualified due to the biased low MS was significantly less than ADEC criteria. PAH - The parent samples were qualified QL and have nondetect results. The reporting limits are less than ADEC criteria for parent sample 16NEC-S08-SS-064 so the affect is minimal. 1-methylnaphthalene and naphthalene have LODs greater than ADEC criteria for sample 16NEC-S08-SS-002.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

RRO - n-triacontane was less than criteria in sample 16NEC-S08-SS-051. DRO - o-Terphenyl was less than criteria in sample 16NEC-S08-SS-051, 16NEC-S08-SS-059, and 16NEC-S08-SS-060. PAH – Surrogates were lower than QC criteria in the following samples: 16NEC-S08-SD-0539, 16NEC-S08-SD-061, 16NEC-S08-SD-063, 16NEC-S08-SS-001, 16NEC-S08-SS-002, 16NEC-S08-SS-003, 16NEC-S08-SS-005, 16NEC-S08-SS-055, and 16NEC-S08-SS-064

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

RRO, DRO, and PAH – The samples were qualified QL indicating a low bias.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

RRO and DRO - Data quality was minimally affected since the results were significantly less than site specific criteria. PAH – All results were nondetect with a low bias; however, the reporting limits were less than associated criteria with the exception of 1-methylnaphthalene and naphthalene for soil samples.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):

Water and Soil

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No volatile samples were submitted with this SDG.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

iii. All results less than PQL?

☐ Yes ☑ No ☑ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Primary 16NEC-S08-SD-050 Duplicate 16NEC-S08-SD-0509 Primary 16NEC-S08-SD-053 Duplicate 16NEC-S08-SD-0539 Primary 16NEC-S08-SS-058 Duplicate 16NEC-S08-SS-0589 Primary 16NEC-S08-SS-064 Duplicate 16NEC-S08-SS-0649

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Sample result detections were evaluated. All sample results were within the RPD of 50%.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was not affected.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No blanks were submitted with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. **<u>Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)</u>**

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Qualifiers are defined in the DQA

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/17/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609742
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**
   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☐ No ☑ NA (Please explain.) Comments

   No samples were transferred.

2. **Chain of Custody (CoC)**
   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. **Laboratory Sample Receipt Documentation**
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Cooler 5th Avenue
   Temperature blank – 2.5°C
   Cooler Temperature – 1.2°C

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

There were no discrepancies noted.

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability was not affected.

4. **Case Narrative**

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☐ Yes ☐ No ☐ NA (Please explain.) Comments

All discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

No corrective actions were documented.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. **Samples Results**

a. Correct analyses performed/reported as requested on COC?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The laboratory did not analyze samples by the requested method of SW8270SIM, the lab analyzed samples by method SW8270D.

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

c. All soils reported on a dry weight basis?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016) for soil and site specific criteria for sediment.

PAH – The soil LODs for analytes 1-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, dibenzo(a,h)anthracene, and naphthalene were greater than ADEC criteria in one or more samples. The laboratory did not analyze samples by the requested method of SW8270SIM which contributed to these elevated reporting limits.

e. Data quality or usability affected?

Comments:

Data quality and usability is affected due to the reporting limit. Majority of samples needed dilution due to the presence of elevated levels of non-target analytes and extracts that were viscous. Clean-up of the extract was performed within the scope of the method.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The method blank had detections for DRO and RRO.

iii. If above PQL, what samples are affected?

Comments:

Samples within 5 times the method blank detection were qualified.

No samples affected.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples affected.

v. Data quality or usability affected? (please explain)

Comments:

Data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No metals were submitted with this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

All LCS and LCSD were within QC criteria MS/MSD anomalies: DRO – (QC Batch KWG1607742) The MS and MSD were greater than QC criteria. RRO – (QC Batch KWG1607742) The MS and MSD were less than QC criteria. DRO/RRO – (QC Batch KWG1607743) The MS and MSD were less than QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

LCS/LCSD anomaly: DRO/RRO – The LCS/LCSD (QC Batch KWG1607743) RPD was greater than 20%. MS/MSD anomaly: All MS/MSD RPDs were within criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

LCS/LCSD anomaly: DRO/RRO –Samples 16NEC-S08-SD-036, 16NEC-S08-SD-0369, 16NEC-S08-SD-040, and 16NEC-S08-SD-041 were affected by the LCS/LCSD RPD. MS/MSD anomaly: DRO/RRO -The parent samples were not affected.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

LCS/LCSD RPD: DRO/RRO –samples were qualified QN MS/MSD anomaly: DRO/RRO - The parent sample was not qualified either because the dilution factor was greater than 5 or the spike amount was less than the parent sample concentration.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

LCS/LCSD RPD: DRO/RRO – Data is affected minimally since the LCS and LCSD were within the required QC parameters. MS/MSD anomaly: DRO/RRO – Data quality and usability was not affected.

c. Surrogates – Organics Only
   i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

PAH – Surrogates were lower than QC criteria in the following samples: 16NEC-S08-SD-014 and 16NEC-S08-SS-028

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

PAH – The samples were qualified QL indicating a low bias.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

There is thought to be a spiking error for sample 16NEC-S08-SD-014, results were not rejected but are considered biased low. The results are nondetect and the reporting limits are orders of magnitude less than site specific criteria.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
   Water and Soil
   i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No volatile samples were submitted with this SDG.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

iii. All results less than PQL?

☐ Yes ☑ No ☑ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Primary 16NEC-S08-SS-018
Duplicate 16NEC-S08-SS-0189

Primary 16NEC-S08-SD-036
Duplicate 16NEC-S08-SD-0369

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$RPD\ (\%) = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All sample results were within the RPD of 50%.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was not affected.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No blanks were submitted with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Qualifiers are defined in the DQA

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/21/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609847
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**
   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   ☐ Yes ☐ No ☑ NA (Please explain.) Comments

   No samples were transferred.

2. **Chain of Custody (CoC)**
   a. CoC information completed, signed, and dated (including released/received by)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. **Laboratory Sample Receipt Documentation**
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

   ☐ Yes ☑ No ☐ NA (Please explain.) Comments

   Cooler Mr. Goodbar
   Temperature blank – 1.7°C
   Cooler Temperature – -0.9°C

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   ☑ Yes ☐ No ☐ NA (Please explain.) Comments

   All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The temperatures below the acceptable range were listed.

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected since the samples were not frozen upon receipt at the laboratory.

4. <u>Case Narrative</u>

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

AK102 – Surrogate n-triacontane exceeded in the closing CCV. Samples were re-analyzed yielding a similar result. The results potentially could be biased high. All discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

AK102 - Samples were re-analyzed yielding a similar result as stated above.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. <u>Samples Results</u>

a. Correct analyses performed/reported as requested on COC?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The laboratory did not analyze samples by the requested method of SW8270SIM, the lab analyzed samples by method SW8270D.

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

c. All soils reported on a dry weight basis?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016) for soil and site specific criteria for sediment.

PAH – The soil LODs for analytes 1-methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and naphthalene were greater than ADEC criteria in one or more samples. The laboratory did not analyze samples by the requested method of SW8270SIM which contributed to these elevated reporting limits.

e. Data quality or usability affected?

Comments:

Data quality and usability is affected due to the reporting limit; however, all LODs were less than site specific criteria. Majority of samples needed dilution due to the presence of elevated levels of non-target analytes and extracts that were viscous. Clean-up of the extract was performed within the scope of the method.

6. <u>QC Samples</u>

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO– The method blank had detections for DRO.

iii. If above PQL, what samples are affected?

Comments:

Samples within 10 times the method blank detection were qualified.

DRO – 16NEC-S08-SS-069

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Sample was qualified B.

v. Data quality or usability affected? (please explain)

Comments:

Data quality and usability were not affected since the bias was high and the result is less than ADEC criteria.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No metals were submitted with this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

All LCS and LCSD were within QC criteria

MS/MSD anomalies:
DRO/RRO – The MS and MSD percent recoveries were less than QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All LCS/LCSD and MS/MSD RPDs were within criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

MS/MSD anomaly:
DRO/RRO -The parent sample was not affected since the spike amount was less than the parent sample concentration.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

MS/MSD anomaly:
DRO/RRO - The parent sample was not qualified either because the dilution factor was greater than 5 or the spike amount was less than the parent sample concentration.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

MS/MSD anomaly:
DRO/RRO – Data quality and usability was not affected.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

Surrogates were evaluated in samples with dilution factors less than five. PAH – Surrogates were lower than QC criteria in the following sample: 16NEC-S08-SD-038 Surrogates were higher than QC criteria in the following samples: 16NEC-S08-SS-013 and 16NEC-S08-SS-0139

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

PAH – The samples were qualified QL indicating a low bias or QH indicating a high bias.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality is minimally affected. Results were either significantly greater than screening criteria or significantly less than criteria. The reporting limits were less than screening limits.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
<u>Water and Soil</u>

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No volatile samples were submitted with this SDG.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

iii. All results less than PQL?

☐ Yes ☑ No ☑ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Primary 16NEC-S08-SS-013 Duplicate 16NEC-S08-SS-0139 Primary 16NEC-S08-SD-037 Duplicate 16NEC-S08-SD-0379

iii. Precision – All relative percent differences (RPD) less than specified DQOs?
(Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☑ No ☐ NA (Please explain.) Comments

PAH – 16NEC-S08-SS-013/16NEC-S08-SS-0139. The following analytes had an RPD greater than 50%: 1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, and fluorene. Sample results were qualified QN.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was minimally affected since the primary and duplicate were either both greater than or less than the ADEC criteria and site specific criteria.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No blanks were submitted with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Qualifiers are defined in the DQA

Laboratory Data Review Checklist

Completed by:	Angela DiBerardino		
Title:	Project Chemist	**Date:**	12/21/2016
CS Report Name:	Northeast Cape Groundwater Report	**Report Date:**	March 2017
Consultant Firm:	Jacobs Engineering Group Inc.		
Laboratory Name:	ALS, Kelso, WA.	**Laboratory Report Number:**	K1609852
ADEC File Number:	475.38.013	**ADEC RecKey Number:**	Haz ID: 25681

1. **Laboratory**
   a. Did an ADEC CS-approved laboratory receive and perform all of the submitted sample analyses?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

Samples were shipped to ALS in Kelso, WA.

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples were transferred.

2. **Chain of Custody (CoC)**
   a. CoC information completed, signed, and dated (including released/received by)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

   b. Correct Analyses requested?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

3. **Laboratory Sample Receipt Documentation**
   a. Sample/cooler temperature documented and within range at receipt (4° ± 2° C)?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

Cooler Mr. Goodbar
Temperature blank – 1.7°C
Cooler Temperature – -0.9°C

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received properly preserved.

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All samples were received in good condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

The temperatures below the acceptable range were listed.

e. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected since the samples were not frozen upon receipt at the laboratory.

4. **Case Narrative**

a. Present and understandable?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

b. Discrepancies, errors, or QC failures identified by the lab?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

AK102 – Surrogate o-terphenyl in the CCV was outside criteria of ±20% but within 60-120%. .

All discrepancies and anomalies are discussed in the relevant sections below.

c. Were all corrective actions documented?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

No corrective actions were necessary

d. What is the effect on data quality/usability according to the case narrative?

Comments:

All data is usable, see the relevant sections for effects on data quality.

5. **Samples Results**

a. Correct analyses performed/reported as requested on COC?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The laboratory did not analyze samples by the requested method of SW8270SIM, the lab analyzed samples by method SW8270D.

b. All applicable holding times met?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

c. All soils reported on a dry weight basis?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

d. Are the reported PQLs less than the Cleanup Level or the minimum required detection level for the project?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

The LODs for nondetect sample results were compared to 18 AAC 75 ADEC Table B1 and B2. Most Stringent of Under 40 Inch Zone Human Health And Migration to Groundwater (ADEC 2016) for soil and site specific criteria for sediment. PAH – The soil LODs for analytes 1-methylnaphthalene, benzo(a)pyrene, dibenzo(a,h)anthracene, and naphthalene were greater than ADEC criteria in one or more samples. The laboratory did not analyze samples by the requested method of SW8270SIM which contributed to these elevated reporting limits.

e. Data quality or usability affected?

Comments:

Data quality and usability is affected due to the reporting limit; however, all LODs were less than site specific criteria. Majority of samples needed dilution due to the presence of elevated levels of non-target analytes and extracts that were viscous. Clean-up of the extract was performed within the scope of the method.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. All method blank results less than PQL?

☐ Yes ☑ No ☐ NA (Please explain.) Comments

DRO/RRO – The method blank had detections for DRO and RRO.

iii. If above PQL, what samples are affected?

Comments:

Samples within 5 times the method blank detection were qualified. No samples affected.

iv. Do the affected sample(s) have data flags and if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No samples affected.

v. Data quality or usability affected? (please explain)

Comments:

Data quality and usability were not affected.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No metals were submitted with this SDG.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

All LCS and LCSD were within QC criteria MS/MSD anomalies: DRO/RRO – The MS and MSD percent recoveries were less than QC criteria.

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits? And project specified DQOs, if applicable. RPD reported from LCS/LCSD, MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

☑ Yes ☐ No ☐ NA (Please explain.) Comments

All LCS/LCSD RPDs were within criteria. MS/MSD RPD anomaly: The DRO and RRO RPD was greater than 20%.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

MS/MSD Accuracy: DRO/RRO -The parent sample was not affected since the spike amount was less than the parent sample concentration. MS/MSD Precision: 16NEC-S08-SD-070

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

MS/MSD anomaly: DRO/RRO - The parent sample 16NEC-S08-SD-070 was qualified QN.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

MS/MSD anomaly: DRO/RRO – Data quality and usability was minimally affected since the DRO and RRO concentration were either significantly less than or greater than the site specific criteria.

c. Surrogates – Organics Only

i. Are surrogate recoveries reported for organic analyses – field, QC and laboratory samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits? And project specified DQOs, if applicable. (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

☐ Yes ☑ No ☐ NA (Please explain.) Comments

Surrogates were evaluated in samples with dilution factors less than five. PAH – Surrogates were lower than QC criteria in the following sample: 16NEC-S08-SD-070 and 16NEC-S08-SD-074.

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

PAH – The samples were qualified QL indicating a low bias.

iv. Data quality or usability affected? (Use the comment box to explain.)

Comments:

Data quality is minimally affected. Results and reporting limits were either significantly less than site specific criteria.

d. Trip blank – Volatile analyses only (GRO, BTEX, Volatile Chlorinated Solvents, etc.):
<u>Water and Soil</u>

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No volatile samples were submitted with this SDG.

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

☐ Yes ☐ No ☑ NA (Please explain.) Comments

iii. All results less than PQL?

☐ Yes ☑ No ☑ NA (Please explain.) Comments

iv. If above PQL, what samples are affected?

Comments:

v. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

e. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

No duplicates were analyzed with this SDG but the project frequency was met.

ii. Submitted blind to lab?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

NA

iii. Precision – All relative percent differences (RPD) less than specified DQOs? (Recommended: 30% water, 50% soil)

$$RPD\ (\%) = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐ Yes ☐ No ☑ NA (Please explain.) Comments

Duplicates not analyzed with this SDG.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

Data quality and usability was not affected.

f. Decontamination or Equipment Blank (If not used explain why).

☐ Yes ☐ No ☑ NA (Please explain.) Comments

No blanks were submitted with this SDG

i. All results less than PQL?

☐ Yes ☐ No ☑ NA (Please explain.) Comments

NA

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Data quality or usability affected? (Please explain.)

Comments:

Data quality and usability were not affected.

7. <u>Other Data Flags/Qualifiers (ACOE, AFCEE, Lab-Specific, etc.)</u>

a. Defined and appropriate?

☑ Yes ☐ No ☐ NA (Please explain.) Comments

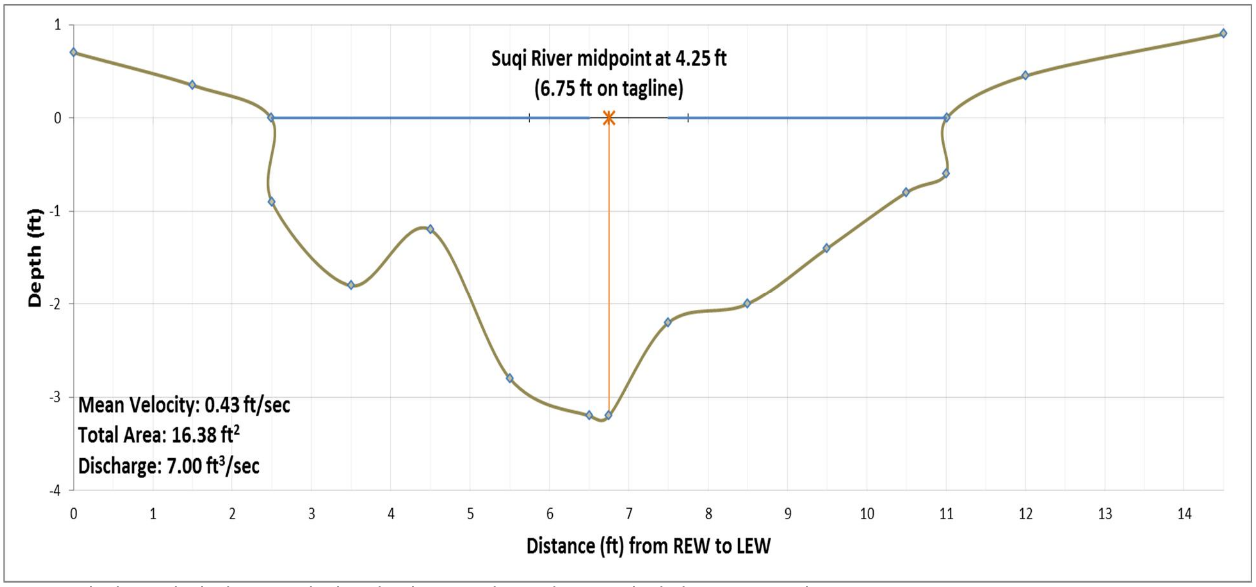
Qualifiers are defined in the DQA

ATTACHMENT B-4
Laboratory Deliverables

Provided electronically on CD

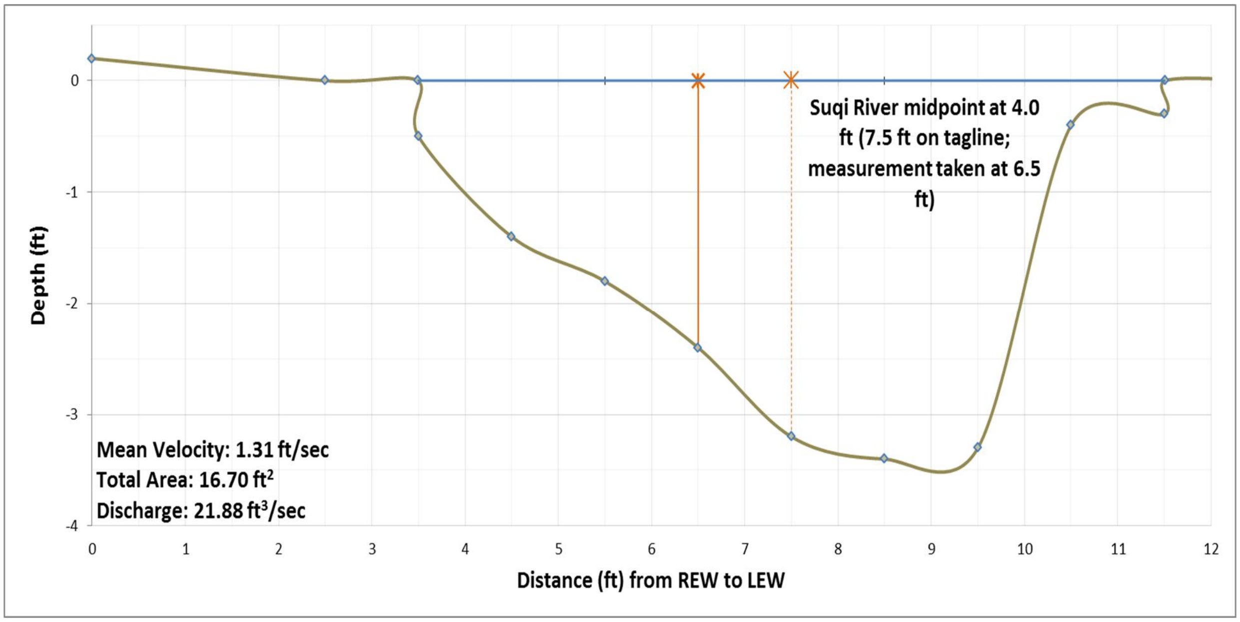
APPENDIX C
Suqitughneq River Cross-Sections

C-1.1. S29-001 Cross Section



Mean Velocity and Discharge calculated using Marsh McBirney Calculation; see Section 6.3.2.
Proportion of depth, depth at center point (ft), velocity (ft/sec):
(1) 0.2, 2.56, 0.40; (2) 0.4, 1.92, 0.45; (3) 0.8 0.64, 0.41.
Notes: Rocky streambed; sides silty with organics.

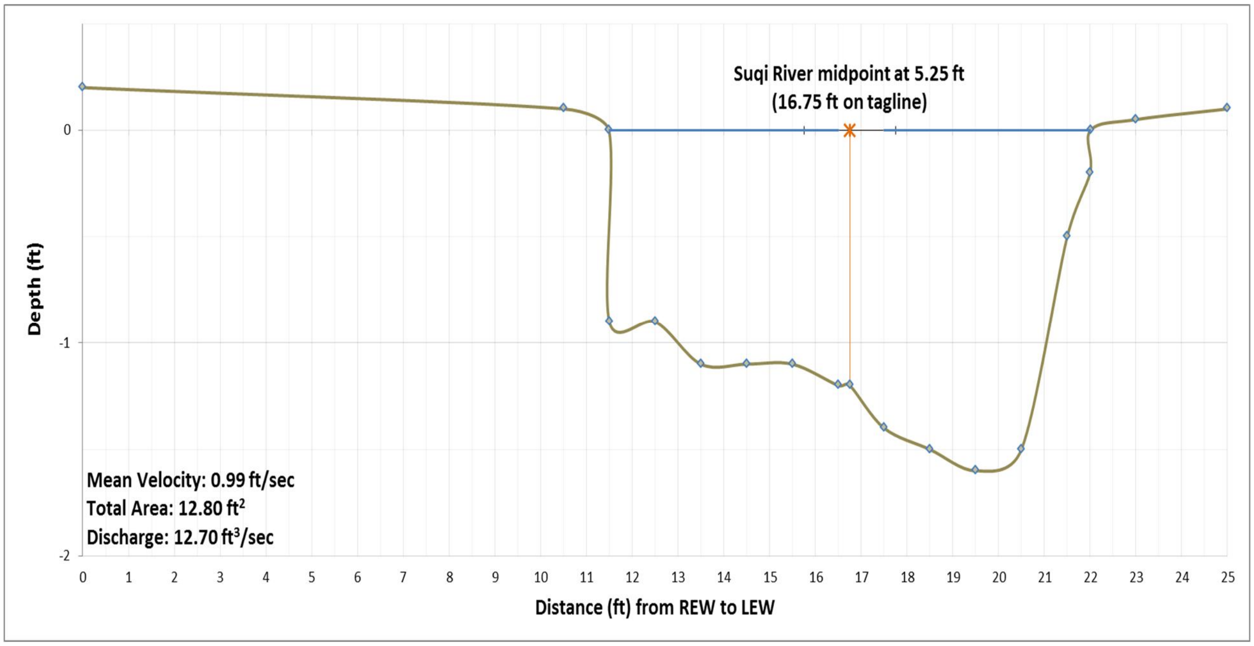
C-1.2. S29-002 Cross Section



Mean Velocity and Discharge calculated using Marsh McBirney Calculation; see Section 6.3.2.
Proportion of depth, depth at center point (ft), velocity (ft/sec):
(1) 0.2, 1.92, 0.60; (2) 0.4, 1.44, 1.32; (3) 0.8 0.48, 2.0.
Notes: Due to eddy at center point of stream, measurement taken 1 ft from center point.
Smooth gravel and silt covered streambed.

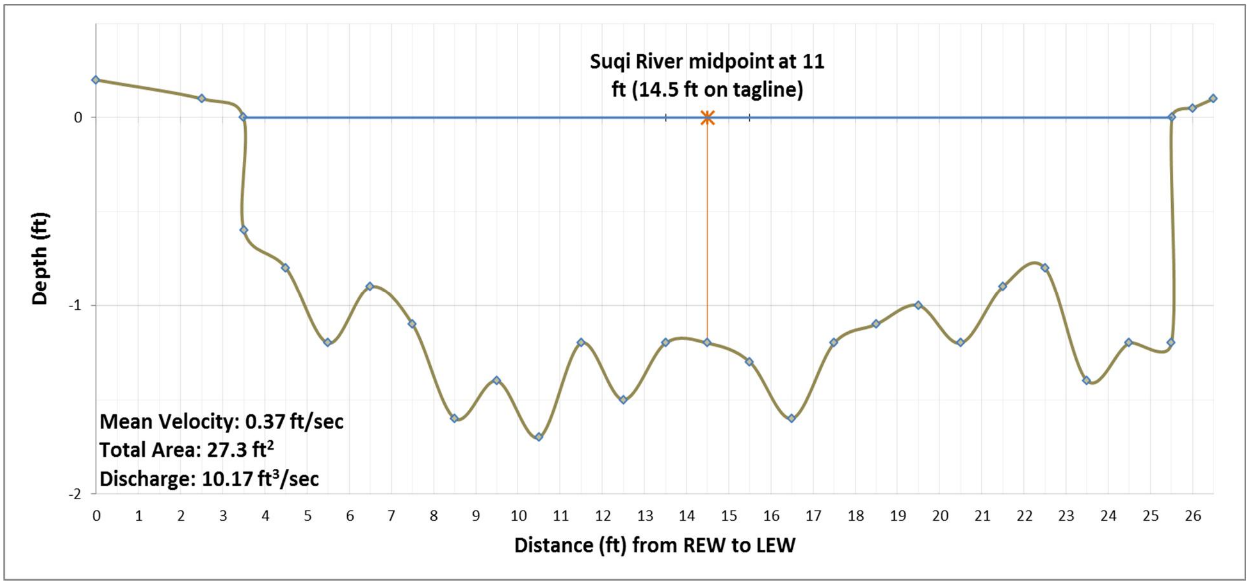
S29-002 - 16 August 2016; 1632 hours.
Cross section S29-002. Facing east, flow to the west.

C-1.3. S29-003 Cross Section



Mean Velocity and Discharge calculated using Marsh McBirney Calculation; see Section 6.3.2.
Proportion of depth, depth at center point (ft), velocity (ft/sec):
(1) 0.2, 0.96, 0.74; (2) 0.4, 0.72, 0.96; (3) 0.8 0.24, 1.31.
Notes: Boulder lined streambed.

C-1.4. S29-004 Cross Section



Mean Velocity and Discharge calculated using Marsh McBirney Calculation; see Section 6.3.2.
Proportion of depth, depth at center point (ft), velocity (ft/sec):
(1) 0.2, 0.96, 0.25; (2) 0.4, 0.72, 0.39; (3) 0.8 0.24, 0.46.
Notes: Boulder lined streambed.

S29-004 - 16 August 2016; 1524 hours.
Collecting depth measurements along the tag line at cross section S29-004. Facing northeast, flow to the northeast.

APPENDIX D
Field Documentation

Soil and Sediment Classifications at Site 8

Sample ID	Sample Start Depth	Sample End Depth	Depth Units	USGS Classification Code
16NEC-S08-SS-001	1.00	1.50	ft bgs	ML
16NEC-S08-SS-002	1.00	1.50	ft bgs	ML
16NEC-S08-SS-003	0.75	1.00	ft bgs	ML
16NEC-S08-SS-004	1.00	1.50	ft bgs	ML
16NEC-S08-SS-005	1.50	1.75	ft bgs	ML
16NEC-S08-SS-006	1.75	2.25	ft bgs	ML
16NEC-S08-SD-007	1.75	2.00	ft bgs	ML
16NEC-S08-SS-008	1.25	1.75	ft bgs	ML
16NEC-S08-SD-009	1.75	2.25	ft bgs	ML
16NEC-S08-SD-010	1.50	2.00	ft bgs	ML
16NEC-S08-SS-011	1.50	2.00	ft bgs	ML
16NEC-S08-SS-012	1.75	2.25	ft bgs	ML
16NEC-S08-SS-013	1.00	1.50	ft bgs	ML/SW
16NEC-S08-SD-014	1.50	2.00	ft bgs	ML
16NEC-S08-SD-015	2.00	2.50	ft bgs	ML
16NEC-S08-SD-016	1.50	2.00	ft bgs	ML
16NEC-S08-SD-017	1.50	2.00	ft bgs	ML
16NEC-S08-SS-018	1.50	2.00	ft bgs	ML
16NEC-S08-SS-019	2.00	2.50	ft bgs	ML
16NEC-S08-SS-020	1.25	1.50	ft bgs	SW
16NEC-S08-SS-021	1.00	1.50	ft bgs	ML/SW
16NEC-S08-SS-022	1.00	1.50	ft bgs	ML
16NEC-S08-SS-023	2.00	2.50	ft bgs	ML
16NEC-S08-SS-024	1.50	2.50	ft bgs	ML/SW
16NEC-S08-SD-025	0.50	1.00	ft bgs	ML
16NEC-S08-SD-026	1.00	1.25	ft bgs	ML
16NEC-S08-SS-027	1.50	2.00	ft bgs	ML
16NEC-S08-SS-028	2.00	2.50	ft bgs	ML
16NEC-S08-SD-029	1.50	2.00	ft bgs	ML
16NEC-S08-SS-030	1.00	1.50	ft bgs	SW
16NEC-S08-SS-031	1.00	1.50	ft bgs	ML
16NEC-S08-SS-032	1.00	1.50	ft bgs	ML
16NEC-S08-SD-033	1.00	1.50	ft bgs	ML
16NEC-S08-SD-034	1.50	2.00	ft bgs	ML
16NEC-S08-SD-035	1.50	2.00	ft bgs	ML
16NEC-S08-SD-036	1.50	2.00	ft bgs	ML
16NEC-S08-SD-037	2.00	2.50	ft bgs	ML
16NEC-S08-SD-038	1.50	2.00	ft bgs	ML
16NEC-S08-SS-039	2.00	2.50	ft bgs	ML
16NEC-S08-SD-040	2.00	2.50	ft bgs	ML
16NEC-S08-SD-041	2.00	2.50	ft bgs	ML
16NEC-S08-SD-042	1.50	2.00	ft bgs	ML
16NEC-S08-SD-043	1.50	2.00	ft bgs	ML

Soil and Sediment Classifications at Site 8

Sample ID	Sample Start Depth	Sample End Depth	Depth Units	USGS Classification Code
16NEC-S08-SS-044	2.00	2.50	ft bgs	ML
16NEC-S08-SS-045	1.25	1.75	ft bgs	ML
16NEC-S08-SS-046	1.50	1.75	ft bgs	ML
16NEC-S08-SS-047	1.00	1.50	ft bgs	ML
16NEC-S08-SS-048	1.00	1.50	ft bgs	ML
16NEC-S08-SD-049	1.25	1.75	ft bgs	ML
16NEC-S08-SD-050	0.90	1.25	ft bgs	ML
16NEC-S08-SS-051	1.40	1.75	ft bgs	ML
16NEC-S08-SD-052	1.50	2.00	ft bgs	ML
16NEC-S08-SD-053	1.00	1.50	ft bgs	ML
16NEC-S08-SD-054	1.50	2.00	ft bgs	ML
16NEC-S08-SS-055	1.70	2.10	ft bgs	ML
16NEC-S08-SD-056	1.75	2.25	ft bgs	ML
16NEC-S08-SS-057	1.50	2.00	ft bgs	ML
16NEC-S08-SS-058	1.50	2.00	ft bgs	ML
16NEC-S08-SS-059	1.50	1.75	ft bgs	ML
16NEC-S08-SS-060	1.50	1.80	ft bgs	ML
16NEC-S08-SD-061	1.70	2.20	ft bgs	ML
16NEC-S08-SD-062	1.50	2.00	ft bgs	ML
16NEC-S08-SD-063	1.00	1.66	ft bgs	ML
16NEC-S08-SS-064	1.30	2.00	ft bgs	ML
16NEC-S08-SD-065	1.50	1.75	ft bgs	ML
16NEC-S08-SD-066	1.50	1.75	ft bgs	ML
16NEC-S08-SS-067	1.30	2.00	ft bgs	ML
16NEC-S08-SD-068	1.50	2.00	ft bgs	ML
16NEC-S08-SS-069	0.50	1.00	ft bgs	SW
16NEC-S08-SD-070	1.50	2.00	ft bgs	ML
16NEC-S08-SS-071	1.50	2.00	ft bgs	ML
16NEC-S08-SS-072	1.00	1.50	ft bgs	SW
16NEC-S08-SS-073	2.00	2.50	ft bgs	ML
16NEC-S08-SD-074	1.00	1.50	ft bgs	ML
16NEC-S08-SD-075	1.50	2.00	ft bgs	ML

ft - feet
bgs - below ground surface
USGS - U.S. Geological Survey
SS - surface soil
ML - inorganic silt & very fine sand, silty or clayey fine sands, clayey silt with slight plasticity
SD - sediment
SW - well-graded sand, gravelly sand, little or no fines

NEC 1 of 2

2016

Hollee McLean

Rite in the Rain®

ALL-WEATHER

ENVIRONMENTAL

FIELD BOOK

№ 550

Ø5DK87Ø2

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H04-001

8/4/2016 - 8/24/2016

Rite in the Rain
ALL-WEATHER WRITING PAPER

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CONTENTS

Reference Page Index

CONTENTS

PAGE	REFERENCE	DATE

Location NORTHEAST CAPE (NEC) / Nome Date 8/4/2016

Project / Client 05DK8702 / USACE & ECC

Nome

0715	Pick up remaining items from Jacobs office
0830	Arrive at airport
0955	Depart for Nome.
	Prepare SPAS on plane.
1130	Arrived in Nome.
1200	Taxi to Stampede Auto.
	Performed vehicle inspection.
1215	Arrive at BSNC Building. Receive access to office space.
1300	Arrive at old Alaska Rooms
1345	Receive first shipment from Alaska Air Cargo.
1645	Complete ~~transfer~~ of all gear from AK Air Cargo to office space.
	Start unpacking boxes.
1930	EOD

[illegible]

Summary: Mob to Nome

Started preparing office & equipment.

Location NEC / Nome Date 8/5/2016

Project / Client 05DK8702 / USACE & ECC Nome

0730 Arrive at BSNC office space.
unpack coolers & prepare sample kits.

1130 Receive call that ECC (Stan Seegars & Kristopher Reidt) & AK Total Safety (Chris Carson) arrived in Nome. Transported ECC & AKT.S. to vehicle rental & Ak Rooms.

1230 Continue prepping sample kits.

1530 Drop gear at ~~Bearing~~ Air. HM 8/6
Arranged 8 AM departure.
Discussed w/ pilot likelihood of flight and best time of day to fly

1700. Review SPAs & HSP

1745 Drop additional gear at ~~Bearing~~ Air HM 8/6 because elected to upgrade Navajo flight to larger aircraft

1815 EOD

Hollee McLean

Summary: ECC & TS arrive in Nome
- continue to prepare MOB to NEC.

Location NEC / Nome Date 8/6/2016

Project / Client 05DK8702 / USACE & ECC

~~Arrive at Bearing Air~~ HM 8/6

0710 Hold Safety Tailgate:
weather: cloudy, poor visibility (1/4 mile vis. in Savoonga), rain, 50°F's
Personnel: Stan Seegars (SS)
Kristopher Reidt (KR)
Chris Carson (CC)
Hollee McLean (HM)
Concerns: driving - pedestrians & atVs w/o helmet
weather delays likely (spoke w/ Bearing Air)
Obj: continue kit prep
Go through all equipment
Review schedule
Review WP & SPAs
(assuming no air travel, will re-assess at Bearing Air)
PPE: Modified Level D appropriate for task

0750 Depart for ~~Bearing~~ Air. HM 8/6

0800 Arrive at Bering Air.

0810 Briefed at Bering Air. $\boxed{\text{Stand down}}$ (from Pilot Kevin)
No one has been to runway this year; need 3 mile visibility so they can assess the runway and 1000 ft ceiling.

0900 Managed ice, reviewed WP, schedule, # of sample jars, and equipment (flow meter).

Location NEC/ Nome Date 8/6/2016

Project / Client 05DK8702 / USACE & ECC

Nome

1015 ECC & Total Safety mob to Bering Air; will try to perform dry set-up of tent in hangar to ensure comfort w/ & knowledge of process.

1045 Mob to Bering Air to set up emergency shelter. Model # H0004-067 weatherport

1315 completed set up and take down of emergency shelter.

1330 Procure additional items from hardware store.

1345 Talked with Bering Air. Aiming for 9 AM tomorrow. Someone flying to Savoonga today; should help w/ determining conditions.

1450 Calling EOD

~~Hello mohan~~

Summary: Weather Day
-Practiced erecting emergency Shelter

Location NEC / Nome Date 8/7/2016

Project / Client 05DK8702 / USACE & ECC

Nome

0730 Mob to office to check ice and look for 2nd copy of WP.

0733 WP located in truck; will check ice later.

0810 Safety Tailgate:
Personnel: SS, KR, CC, HM
PPE: Modified Level D
Wx: Nome - Sunny w/ rains around noon.
NEC - overcast & foggy
Safety: Keep communication w/ Bering Air
Obj: set up shelter
site walk/ ride
well depths
- Performed a verbal group SPA w/ lessons learned for set-up for shelter.

0840 Mob to the Bering Air

0850 Discuss w/ Bering Air travel to NEC. Hold off a few hours.

0852 Mob to office; manage ice.

0920 Mob to creek to test flow meter. Additional practice/tutorial and manual are necessary.

1045 Mob to Bering Air. Check flight status. Ground fog near Savoonga. They are doing a "test flight" to determine if they can see the island.

Location NEC / Nome   Date 8/7/2016

Project / Client OSDK8702 / USACE & ECC

Nome

1115 Make decision to go ahead.
Will start loading plane. First flight will keep plane on ground to set-up camp. Likely will not have time for groundwater measurements.

1200 Reviewed Process / Procedure for Tsunami while on island w/o alert system.
Completed SPA.

1205 Watched video tutorials for flow meter.
Team feels much more prepared for task

1405 Told we are not flying.

1450 Practice stream flow measurements.

1630 Complete field practice w/ stream flow meter.
Downloaded test data.
Changed some settings on meter.

1720 Return to field, continue testing stream flow meter.

1900 Transfer data to laptop.

1930 EOD

Summary:
Weather standown
Acquainted selves w/ flowmeter

Location NEC / Nome   Date 8/8

Project / Client OSDK8702 / USACE & ECC

Nome/NEC

0800 Call Bering Air; meet at 0900.

0810 Safety Tailgate:
WX: Partly cloudy the overcast & cloudy
NEC similar but 10°F cooler
Personnel: SS, KR, CC, HM
Safety: one aircraft will stay w/ us
Obj: set up camp
site visit
well depths
PPE: Modified Level D

0900 Arrive at Bering Air.

0930 Depart on Navajo w/ CASA to follow.
Navajo pilot - Stan
Casa pilot - Kyle

1020 Arrive at NEC. Test satellite phone. Unpack Navajo.

1040 Casa arrives. unpack casa.
Start setting up emergency shelter.

1100 Set up emergency shelter

1325 Break for lunch.
Coordinates for Basecamp from Stan's GPS
E 0601636 UTMs
N 7023535

HM

Location NEC/ Nome Date 8/8

Project / Client 0SDK8702/ USACE & ECC

NEC-MOC

1500 Calibrate PID 100 ppm Isobutylene
S/N 910685 Lot # 16-5516
Zero Cal = 0.0 ppm
Span cal = 100.0 ppm

1510 SS & CC set-up weather station & check beach
KR & HM mob to MOC to collect
well depths.

Time	Well ID	SU (ft)	DTW (ft) BTOC ~~Depth to GW (ft)~~	TD (ft) BTOC	PID
1534	MW10-1	2.21	5.04	11.0	0.0
1550	14MW07	(-0.25)	25.73	33.21	0.0

1610 Having difficulty locating wells.
Discussing plan forward.
SS, KR, CC, & HM locate all wells; record depths tomorrow.

1645 Mob from MOC to shelter.

1705 Load Navajo.
According to pilot Stan: 2 mi vis & 500' ceiling
for uninstrumented approach. company standard.
~~May be "flexible" if visibility is good at far away.~~ HM 8/8

1715 Depart NEC for Nome; saw ATVers on beach.

1801 Arrive in Nome.
Discussed w/ Bering Air future flights.
Will call tomorrow at 8 AM.

Location NEC/ Nome Date 8/8

Project / Client 0SDK8702/ USACE & ECC

Nome

1816 Mob to Old Alaska Rooms.

1830 Call K. Maher to check-in.

Daily Summary:
- Mob to NEC for first time
- casa departed; Navajo remained on standby
- Set up weather shelter & weather station
- Located all MWs @ MOC
- Performed site walk.

Hollee McFann

Location NEC/Nome Date 8/9

Project / Client 05DK8702 / USACE & ECC

Nome

0800 Call Bering Air, weather delay.

0805 Safety Tailgate:

personnel: SS, KR, CC, HM

PPE: Modified Level D

WX: overcast with showers, 55°F-59°F in Nome

safety: Non-Project personnel, wind, wildlife

Objectives: survey, GW depths, sample wells

0930 Mob to get ice. Prepare for 11AM departure.

0945 Mob to Bering Air. Discuss with pilot Stan about flying. We will try to go after surveyor arrives.

1020 Received brief from David olsen. The plane will stay on the grand on stand-by.

Scott from ECO-Land arrives. Hold meeting for preparation of today's activities.

1030 David olsen states weather is deteriorating. We will wait on the ground for better weather.

1100 Call "No Flight" for now.

1238 Conference call with Kevin Maher. Discussed weather. Concern about local/visitor theft. Zero exposure on our end. Keep following the plan & check in.

Page out of order

Location NEC/Nome Date 8/10

Project / Client 05DK8702 / USACE & ECC

NEC-MOC

Well ID	Time	Stick up (ft)	DTW (ft) BTOC	DTW (ft) BGS	Headspace PID (ppm)
17MW-1	1234	(-0.15)	12.15	HM 8/14 ~~12.0~~ 12.3	0.2
14MW01	1230	(-0.15)	15.65	15.8	12.6
14MW02	1227	(-0.30)	10.50	10.80	14.0
22MW2	1205	(-0.45)	27.57	28.02	0.1
14MW03 •	1222	(-0.2)	12.05	HM 8/14 ~~12.85~~ 12.25	37.0
20MW-1	1202	(-0.15)	22.60	22.~~75~~ HM 8/14 45	0.0
14MW04	1219	(-0.48)	3.22	3.~~74~~ HM 8/14	3.1
MW88-10 •	1200	(-0.35)	~~20.64~~ HM 8/10 20.69	HM 8/14 ~~20.34~~ 21.04	0.3
• MW88-1	1153	(-0.15)	16.94	HM 8/14 ~~16.79~~ 17.09	0.7
14MW07	1156	(-0.25)	25.63	15.88	0.10
14MW05	1215	(-0.52)	3.10	HM 8/14 ~~2.58~~ 3.62	70.2
MW88-3	1149	(0.2)	12.32	HM 8/14 ~~11.12~~ 12.52	11.0
26MW1	1210	~~(-0.2)~~ (-0.4) HM 8/10	~~12.32~~ HM 8/10 34.96	HM 8/14 ~~34.56~~ 35.36	HM 8/14 ~~0.0~~ 0.3
14MW06	1144	(-0.50)	3.47	3.97	33.6
MW10-1	1140	1.20	5.18	2.98	0.0

Location NEC/Nome Date 8/9/2016

Project / Client OSDK8702/ USACE & ECC Nome

1310 Calling day as weather day.

HolleeMcLean

Location NEC/ Nome Date 8/10/2016

Project / Client O5DK8702 / USACE & ECC Nome

0800 Call Bering Air. Break in the weather. will try to depart ~1000.

0845 Safety Tailgate

Personnel: Stanley Seegars (SS)
Kristopher Reidt (KR)
Chris Carson (CC)
Hollee McLean (HM)

PPE: Modified Level D

WX: 50°Fs w/ showers

Safety: Personnel, wild life, may not have Standby aircraft

objectives: inventory camp, GW depths, sample GW MWs

0920 Mob to office to gather ice.

0925 Arrive at office and prepare ice

0935 Mob to Bering Air.

0940 Arrive at Bering Air; aircraft will remain onsite.

1016 Depart Bering Air.

1100 Arrive at NEC; perform quick check that all gear is still present.

1116 Calibrate PIDs

	S/N	Zero	Span
MiniRae 3000	410685	0.0 ppm	100.0 ppm
MiniRae 2000	11231	0.0 ppm	Failed

Location NEC / Nome Date 8/10

Project / Client 05DK8702 / USACE/ECC

NEC- MOC

1138 MOB to MOC to measure GW Depths

See pg 13

1345 Calibrate PID

S/N 11231 zero 0.0 ppm span 100

1350 Calibrate Turbidimeter

Lot # A6061

Turbidimeter 17396 - cal'd

check Std 6.86 Read 6.95

60.5 60.2

506 507

Turbidimeter 17212 - cal'd

check Std ~~6.86~~ 6.86 Reading 6.99

~~60.5~~ 8/10 56.9 55.7

~~506~~ 513 515

1500 All Mob to 14MW01. Sample well as a group at 1625

See sample form; issues w/ Turb 17396

1705 GAC filter approx 4 gal about (KR)

5 meters from 14MW01

1715 Mob to 14MW02 (cc & HM) 1817

See Sample form. will note on COC that one dissolved metals jar may not be fully acidified.

Collect DUP ~~1 vial broke while labeling.~~

1855 GAC filter approx. 4 gal (KR)

1915 Mob to shelter

Unpack gear & prepare for departure.

Location NEC / Nome Date 8/10

Project / Client 05DK8702 / USACE & ECC

NEC-MOC

1945 Depart for Nome

Perform sample sheet QC.

Prepare labels.

2034 Arrive in Nome.

2039 Pack out gear & samples.

2050 Arrive at office. Label samples & manage ice.

2135 Depart office after call to Kevin Maher

2145 Complete sample summary.

2215 Break for dinner

2230 Complete Sit Rep

2400 EOD

Daily Summary:

Sampled 2 wells

- 2 primary & 1 DUP.

Issues w/ turbidimeter & pump controller / battery.

- 16NEC-14MW01-WG @ 1625
- 16NEC-14MW02-WG(-9) @ 1817

Holly Madsen

Location NEC/Nome Date 8/11/2016

Project / Client 05DK8702 / USACE & ECC

Nome

0700 sample management.
Create chains
Pack coolers
800 call Bering Air. check in at 1000.
0930 List of items to bring back from
NEC:
Tape, PIDs & Batteries,
ziplocs, Trip Blank
To purchase: Battery from auto shop.
0945 MOB to AK Air cargo
#9357
907-563-3322
05DK8702
0955 Arrive at AK Air Cargo.
Ship samples Air way Bill # 027-4010-5785
1000 Call Bering Air. No travel today.
1100 Purchase additional Battery @ Car Quest.
1105 EOD
• Daily Summary: Shipped 2 coolers
COC #1 Almond Joy
COC #2 Mounds
AWB # 027-4010-5785

Hollee McLean

Location NEC / Nome Date 8/12/2016

Project / Client 05DK8702 / USACE & ECC.

Nome / NEC

0800 Call Bering Air; will try to depart at 930
0830 Safety Tailgate:
Personnel: Stan Seegars
Kris Reidt
Chris Carson
Hollee McLean
PPE: Modified Level D
WX: 54-61°F & showers in Nome, expect 40s°F in NEC.
Safety: Will not have standby aircraft.
Objectives: Sample at MOC
Eco-Land Survey cannot
make today's flight.
Mob most of remaining gear
because of travel on a King Air.
0850 Communicate w/ Kevin Maher. Sample
all wells 1-2' below DTW.
0855 Mob to office to gather gear.
0910 Arrive at Bering Air. Meet with pilot Kevin.
0920 Call KM. Target analytes are near top
of column. Will be drawing from surrounding
aquifer. 1-2' ~~bgs~~ DTW for all samples. HM 8/12
0935 Load onto King Air w/ pilot Kevin.
HM 8/12 ~~0940~~ 0946 Depart Nome for NEC (riding co-pilot).
~~Arrive in NEC~~ HM 8/12

Location NEC / Nome Date 8/12/2016

Project / Client 05DK8702 / USACE & ECC

Nome/NEC

0955 Received mid air report that ceiling in Savoonga dropped to 200'.

1025 could not make landing safely. Did not land. Return to Nome.

1056 Landed in Nome.

1100 Weather not expected to improve.

Summary:

- Attempted flight to NEC but could not land. weather stand-down.
- Need to check minimum weather requirements.

Hollee McLean

Location NEC / Nome Date 8/13

Project / Client 05DK8702 / USACE & ECC

Nome

0800 Call Bering Air; need to call back at 900.

0830 Safety Tailgate:

Personnel: Stanley Seegars (SS)
Kristopher Reidt (KR)
Christopher Carson (CC)
Hollee McLean (HM)

PPE: Modified Level D

WX: 53-65°F, overcast, showers (Nome)
40s - 50s °F

Safety: low cloud ceiling

Objectives: sample GW
Survey

0900 Call Bering Air. Discuss waiting one more hour to ensure weather holds. Bering Air wants team to be ready to go at 1000.

0925 Mob to office for ice & coolers.

0940 Arrive at Bering Air.

0945 Scott (Eco-Land) arrives at Bering Air. New personnel: Scott McClintock (SM)

1010 Depart Nome on Bering Air Navajo.

1054 Arrive at NEC

HM

Location NEC / Nome Date 8/13/2016

Project / Client 05DK8702 / USACE & ECC

NEC

1055 Mob survey gear, sample gear, & calibrate equipment. Safety brief w/ SM.

1108 Calibrate Turbidimeters

Check Readings:

Stds	17396	17212
6.86	6.52 NTU	6.79 NTU
60.5	59.2	59.95
506	509	512

calibrate PIDs (check)

	S/N	zero	100.0 ppm
1120	910685	0.0	100.0
1120	11231	0.0	100.0

1158 Mob to MOC

1205 Arrive at MW10-1

1221 start purging well

1254 Sample well MW10-1 & MS/MSD

See GW sampling form

Samplers: CC, HM

Sample ID: 16NEC-MW10-1-WG

1350 End sampling MW10-1

GAC Filter approximately 1.5 gallons

HM

Location NEC / Nome Date 8/13/2016

Project / Client 05DK8702 / USACE & ECC

NEC

1421 Collect equipment Blank

16NEC-10MW-1-~~DVS~~ DVW HM 8/13/2016

Sampler: CC, HM

- 6-40mL VOAs w/HCl VOCs, GRO SW8260, AK101
- 2-40mL VOAs Glycol SW8015
- 3-1L amber SW8270DSIM, SW8082 PAHs, PCBs
- 2-250mL amber w/ HCl DRO/RRO AK102/103
- 1-250mL HDPE w/HNO3 SW6020/7470 Diss. RCRA metals plus Mn, Ni, V, Zn

1440 Mob to camp for lunch.

1520 Return to MOC.

1545 Arrive at MW88-1

1553 Begin purge of well.

1628 Sample well MW88-1

16NEC-MW88-1-WG

Samplers: CC, HM

See GW sampling Form

1647 End sampling MW88-1

1700 GAC filter approximately 2 gallons.

1710 Visitors arrive to site.

3 people; 2 adults & 1 child

Eugene Tooley, Marie, & Ty. - used to work w/ Bristol.

Report of rabid fox. Boated in from Savoonga

HM

Location NEC/ Nome Date 8/13/2016

Project / Client 05DK8702 / USACE & ECC

NEC/Nome

1730 Mob to 14MW07

1746 Start purging 14MW07

1815 Sample 14MW07

16NEC-14MW07-WG

See GW sample form

Samplers: CC, HM

1832 End sampling 14MW07

1905 GAC filter approx 3 gallons

GAC filter approx 3 gallons Rinse water.

GAC filter approx 2 gallons alconox

GAC filter approx 2.5 gallons DI H_2O Rinse

2000 Pack Plane w/ Gear & samples.

2040 Depart NEC

2132 Arrive in Nome

2150 Transport gear & samples to office.

2230 ~~1036~~ HM 8/13/16 Return to old Alaska Rooms

EOD

Daily summary:

Survey for S29 & S08

HM

Location NEC/ Nome Date 8/13/2016

Project / Client 05DK8702/ USACE & ECC

Sampled 6 wells, collected 1 DUP, 1 MS/MSD, & 1 EB

1254 -	MW10-1	16NEC-MW10-1-WG	MS/MSD
1310 -	14MW06	16NEC-14MW06-WG(-9)	DUP
1628 -	MW88-1	16NEC-MW88-1-WG	
1644 -	14MW03	16NEC-14MW03-WG	
1815 -	14MW07	16NEC-14MW07-WG	
1829 -	MW88-10	16NEC-MW88-10-WG	
1421 -	EB	16NEC-10MW-1-DVW	

[signature]

Location NEC/Nome Date 8/14/2016

Project / Client 05DK8702 / USACE & ECC

Nome

0830 Safety Tailgate:

PPE: Modified Level D

Safety: weather & flying

WX: clear, 50-65 Nome

45-55, variable in NEC

Obj: Drive & fly

Collect samples

Prepare samples for shipment

0900 call Bering Air. weather hold.

~~0900 Mob to office.~~ HM 8/14

0900 Enter well depths from 8/10/2016 into spreadsheet

0930 Mob to office for sample management.

0932 Battery that did not work in field shows full charge after less than 1 hour. According to SS, after 5 min battery showed 70%.

1030 SS, KR, & CC mob to Bering Air for flight to NEC. HM stays behind to perform sample management. Prepare 5 coolers for shipment on 8/15/2016.

1530 Complete sample management. Return to Old Alaska Rooms to

Location NEC / Nome Date 8/14/2016

Project / Client 05DK8702 / USACE & ECC

Nome

review equipment rentals vs. purchases.

2140 Mob to office to label samples & prepare coolers & sample management.

2300 Depart for old AK Rooms. Complete EOD paperwork

2330 EOD

Daily Summary:

Sampled 4 wells @ MOC

@ 1422 17MW1

@ 1542 22MW2

@ 1737 26MW1

@ 1858 20MW-1

Packed 7 coolers for shipment to ALS on 8/15/2016

~~@1422 17M~~ HM 8/14/16

CoC # 3	Milky way
" 4	100 Grand
" 5	Snickers
" 6	Caramello
" 7	Butterfinger
" 8	Twix
" 9	Kit Kat

Hollee McLoan

Location NEC / Nome Date 8/15/2016

Project / Client OSDK8702 / USACE & ECC

Nome / NEC

0800 Mob to office to continue sample mgmt.

0830 SS & KR arrive at office to help pack coolers.

0905 Arrive at AK Air Cargo. Ship 7 coolers to ALS

0940 AWB# 027-4010-6113

Depart for Bering Air.

0945 Received call from KM.

Need to resample 14MW03.

will have to get glassware from lab.

Need filter from KM

14MW03 did not meet stability before sample collection.

1030 Load plane to NEC.

1123 Arrive in NEC. Plane remains on ground.

1150 Turbidimeter check S/N 17212

Check Std	Reading
6.86	6.77
60.5	58.9
506	509

All Turbidimeter checks okay

PID Calibrate check:

	Zero Cal	Span Cal
910685	0.0 ppm ✓	100.0 ppm. ✓

Location NEC/ Nome Date 8/15/2016

Project / Client OSDK8702 / USACE & ECC

NEC

1235 Mob to S29 to collect sediment, surface water flow. Samplers: SS & HM

Surface water (WS) at S29

2-1L amber	~~PAH~~	SW8270SIM
3-40ml VOA vial w/ HCl	BTEX	SW8260

Sediment (SD) at S29

2-8 oz amber	DRO/RRO	AK102/103
	PAH	SW8270SIM
	PCB	SW8082
	Metals As, Cr, Pb, & Zn	

Sample ID	Time	Date	Depth bgs	USCS
16NEC-S29-SD-010 1.5 ' H20	1310	8/15/2016	organics 0-1' SD collected 1-1.5'	saturated ML, Brown, Black ~~[illegible]~~ patches.
16NEC-S29-SD-008 0.5 ' H20	1350		organics 0-1' SD collected 1-1.5'	ML, grey-ish brown little organics
* 16NEC-S29-SD-005 1.5' H20 Collected sample 1 ft from stake	1420		Organics 0-0.5' 0.5-1' for SD.	ML, brown with organics. At 1.0 foot bgs, brought up angular cobble of 3" and gravel

Location NEC / Nome Date 8/15/2016

Project / Client 05DK8702 / USACE & ECC

NEC

Sample ID	Time	Date	Depth bgs	USCS
*16NEC-S29-SD-006 2.0 ' H_2O Organics 1.0 ' bgs	1445	8/15/2016	1.0- 2.0	ML, trace gravel, little organics. Brown cobbles & gravel @ 2' bgs
*16NEC-~~S28~~-SD-007 1.0' H_2O Organics 0.5 'bgs	1520		0.5 - ~~2.0~~ am 8/15 1.0	ML, little sand, little organics. Brown. Some Rust color.
16NEC-S29-SD-009 1.5' H_2O organics 1.9' bgs	1555		~~organi~~ 1.5- 2.0' bgs	ML, little sand (medium) damp. Little organics. Brown Some rust color. Strong odor
16NEC-S29-WS-004	1803			
16NEC-S29-SD-004 0.75' H_2O organics 0.75-1.75 Rocks @ 2' (boulders)	1810		1.5- 2; removed organics	SM, brown sand with silt and little gravel
16NEC-S29-~~SW~~ WS-003 MS/MSD	1910			
16NEC-S29-SD-003 & 16NEC-S29-SD-0039 H_2O 1.0' ~~bgs~~ am 1.5 'bgs boulders & cobbles ~~1.0~~	1925		0-1.0 feet organics SD Sample 1.0-1.5' bgs	1.0-1.~~8~~5 ML, some organics, brown, saturated. 1.25-1.5 SW, medium sand, no fines.

Location NEC / Nome Date 8/15/2016

Project / Client 05DK8702 / USACE & ECC

NEC/Nome

* Require re-survey :

S29-SD-005

S29-SD-006

S24-SD-007

S29-001 (8/16/2016)

~~808-054 (8/17/2016)~~ am 8/17

1740 Verified mouth of Suki River blocked by sand berm.

1800 At sample location S29-004, strong winds prevail, but upstream water still flowing downstream. Collected WS from flowing water / Suqi River. "SD" sample collected from peninsula under submerged vegetation.

1910 Collected WS MS/MSD for S29 @ S29-003. 3X volume

1928 ~~Saw~~ am Observed sheen while collecting SD sample. 2x volume.

1925 Collect Duplicate sample @ S29-SD-003

2020 Depart NEC for Nome.

2110 Arrive in Nome. Take samples to office. Replace ice. Took 2 bags of IDW.

2130 Mob to Old Alaska Rooms; break for dinner.

am

Location NEC/Nome Date 8/15/2016

Project / Client 0SDK8702/ USACE & ECC Nome

1015 AM Safety Tailgate:

PPE: Modified Level D

WX: ~~48-55°F; 40-50°F~~ 53-61 45-55°F; 44-56°F

Personnel: Stanley Seegars (SS)

Kristopher Reidt (KR)

Christopher Carson (CC)

Hollee McLean (HM)

Obj: Continue sampling at MOC

Sample at S29.

Safety: weather & wind

Daily Summary:

- 2 primary WS & 1 MS/MSD
- 8 primary SD & 1 DUP
- 3 MW @ MOC
  - 14MW03 @ 1354
  - " "4 @ 1840
  - " "5 @ 1553
- Visual inspection of beach; SUBi outlet is blocked by sand.
- Removed 2 bags IDW trash.

2300 Start sit Rep & EOD

Hollee McLean

Location NEC/ Nome Date 8/16/2016

Project / Client 0SDK8702 / USACE & ECC Nome

0915 Safety Tailgate

WX: 53-61°F; mid to high 40°Fs

PPE: Modified Level D

Personnel Stanley Seegars (SS)

Kristopher Reidt (KR)

Christopher Carson (CC)

Hollee McLean (HM)

Safety: water, wildlife

Obj Finish MOC

Finish S29

920 Mob to office Prep coolers & ice.

0950 Arrive at Bering Air.

1015 Depart Nome for NEC

1054 Arrive in NEC. Unload plane. Plane will remain on ground.

1107 Calibrate Turbidimeter 17212

Check Std	Reading
6.19	5.59
60.5	58.9
506	508

1121 Calibrate PID S/N 910685

Zero Cal 0.0 ppm Span Cal 100.0 ppm

1210 Mob to site 29. 3 visitors - the Tooley's arrive.

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702/ USACE & ECC

NEC

S29 WS & SD

Samplers: SS & HM

Sample ID	Time	Date	bgs Depth	USCS
16NEC-S29-WS-002 ~~lots of~~ HM 8/16/16	1230	8/16/2016		
16NEC-S29-SD-002 - Lots of sheen upon river entry H2O: 3'	1235		0-1.5 organics 1.5-2.0 for SD Sample	ML, brown small patches of SW-SM. Lots of organics.
16NEC-S29-WS-001 & 16NEC-S29-WS-001Q	1340			
16NEC-S29-SD-001 MS/MSD 1.5' H2O	1350		0-1 ~~1.5'~~ organics 1-1.5 for SD	ML, brown small patches of SW-SM. Lots of organics

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702/ USACE & ECC

NEC

1340 SW DUP @ S29-WS-001

1350 SD MS/MSD @ S29-SD-001

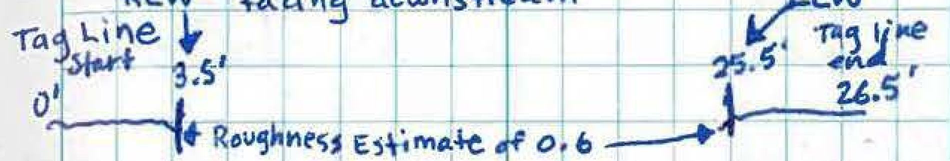
1430 Return to camp

1510 Mob to S29-004

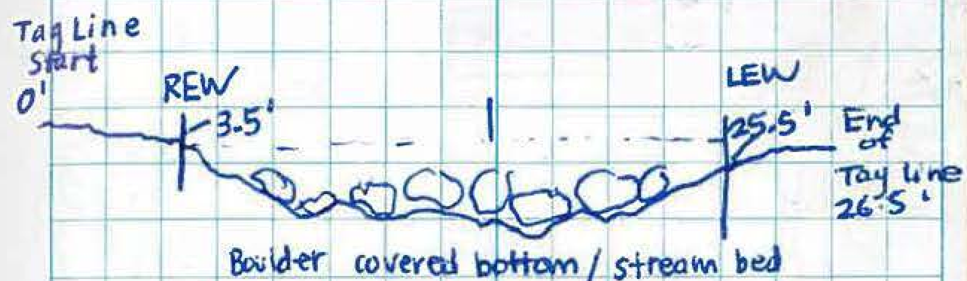
1515 $\boxed{\text{S29-004}}$ compass @ 310° from REW

REW- Right Edge water when facing downstream

Left edge water LEW



~~From start of tag line~~ ~~Depth~~ HM 8/16/2016



1525

Distance from Start of Tag Line (ft) / Depth of H2O (ft)

3.5/0.6	9.5/1.4	15.5/1.3	21.5/0.9
4.5/0.8	10.5/1.7	16.5/1.6	22.5/0.8
5.5/1.2	11.5/1.2 - boulder	17.5/1.2	23.5/~~0.9~~ 1.4 HM
6.5/0.9 - boulder	12.5/1.5	18.5/1.1	24.5/1.2
7.5/1.1	13.5/1.2	19.5/1.0 - boulder	25.5/1.2
8.5/1.6	14.5/1.2	20.5/1.2	

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702 / USACE & ECC

NEC

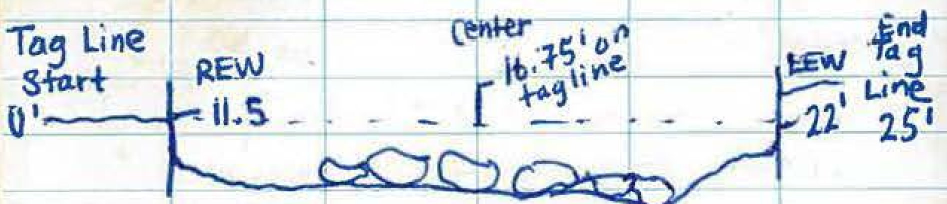
S29-004

1538 Depth measurement @ 14.5' of tagline is 1.2'. Center of stream at 14.5' tagline

~~0.2 Depth~~ HM 8/16	Ft below water surface	ft/sec Flow Reading
0.2 from surface	=0.24'	~~0.32~~ HM 8/16 0.46
0.4 "	" =0.48'	0.41
0.6 "	" =0.72'	0.39
0.8 "	" =0.96'	0.25

Although wind is blowing upstream, SUBI still flowing down stream

S29-003 compass 289° from REW



Boulder lined streambed.

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702 / USACE & ECC

NEC

S29-003

1555 Distance from start of tagline (ft) / Depth of H_2O (ft)

11.5/0.9	16.5/1.2	21.5/0.5
12.5 ~~13.5~~ HM/8/16 /0.9	17.5/1.4	22/0.2
13.5/1.1	18.5/1.5	
14.5/1.1	19.5/1.6	
15.5/1.1	20.5/1.5	

1602 Distance across stream is 10.5'.
1/2 lenth of cross section is 5.25'
B Stream flow measurement at 16.75' on tagline

Depth at 16.75' is 1.2'	Depth below water surface (feet)	Flow Reading (ft/sec)
0.2 from surface = 0.24'	0.24'	1.31
0.4 from surface = 0.48'	0.48'	1.23
0.6 from surface = 0.72'	0.72'	0.96
0.8 from surface = 0.96'	0.96'	0.74

1615 Mob to S29-002

1635 **S29-002** compass 185° from REW

Tag Line start 0'

~~Center pt: 8.5' on tag line~~ HM 8/16

REW 3.5'

LEW 11.5

width = 8.0 7.5'

Tag Line End 12'

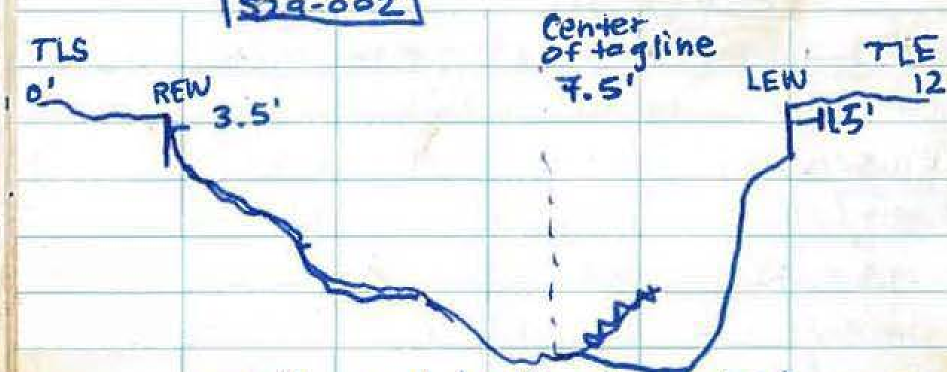
center = 4.00' or ~~7.75~~ HM 8/16 on tagline

Location NEC / Nome Date 8/16/2016

Project / Client OSDK8702 / USACE & ECC

NEC

$\boxed{\text{S29-002}}$

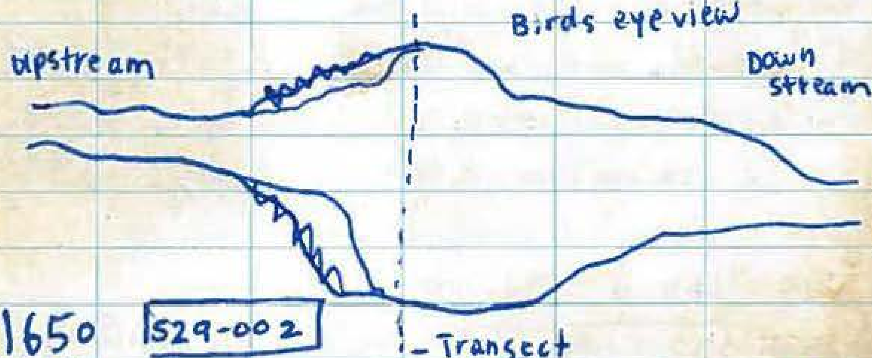


smooth gravel & silt streambed

1645 Distance from start of tag line (ft) / Depth of H_2O (ft) S29-002

3.5/0.5	6.5/2.4	9.5/ ~~3.3~~ 3.3 HM 8/16
4.5/1.4	7.5/3.2	10.5/0.4
5.5/1.8	8.5/3.4	11.5/0.3
		~~12.0/~~ HM 8/16

Birds eye view



1650 $\boxed{\text{S29-002}}$

~~165~~ HM 8/16 Depth at center of ~~7.5~~ 7.50' HM 8/16 on tagline = 3.2' H_2O

Measurement		
0.2	0.64'	from surface of H_2O
0.4	1.28'	
0.6	1.92'	
0.8	2.50	

Location NEC / Nome Date 8/16/2016

Project / Client OSDK8702 / USACE & ECC

NEC

$\boxed{\text{S29-002}}$

Depth from surface (ft)	Flow (ft/sec)
0.64'	0.45
1.28'	0.66
1.92'	0.58
2.50'	0.21

Center of stream in eddy.
Personnel did not enter water > 3' deep.

1700 Team chooses to take measurements at estimated center of streamflow at 6.5 ' on tagline, depth 2.4'

1705	Depth from surface (ft)	Flow (ft/sec)
0.2	0.48	2.0
0.4	0.96	1.71
0.6	1.44	1.32
0.8	1.92	0.60

Mob to S29-001

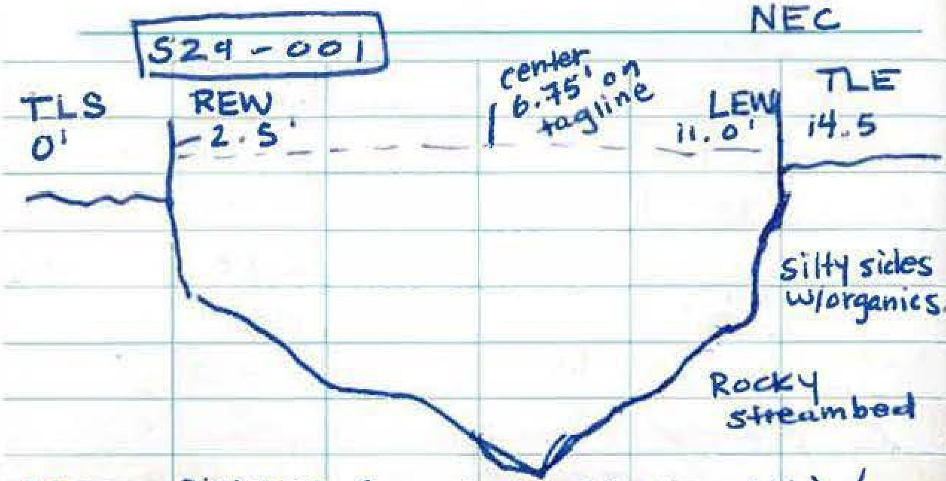
$\boxed{\text{S29-001}}$ compass 170 ° from REW

TLS = 0 '	Width of stream = 8.5 '
REW = 2.5 '	Center pt = 4.25 '
LEW = 11.0 '	Center pt on tag line = 6.75 '
TLE = 14.5 '	Depth at center = 3.2

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702 / USACE & ECC

NEC



1730 Distance from start of tagline (ft) / Depth of water (ft)

2.5/0.9	5.5/2.8	8.5/2.0	11/0.6
3.5/1.8	6.5/3.2	9.5/1.4	
4.5/1.2	7.5/2.2	10.5/0.8	

1735 Depth@ center (6.75') ~~of H2O~~ HM is 3.2' H_2O

	Depth from surface (ft) of H_2O	Flow (ft/sec)
0.2	0.64	0.41
0.4	1.28	0.45
0.6	1.92	0.45
0.8	2.56	0.40

vegetation approximately 2' upstream from measurement may affect flow. Vegetation along REW.

Location NEC / Nome Date 8/16/2016

Project / Client 05DK8702 / USACE & ECC

NEC

1750 Team elected to take additional measurements. Moved site 64° & 9.0' from post

TLS	0'	~~Center = 7.~~ HM 8/16
REW	~~1.5~~ HM 8/16 2.0'	Width = 7.0'
LEW	9'	center = ~~3.75~~ HM 8/16 3.5'
TLE	11.5'	Center on tagline = 5.5'

Distance from start of tagline (ft) / depth of water (ft) [compass @ 170° REW]

2.0/2.1	5.0/2.9	8.0/2.2
3.0/2.3	6.0/2.9	9.0/2.1
4.0/2.9	7.0/2.8	

1754 Depth at center (5.5' on tagline) is 2.9' H_2O.

	Depth from surface (ft) of H_2O	Flow (ft/sec)
0.2	0.58	0.16
0.4	1.16	0.17
0.6	1.74	0.23
0.8	2.32	0.26

All depth & flow measurements collected by SS, CC, & HM

1810 Pack up & Mob to camp. Remove 1 bag IDW

1815 Load plane

Location NEC/Nome Date 8/16/2016

Project / Client 05DK8702 /USACE & ECC

NEC/Nome

1852 Depart NEC for Nome
1940 Arrive in Nome
2000 Perform sample management
2200 End sample management
2300 Complete Sit Rep & EOD

Daily Summary

- sample 1 well @ MOC. MOC complete.
  1 primary sample
- sample S29
  2 sediment: 2 primary & 1 MS/MSD
  2 surface water: 2 primary & 1 DUP
- Collected flow on S[illegible] (S29)
  4 measurements
- Remove 1 bag IDW
- Pack 4 coolers.

Hallee McLean

Location NEC/Nome Date 8/17/2016

Project / Client 05DK8702/ USACE & ECC

Nome

1015 Safety Tailgate:
Personnel: Stanley Seegars, Kristopher Reidt, Chris Carson, Hallee Mclean
WX:
PPE: Modified Level D
Safety: Fatigue management, wildlife, weather
Objectives: Sample SØ8

0845 Depart for office to prepare coolers.
0930 Arrive at AK Air Cargo to ship 4 coolers to ALS
COC#s 10-13
AWB# 027-4010-6345 Destination changed from SEA to PDX.
1000 Arrive at Bering Air.
1015 safety Tailgate. See above.
1035 Depart Nome for NEC.
1125 Arrive in NEC & pack gear to mob to Site Ø8. GAC filtered 9L of Decon water
1210 Mob to SØ8 to collect samples.
Samplers: SS, KR, CC, HM
Bottles; Methods; Analyses

1- 8 oz amber	DRO/RRO	AK102/103
	PAHs	SW8270DSIM

- All sample names start with:
"16NEC-SØ8-"

Site 08 Sediment & surface soil sampling 16NEC-S08-...

Location NEC / Nome
Project / Client 05DK8702 / USACE & ECC
Date 8/17/2016

Remainder of Sample ID (Location ID)	Date	Time	Sample Depth (ft bgs)	USCS & other observations
SD-065 (MS/MSD)	8/17/2016	1245	1.5-1.75	Grey, ML 0-1.5' organics & H_2O wet/saturated
SD-066		1253	1.5-1.75	Grey & Brown, ML, 0-1.5 organics wet/saturated
SS-067 (MS/MSD)		1305	1.3-2	0-1.3 organics, wet 1.3-2' brown, moist ~~damp~~ ML, little organics
SS-064 (9)(DUP)		1310	1.3-2	See above
~~SS~~ SD-063 HM 8/17/2016		1320	1.0-1.66	0-1' organics moist/wet 1.0-1.66' brown, ~~damp~~ ML HM 8/17
SD-062		1330	1.5-2.0	0-1.5' organics & water 1.5-2.0' brown/grey moist/wet ML
SS-058 (9)(DUP)		1336	1.5-2.0	~~0-1~~ 0-1.5' organics 1.5-2.0' brown ML wet
SS-059		1345	1.5-1.75	0-1.5' organic layer 1.5-1.75' brown ML, damp, trace organics

NEC

Location NEC / Nome
Project / Client 05DK8702 / USACE & ECC
Date 8/17/2016

Remainder of Sample ID	Date	Time	Depth	USCS & other observations
SS-060	8/17/2016	1403	1.5-1.8	0-1.5 organics & water 1.5-1.8 ML, brown, ~~wet~~ moist, trace organics
SD-061		1412	1.7-2.2	0-1.7 organics & water 1.7-2.2 ML, brown, wet, little organics
SS-057		1427	1.5-2.0	0-1.5 organics 1.5-2.0 ML, brown, wet
SD-056		1432	1.75-2.25	0-1.75' organics 1.75-2.25 ML, brown, wet
SS-055		1438	1.7-2.1	0-1.7 organics 1.7-2.1 ML, brown, damp
SS-051		1442	1.4-1.75	0-1.4 organics 1.4-1.75 ML, brown, moist
SD-052		1459	1.5-2.0	0-1.5 organics & water 1.5-2.0' ML, wet, brown
SD-053 (9) DUP		1620	1.0-1.5	~~0-1~~ H_2O Depth 1 foot 0-1' organics 1.0-1.5' brown ML medium stiff, wet

NEC

Remainder of Sample ID	Date	Time	Sample Depth	USCS & other observations
SD-054	8/17/2016	1636	1.5-2.0 ~~2.0-2.8~~	H_2O depth 0.5'; organics @ 0' bgs - 1.5' 1.5-2.0 ML, wet, medium stiff, brown, grey & trace organics
SD-049		1651	1.25-1.75	H_2O Depth 0.75'; 0-1.25' bgs organics. 1.25-1.75 ML, grey & brown, wet/saturated
SD-050(9) DUP		1656	0.9-1.25'	0-0.9' organics 0.9-1.25 ML, grey & brown, saturated
SS-048		1704	1.0-1.5	0-1' organics 1.0-1.5 ML, brown, moist/wet, little organics
SS-045		1712	1.25-1.75	0-1.25' organics 1.25-1.75' ML, brown, damp
SS-046		1717	1.5-1.75	0-1.5' organics 1.5-1.75' ML, moist, brown
SS-047		1726	1.0-1.5	0-1' organics strong odor * 1.0-1.5 ML, brown, damp, medium stiff
SS-003		1742	0.75-1.0	0-0.75' organics with organics & rust color 0.75-1.0' ML, brown, moist, trace gravel, fuel odor *
SS-004		1752	2.5-3.0	Not Sampled; along roadside. Collect Sand or go down to Silt?
SS-008		1806	1.25-1.75 ~~1.5-2.0~~	Placed PID into hole & reads 194 ppm. 0-1.25 organics 1.25-1.75' ML, brown wet. Max reading of 373 ppm on PID
SD-007		1813	1.75-2.0	0-1.75 organics wet at 2.0' 1.75-2.0 ML, brown, wet
SS-~~006~~-005		1829	1.5-1.75	0-1.5 organics. 1.5-1.75 submerged, ML, brown/grey, wet, little organics
SS-002 (MS/MSD)		1835	1.0-1.5	0-1 organics 1-1.5 ML, brown, trace organics, w/ medium sand, moist, trace gravel
SS-001		1840	1.0-1.5	organics @ 0-1' 1.0-1.5' ML, Brown, damp, with organics.

* PID reading at SOB-008 not calibrated.

1634 SO8-054 Relocated original location w/ cobbles @ 2' bgs (6-10" cobbles) that appear similar to those lining the edge of the road bed.

1752 Want guidance for SO8-004 & SO8-075.

Location NEC/Nome Date 8/17/2016

Project / Client OSDK8702 / USACE & ECC

NEC/Nome

1850	Mob to camp. Load up samples & gear.
1926	Depart NEC for Nome.
2015	Arrive in Nome. Take samples to office & refresh ice. Transported
	$\boxed{\text{1 bag camp trash \& 1 bag IDW.}}$
	See Logbook 2 for info on 8 visitors today.
	Daily summary:
	Shipped 4 coolers to ALS
	Collected SS: 17 primary, 2 DUP, 2 MS/MSD
	SD: 12 primary, 2 DUP, 1 MS/MSD
2100	Break for dinner
2230	Sample Summary & sample tracking
2330	EOD

Hollee McLean

Location NEC / Nome Date 8/18/2016

Project / Client OSDK8702/ USACE & ECC

Nome

0700	Prepare labels for sample shipment.
0750	Call from KM regarding sample locations along & within roadbed.
0805	Safety Tailgate:
	Personnel: Stan Seegars
	Kristopher Reidt
	Chris Carson
	Hollee McLean
	PPE: Modified level D
	WX:
	Safety: Fatigue
	Obj- ship samples, Sample SO8
0825	Mob to office for sample management
0930	Mob to AK Air Cargo.
	Ship two soil / sediment coolers to ALS. Allison - AK ...
	AWB# 027-4010-6430
1000	Arrive at Bering Air. Meet w/ Scott McClintok for survey.
1010	Receive call from KM regarding sample points immediately adjacent to roadside.
	18663654406 7513429
1035	Conference Call w/ KM & Don Maloney
	From Aaron Snewman. Should not sample in road bed. In 20' grid along road bed, relocate

Location NEC/Nome Date 8/18/2016

Project / Client OSDK8702 / USACE & ECC

Nome / NEC

directly west at vegetation.
From 10' centroid, relocate N/~~N~~W until
we reach vegetation. (73 & 75) (69)

1000 Field team boards plane. Very strong fuel odor. Alerted pilot to strong smell. Pilot (Jack) got out of plane to check for leaks. HM 8/18/2016 ~~No leaks~~. Pilot started plane but team continued to express concern. Asked pilot to please not take off. We all got out of plane. Turns out the odor was epoxy from a new door seal that HM 8/18/2016 ~~have~~ had been installed the night before. The fumes were trapped inside the aircraft.

1150 Depart Nome for NEC

1242 Arrive in Nome. Missing survey equipment. Must still be in other plane?

1245 2 visitors (Floyd and his wife) arrive to collect birthday cake.

1335 Field team mobs to S08 to determine pts that need to be relocated.

1345 Field team elects to relocate S08-04, 13, 21, 39, 69, 73, & 75

For samplers, bottles, & Methods see pg # 43.

Location NEC/ Nome Date 8/18/2016

Project / Client OSDK8702 / USACE & ECC

NEC

Site 08 Sediment & Surface Soil Sampling 16NEC-S08-...

Remainder of Sample

ID (Loc ID)	Date	Time	Depth	USCS & other observations
SS -011	8/18/2016 →	1415	1.5-2.0	0-1.5' organics; 1.5-2.0' ML, brown, little sand, with organics damp/moist
~~S08~~ -010 SD		1422	1.5-2.0	0-1.5' organics ~~0-0.~~ H2O 0.25'; 1.5-2' ML, brown, trace sand, little organics, moist
SD -009		1425	1.75-2.25	0.25' H2O 0-1.75' organics; 1.75-2.0' ML, brown, wet/saturated, little organics
SS -012		1432	1.75-2.25	0-1.75' organics PID = 7.3 ppm; 1.75-2.25' ML, brown, moist, trace organics.
SS -006		1440	1.75-2.25	0-1.75' organics PID = 1.4 ppm; 1.75-2.25' ML, brown, ~~trace~~ trace organics
SD -014		1449	1.5-2.0	0-1.5' organics; 1.5-2.0 ML, brown, little organics, moist
SS-018 (9) DUP		1459	1.5-2.0	0-1.5' organics; 1.5-2.0' ML, brown, trace sand, damp/moist

Location NEC / Nome Date 8/18/2016

Project / Client 0SDK8702 / USACE & ECC

NEC

~~SOB-004~~ SOB-004	ADJ	7'	W°
SOB-013	ADJ	7.25'	W°
~~SOB-021~~	~~ADJ~~		~~W°~~ HM 8/18
SOB-069	ADJ	3.75'	NW°
SOB-021	ADJ	6'	W°
SOB-073	ADJ	8.25'	NW°
SOB-075	ADJ	6.5'	NW°
SOB-039	ADJ	7.5'	W°

1455 PID Bag Blank 0.6 ppm

1805 GAC filter approx. $\boxed{8\text{ gal}}$ decon water.

1835 Load Plane for departure to Nome

~~18~~42 Depart NEC for Nome. Brought $\boxed{1\text{ bag IDW}}$

1930 Arrive in Nome. Transport samples & gear to office.

2100 complete labels & sample mgmt

Sit Rep, send photos of sample relocation.

Daily Summary

- Relocated 7 sample locs that conflict with road.
- collect samples @ SOB
  - SS - 12 primary & 1 dup (1 in permafrost)
  - SD - 10 primary & 1 dup
- No survey; base station left in Nome.

EOD HM

Location NEC / Nome Date 8/18/2016

Project / Client 0SDK8702 / USACE & ECC

NEC

Remainder of Sample ID (Loc ID)	Date	Time	Depth	USCS & other observations
SS -022	8/18/2016	1510	1.0-1.5	0-1' organics ~~w/~~ blackish. 1.0-1.5' ML, brown, moist, with organics
SS -027 -tussick		1517	1.5-2.0	0-1.5' organics 1.5-2.0 ML, darkbrown, some organics moist/wet
SS-031 -tussick		1526	1.0-1.5	0-1' organics 1.0-1.5 ML greyish brown, moist, trace organics
~~SB~~ -036(9) ~~SS~~ SD DUP		1533	1.5-2.0	0-1.5' organics 1.5'-2.0 ML, greyish brown, moist, trace organics
SD-040		1543	2.0-2.5	0-2' organics. H2O@ surface 2.0-2.5 ML, See above, moist / wet
SD-041		1616	2.0-2.5	~~0-2' HM 8/18/2016 See SD-040, brown~~ HM 0-2' organics H2O@ surface 2.0-2.5' ML, dark brown, moist/wet, some organics
SD -017		1626	1.5-2.0	0-1.5' organics. H2O @ surface 1.5-2.0 ML, brown, trace organics, moist 0.7 ppm on PID
SD -016		1632	1.5-2.0	0-1.5' organics 1.5-2.0' ML, brown, trace organics, moist

Location NEC / Nome Date 8/18/2016

Project / Client 05DK8702 / USACE & ECC NEC

Remainder of Sample ID (Loc ID)	Date	Time	Depth	USCS & other Observations
SD-015	8/18/2016	1638	2.0-2.5	0-2' organics H2O 0-0.25' bgs. 2-2.5 ML, greyish brown, moist, little organics
SS -019	↓	1643	2.0-2.5	0-2' organics 2.0-2.5' brown, damp, little organics, ML
SS-020		1715	1.25-1.5	0-0.25' organics 0.25-1.25' - cobbles 3" - 9", some boulders (similar to those along road. 1.25'-1.5' SW, coarse sand with gravel
SD-026		1720	1.0-1.25	0-.25' organics 0.25'-1' Gravel & cobbles 1.0-1.25 some organics, saturated, ML brown. * sheen & odor during sampling 3.7 ppm PID in headspace of bag. Due to wet sample, difficult to PID.
SS-024 tussick		1737	1.5-2.5	0-2' organics w/ coarse sand & gravel (SW) 2'-2.5 ML, brown, damp
SS-023 * tussick		1749	2.0-2.5	0-2' organics 2.0-2.5 * Permafrost, ML, brown, little organics.
SS-028	↓	1801	2.0-2.5	0-2.0' organics 2.0-2.5 brown, ML, damp, with organics.

Location NEC/ Nome Date 8/19/2016

Project / Client 05DK8702 / USACE & ECC

Nome

0800 Call Bering Air. Call back at 930

930 call Bering Air. call back at 1100

Call TTT to verify special shipping info:

Batteries - DO NOT need declaration.

PID cal gas

Return unused

Sticker - Battery, non-spillable

UN 2800 Battery, wet, non-spillable

AWB → NOT RESTRICTED per SPECIAL Provision A67

→ cal gas - IATA certified to ship.

\$100 - to package

\$65 - to handle

If fully expelled, throw bottle away

Puncture & recycle.

1050 Call Angela

Give away air horns.

Neutralize acids from bottles

3372 or cell 907-350-6742

Greg Rutkowski

1105 called Bering Air. Not flying today due to weather.

Location NEC / Nome Date 8/19/2016

Project / Client 05DK8702 / USACE & ECC

1106 Call Greg Rutkowski
* Lithium-ion battery
Flow meter? PID
Check all batteries
Lithium Ion battery sticker -
- on AWB: Nature & Quant of Goods
lithium ion batteries in compliance
with section II of PI 966.
* NAC - for chemetrics test kit
# 1019 - NAC shipping account

1115 Prepare samples & supplies for
shipment.

1345 Ship 1 cooler to ALS via
Goldstreak
AWB# 027-4010-6555
Ship 2 pallets of gear from
Nome to Anchorage office;
notify K. Maher on arrival.
To ship on cargo flight 8/20
issue w/ knowing AMPS of
Lithium ion batteries contained
in equipment. Confirmed w/ agent
"DOES NOT CONTAIN DG"
AWB# 027-4010-6566
EOD [signature]

Location NEC / Nome Date 8/19/2016

Project / Client 05DK8702 / USACE & ECC

2300 Receive message from Linda at
AK Air Cargo. Cooler/Refrigerator broke & shipment
not taken on plane. Samples placed
outside in a secure cart. I will stop
by tomorrow to replace the ice.
Called agent back so we could get cooler
tonight to refresh ice. Linda will
get cooler & drop it off at Old Alaska
Rooms

2325 Linda calls. Cooler is in the mail
truck behind locked gate. She
cannot find the key to the truck.
I will pick up cooler tomorrow at 830.

[signature]

Location NEC/Nome Date 8/20/2016

Project / Client 05DK8702/USACE & ECC

Nome

0800 Call Bering Air. Weather hold. Bering Air is not making any scheduled flights. Call back at 1000.

0835 Arrive at AK Air Cargo. Pick up cooler.

0846 Arrive at office to replace ice.

0915 Ship cooler to PDX on same AWB.

1015 Call Bering Air. No flight yet. Call back at noon.

To DO:

Ship chemetrics via NAC to ANC

Ship/PKG remaining items to ANC

- defrost freezer.

- ship coolers to ALS.

1200 No flight.

Location NEC/Nome Date 8/21/2016

Project / Client 05DK8702/ USACE & ECC

Nome

0800 Call Bering Air. No one answers phone.

0830 Call Bering Air. Not looking good.

1000 called as WX day.

Started working on reports.

EOD

[signature]

Location NEC/Nome Date 8/22/2016

Project / Client ~~USACE~~ HM / 05DK8702 / USACE & ECC

Nome/NEC

0800 Call Bering Air. Depart at 930.

0900 Safety Tailgate:

WX: 38-49°F, windy

PPE: Modified Level D

Personnel: Stanley Seegars

Kristopher Reidt

Christopher Carson

Hollee McLean

Safety: wind & windchill

Obj: site 08

0905 Depart for office

0930 Arrive at Bering Air

0945 Load plane

0950 Depart Nome for NEC.

1035 Arrive in NEC

Tent moved in the wind. Must have rolled over in wind. Someone came an secured the tent in our absence.

1200 Try to verify that all moved locations are there.

S29-006 still there but under approx. 5ft of H_2O

See Logbook #2

1300 Mob to Site 8. See pg 43 for bottles, analyses, & samplers

Location NEC/Nome Date 8/22/2016

Project / Client 05DK8702 / USACE & ECC

S08 SD & SS Sampling NEC

Remainder of Sample ID (Loc ID)	Date	Time	Sample Depth	USCS & other observations
Moved 025 Location.	8/22/2016			0.5' H_2O. 0.25' bgs organics. 0.5-1.5 cobbles (5-8")
SD-025 7' from actual 025 & 17.2' from 028		1330	0.5-1.0'	0-0.5' organics. H_2O @ 0.25' bgs 0.5-1.0 ML, dark brown/with grey, wet, trace organics
SS-004		1338	1.0-1.5	0-1.0' organics H_2O @ 0.5' bgs ML, brown, little organics, moist
SS-013(4) Dup		1343	1.0-1.5	0-0.5' organics. 0.5-1.0' ~~SP~~ SW 1.0-1.5' Fuel odor & sheen. SW & ML brown, medium to coarse sand, wet, sand gravel.
SS-069 •collected from original location (green flag) (MS/MSD not needed)		1353	0.5-1.0	0-0.5' cobbles 0.5-1.0' SW · coarse sand trace gravel, moist, little silt

Remainder of Sample ID (ECC ID)	Date	Time	Depth	USCS & other observations
SS -021	8/22/2016	1404	1.0-1.5	0.5' organics, 0.5-1.0' cobbles, H_2O @ ~0.75' bgs 1.0-1.5' SW & ML, wet, little gravel, with organics
SS -071		1412	1.5-2.0	0-1.5' organics. 1.5'-2.0' ML, brown & grey, little organics, trace gravel, damp/moist.
SD -068 MS/MSD		1423	1.5-2.0	~~0-.75' organics~~ 0-1.5' organics & cobbles, H_2O @ 0.25' bgs 1.5-2.0' Brown ML, little organics, ~~moist~~/wet, little coarse sand
SD -070		1430	1.5-2.0	0-1.5' organics. H_2O @ surface 1.5-2.0' brown, ML, little organics, little coarse sand, moist
SS -072		1442	1.0-1.5	0-1' cobbles 1.0-1.5' SW, coarse sand, little silt, wet with gravel
SS -073		1456	2.0-2.5	0-1' organics 1'-2' cobbles 2'-2.5' - Grey ML, little organics, damp/moist, ~~sample~~
SD - 074		1504	1.0-1.5	0-1' organics. 1.0-1.5' Greyish brown, ML, little organics, moist/wet, sample submerged
SD - 075		1512	1.5-2.0	0-1.0 vegetation. 1.0-1.5 cobbles. 1.5-2.0 Grey, ML, little organics, moist/wet, sample submerged
SS -039		1522	2.0-2.5	0-2' organics. ML, light & dark brown, trace organics, damp to moist
SS -044		1537	2.0-2.5	0-2 organics with cobbles. sample under H_2O. 2-2.5 see SS-039

Remainder of Sample ID (ECC ID)	Date	Time	Depth	USCS & other observations
SD-043		1541	1.5-2.0	0.5' H_2O 0-1.5' organics 1.5-2.0' ML brown, trace organics, moist, trace gravel
SD-042		1553	1.5-2.0	0.5' H_2O 0-1.5 ' organics 1.5-2.0 see 043
SD - 038		1601	1.5-2	" " " " 1.5-2.0 ~~brown~~ grey, ML, trace organics, moist
SD -037(9) DUP		1608	2-2.5	0.5' H_2O 0-2.0' organics. 2.0-2.5' ML, grey, trace organics, moist/wet
SS-032		1616	1.0-1.5	0-1' organics. 1.0-1.5' ML, brown, little organics, damp
SD -033		1622	1.0-1.5	0-1' organics 1-1.5' ML, brown, wet
SD-034		1630	1.5-2.0	0-1.5' organics. H_2O @ surface. 1.5-2.0 see 037
SD - 035		1639	1.5-2	0.75' H_2O 0-1.5 organics 1.5-2 see 033
SD -029		1645	1.5-2	H_2O @ surface 0-1.5 organics. 1.5-2.0 see 033 ~~with~~ little organics
SS -030		1655	1-1.5	Fuel odor. 0-1.0 organics & cobbles 1.0-1.5 SW; coarse sand with gravel. trace organics. wet.

Location Nome / NEC Date 8/22/2016

Project / Client 05DK8702 / USACE & ECC

1700 Empty vials of HCl from vo[illegible] & trip blanks.

GAC filter approximately $\boxed{\text{7 gallons}}$ of decon water

1715 Mob to shelter & pack plane. $\boxed{\text{1 Bag IDW}}$

1820 Start plane to leave NEC.

1915 Arrive in Nome.

Daily Summary:

Salvage shelter

verify swing tie method for survey.

SO8 finished

SS - 11 primary (1 DUP & 1 MS/MSD) not needed.

SD - 13 primary (& 1 DUP & 1 MS/MSD)

complete sample labels & SitRep

2200 EOD

[signature]

Location Nome / NEC Date 8/23/2016

Project / Client USACE & ECC / 05DK8702

Nome

0630 Arrive at office to prepare samples for shipment & gear for demob.

0930 called Chemetrics

ship - as dangerous good in accepted quantities Class #8

Disposal - special Handling w/RCRA

1005 Arrive at AK Air Cargo. Waiting for them to open at 1030 AM.

1015 opened early for me.

Shipped 1 coolers to ALS Goldstreak.

AWB 027-4010-6765

027-4010-6776 (5) - empty coolers general freight

Shipped sampling supplies to ANC

AWB 027-4010-6780

1115 Prepare to depart Nome for NEC.

1216 Arrive in NEC.

Check beach @ mouth of Suqi. Beach has been leveled-off.

1247 Stop at culvert on Suqi. Water is higher than yesterday downstream of Suqi.

[initials]

Location Nome / NEC Date 8/23/2016

Project / Client 05DK8702 / USACE & ECC

ADJ	Pt	Dist	Pt	Dist NEC
054 ~~060~~	054	3.06'	57	19.27'
039	039	7.35'	44	22.10'
075	030	8.40'	75	6.11'
073	073	8.16'	072	7.05'
021	021	5.83'	071	17.17'
013	013	7.25'	068	15.21'
004	007	23.73	003	13.38'

1400 Floyd & 2 kids visit camp. Spent 1.5 hours securing our shelter.

1500 Mob to 508 & 529. Removed all stakes @ 508. From 529, removed 001, 002, & 003. Remainder under H_2O.

1515 3 ATVs & ~~8~~ 5 people arrive at S~~0~~8. HM 8/23

1535 Return to camp. Wait for CASA.

1730 CASA arrived. Load gear & 1 bag general trash

1755 Start Navajo. Head for Nome.

1844 Arrive in Nome.

1900 Arrive at Old AK Rooms.

EOD

Holly McLean

Location Nome / NEC Date 8/24/2016

Project / Client 05DK8702 / USACE & ECC

Name

0645 Dispose of 2 bags general trash

Recycle amber bottles (by George).

0900 Ship test kits via NAC.

NOA - H. McLean

AWB# 345 2303 9041

1100 Return vehicle to Stampede Auto

1115 Receive ride to airport & wait for ~1220 departure.

1400 Arrived in Anchorage

Holly McLean

NEC 2 of 2

2016

Kristopher Reidt

Rite in the Rain ®
ALL-WEATHER
ENVIRONMENTAL
FIELD BOOK
№ 550

Ø3DK87Ø2
N2Ø12ØFLD

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8/6/2016 - 8/23/2016

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Rite in the Rain
ALL-WEATHER WRITING PAPER

ALL-WEATHER
ENVIRONMENTAL FIELD BOOK
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CONTENTS

PAGE	REFERENCE	DATE

Reference Page Index

CONTENTS

PAGE	REFERENCE	DATE

Location NEC / Nome Date 8/6/16

Project / Client Ø5DK87Ø2 / USACE + ECC

0710 Hold tailgate safety meeting @ Old Alaska Rooms: 1/4 mile vis. in Savoonga. Expected weather delays.
personnel: Stan Seegars (SS)
Kristopher Reidt (KR)
Chris Carson (CC)
Hollee McLean (HM)
Safety Topics: Driving through Nome (pedestrians + ATV's), weather delays onsite, air travel.
Todays objectives: Continue sample kit prep.
- Continue go through all equipment and workplan.
- Review schedule and possible scenarios
- Practice setting up emergency camp tent.

0750 Depart for Bering Air

0810 Arrive at Bering Air. Discussed weather and flight schedule w/ Kevin (Pilot) No one has flown to site yet this year. Bering Air will require 1000 ft ceiling and 3 mile visibility

0900 Arrive at field office. Discuss workplan and sample procedures.

Location NEC / Nome Date 8/6/16

Project / Client Ø5KD87Ø2 / USACE + ECC

1045 Return to Bering Air to practice setting up weatherport shelter.

1300 Finish setting up and packing shelter. Go to Builder Supply to purchase tools and cable clamps for setting up shelter in the field.

1300 Return to Bering Air. Discuss w/ Chris (scheduler) about attempting a flight tomorrow morning @ 0900.

1330 Responded to a email correspondence from Scott McIntock (Surveyor) regarding remaining questions about sample locations. Also called Dan Malony (ECC PM) and gave him a status update of the project.

1400 End of day

KR

Location NEC / Nome Date 8/7/16

Project / Client Ø5DK87Ø2 / USACE + ECC

Mostly sunny, scattered clouds, light wind. Foggy conditions in Savoonga. Fog expected to lift soon.

0830 Held tailgate safety meeting @ Old Alaska Rooms. Expect to fly to NEC this morning. Personnel in attendance:
Stan Seegars (SS)
Kristopher Reidt (KR)
Chris Carson (CC)
Hollie McLean (HM)

Safety topics: Hazards associated w/ setting up emergency shelter, wearing appropriate PPE, Hazards associated with working at the site.

Today's objectives: 1st flight to NEC setup emergency camp and stage field equipment.

0840 Depart for Bering Air

0850 Check in with Scheduler Chris regarding this morning's flight. Was notified that there was a lifting fog over Savoonga that is expected to clear later in the morning.

Location NEC / Nome Date 8/7/16
Project / Client Ø5DK87Ø2 / USACE + ECC

0900 Arrive at field office to check on gel ice. Restocked and sorted freezer to allow for better freezing of Gel ice packs. Will wait for phone call from Bering Air for when they anticipate they will be able to fly.

0915 Set up stream flow velocity meter on the slow outside of town to practice collecting stream flow measurements. Chris Casa had noticed the lack of cell phone signal at that location. Returned to field office to

1000 wait for phone call from Bering Air for possible flight to NEC.

1130 Begin loading equipment onto aircraft for attempted mobilization flight to NEC. Chris from Bering Air voiced their interpretation of the flight schedule. Bering Air was under the impression that flights would be "daily" but not necessarily twice a day. Aircraft will wait on the ground while field team sets up emergency camp. Schedule changes or possible changes to number of flights a day for field duration.

Location NEC / Nome Date 8/7/16
Project / Client Ø5DK87Ø2 / USACE + ECC

1200 Was notified by Bering Air that the aircraft are loaded and are now waiting for a weather update from the afternoon scheduled flight to the Island. Inquired about standby rates for the Navajo and King Air aircraft to wait onsite.

1230 Reviewed stream velocity gauging procedures while waiting on standby at Bering Air. Emailed a project to Don Maloney regarding flight status, anticipated aircraft and change in plans w/ keeping plane on ground on site. Emailed Scott from Ecoland Survey and responded to his earlier question regarding site #29 location names vs. coordinates. Holly McLean had suggested he review the data on the second tab of the spreadsheet. If this does not answer his questions, we will need to arrange a meeting to discuss.

1430 Was notified by Kyle from Bering Air that today's flight has been cancelled. CASA aircraft is loaded and will make another attempt tomorrow morning at 0900.

Location NEC / NOME Date 8/7/16

Project / Client 05DK 8702 / USACE + ECC

1430 Contacted Scott regarding survey schedule. Addressed his questions about Site #29 by pointing out the search tab on the Excel file. Will attempt the site survey on Tuesday following the mobilization flight.

1300 Continued to practice with the stream flow velocity meter. Updated Dan DMahoney on schedule.

1645 Return to lodging to review expanded equipment manual for flow meter and catch up on log book notes. Reviewed user's manual for stream flow meter

1730 End of day

KE

Location NEC / NOME Date 8/8/16

Project / Client 05DK 8702 / USACE + ECC

Mostly Sunny, light breeze, good vis in Savoonga

0800 Called David Olsen to discuss possible flight to NEC. Was notified that we will plan for 0900 departure.

0810 Conducted tailgate safety meeting at Alaska Rooms. Personnel in Attendance

Stan Seegars (SS)
Kris Reidt (KR)
Chris Carson (CC)
Hollee Mclean (HM)

Discussed similar topics as 8/7/16. With the addition of safe wildlife encounters and preparing a tsunami evacuation plan.

0900 Arrive at Bering Air

0930 Depart on Navajo w/ CASA for mobilization flight.

Navajo pilot - Stan
CASA pilot - Kyle

1020 Arrive at NEC. Wait for CASA to arrive.

1040 CASA arrives. Begin unloading aircraft and setting up WeatherPort.

1325 Finish tent setup. Break for lunch

Location NEC / Nome Date 8/8/16

Project / Client 05DK8702 / USACE + ECC

1500 Calibrate PID: S/N: 910685
Zero cal = 0.0 ppm
Span cal = 100.0 ppm

1510 SS + CC finish site setup
KR + HM begin Groundwater elevations at the MOC. (Well depth measurements are recorded in field notebook #1).

1600. Reassess effort. Focus on strictly locating wells.

1645. All groundwater sampling locations identified. Return to Base Camp and prepare for demobe back to Nome.

1715 Depart NEC.

1801 Arrive at Bering Air. Discuss tomorrow's schedule w/ Kyle. Will try to allow for drop-off morning flight and then return flight. Otherwise, may have to keep plane a Standby. Will notify Don Maloney if they will not provide two flights.

End of day

KC

Location NEC / Nome Date ~~8/8/16~~ 8/9/16 KC

Project / Client 05DK8702 / USACE + ECC

Overcast, 1000 ft + ceiling, 50F, expected showers

0805 Conduct morning tailgate safety meeting at Old Alaska Rooms. Personnel present: Stan Seagers (SS)
Kris Reist (KR)
Hollee McLean (HM)
Chris Carson (CC)
New topics: Securing equipment on site. Will get lock for trailer. Need to consider how to secure equipment while field team is in Nome.

0812 Make Morning Call to Bering Air. to check status of 0900 departure. Was notified that they are unable to get weather information from Savoonga and may not get a flight out at 0900.

0815 Called Scott McClintock and left voicemail to relay status update.

0840 Called Don Maloney to discuss flight delays. Was told to see how long the survey will take and take a flight to see if we

Location NEC/Nome Date 8/9/16

Project / Client 05DK8702 /USACE + ECC

Overcast, 50°F, Foggy in Savoonga.

get in to the site assuming we can possibly be on the ground long enough to finish.

0850 Called Scott McClintock. Was notified his survey at NEC will take at least 8 hours to complete.

1000 Cloud ceiling in Savoonga seems to be holding at 500'. Will make attempt to fly in to NEC. Contacted Scott McClintock and notified him of our intention to disembark. Notified Don Maloney of the weather delay.

1100 Weather moved in over Savoonga. Delayed flight. Field team decided to take the following day off work as Savoonga is forecasted to be foggy for several days.

1200 Called Don Maloney and discussed the possibility of intentionally staying out on the Island as an alternative approach to using the camp for emergencies only. Was told that he will discuss this option w/ Jacobs and USACE.

1230 End of Day

HC

Location NEC/NOME Date 8/10/16

Project / Client 05DK8702 / USACE + ECC

Overcast, 50°F, 3 mile + visibility in Savoonga

0815 Called David @ Bering Air. Was notified that the weather has cleared over Savoonga and we can attempt a flight to NEC. Scheduled flight departure @ 1000. Notified Don Maloney of change to field schedule.

0900 Conducted morning safety meeting @ Old Alaska Rooms. Personnel in attendance: Stan Seagers (SS)
Kaz Reidt (KR)
Chris Casun (CC)
Hollie McClean (HM)

Safety topics: air travel, weather delays, wildlife/people encounters, and doing an inventory of equipment on site before aircraft departs.

Will make sure Bering Air has our contact info in the field.

1000 Arrive @ Bering Air to wait for departure

1100 Arrive @ NEC. Begin site inventory. Everything appears to here. Begin collecting GW elevations (see field notebook # 1) for data.

Location NEC / Nome Date 8/10/16

Project / Client 05DK8702 / USACE + ECC

Overcast, low cloud ceiling (300') 50°F

1354 Begin calibration of YSIs
YSI #1 (SN: 096101038)
YSI #2 (SN: 096101665)
Conductivity solution: 1413 µs/cm EXP: 11/2017
Part # 00653-18 - opened 8/10/16

YSI	Pre-cal	Post-cal
YSI #1	1.432	1.413
YSI #2	1.375	1.413

Dissolved Oxygen

YSI #1	106.1	100.1
YSI #2	104.3	99.7

PH 7.00 Part # 00654-04 EXP = 11/2017

YSI #1	7.28	7.01
YSI #2	6.88	7.01

PH 4.00 part # 00654-00 EXP = 7/2017

YSI #1	4.20	4.04
YSI #2	3.97	4.04

PH 10.00 part # 00654-08 EXP = 08/2017

YSI #1	9.88	9.89
YSI #2	9.46	9.90

ORP Part# 8032 EXP: 09/2019

YSI #1	256.3	240.0
YSI #2	264.9	240.0

Location NEC / Nome Date 8/10/16

Project / Client 05DK8702 / USACE + ECC

overcast, low cloud ceiling (300') 50°F, windy

1430 Begin round of groundwater sampling.
1500 Setup on monitoring well 14MW01.
Refer to field notebook #1 for details of sampling at this location.
Refer to Groundwater collection form for sample details.
* 1620 Collected GW sample ID
16NEC-14MW01-WG
1712 Setup at monitoring well 14MW03.
Samplers: KR + SS
Having issues with submersible pump.
unable to hold a load on the controller.
1730 Stop sampling effort at this location
Return field equipment to Base Camp and assist samplers HM + CC at well location 14MW02.
* 1817 Collected GW sample ID
16NEC-14MW02-WG(-9)
Refer to GW sampling form for details to sampling
1915 Return to shelter. Begin equipment clean and preparing for flight to Nome.

Location: NBC / Nome Date: 8/10/16

Project / Client: Ø5DK8702 / USACE + BCC

2034 Arrive @ Nome.

2050 Arrive @ office. Prepare sample labels and get Ice.

- Was notified by pilot (Stan) that NBC is not on the charter itinerary for tomorrow. He said he would make himself available if weather is favorable for flight tomorrow.
- Notified Scott McClintock that we will attempt to fly to NBC in the morning.
- Prepare daily report to BCC PM.

2400 End of day

KC

Location: NBC / Nome Date: 8/11/16

Project / Client: Ø5DK8702 / USACE + BCC

0800 Call Bering Air to check on weather conditions. Was notified of low cloud ceiling above Savoonga.

0815 Notified Dan Maloney and Scott McIntock about weather delay.

0830 KR, SS, CL go to field off to help prepare samples for shipment.

0945 Go to Alaska Air Cargo to ship sample coolers.

1015 Called Bering Air. Was notified of low cloud ceiling. Will call @ 1300.

1300 Called Bering Air. Was notified of continued cloud cover. Field team will end attempts to fly to NBC.

KC

Location NEC/NOME Date 08/12/16

Project / Client 05DK870C / USACE + ECC

Overcast, 50°F, Cloud ceiling in Savage Band 400'

0800 Made morning call to Bering Air. Was notified of favorable conditions. Will plan a drop off flight @ 0930. Bering Air will provide air King Air at the expense of a Navajo Aircraft. Called Scott McIntosh. He will not be available today due to meeting w/ another client.

0930 Arrive @ Bering Air. Prepare to depart to NEC.

1020 Fly over NEC. Cloud ceiling had dropped to 200' w/ zero visibility. Returned aircraft to Nome.

1110 Called Dan Maloney and notified him of the weather delay. Today will be the 4th option task 1 weather delay and first option task 3 turnaround flight due to weather.

[signature]

Location NEC/NOME Date 08/14/16

Project / Client 05DK870C / USACE + ECC

Overcast 45-50°F @ NEC Lifting Clouds 500' ceiling

0800 Called Bering Air. Was notified of lifting cloud ceiling. Will call back @ 0900. Notified Scott McIntosh.

0830 Conducted Tailgate safety meeting @ Old Alaska Rooms. Personnel on site:
Stan Seegars (SS), Chris Cason (CC)
Hollee McLean (HM), and Kris Reat (KR)
Safety Topics: Travel in Nome
Travel to NEC
Travel while onsite
Emergency weather over @ NEC.

0900 Called Bering Air. Was notified that we will attempt a flight @ 1000. Notified Scott McIntosh.

1015 Departed Bering Air (Nome) for NEC

1100 Arrive at ~~Bering Air~~ NEC. All equipment accounted for. Visibility was approx. 15 mi and cloud ceiling around 500' during the approach. Unpacked field/camp equipment, calibrated instruments and prepared for GW sampling.

Location NEC/Nome Date 8/13/16

Project / Client 05DK 8702 / USACE + ECC

Overcast @ NEC. 500' ceiling 50°F 15mi visibility

1115 Calibrated YSI meters.

Conductivity Solution

Instrument	pre-cal	post-cal
YSI#1	1.378	1.413
YSI#2	1.036	1.415
Dissolved Oxygen		
YSI#1	104.9	99.3
YSI#2	97.5	99.5
PH 4.00 (4.01)		
YSI#1	3.75	4.01
YSI#2	4.05	4.01
pH 10.00 (10.01)		
YSI#1	9.93	10.01
YSI#2	9.84	10.01
pH 7.00 (7.01)		
YSI#1	7.10	7.01
YSI#2	6.98	7.01
ORP Solution		
YSI#1	238.7	240.1
YSI#2	237.6	240.0

See pg. 14 for calibration lot #'s and expiration dates.

Location NEC / Nome Date 8/13/16

Project / Client 05DK 8702 / USACE + ECC

Broken clouds, 500't ceiling. 50°F nowind.

1220 Samplers KR + SS setup @ monitoring well 14MW06

1232 Began purging well.

*1310 Collect GW sample 16NEC-14MW06-WG and duplicate sample 16NEC-14MW06-WG-9 Break for lunch. finished sampling this location @ 1417.

1600 Samplers KR + SS setup on well 14MW03

*1644 Collect GW sample 16NEC-14MW03-WG. Finished Sampling this location @ 1727.

1800 Samplers KR + SS Setup @ well location 16NEC-MW88-10-WG

*1829 Collect GW sample 16NEC-MW88-10-WG. Finished Sampling @ this location at 1859. Begin site breakdown.

2040 Depart NEC for Nome.

Location NEC / Nome Date 8/14/16

Project / Client 05DK8702 / USACE + ECC

Mostly Sunny @ Nome. 200' cloud ceiling @ Savoonga.

0830 Conduct morning safety @ Old Alaska Rooms. Personnel: Kris Read, Stan Seegars, Hollee McLean, Chris Carson.
Safety Topics: Travel to and from Site. Travel around Nome, wildlife encounters fatigue management.

0920 Called Bering Air. Was notified that we are presently on a weather delay, will call after 10:00 am. Notified Dan Malany of delay. Hollee McLean and Stan Seegars departed for the office to prepare sample labels.

1009 Was called by Bering Air. Notified that the field team can head down for departure. Hollee McLean will stay in Nome to process samples.

1114 Depart Nome for NEC in Navajo airplane.

1200 Arrive @ NEC. Limited visibility and Cloud Ceiling @ 400'-500'. Pilot had suggested that we remain on the ground for awhile.

Location NEC / Nome Date 8/14/16

Project / Client 05DK8702 / USACE + ECC

Low cloud ceiling 400' 50°F, Light breeze

1220 Calibrated PID SN: 592-910685
Fresh air calibration: 0.0 ppm
Isobutylene cal gas: 100 ppm

1229 Calibrated YSI SN: 09G101665 (YSI # 2)
(See pg 14 for cal solution lot #s & exp date)

~~Conductivity~~

	pre-cal	post-cal
conductivity	1.403	1.413 mS/cm²
pH 7.00	7.00	7.01
pH 4.00	3.99	4.00
pH 10.00	9.98	10.06
ORP	238.1	240.0
DO	96.0%	99.6%

1245 Break for lunch.

1310 Setup at well 17MW-1
DTW = 12.10 TD = 15.65
PID: 0.0 for all spaces

1328 Start Purging
Initial turbidity = 149 NTU

* 1422 Collected GW sample 16NEC-17MW-WG

1505 Setup at well 22MW2

1540 Visitors arrive on 4-wheeler. Same visitors as yesterday. Eugene and his family out collecting water at the top of the valley.

Location NEC / Nome Date 8/14/16

Project / Client Ø5DK8702 / USACE + ECC

Windy, 45°F, overcast, 500' ceiling

* 1542	Collect GW sample 16NEC-22MW2-WG
1640	Setup at well 26MW1. Begin Purging @ 1652.
* 1737	Collected GW Sample 16NEC-26MW1-WG (see GW Sampling data sheet for details)
1815	Setup at well 20MW-1. Begin Purging @ 1823.
* 1858	Collect GW sample 16NEC-20MW-1-WG (see GW Sampling Sheet for details) Breakdown site, Return to Camp.
1958	Board Navajo and disembark for Nome.
2045	Arrive in Nome. Drop sample coolers off at office and put fresh ice on samples. - End of day

VC

Location NEC / Nome Date 8/15/16

Project / Client Ø5DK8702

Windy, 40-45°F overcast

0900	- Made morning check-in call to Bering to confirm flight to NEC. Was notified that the weather @ Savoonga looks favorable so they will attempt a flight. Requested a departure time of 1030. • Package and ship sample coolers to ALS.
1000	Arrive at Bering Air. Was notified by Don Maloney that USACE had directed ECC to resample monitoring well 14MW03 due to lack of stabilization of three parameters.
1034	Depart Nome via Navajo airplane. 1000' cloud ceiling on approach to NEC.
1140	Arrive @ NEC. Begin preparing for GW Sampling and Surface Water Stream gauging.
1158	Calibrate PID (see field book #1)
1159	Calibrate YSI (see following pg).

Location NEC / Nome Date 8/15/16

Project / Client 05DK8702

Windy, 40-45°F, overcast

YSI SN: 09G101665	pre-cal	post-cal
Dissolved Oxygen	105.5 %	99.6 %
Specific Conductance	1,398 mS/cm²	1413 mS/cm²
pH 7.00 (7.06)	7.60	7.06
pH 4.00 (4.00)	4.00	4.00
pH 10.00 (10.06)	10.06	10.06
ORP (240.0)	242.9	240.0

~~Beg~~ 1300 Samplers KR + CC setup on monitoring well 14MW03. Begin purging @ 1315.

* 1354 collect GW sample 16NEC-14MW03-WG

1454 Samplers KR + CC setup at well 14MW05.

* 1553 collect GW sample 16NEC-14MW05-WG

1640 Break

1740 Samplers KR + CC setup at well 14MW04 Begin purging @ 1801.

* 1840 Collect GW Sample 16NEC-14MW04WG

1920 Return to camp and begin preparing for departure.

2010 Depart NEC for Nome.
Total of 3 GW samples collected

Location NEC / Nome Date 8/15/16

Project / Client 05DK8702

Windy, 40-45 F, overcast

0955 Arrive at Bering Air in Nome

* Note on monitoring well 14MW04: Purge water was very turbid throughout purging process. Initial turbidity read was approximately 860 while the subsequent readings showed an error code on the instrument which indicated the water was too turbid for the instrument to read. A calibration solution was used which was read accurately.

* Tailgate safety briefing was conducted @ 1015 at Bering Air.
personnel on site: Stan Seegers, Kris Reist, Kollee Mclean, Chris Casa
Safety topics: Travel on site, flight to-from Nome/NEC, driving around Nome, exposure to weather, fatigue management

* Discarded two bags of IDW and trash from camp at Bering Air.

Location NEC / NOME Date 8/15/16

Project / Client 05DK8702

Overcast, 500'-300' ceiling, 45°F, light breeze

0900 Called Dan Mabey about having Sample locations resurveyed @ the Solo River site.
Called Scott McIntosh about resurveying the site. Scott said he will let us know his availability in two days time.

0915 Conducted morning tailgate safety meeting @ Old Alaska Rooms.
Personnel on site: Stan Seegars, Kris Root, Hollee Mclean, Chris Casa
Safety discussion: Travel and Love, Travel to NEC, working in open water exposure to elements.

1000 Arrive @ Bering Air. Disembark for NEC.

1055 Arrive @ NEC 800-900' cloud ceiling, good visibility, moderate wind, Approx 45°F
Anemometer does not appear to be working accurately.

Location NEC / NOME Date 8/15/16

Project / Client 05DK8702

Overcast @ NEC, 45°F, light - no breeze

Calibrate Instruments for GW sampling
YSI #2 SN: 096101665
(see pg 14 for Cal. solutions Lot #'s and expiration dates)

	pre-cal	post-cal
Dissolved Oxygen	101.2%	100.4%
Conductivity	1.431 mS/cm²	1.432 mS/cm²
pH 7.00 (7.01)	7.06	7.01
pH 4.00 (4.01)	3.96	4.01
pH 10.00 (10.01)	10.00	10.01
ORP	239.7	240.0

1220 Samplers KR + CC setup @ well MW88-3, Began purging @ 1233

* 1330 Collect GW sample 16NEC-MW88-3-WG

1405 Finish @ well MW88-3. Return to camp to retrieve tool kit to close well monument.

1500 Collect final total depth from well 22MW2, Return to camp to Prepare GW field equipment to move back to Nome.

1600 Sampler C.C. goes to assist the rest of the field team w/ stream water flow measurements.

Location NFC/Nome Date 8/16/16

Project / Client 05DK870C

Overcast. 500' cloud ceiling 45°F

~~Clear skies in Nome, 50°F, light breeze~~

1730 Sample K.R. goes to join the the field team w/ Stream water measurements. (Refer to fieldnote book #1) for details pertaining to Site 29)

1900 Complete Sampling and stream flow measurements along the Sugi River.

* Camp was visited by Eugene Tully and his family again. They had left a package for one of the pilots at the ~~#~~ shelter for the field team to bring back to Nome.

1955 Arrive in Nome! Discard 1 bag of camp related trash at Bering Air.

· Notify Dan Malarey of progress. Contact Scott McIntock that we will require additional survey @ NFC. He will attempt to come w/ field team tomorrow

2020 - Go to office to prepare samples for shipment to lab.

2230 End of day.

KC

Location NFC/Nome Date 8/17/16

Project / Client 05DK870C

Clear skies in Nome, 50+°F light - no breeze

0830 Return Rental truck (UCC) to the Dredge no 7 Because a balding tire was beginning to show the threads. Replaced vehicle w/ a jeep.

0900 Go to office to prepare samples for shipment.

1000 Drop sample coolers off @ Alaska Airlines

1005 Conduct Tailgate Safety Meeting @ Bering Air.

Personnel on site: Stan Scagars. Chris Losa Hollee Mclean, Kristopher Rabt

Safety Topics discussed: Fatigue management, Slips/trips/falls, travel to-from site.

1035 Depart Nome for NFC in Navajo airplane

1115 Approaching NFC. Skies look clear w/ unlimited visibility. Conducted 360° fly-over NFC for aerial photos.

1128 Arrive @ NFC. Prepare for sampling @ Site E.

1224 Field team arrives @ Site E.

1530 Four visitors came by the camp on two 4-wheelers. One of the visitors is the daughter of Eugene Tully who has a cabin 10 miles to the west. The visitors had asked the pilot if they could bring a birthday

Location NBC/Nome Date 8/17/16

Project / Client 05DK8702 / USACE + ECC

Clear skies, 60+°F, light breeze

cake for his Son's birthday. Four more visitors showed up (8 total). It was Eugene Tully and his wife and grandchildren.

1857 End sampling @ Site 8. Collected a total of 29 sediments samples and additional QA/QC samples (duplicate + MS/MSD)
- Begin site cleanup and prepare for departure back to Nome.

1932 Take off for Nome.

2015 Arrive back at Bering Air. Discarded 2 bags of trash (1 camp trash, 1 IDW).

2045 Go to office to put fresh ice on samples. Collected a total of 17 primary soil samples w/ 2 duplicates and 2 MS/MSD samples & 12 Sediment w/ 2 duplicate and 1 MS/MSD Samples.

2110 End of day

Location NBC / Nome Date 8/18/16

Project / Client 05DK8702 / USACE + ECC

Overcast, light breeze, 45°F, cloud ceiling 600-700'

0800 Morning tailgate Safety meeting @ Old Alaska Rooms.
Personnel on site: Stan Sangas, Kris Reiat
Hollee McLean, Chris Carson
Safety topics: Travel to and from Nome, fatigue management, slips/trips/falls

0830 Field team heads to office to prepare samples to ship to the lab.

0900 Called Bering Air to confirm morning flight to NBC. Followed up with Confirmation to Scott McIntock to confirm schedule for today.

0956 Arrive @ Bering Air.
Communicated w/ Kevin Maher and Dan Maloney about adjust several sample locations at Site 8.

1040 Held conference call w/ Kevin and Dan regarding plan for adjusting sample locations at Site 8 and surveying adjusted sample locations at Site 9. ~~Refer to fi~~
(Refer to field notebook #1 for details regarding which samples will be adjusted).

Location NEC/Nome Date 8/10/16

Project / Client Ø5DK870Z / USACE + ECC

Overcast in Nome. 50+ °F

1100 Board Navajo airplane for NEC. Strong petroleum odor was experienced in the cabin. Asked pilot if the smell was normal for this particular aircraft.
- Pilot conducted a walk around the plane to affirm there were no fuel leaks or for any obvious indications of source of smell. No sources of the odor were found. Field team commented again on how strong the odor was, saying it was giving people a headache. Again, team asked pilot if we could ask the maintenance people if they could confirm the source of odor. Pilot shut down aircraft and said we would use a different plane. Chris, who works in scheduling later had said the odor was not from petroleum but from "running the engines up" and/or is from new plastic, perhaps from a new tote in the plane.

1140 Board new aircraft. Pilot notified field team that source of odor in previous aircraft was due to ~~door~~ sealant material on the door.

Location NEC/NOME Date 8/10/16

Project / Client Ø5DK870Z

Windy, Overcast, 600-800' ceiling 45 °F

1250 Arrive @ NEC. Upon unloading the aircraft, the surveyor realized his tote of equipment was not loaded on to the new aircraft. Surveyor will not be able to survey the adjusted locations today. Will be available tomorrow.

1325 Calibrate PID SN: 592-910685
Zero cal gas: 00.0 ppm
Span cal gas: 100.7 ppm

1400 Field team heads to site 8 to continue sediment/soil sampling.

1808 Prepare to disembark for Nome. Field team heads to camp to clean up work area and board aircraft.

1830 Take off for Nome

1915 Arrive back at Bering Air. Field team heads to office to put fresh ice ~~of~~ on samples

2030 End of day

MC

Location NEC/NOME Date 8/19/16

Project / Client 05DK8702 / USACE + ECC

Foggy + low Cloud Ceiling in Nome, high winds and Rain

0749 Called Bering Air to check status of charter flight. Was notified that we are on a weather standby and was instructed to call back @ ~~1100~~ 0930.

0930 Called Bering Air. Still on standby. Will call again @ 1100 - Currently high winds and rain in Savoonga. Temperature in the 50°s.

1100 Called Bering Air. Spoke w/ David Olson regarding today's flight. Was told a storm is blowing through and the worst will be tomorrow. Will stand down today and call in the morning.

- Notified Scott McClintock of delay and told him that we will plan on tomorrow morning.
- Notified Dan Malony of weather delay.
- Field team heads to office to pack field equipment and prepare samples for shipment.

1400 Go to Alaska Airlines to ship equipment

Location NEC/NOME Date 8/20/16

Project / Client 05DK8702 /USACE +ECC

Nome - Foggy, rain, breezy

0757 Called Bering Air to check a status of charter flight to NEC. Was told they are not flying any scheduled flights today. Foggy in Savoonga. Will call back @ 1000

0845 Call Scott McClintock. Notified him of the weather delay. Was told that he will not be available to conduct the rest of the survey. Suggested that we survey tie in the remaining points

0900 Called Dan Malony. Notified him of weather delay and status of the survey. Requested a 300' survey tape to do survey ties.

1012 Called Bering Air to check a flight status. Still poor weather conditions in Savoonga. The NOAA weather observation at the Savoonga airport reports overcast sky w/ 200' cloud ceiling. Will call back at 1200.

Location NEC / NOME Date 8/21/16

Project / Client 05DK8702 / USACE + ECC

Nome - Overcast / foggy 45°F, rainy

Savoonga - Overcast, 45°F, windy, cloud ceiling 800'

0830 Called Bering Air for flight status to NEC. Was told by the scheduler that flights this morning. Will be contacted by Kyle (weekend manager or Dave Olson) regarding flight today.

1030 Called Bering Air. Still a stand down due to tourists' flight tours.

VK

Location NEC / NOME Date 8/22/16

Project / Client 05DK8702 / USACE + ECC

Nome - Mostly cloudy, windy, 45°F

0800 - Called Bering Air to check on flight. Was notified that conditions are favorable and will depart @ 0930.

0900 - Go to office to pick up ice and sample coolers.

0940 - Disembark Bering Air for NEC

1030 - Arrive @ NEC. Strong winds (40 mph) 40°F. The camp shelter had been blown over during the 3 day weather delay. The Tilly's had come by to secure it down. The tent is destroyed. The field equipment inside is a mess but appears serviceable.

- Contacted Dan Maloney and updated him on the situation. Was instructed to look at the adjusted sample locations to see if they can be sampled.

1200 - The lower Sagi River is several feet higher than when previously sampled.

Location NEC/Nome Date 8/22/16
Project / Client 0SDK8702 / USACE + ECC

Sample locations for Site 29 that require Survey
~~S29~~ S29-005 - Surveyed
S29-006 - Adjusted in the field, Presently submerged under water. Appears c/in 700' to location S29-005 and S29-008 which is across the river.
- S29-007 - Adjusted in the field. c/in the river. New location w/in 300' of S29-005 and S29-008. Location is about chest deep in the water.
- S29-001 - All samples ~~and~~ flow were collected at the surveyed point. extra flow measurements were collected from a better area in the stream. This location cannot be surveyed. There is only the original location of in close proximity. Maybe does not require
1300 Begin sediment / soil sampling @ Site 8

Location NEC/Nome Date 8/23/16
Project / Client 0SDK8702 / USACE + ECC
Overcast / windy / 45°F

1030 Ship field equipment provided by Jacobs Engineering back to Anchorage.
1115 Depart Bering Air for NEC.
1210 Conduct aerial survey of the estuary of the Sagi River. Land @ NEC.
1230 Conduct ground survey of the estuary. Sand bar appears leveled from the wave action. Grass on top of sand bar knocked over from waves.
Top of sand bar looks about 6' above current ocean water level. The river looks several feet higher than the ocean
- Area of Sagi River near the bridge where samples were collected appears higher than yesterday.
1245 Field team heads to Site 8 to collect survey tie measurements for select sample locations. (Refer to field book #1 for data)

APPENDIX E
Photograph Log

PHOTOGRAPH LOG
TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

TABLE OF CONTENTS (Continued)

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Photo No. 1 – 08 August 2016; 1038 hours.
Suqi River and estuary. Facing northeast.

Photo No. 2 – 08 August 2016; 1044 hours.
Field gear loaded into CASA. Facing northwest.

Photo No. 3 – 08 August 2016; 1058 hours.
Field gear unloaded from the Bering Air CASA. Facing north.

Photo No. 4 – 08 August 2016; 1113 hours.
Erecting emergency shelter along the Airstrip. Facing south.

Photo No. 5 – 08 August 2016; 1534 hours.
Emergency and field gear stored inside weatherport shelter. Inside.

Photo No. 6 – 08 August 2016; 1704 hours.
Emergency weatherport shelter, weather station, and ATV along the Airstrip. Facing northeast.

Photo No. 7 – 13 August 2016; 1522 hours.
ECO-Land LLC performing survey at Site 8. Facing west.

Photo No. 8 – 14 August 2016; 1245 hours**.**
Washout near Suqi River culvert. Facing southeast.

Photo No. 9 – 14 August 2016; 1253 hours.
Flagging placed as safety barrier around washout near Suqi River culvert. Facing southeast.

Photo No. 10 – 15 August 2016;1258 hours.
Collecting sediment from S29-010 in Suqi River estuary with hand auger. Facing southeast, flow to the northeast.

Photo No. 11 – 15 August 2016; 1305 hours.
Collecting sediment from S29-010 in Suqi River estuary with hand auger. Facing south, flow to the northeast.

Photo No. 12 – 15 August 2016; 1316 hours.
Classifying sediment from Suqi River estuary using a USCS chart at S29-010. Facing down.

Photo No. 13 – 15 August 2016; 1430 hours.
Sediment from Suqi River estuary sample location S29-008. Facing down.

Photo No. 14 – 15 August 2016; 1522 hours.
Method used to locate actual proposed sample location for S29-006 in Suqi River estuary.
Facing south, flow to the northeast.

Photo No. 15 – 15 August 2016; 1555 hours.
Organic layer encountered and removed prior to sampling sediment at Suqi River sample location S29-009. Facing down.

Photo No. 16 – 15 August 2016; 1740 hours.
Terminus of the Suqi River estuary, berm, and Bering Sea. For Northeast Cape (No. 2435), using Nome as a reference station, predicted low tide (0.1 ft mean lower low water) at 1609 on 15 August 2016 and high tide (1.8 ft mean lower low water at 0115 on 16 August 2016. Data Source: NOAA Tide Tables 2016: High and Low Water Predictions. Facing east.

Photo No. 17 – 15 August 2016; 1740 hours.
Terminus of the Suqi River estuary, berm, and Bering Sea. For Northeast Cape (No. 2435), using Nome as a reference station, predicted low tide (0.1 ft mean lower low water) at 1609 on 15 August 2016 and high tide (1.8 ft mean lower low water at 0115 on 16 August 2016. Data Source: NOAA Tide Tables 2016: High and Low Water Predictions. Facing east.

Photo No. 18 – 15 August 2016, 1933 hours.
Sheen observed prior to collecting sediment from Suqi River sample location S29-003. Facing down.

Photo No. 19 – 15 August 2016; 1942 hours.
Collecting sediment from peat and gravel sample at Suqi River sample location S29-003. Facing down.

Photo No. 20 – 16 August 2016; 1306 hours.
Debris in Suqi River near Suqi River cross section S29-002. Facing down, flow to the west (right).

Photo No. 21 – 16 August 2016; 1524 hours.
Collecting depth measurements along the tag line at Suqi River cross section S29-004; while the source of the downstream foam was not investigated, it is likely the result of natural decomposition. Facing northeast, flow to the northeast.

Photo No. 22 – 16 August 2016; 1632 hours.
Suqi River cross section S29-002. Facing east, flow to the west.

Photo No. 23 – 16 August 2016; 1641 hours.
Collecting the depth measurement at the midpoint of the Suqi River at cross section S29-002.
Facing down, flow to the west (right).

Photo No. 24 – 17 August 2016, 1358 hours.
Soil and sediment sampling at Site 8. Facing west.

Photo No. 25 – 17 August 2016, 1400 hours.
Decontaminating sample collection equipment during soil and sediment sampling at Site 8. Facing west.

Photo No. 26 – 17 August 2016, 1419 hours.
Soil and sediment sampling at Site 8 UDU. Facing southeast.

Photo No. 27 – 17 August 2016, 1638 hours.
Soil and sediment sampling at Site 8 UDU. Facing east.

Photo No. 28 – 17 August 2016, 1709 hours.
Typical depth of samples (1 to 2 feet bgs) collected from Site 8; ; this sample was collected southwest of the UDU and northwest of the MDU from SS-045. Facing down.

Photo No. 29 – 18 August 2016, 1343 hours.
Slope and extent of road toe along the MDU and LDU at Site 8. Facing south.

Photo No. 30 – 18 August 2016, 1411 hours.
Survey lathe with blue flagging (left edge of photo) represents the adjusted Site 8 sample location for S08-073 (right edge of photo); both the original proposed and adjusted sample location are east of the MDU. Facing northeast.

Photo No. 31 – 18 August 2016, 1655 hours.
Site 8 sample collection at S08-020 in the LDU. Facing down.

Photo No. 32 – 18 August 2016, 1705 hours.
Site 8 sample collection at S08-020 in the LDU. Facing down.

Photo No. 33 – 18 August 2016, 1732 hours.
Collecting sample S08-020 at from the LDU at Site 8, a saturated coarse gravel and sand surface soil. Facing down.

Photo No. 34 – 18 August 2016, 1738 hours.
Soil sampling on a tussock at Site 8 location SS-024 near the southwestern edge of the MDU. Facing northwest.

Photo No. 35 – 18 August 2016, 1757 hours.
Soil sampling on a tussock at Site 8 sample location SS-023 west of the MDU and LDU boundaries. Facing northwest.

Photo No. 36 – 22 August 2016, 1038 hours.
Location of emergency shelter along the Airstrip after storm event. Facing east.

Photo No. 37 – 22 August 2016, 1040 hours.
State of equipment in emergency shelter upon arrival to NEC after storm event. Inside.

Photo No. 38 – 22 August 2016, 1105 hours.
Water in drip pan after storm event. Facing down.

Photo No. 39 – 23 August 2016, 1236 hours.
Terminus of the Suqi River estuary, berm, and Bering Sea after storm event. For Northeast Cape (No. 2435), using Nome as a reference station, predicted low tide (0.2 ft mean lower low water) at 0936 on 23 August 2016 and high tide (2.2 ft mean lower low water at 1539 on 23 August 2016. Data Source: NOAA Tide Tables 2016: High and Low Water Predictions. Facing east.

APPENDIX F
Survey Data

Gmail by Google

Scott McClintock <nomesurveyor@gmail.com>

OPUS solution : 52701880.09o OP1385486917463

1 message

opus <opus@ngs.noaa.gov> Tue, Nov 26, 2013 at 11:30 AM
Reply-To: ngs.opus@noaa.gov
To: nomesurveyor@gmail.com

FILE: 52701880.09o OP1385486917463

NGS OPUS SOLUTION REPORT
========================

All computed coordinate accuracies are listed as peak-to-peak values.
For additional information: http://www.ngs.noaa.gov/OPUS/about.jsp#accuracy

USER: nomesurveyor@gmail.com DATE: November 26, 2013
RINEX FILE: 5270188p.09o TIME: 17:30:12 UTC

SOFTWARE: page5 1209.04 master93.pl 072313 START: 2009/07/07 15:03:00
EPHEMERIS: igs15392.eph [precise] STOP: 2009/07/07 23:37:00
NAV FILE: brdc1880.09n OBS USED: 18860 / 21412 : 88%
ANT NAME: SPP39105.90 NONE # FIXED AMB: 132 / 149 : 89%
ARP HEIGHT: 1.763 OVERALL RMS: 0.017(m)

REF FRAME: NAD_83(2011)(EPOCH:2010.0000) IGS08 (EPOCH:2009.5146)

X:	-2817926.174(m)	0.009(m)	-2817927.148(m)	0.009(m)
Y:	-549234.893(m)	0.003(m)	-549233.866(m)	0.003(m)
Z:	5676379.646(m)	0.005(m)	5676380.116(m)	0.005(m)
LAT:	63 19 32.49100	0.011(m)	63 19 32.47589	0.011(m)
E LON:	191 1 44.76780	0.001(m)	191 1 44.68199	0.001(m)
W LON:	168 58 15.23220	0.001(m)	168 58 15.31801	0.001(m)
EL HGT:	45.26' 13.794(m)	0.001(m)	14.555(m)	0.001(m)
ORTHO HGT:	8.837(m) 28.99	0.006(m) [NAVD88 (Computed using GEOID12A)]		

	UTM COORDINATES UTM (Zone 02)	STATE PLANE COORDINATES SPC (5009 AK 9)	
Northing (Y) [meters]	7023485.836	1039081.435	3409052.9734
Easting (X) [meters]	601619.811	551558.886	1809572.7601
Convergence [degrees]	1.81330383	0.91959769	
Point Scale	0.99972647	0.99993255	
Combined Factor	0.99972431	0.99993039	

US NATIONAL GRID DESIGNATOR: 2VPR0161923485(NAD 83)

BASE STATIONS USED

PID DESIGNATION LATITUDE LONGITUDE DISTANCE(m)

File> C:\Users\Scott\Documents\NOME\16-JOBS\AK16-017\SURVEY DATA\AK16-017.crd
Job Description> N.E. Cape Sample Locations
Job Number>AK16-017 Survey Date> 08/13/2016
Projection: State Plane 83: AK Zone 9
Lat/Lon Datum: WGS84
Geoid: GEOID 2012A

(NOTE: "As-Surveyed" points are designated with a "S")

Point#	Northing	Easting	Elevation	Latitude (DMS)	Longitude (DMS)	Grid Scale(Grd->Gnd)
1	3405354.8025	1812033.0154	0	N63°18'55.6966"	W168°57'22.6783"	1.00006650483215
1S	3405354.7931	1812033.0167	56.4	N63°18'55.6965"	W168°57'22.6783"	1.00006650483174
2	3405354.8028	1812053.0148	0	N63°18'55.6934"	W168°57'22.2405"	1.00006649702291
2S	3405354.7880	1812053.0188	41.5	N63°18'55.6933"	W168°57'22.2404"	1.00006649702139
3	3405354.8028	1812073.0148	0	N63°18'55.6902"	W168°57'21.8027"	1.00006648921240
3S	3405354.7971	1812073.0249	42.1	N63°18'55.6901"	W168°57'21.8025"	1.00006648920844
4	3405354.8028	1812093.0148	0	N63°18'55.6870"	W168°57'21.3649"	1.00006648140116
4S	3405354.7904	1812093.0103	43.3	N63°18'55.6869"	W168°57'21.3650"	1.00006648140286
5	3405374.8028	1812033.0148	0	N63°18'55.8935"	W168°57'22.6712"	1.00006650483280
5S	3405374.7906	1812033.0096	40.8	N63°18'55.8934"	W168°57'22.6713"	1.00006650483486
6	3405374.8028	1812053.0148	0	N63°18'55.8903"	W168°57'22.2334"	1.00006649702321
6S	3405374.7881	1812053.0146	41.2	N63°18'55.8901"	W168°57'22.2334"	1.00006649702329
7	3405374.8028	1812073.0148	0	N63°18'55.8871"	W168°57'21.7956"	1.00006648921289
7S	3405374.8328	1812073.0226	41.1	N63°18'55.8874"	W168°57'21.7954"	1.00006648920969
8	3405374.8028	1812093.0148	0	N63°18'55.8839"	W168°57'21.3578"	1.00006648140148
8S	3405374.8289	1812093.0277	41.5	N63°18'55.8841"	W168°57'21.3575"	1.00006648139647
9	3405394.8028	1812033.0148	0	N63°18'56.0903"	W168°57'22.6641"	1.00006650483325
9S	3405394.7999	1812033.0198	41.0	N63°18'56.0903"	W168°57'22.6639"	1.00006650483127
10	3405394.8028	1812053.0148	0	N63°18'56.0871"	W168°57'22.2263"	1.00006649702368
10S	3405394.8004	1812053.0269	41.1	N63°18'56.0871"	W168°57'22.2260"	1.00006649701884
11	3405394.8028	1812073.0148	0	N63°18'56.0839"	W168°57'21.7885"	1.00006648921319
11S	3405394.8022	1812073.0026	41.1	N63°18'56.0839"	W168°57'21.7887"	1.00006648921783
12	3405394.8028	1812093.0148	0	N63°18'56.0807"	W168°57'21.3507"	1.00006648140180
12S	3405394.8163	1812093.0288	41.7	N63°18'56.0809"	W168°57'21.3504"	1.00006648139636
13	3405394.8028	1812113.0148	0	N63°18'56.0775"	W168°57'20.9129"	1.00006647358950
13S	3405394.8044	1812113.0071	42.8	N63°18'56.0775"	W168°57'20.9131"	1.00006647359254
14	3405414.8028	1812033.0156	0	N63°18'56.2872"	W168°57'22.6569"	1.00006650483317
14S	3405414.8117	1812032.9951	41.2	N63°18'56.2873"	W168°57'22.6574"	1.00006650484125
15	3405414.8028	1812053.0152	0	N63°18'56.2840"	W168°57'22.2191"	1.00006649702379
15S	3405414.8147	1812053.0401	41.3	N63°18'56.2841"	W168°57'22.2186"	1.00006649701406
16	3405414.8028	1812073.0148	0	N63°18'56.2808"	W168°57'21.7813"	1.00006648921350
16S	3405414.8256	1812073.0009	41.4	N63°18'56.2810"	W168°57'21.7816"	1.00006648921900
17	3405414.8028	1812093.0148	0	N63°18'56.2776"	W168°57'21.3436"	1.00006648140213
17S	3405414.7999	1812093.0525	41.6	N63°18'56.2776"	W168°57'21.3427"	1.00006648138747
18	3405434.8028	1812073.0148	0	N63°18'56.4777"	W168°57'21.7742"	1.00006648921381
18S	3405434.8104	1812073.0035	42.8	N63°18'56.4777"	W168°57'21.7745"	1.00006648921832
19	3405434.8028	1812093.0148	0	N63°18'56.4745"	W168°57'21.3364"	1.00006648140245
19S	3405434.8217	1812093.0356	43.7	N63°18'56.4746"	W168°57'21.3360"	1.00006648139436
20	3405434.8028	1812113.0148	0	N63°18'56.4713"	W168°57'20.8986"	1.00006647359018
20S	3405434.7953	1812113.0212	42.9	N63°18'56.4712"	W168°57'20.8985"	1.00006647358763
21	3405434.8028	1812133.0148	0	N63°18'56.4681"	W168°57'20.4608"	1.00006646577699
21S	3405434.7172	1812132.0741	43.7	N63°18'56.4674"	W168°57'20.4815"	1.00006646614447
22	3405454.8033	1812053.0152	0	N63°18'56.6777"	W168°57'22.2049"	1.00006649702456
22S	3405454.8101	1812053.0030	43.7	N63°18'56.6778"	W168°57'22.2051"	1.00006649702925
23	3405454.8028	1812073.0148	0	N63°18'56.6745"	W168°57'21.7671"	1.00006648921412
23S	3405454.8043	1812073.0086	46.4	N63°18'56.6746"	W168°57'21.7672"	1.00006648921663
24	3405454.8028	1812093.0148	0	N63°18'56.6713"	W168°57'21.3293"	1.00006648140277
24S	3405454.8071	1812093.0075	45.8	N63°18'56.6714"	W168°57'21.3295"	1.00006648140565
25	3405454.8028	1812113.0148	0	N63°18'56.6681"	W168°57'20.8915"	1.00006647359052
25S	3405454.7994	1812112.9996	43.2	N63°18'56.6681"	W168°57'20.8918"	1.00006647359638
26	3405454.8028	1812133.0148	0	N63°18'56.6649"	W168°57'20.4537"	1.00006646577735
26S	3405454.8075	1812133.0173	43.5	N63°18'56.6650"	W168°57'20.4537"	1.00006646577630
27	3405474.8028	1812093.0148	0	N63°18'56.8682"	W168°57'21.3222"	1.00006648140310
27S	3405474.7977	1812092.9985	47.0	N63°18'56.8682"	W168°57'21.3225"	1.00006648140949
28	3405474.8028	1812113.0148	0	N63°18'56.8650"	W168°57'20.8844"	1.00006647359085
28S	3405474.8134	1812113.0241	45.3	N63°18'56.8651"	W168°57'20.8842"	1.00006647358718
29	3405474.8028	1812133.0148	0	N63°18'56.8618"	W168°57'20.4466"	1.00006646577770
29S	3405474.7905	1812133.0290	43.8	N63°18'56.8617"	W168°57'20.4463"	1.00006646577209
30	3405474.8028	1812153.0148	0	N63°18'56.8586"	W168°57'20.0088"	1.00006645796363
30S	3405474.7787	1812153.0280	44.3	N63°18'56.8583"	W168°57'20.0085"	1.00006645795848
31	3405494.8020	1812073.0148	0	N63°18'57.0683"	W168°57'21.7528"	1.00006648921491
31S	3405494.7969	1812073.0178	46.9	N63°18'57.0682"	W168°57'21.7528"	1.00006648921363
32	3405494.8024	1812093.0148	0	N63°18'57.0651"	W168°57'21.3150"	1.00006648140342
32S	3405494.7921	1812093.0244	46.9	N63°18'57.0650"	W168°57'21.3148"	1.00006648139979
33	3405494.8028	1812113.0148	0	N63°18'57.0619"	W168°57'20.8773"	1.00006647359119
33S	3405494.7947	1812113.0231	44.2	N63°18'57.0618"	W168°57'20.8771"	1.00006647358793

34	3405494.8028	1812133.0148	0	N63°18'57.0587"	W168°57'20.4395"	1.00006646577805
34S	3405494.8166	1812133.0266	43.8	N63°18'57.0588"	W168°57'20.4392"	1.00006646577332
35	3405494.8028	1812153.0148	0	N63°18'57.0554"	W168°57'20.0017"	1.00006645796383
35S	3405494.7971	1812153.0426	43.6	N63°18'57.0554"	W168°57'20.0011"	1.00006645795308
36	3405514.8028	1812113.0148	0	N63°18'57.2587"	W168°57'20.8701"	1.00006647359153
36S	3405514.7931	1812113.0369	44.3	N63°18'57.2586"	W168°57'20.8696"	1.00006647358291
37	3405514.8028	1812133.0148	0	N63°18'57.2555"	W168°57'20.4323"	1.00006646577841
37S	3405514.8190	1812133.0416	43.5	N63°18'57.2557"	W168°57'20.4317"	1.00006646576798
38	3405514.8028	1812153.0148	0	N63°18'57.2523"	W168°57'19.9945"	1.00006645796420
38S	3405514.8111	1812153.0437	43.8	N63°18'57.2524"	W168°57'19.9939"	1.00006645795300
39	3405514.8028	1812173.0148	0	N63°18'57.2491"	W168°57'19.5567"	1.00006645014925
39S	3405514.8076	1812173.0047	45.0	N63°18'57.2492"	W168°57'19.5570"	1.00006645015321
40	3405534.8028	1812073.0147	0	N63°18'57.4620"	W168°57'21.7386"	1.00006648921554
40S	3405534.8082	1812073.0344	44.7	N63°18'57.4621"	W168°57'21.7382"	1.00006648920791
41	3405534.5316	1812112.9236	0	N63°18'57.4529"	W168°57'20.8651"	1.00006647362744
41S	3405534.5155	1812112.9322	44.0	N63°18'57.4528"	W168°57'20.8649"	1.00006647362413
42	3405534.8028	1812133.0148	0	N63°18'57.4524"	W168°57'20.4252"	1.00006646577877
42S	3405534.7916	1812133.0279	44.0	N63°18'57.4523"	W168°57'20.4249"	1.00006646577352
43	3405534.8028	1812153.0148	0	N63°18'57.4492"	W168°57'19.9874"	1.00006645796456
43S	3405534.7889	1812153.0098	43.7	N63°18'57.4490"	W168°57'19.9875"	1.00006645796662
44	3405534.8028	1812173.0148	0	N63°18'57.4460"	W168°57'19.5496"	1.00006645014964
44S	3405534.8127	1812172.9960	44.1	N63°18'57.4461"	W168°57'19.5500"	1.00006645015702
45	3405554.2603	1812112.8325	0	N63°18'57.6472"	W168°57'20.8600"	1.00006647366353
45S	3405554.2432	1812112.8496	45.1	N63°18'57.6470"	W168°57'20.8597"	1.00006647365682
46	3405554.8028	1812153.0148	0	N63°18'57.6461"	W168°57'19.9803"	1.00006645796494
46S	3405554.7968	1812153.0193	44.9	N63°18'57.6460"	W168°57'19.9802"	1.00006645796311
47	3405554.8028	1812173.0148	0	N63°18'57.6428"	W168°57'19.5425"	1.00006645015002
47S	3405554.7917	1812173.0165	44.9	N63°18'57.6427"	W168°57'19.5424"	1.00006645014924
48	3405574.8048	1812133.0139	0	N63°18'57.8461"	W168°57'20.4110"	1.00006646577967
48S	3405574.8281	1812133.0153	49.4	N63°18'57.8464"	W168°57'20.4109"	1.00006646577928
49	3405574.8028	1812153.0148	0	N63°18'57.8429"	W168°57'19.9731"	1.00006645796531
49S	3405574.7921	1812153.0347	45.2	N63°18'57.8428"	W168°57'19.9727"	1.00006645795757
50	3405574.8028	1812173.0148	0	N63°18'57.8397"	W168°57'19.5353"	1.00006645015023
50S	3405574.8157	1812173.0112	46.4	N63°18'57.8398"	W168°57'19.5354"	1.00006645015174
51	3405593.4654	1812133.3752	0	N63°18'58.0298"	W168°57'20.3964"	1.00006646563887
51S	3405593.4731	1812133.3593	47.9	N63°18'58.0298"	W168°57'20.3967"	1.00006646564517
52	3405594.8028	1812153.0148	0	N63°18'58.0398"	W168°57'19.9660"	1.00006645796569
52S	3405594.7921	1812153.0098	46.0	N63°18'58.0397"	W168°57'19.9661"	1.00006645796758
53	3405594.8028	1812173.0148	0	N63°18'58.0366"	W168°57'19.5282"	1.00006645015062
53S	3405594.7694	1812173.0294	45.0	N63°18'58.0362"	W168°57'19.5279"	1.00006645014487
54	3405594.8028	1812193.0148	0	N63°18'58.0334"	W168°57'19.0904"	1.00006644233464
54S	3405594.8066	1812193.0221	46.1	N63°18'58.0334"	W168°57'19.0903"	1.00006644233181
55	3405614.8028	1812153.0148	0	N63°18'58.2367"	W168°57'19.9589"	1.00006645796605
55S	3405614.7783	1812153.0467	46.6	N63°18'58.2364"	W168°57'19.9582"	1.00006645795358
56S	3405614.8028	1812173.0148	46.5	N63°18'58.2334"	W168°57'19.5211"	1.00006645015101
57	3405614.8028	1812193.0148	0	N63°18'58.2302"	W168°57'19.0833"	1.00006644233505
57S	3405614.7874	1812192.9787	46.2	N63°18'58.2301"	W168°57'19.0841"	1.00006644234923
58	3405634.8046	1812133.0139	0	N63°18'58.4367"	W168°57'20.3896"	1.00006646578075
58S	3405634.8089	1812133.0144	48.8	N63°18'58.4368"	W168°57'20.3896"	1.00006646578059
59	3405634.8028	1812153.0148	0	N63°18'58.4335"	W168°57'19.9517"	1.00006645796625
59S	3405634.8172	1812153.0315	46.6	N63°18'58.4337"	W168°57'19.9514"	1.00006645795974
60	3405634.8028	1812173.0148	0	N63°18'58.4303"	W168°57'19.5139"	1.00006645015140
60S	3405634.7820	1812173.0210	46.3	N63°18'58.4301"	W168°57'19.5138"	1.00006645014894
61	3405634.8028	1812193.0148	0	N63°18'58.4271"	W168°57'19.0761"	1.00006644233545
61S	3405634.8202	1812193.0131	46.2	N63°18'58.4273"	W168°57'19.0762"	1.00006644233610
62	3405654.8028	1812153.0148	0	N63°18'58.6304"	W168°57'19.9446"	1.00006645796663
62S	3405654.7908	1812153.0306	46.4	N63°18'58.6303"	W168°57'19.9443"	1.00006645796048
63	3405654.8028	1812173.0148	0	N63°18'58.6272"	W168°57'19.5068"	1.00006645015160
63S	3405654.8001	1812173.0253	46.5	N63°18'58.6272"	W168°57'19.5066"	1.00006645014748
64	3405654.8028	1812193.0148	0	N63°18'58.6240"	W168°57'19.0690"	1.00006644233568
64S	3405654.8362	1812193.0037	46.8	N63°18'58.6243"	W168°57'19.0692"	1.00006644234000
65	3405674.8028	1812153.0148	0	N63°18'58.8273"	W168°57'19.9375"	1.00006645796700
65S	3405674.7980	1812153.0264	47.1	N63°18'58.8272"	W168°57'19.9372"	1.00006645796251
66	3405674.8028	1812173.0148	0	N63°18'58.8241"	W168°57'19.4997"	1.00006645015199
66S	3405674.8499	1812173.0110	47.1	N63°18'58.8245"	W168°57'19.4997"	1.00006645015354
67	3405674.8028	1812193.0148	0	N63°18'58.8208"	W168°57'19.0619"	1.00006644233608
67S	3405674.7998	1812193.0073	47.3	N63°18'58.8208"	W168°57'19.0620"	1.00006644233909
68	3405409.8028	1812108.0148	0	N63°18'56.2260"	W168°57'21.0170"	1.00006647554291
68S	3405409.8125	1812108.0047	42.1	N63°18'56.2261"	W168°57'21.0172"	1.00006647554690
69	3405409.8028	1812118.0148	0	N63°18'56.2244"	W168°57'20.7981"	1.00006647163645
69S	3405409.7862	1812118.0133	42.6	N63°18'56.2242"	W168°57'20.7981"	1.00006647163706
70	3405419.8028	1812108.0148	0	N63°18'56.3244"	W168°57'21.0134"	1.00006647554299
70S	3405419.8146	1812108.0268	42.3	N63°18'56.3245"	W168°57'21.0132"	1.00006647553842
71	3405419.8028	1812118.0148	0	N63°18'56.3228"	W168°57'20.7945"	1.00006647163671
71S	3405419.8069	1812118.0146	42.3	N63°18'56.3228"	W168°57'20.7945"	1.00006647163674
72	3405454.6605	1812140.4922	0	N63°18'56.6623"	W168°57'20.2901"	1.00006646285592
72S	3405454.6526	1812140.4874	43.7	N63°18'56.6622"	W168°57'20.2902"	1.00006646285784

73	3405454.6605	1812150.4922	0	N63°18'56.6607"	W168°57'20.0712"	1.00006645894892
73S	3405454.6600	1812150.4945	45.4	N63°18'56.6607"	W168°57'20.0711"	1.00006645894802
74	3405464.6605	1812140.4922	0	N63°18'56.7608"	W168°57'20.2865"	1.00006646285619
74S	3405464.6708	1812140.4934	43.4	N63°18'56.7609"	W168°57'20.2865"	1.00006646285572
75	3405464.6605	1812150.4922	0	N63°18'56.7592"	W168°57'20.0676"	1.00006645894901
75S	3405464.6566	1812150.4826	44.5	N63°18'56.7591"	W168°57'20.0678"	1.00006645895273
76	3409097.8668	1810061.6167	0	N63°19'32.8552"	W168°58'04.5122"	1.00006727021731
76S	3409098.0629	1810061.5522	6.0	N63°19'32.8572"	W168°58'04.5136"	1.00006727024232
77	3408989.2788	1809883.2221	0	N63°19'31.8146"	W168°58'08.4568"	1.00006733903423
77S	3408989.2956	1809883.2244	9.0	N63°19'31.8148"	W168°58'08.4568"	1.00006733903327
78	3405575.8969	1810985.1574	0	N63°18'58.0403"	W168°57'45.5370"	1.00006691272849
78S	3405575.0291	1810985.0985	37.1	N63°18'58.0318"	W168°57'45.5386"	1.00006691275139
79	3405585.0370	1811417.7898	0	N63°18'58.0613"	W168°57'36.0635"	1.00006674462361
79S	3405585.0080	1811417.8273	39.2	N63°18'58.0610"	W168°57'36.0627"	1.00006674460903
80	3409845.2020	1810703.7594	0	N63°19'40.1096"	W168°57'50.1866"	1.00006702191352
80S	3409845.1866	1810703.7570	5.4	N63°19'40.1094"	W168°57'50.1867"	1.00006702191448
81	3409760.6872	1810824.2402	0	N63°19'39.2585"	W168°57'47.5781"	1.00006697521774
81S	3409760.6587	1810824.2471	5.4	N63°19'39.2582"	W168°57'47.5780"	1.00006697521491
82	3409313.1244	1810196.1896	0	N63°19'34.9528"	W168°58'01.4895"	1.00006721825933
82S	3409313.1760	1810196.1655	6.6	N63°19'34.9533"	W168°58'01.4900"	1.00006721826865
83	3409253.4394	1810252.8032	0	N63°19'34.3563"	W168°58'00.2709"	1.00006719638632
83S	3409221.4514	1810252.7521	6.3	N63°19'34.0414"	W168°58'00.2833"	1.00006719640539
84	3409181.5346	1810180.6949	0	N63°19'33.6599"	W168°58'01.8752"	1.00006722424209
84S	3409151.3101	1810168.8917	6.5	N63°19'33.3643"	W168°58'02.1443"	1.00006722880028
85	3409087.7546	1810139.2777	0	N63°19'32.7434"	W168°58'02.8152"	1.00006724023548
85S	3409076.8758	1810139.1907	6.6	N63°19'32.6363"	W168°58'02.8210"	1.00006724026904

----- Grand Total -----

Min X: 1809883.2221 Max X: 1812193.0221

Min Y: 3405354.7880 Max Y: 3409845.2020

Min Z: 0 Max Z: 56.4

Number of points listed> 169

Northeast Cape FUDS 2016 Surface Water and Sediment Sampling Activities
Table F-1.1 Sample Locations at Site 8

Sample ID	Northing	Easting	Elevation (feet)	Description	Date and Time	
S08-001	3405354.79	1812033.02	56.4	Sample location	8/13/16	18:07:03
S08-002	3405354.79	1812053.02	41.5	Sample location	8/13/16	18:09:29
S08-003	3405354.80	1812073.02	42.1	Sample location	8/13/16	18:12:50
S08-004[1]	3405354.79	1812093.01	43.3	Sample location	8/18/16	13:50:00
S08-005	3405374.79	1812033.01	40.8	Sample location	8/13/16	18:03:12
S08-006	3405374.79	1812053.01	41.2	Sample location	8/13/16	17:59:45
S08-007	3405374.83	1812073.02	41.1	Sample location	8/13/16	17:56:32
S08-008	3405374.83	1812093.03	41.5	Sample location	8/13/16	17:53:55
S08-009	3405394.80	1812033.02	41.0	Sample location	8/13/16	17:33:39
S08-010	3405394.80	1812053.03	41.1	Sample location	8/13/16	17:36:59
S08-011	3405394.80	1812073.00	41.1	Sample location	8/13/16	17:39:36
S08-012	3405394.82	1812093.03	41.7	Sample location	8/13/16	17:45:42
S08-013[1]	3405394.80	1812113.01	42.8	Sample location	8/18/16	13:55:00
S08-014	3405414.81	1812033.00	41.2	Sample location	8/13/16	17:30:08
S08-015	3405414.81	1812053.04	41.3	Sample location	8/13/16	17:26:40
S08-016	3405414.83	1812073.00	41.4	Sample location	8/13/16	17:23:12
S08-017	3405414.80	1812093.05	41.6	Sample location	8/13/16	17:19:52
S08-018	3405434.81	1812073.00	42.8	Sample location	8/13/16	17:01:40
S08-019	3405434.82	1812093.04	43.7	Sample location	8/13/16	17:06:11
S08-020	3405434.80	1812113.02	42.9	Sample location	8/13/16	17:09:59
S08-021[1]	3405434.72	1812132.07	43.7	Sample location	8/18/16	14:05:00
S08-022	3405454.81	1812053.00	43.7	Sample location	8/13/16	16:57:06
S08-023	3405454.80	1812073.01	46.4	Sample location	8/13/16	16:54:19
S08-024	3405454.81	1812093.01	45.8	Sample location	8/13/16	16:51:29
S08-025	3405454.80	1812113.00	43.2	Sample location	8/13/16	16:47:52
S08-026	3405454.81	1812133.02	43.5	Sample location	8/13/16	16:44:57
S08-027	3405474.80	1812093.00	47.0	Sample location	8/13/16	16:14:23
S08-028	3405474.81	1812113.02	45.3	Sample location	8/13/16	16:18:37
S08-029	3405474.79	1812133.03	43.8	Sample location	8/13/16	16:21:33
S08-030	3405474.78	1812153.03	44.3	Sample location	8/13/16	16:24:40
S08-031	3405494.80	1812073.02	46.9	Sample location	8/13/16	16:09:08
S08-032	3405494.79	1812093.02	46.9	Sample location	8/13/16	16:05:58
S08-033	3405494.79	1812113.02	44.2	Sample location	8/13/16	16:03:00
S08-034	3405494.82	1812133.03	43.8	Sample location	8/13/16	16:00:57
S08-035	3405494.80	1812153.04	43.6	Sample location	8/13/16	15:57:27
S08-036	3405514.79	1812113.04	44.3	Sample location	8/13/16	15:29:29
S08-037	3405514.82	1812133.04	43.5	Sample location	8/13/16	15:36:46
S08-038	3405514.81	1812153.04	43.8	Sample location	8/13/16	15:39:59
S08-039[1]	3405514.81	1812173.00	45.0	Sample location	8/18/16	14:25:00
S08-040	3405534.81	1812073.03	44.7	Sample location	8/13/16	15:22:14
S08-041	3405534.52	1812112.93	44.0	Sample location	8/13/16	15:19:06
S08-042	3405534.79	1812133.03	44.0	Sample location	8/13/16	15:16:04
S08-043	3405534.79	1812153.01	43.7	Sample location	8/13/16	15:12:25
S08-044	3405534.81	1812173.00	44.1	Sample location	8/13/16	15:09:09

Northeast Cape FUDS 2016 Surface Water and Sediment Sampling Activities
Table F-1.1 Sample Locations at Site 8

Sample ID	Northing	Easting	Elevation (feet)	Description	Date and Time	
S08-045	3405554.24	1812112.85	45.1	Sample location	8/13/16	14:53:54
S08-046	3405554.80	1812153.02	44.9	Sample location	8/13/16	14:57:59
S08-047	3405554.79	1812173.02	44.9	Sample location	8/13/16	15:01:20
S08-048	3405574.83	1812133.02	49.4	Sample location	8/13/16	14:42:51
S08-049	3405574.79	1812153.03	45.2	Sample location	8/13/16	14:46:03
S08-050	3405574.82	1812173.01	46.4	Sample location	8/13/16	14:51:15
S08-051	3405593.47	1812133.36	47.9	Sample location	8/13/16	14:32:45
S08-052	3405594.79	1812153.01	46.0	Sample location	8/13/16	14:35:16
S08-053	3405594.77	1812173.03	45.0	Sample location	8/13/16	14:38:58
S08-054[1]	3405594.81	1812193.02	46.1	Sample location	8/18/16	14:10:00
S08-055	3405614.78	1812153.05	46.6	Sample location	8/13/16	14:24:55
S08-056	3405614.80	1812173.01	46.5	Sample location	8/13/16	lost data
S08-057	3405614.79	1812192.98	46.2	Sample location	8/13/16	13:42:38
S08-058	3405634.81	1812133.01	48.8	Sample location	8/13/16	14:15:06
S08-059	3405634.82	1812153.03	46.6	Sample location	8/13/16	14:17:55
S08-060	3405634.78	1812173.02	46.3	Sample location	8/13/16	14:20:37
S08-061	3405634.82	1812193.01	46.2	Sample location	8/13/16	13:38:32
S08-062	3405654.79	1812153.03	46.4	Sample location	8/13/16	13:58:57
S08-063	3405654.80	1812173.03	46.5	Sample location	8/13/16	14:11:57
S08-064	3405654.84	1812193.00	46.8	Sample location	8/13/16	13:36:16
S08-065	3405674.80	1812153.03	47.1	Sample location	8/13/16	13:55:57
S08-066	3405674.85	1812173.01	47.1	Sample location	8/13/16	13:52:56
S08-067	3405674.80	1812193.01	47.3	Sample location	8/13/16	13:32:19
S08-068	3405409.81	1812108.00	42.1	Sample location	8/13/16	18:24:33
S08-069	3405409.79	1812118.01	42.6	Sample location	8/13/16	18:27:41
S08-070	3405419.81	1812108.03	42.3	Sample location	8/13/16	18:31:35
S08-071	3405419.81	1812118.01	42.3	Sample location	8/13/16	18:34:39
S08-072	3405454.65	1812140.49	43.7	Sample location	8/13/16	18:39:33
S08-073[1]	3405454.66	1812150.49	45.4	Sample location	8/18/16	14:15:00
S08-074	3405464.67	1812140.49	43.4	Sample location	8/13/16	18:47:22
S08-075[1]	3405464.66	1812150.48	44.5	Sample location	8/18/16	14:20:00

Note:

[1] Elevation and time are approximate.

Northeast Cape FUDS 2016 Surface Water and Sediment Sampling Activities
Table F-1.2 Sample Locations at Suqi River

Sample ID	Northing	Easting	Elevation (feet)	Description	Date and Time	
S29-001	3405585.01	1811417.83	39.20	Sample location	8/13/16	13:00:23
S29-002	3405575.03	1810985.10	37.10	Sample location	8/13/16	13:07:02
S29-003	3408989.30	1809883.22	9.00	Sample location	8/13/16	11:37:50
S29-004	3409098.06	1810061.55	6.00	Sample location	8/13/16	lost data
S29-005[1]	3409087.75	1810139.28	6.60	Sample location	8/15/16	15:35:00
S29-006[1]	3409181.53	1810180.69	6.50	Sample location	8/15/16	15:25:00
S29-007[1]	3409253.44	1810252.80	6.30	Sample location	8/15/16	15:15:00
S29-008	3409313.18	1810196.17	6.60	Sample location	8/13/16	12:21:30
S29-009	3409760.66	1810824.25	5.40	Sample location	8/13/16	19:21:04
S29-010	3409845.19	1810703.76	5.40	Sample location	8/13/16	19:44:42

Note:

[1] Northing, easting, elevation, and time are approximate. Due to unsafe conditions, locations were not re-surveyed.

APPENDIX G
Silica Gel Cleanup Comparison at Site 8

Northeast Cape FUDS 2016 Surface Water and Sediment Sampling Activities
Silica Gel Cleanup Comparison at Site 8 for DRO and RRO

Decision Unit	Sample ID	Sample Year	DRO mg/kg	RRO mg/kg	DRO after Silica Gel Cleanup mg/kg	RRO after Silica Gel Cleanup mg/kg
LDU	10NC08SB01	2010	2800	1600	3100	1000
LDU	11NC08SS003	2011	550	820	550	1300
LDU	11NC08SS004-DUP	2011	1500	690	1600	1200
LDU	12NC08SS001	2012	2900	2400	2700	680
LDU	12NC08SS002[D]	2012	2500	2200	2200	570
MDU	10NC08SB02	2010	7100	3300	6700	1300
MDU	10NC08SB03[D]	2010	9300	5300	8500	2100
MDU	11NC08SS002	2011	1800	1100	1800	1800
MDU	12NC08SS003	2012	960	2100	940	1500
UDU	10NC08SB04	2010	660	6300	310	3000
UDU	11NC08SS001	2011	58	380	36	320
UDU	12NC08SS004	2012	290	2700	220	1900
		Average Concentration	**2535**	**2408**	**2388**	**1389**

Change in average DRO concentration from before to after silica gel cleanup **-6%**

Change in average RRO concentration from before to after silica gel cleanup **-42%**

Notes:

[D] Duplicate sample

Source for 2010 results: USACE. 2011a (July). Northeast Cape HTRW Remedial Actions, Northeast Cape, St. Lawrence Island, Alaska.

Source for 2011 results:USACE. 2012 (June). Northeast Cape HTRW Remedial Actions, Final Removal Action Report, Northeast Cape, St. Lawrence Island, Alaska.

Source for 2012 results: USACE. 2013 (May). Northeast Cape HTRW Remedial Actions Report, Northeast Cape Formerly Used Defense Site St. Lawrence Island, Alaska. Revision 1.

APPENDIX H
Responses to Comments

Alaska Department of Environmental Conservation (ADEC)
Contaminated Sites Program
Document Reviewed: Draft April, 2017 Northeast Cape 2016 Site 8 and Suqi River Surface Water and Sediment Sampling Report
Commenters: Curtis Dunkin-ADEC Project Manager
Date Submitted: June 1, 2017 ADEC Received RTCs on August 7, and Submitted Review Determinations on August 24, 2017 (post-comment resolution meeting conducted on August 10, 2017)

#	Page #	Section	ADEC Comment	Response
1.		General ADEC File Number	Please add the ADEC file number 475.38.013 to applicable references and/or sections throughout the report. Please also revise incorrect references to the file number throughout the document; noting that all/most of the ADEC checklists in Appendix B-3 state an incorrect file number. Please create headers and sub-headers that provide better separation and presentation of the information for Site 8 vs. the Suqi River throughout the report where applicable. There are multiple instances throughout the report where narrative discussion, bullet summaries, etc. run from one AOC to another making it difficult for the reader to differentiate; i.e. in the bullets listed on pages ES-1 and ES-2.	Accepted. The ADEC file number 475.38.013 will be applied throughout the report as necessary. **ADEC-Accepted August 24, 2017** First sentence of ES, Section 1.0, and Section 1.0 in Appendix B will be revised to state: "*…Northeast Cape (NEC) on St. Lawrence Island, Alaska (Alaska Department of Environmental Conservation [ADEC] file number 475.38.013)*". **ADEC-Accepted August 24, 2017** The checklists in Appendix B will be revised to state "*475.38.013*". **ADEC-Accepted August 24, 2017** Accepted. Where appropriate, headers, sub-headers, or introductory text will be added to better separate information presented for Site 8 versus the Suqi River. **ADEC-Accepted August 24, 2017** The bullets in the ES will be separated and preceded as follows: "*…sample results at Site 8 include the following*" or "*…sample results at the Suqi River include the following*". **ADEC-Accepted August 24, 2017** First paragraph of Section 1.1 will be revised to state: "*Project goals specific to Site 8 and the Suqi River were defined in the work plan. Goals for Site*

#	Page #	Section	ADEC Comment	Response
				8 were to collect sediment and soil samples. Goals for the Suqitughneq (Suqi) River were to collect surface water and sediment samples from the Suqi River and estuary, and measure river flow velocity. The 2016 field effort, sample results, and observations satisfied these goals. All planned samples were collected. The sample results and observations were used to determine if the historical Site 8 decision units encompassed the lateral extent of petroleum, oil, and lubricant (POL) affected sediment and soil at Site 8, to assess Suqi River and estuary sediment and surface water quality following remedial actions at the Site 28 drainage basin performed from 2010 through 2013, and to compare 2016 Suqi River surface water discharge measurements with measurements collected during previous RIs". **ADEC-Accepted August 24, 2017** Section 4.0 will be revised to categorize deviations as: (1) Project Wide; (2) Site 8; and (3) Suqi River. Please see the text at the end of this document. **ADEC-Accepted August 24, 2017** The bullets in Section 7.0 will be separated and preceded as follows: "…conclusions of the 2016 Site 8 field effort were as follows" or "…conclusions of the 2016 Suqi River field effort were as follows". **ADEC-Accepted August 24 2017**

#	Page #	Section	ADEC Comment	Response
2.	ES-1	Executive Summary	Please provide more information re: what is stated as 'discontinuous surface water ponds interspersed with areas of soil' in the first bullet on this page and elsewhere throughout the document. This is the first mention of this type of feature, and/or first naming associated with Site 8. This would be applicable for the Site 28 Drainage Basin, Suqi River, greater/larger wetland areas in general but doesn't seem to be appropriate for Site 8. Please provide more detail and clarification re: how this relates to determining/delineating material to be sediment vs. soil at the time of sampling, as well as rationale to determine whether the sample locations/areas are primarily considered upland or wetland. ADEC's tentative position is that the entirety of Site 8 material that is located within the pathway of the primary seasonal surface water overflow and drainage, should be considered sediment; and compared to applicable/site-specific cleanup levels. Further resolution discussion is necessary on this subject by the project team prior to finalizing this report. Re: the statements in the third bulled on this page and also the subject of biogenic interference in general, it is not appropriate to make statements in the executive summary that have not been definitively demonstrated, referenced, and/or ADEC-approved. While ADEC does not necessarily disagree with the biogenic interference as presented and discussed in this report, it is not appropriate to state 'was present' without adequate reference and correlation.	Accepted. As suggested in comment #21, "discontinuous surface water ponds" will be replaced with "discontinuous ephemeral surface water" throughout the document. **ADEC-Accepted August 24, 2017** The description of discontinuous ephemeral surface water is based on the observations of field personnel. As stated in Section 3.3 of the WP, Site 8 sediment mapping followed the definition of sediment used during the 2012 Site 28 mapping effort (that defined all loose submerged material except for that which is actively growing vegetation or is part of the vegetative mat). Photographs and survey elevations show the varied topography at Site 8; this is stated in the second sentence of the second paragraph of Section 5.2.1. Not all areas are within the seasonal surface water overflow and drainage area. **ADEC-Accepted August 24, 2017** Accepted. See text at the end of this document to remove definitive statements and to reference Appendix B. **ADEC-Accepted August 24, 2017** Additionally, statements throughout the document indicating biogenic interference will be revised to indicate that "biogenic interference 'likely' contributed to elevated DRO and RRO concentrations" or similar. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			Further, ADEC notes that numerous statements are made throughout the document that i.e. 'results will not be discussed further due to biogenic interference'; however none of these statements include references to the 'biogenic interference' on page B-1-9 of section 1.2.9 of Appendix B. Please also see and apply further ADEC comment(s) on this topic and respective work plan section(s) below.	See text at the end of this document (Executive Summary, Sections 6.3, 6.3.1, 6.4, and 7.0) for most changes. **ADEC-Accepted August 24, 2017** The first sentence of Section 6.3.1, second paragraph, will be revised to state: "*Silica gel or other cleanup techniques should be applied to future samples so that the likely biogenic contribution to DRO and RRO results can be minimized*". **ADEC- Partially Accepted August 24, 2017; however please amend the proposed revision to state '…can be evaluated in more relevant detail for the purpose of determining actual biogenic contributions.".**
3.	ES-2	Executive Summary	Please revise the statements and discussions associated with 'target analytes above the SSCLs' to also include ranges of concentrations, detections to provide a better site characterization, site status overall. The sampling and analysis (and visual inspections) for both sites/AOCs is intended to evaluate contaminant migration and fate and transport issues and not only whether or not a respective cleanup/action level was exceeded. Please apply this comment and expand/elaborate respective statements and discussions throughout the document as applicable. Throughout the document there seems to be no real connection re: the flow investigation for the Suqi River. Please provide more detail re: the objectives, the results and conclusions of the Suqi river flow measurements; which was presumed by ADEC's review and approval of the work plan that it was conducted and evaluated based on better	Accepted. Ranges of concentrations will be included in the text. See text at the end of this document for revised Executive Summary second and fourth bullets. Additional revisions will be made throughout the document. See text at the end of this document for Section 6.3 second paragraph and Section 6.4. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. The intent of sampling at the Suqi River was to determine whether the remedial activities at Site 28 impacted the Suqi River by revisiting previous sampling locations and comparing historical results to the 2016 results.

#	Page #	Section	ADEC Comment	Response
			characterizing and improving the site CSM for contaminant fate and transport. **ADEC-Tentatively Accepted August 24, 2017; ADEC concurs with the RTC and agrees re: overall intent of sampling, however please amend/elaborate on the revision to the narrative to emphasize/clarify that the primary DQO of the flow investigation was as a control evaluation to prior investigation results in the event that elevated COC concentrations were detected.**	**ADEC-Tentatively Accepted August 24, 2017; please see further response on the left.**
4.	1-1	1.1	Please revise/amend the last sentence of the first paragraph of this section to clarify whether sample analyses results (and data quality) also accomplished the project goals. ADEC notes that the actual project goals are stated in the second paragraph of this section; for which the field effort was part of the overall project goals. I.e. if confirming/updating the fate and transport CSM was a goal of the flow study, then did the field efforts accomplish this?	Accepted. Section 1.1 will be combined into one paragraph and indicate that samples results and observations were used to meet objectives. **ADEC-Accepted August 24, 2017** Section 1.1 will be revised to state: "*The 2016 field effort, sample results, and observations satisfied the project goals. Project goals specific to Site 8 and the Suqi River were defined in the work plan. Goals for Site 8 were to collect sediment and soil samples. Goals for the Suqitughneq (Suqi) River were to collect surface water and sediment samples from the Suqi River and estuary, and measure river flow velocity. All planned samples were collected. The sample results and observations were used to determine if the historical Site 8 decision units encompassed the extent of petroleum, oil, and lubricant (POL) affected sediment and soil at Site 8, to assess Suqi River and estuary sediment and surface water quality following remedial actions at the Site 28 drainage basin performed from 2010 through 2013, and to compare 2016 Suqi River surface water discharge measurements with*

#	Page #	Section	ADEC Comment	Response
			Please revise the objective statement in the last sentence of this section to clarify that the subject Suqi River investigation objective was not limited to characterizing site conditions after the stated Site 28 removal/remedial actions, but also as a follow on site investigation to reevaluate the site conditions since the last historical Suqi River characterization activities; which were also postponed until after all primary removal/remedial actions were complete in order to allow for a true 'post remedial' site characterization. Further, please revise the stated dates of 2012 and 2013 associated with the Site 28 drainage basin remedial actions and also specify other sites that are known and/or considered to be potential contaminant contributors to the Suqi River drainage system; noting that dates should range from the span of actual removal/remedial actions associated with the subject sites since the last time that the Suqi River was investigated prior to 2016.	*measurements collected during previous RIs*". **ADEC-Accepted August 24, 2017** Accepted. See response above. **ADEC-Accepted August 24, 2017** Accepted in part. The last sentence of Section 1.1 will be revised to include the culvert removal in 2010. Also, please see the response above. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. The specific goal of the sediment and surface water effort was to verify that Site 28 remedial actions have not affected the river and to compare surface water discharge measurements collected during RI activities. **ADEC-Tentatively Accepted August 24, 2017; this should be clarified/specified and discussed further in this section per project team conclusions/concurrence during the August 10, 2017 resolution meeting.** Additional, potential contaminant contributors were not specifically investigated. **ADEC-Tentatively Accepted August 24, 2017; however, this should be clarified/specified and discussed further in this section.**
5.	2.5-2.6	2.2.1	Instead of only stating the residual exceedances would be helpful to include a brief summary of the historical investigation events and analyses results that identified the stated site COCs which were carried forward and included in the DD; as well as the sampling and analyses that were approved and used to determine specific COCs that were no	Accepted. The analytical suite and a more detailed description of historical results will be presented. See revised text for Section 2.2.1 at the end of this document. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			further concern. Noting with emphasis on Site 8 since the 2016 effort is a re-characterization of the extent of surface/shallow contamination vs. the NA monitoring approach that was planned based upon the selected remedy. Please also discuss any decisions/determinations that were made re: the upper decision unit (UDU) since the DD was finalized; i.e. was it previously postulated that the UDU was not contaminated and/or was outside/upgradient of the areas of contamination? **ADEC-Accepted August 24, 2017; agree re: original purpose of the three DUs, however, has there been further determination/change in how the DUs are perceived with re: to contamination since the DD – as also discussed/concurred by the project team during the August 10, 2017 comment resolution meeting.**	Discuss during comment resolution meeting. The Sediment Section of Section 2.2.1 details the original purpose of the three decision units (and indicated that the UDU was upgradient of the suspected source area). **ADEC-Partially Accepted August 24, 2017; please see further response on the left.**
6.	2-7	2.2.1	Please insert 'sediment' in the header statement beginning with 'A summary of the 2010 [sediment]…'; here and elsewhere throughout the document in similar sections, headers, and statements in order to always specify the matrix, AOC, etc.	Accepted; also see comment #1. Header statements will be revised to clarify matrix and AOC throughout the document. Specifically, the header section referenced will be revised to state: "*A summary of the 2010 sediment exceedances are as follows:*". Similar changes will be made throughout the document. **ADEC-Accepted August 24, 2017**
7.	2-8	Table 2-1	Please include all years that sampling was conducted regardless of whether or not exceedances were observed. Since the selected remedy for this site is MNA, it would helpful to also to include information on the ranges of concentrations for all significant detections over the years of investigation and monitoring. This logic should be applied to all tables, charts, etc. for which the intent is to present/evaluate trend(s) over time.	Accepted. Table 2-1 will be revised to include DRO, RRO, and 2-methylnaphthalene results for the three decision units collected in 2010, 2011, and 2012. Table 6-1 will be revised to include 2-methylnaphthalene concentrations. Remaining tables and charts will be revised as necessary. See tables at the end of this document. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			Per other comments related to re-characterizing Site 8, the Corps and ADEC need to better identify and agree upon which areas/material should be considered sediment and which should be soil. ADEC's tentative position is that all of the samples collected at Site 8 to date (at least post-DD) should potentially be considered sediment samples and be reported and compared to the sediment criteria. Please confirm (and clarify in a table note) whether the listed 2012 LDU 'DNE' in the duplicate is applicable since this appears to be listed instead of the primary results for 2-Methylnaphthalene; in order to clarify whether stated duplicate results are applicable for all the COCs.	Discuss during comment resolution meeting. Reports documenting sampling performed by Bristol from 2010 through 2012 interchangeably refer to samples collected at Site 8 as soil and sediment. **ADEC- Tentatively Accepted August 24, 2017; per the resolution discussion and concurrence re: defining soil vs. sediment in this report and going forward.** Accepted. See response to comment above. In addition, only the duplicate sample results (as indicated in the Bristol Reports) will be marked as a field duplicate. **ADEC-Accepted August 24, 2017**
8.	2-8	2.2.2	Similar to comment above associated with Site 8, please state the categories and/or specific analytes that were included over the years of investigation to demonstrate that all potential COCs were adequately investigated; noting that if only a limited set POL COCs were included as analytes then state i.e. 'DRO was the only one of the limited range of COCs that were investigated at this site in 2016 that exceeded…'. Please apply this logic and revision/amendments throughout the document where applicable.	Accepted. The Surface Water Section of Section 2.2.1 will be revised to include the historical surface water analytes. See text at the end of this document for revisions to Section 2.2.1. Section 2.2.2 will be revised to include the historical analytical suite. Bulleted text and the bulleted header will be revised. See text at the end of this table. **ADEC-Accepted August 24, 2017**
9.	2-9	2.2.2	ADEC noted in its comments on the draft 2016 work plan that there were COCs detected in sediment and surface water associated with the Site 28 drainage, at concentrations that exceeded applicable cleanup criteria, that required evaluation in this and future investigations/monitoring of the Suqi. Further, the discussion should be expanded beyond drinking water cleanup levels, since this should	Discuss during comment resolution meeting. Since historical surface water sampling results were compared to drinking water cleanup levels in the DD, surface water results discussed in Section 2.2.2 refer to drinking water cleanup levels. DD

#	Page #	Section	ADEC Comment	Response
			also include human and ecological risk assessment criteria; referring to the statement made in the first bullet on this page. This report should also include references and summarize the status and determinations of the most recent ATSDR evaluation and also evaluate any differences, changes over time, etc. with re: to regulatory/agency evaluations and/or determinations as well as site conditions.	numerical surface water criteria only exist for TAH and TAqH. **ADEC-Partially Tentatively Accepted August 24, 2017; noting that this subject has come up numerous times over the years, and ADEC's position remains that although SSCLs for surface water were not specified in the DD, that 1) the DD does reference 18AAC70 as applicable, and 2) the criteria and action levels apply regardless. Further ADEC's position is that this issue was addressed and reconciled in the last Five-year Review.** This effort was not meant to evaluate current results in the context of the recent ATSDR or changes over time with regard to regulatory/ agency evaluations or site conditions. **ADEC-Tentatively Accepted August 24, 2017; noting however that these issues need to be addressed further in future efforts within the current FYR period.**
10.	4-1	4.0	Re: the mention of the State's regulation and cleanup level revisions, please clarify further what impacts this did or did not have on this project as well as the selected remedy in the DD and prospective future site work and decisions. Please also clarify why this issue is considered a deviation.	Accepted. Section 4.0 screening level deviation will indicate that the values used were more stringent than those agreed to in the 2016 WP. As stated, this is a deviation because the 2016 WP referenced Tables B1 and B2 from January 2016. This does not impact the selected remedy at this time. Text will be revised. Please see text at the end of this document. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			Please include a statement indicating any impacts to the project for each deviation; noting the site 8 equipment blank; noting also that this appears to not be included in the data quality review/assessment later in the report. Further discussion and resolution is necessary prior to finalizing this report to clarify why the proposed sample locations were located within the roadbed vs. relocating them within the site 8 drainage/migration pathway; noting that the work plan objective was to sample the drainage, not the road. The deviation for the Suqi River survey issues needs to clarify how the compass and tape measure locations are noted/identified on tables, figures, etc.	Accepted. Deviations discussing the screening levels, lack of equipment blank, and Suqi River sample locations will be revised to include project impacts. **ADEC-Accepted August 24, 2017** Other deviations did not impact the overall project. Please see text at the end of this document. **ADEC-Accepted August 24, 2017** Accepted. The DQA will be revised to include discussion regarding the lack of an equipment blank at Site 8 (Section 1.2.12). Please see text at the end of this document. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. Proposed sample locations that ended up in the roadbed were relocated closer to Site 8 so that undisturbed material could be collected as identified in Section 4.0 **ADEC-Accepted August 24, 2017** Accepted. Figure A-5 already includes a note that the locations of S29-005, S29-006, and S29-007 are approximate. Appendix F already highlights locations measured using a tape and compass. No changes will be made to Appendix B tables. **ADEC-Accepted August 24, 2017**
11.	4-2	4.0	Please amend the discussion in the first bullet on this page i.e. what were the dates associated with the lathes being put in place and when they were attempted to be removed.	Accepted. Dates will be added to the deviation. See text at the end of this document. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting.

#	Page #	Section	ADEC Comment	Response
			It would helpful and of interest to include photos and respective references for this and other site conditions, issues, deviations, etc. Did heavy rain and resulting increase in water levels occur the entire time of the field effort or just towards the end? How did site conditions differ at Site 8 at the very end (presuming the end was the wettest/greatest precipitation accumulation) of the field effort vs. when sample collection activities occurred? How many locations which were originally delineated as 'soil' locations would have been considered 'sediment' based upon the rationale/logic implemented in this report? Please amend the discussion in the second bullet to include reference and respective photo of the subject eddy and cross section location. Please also apply this throughout the document for all AOCs, referenced site-specific features, etc.	No additional photos of this condition are available. **ADEC-Accepted August 24, 2017** The heavy rainfall event referenced in the report occurred between the field team's departure from NEC at 1842 on 18 August 2016 and return to NEC at 1035 on 22 August 2016. One day of sampling at Site 8 occurred after the heavy rainfall event; no specific change in general Site 8 conditions were noted at the time by the field team. **ADEC-Accepted August 24, 2017; please include the RTC and further clarifications as discussed during the August 10, 2017 comment resolution meeting in the applicable discussions/sections in the report.** Accepted. This and other deviations will now include reference to photos in Appendix E if a photo of the deviation exists. See end of document for updated text. **ADEC-Accepted August 24, 2017**
12.	5-1	5.0	Please revise/amend/relocate some of the discussion associated with mobilization vs. field activities throughout this section (and elsewhere throughout the report where applicable) to better clarify the chronology of activities; noting it is misleading to the reader to state that field activities occurred August 4-23 in the first section but then to state later in section 5.2 that NEC sampling activities were from August 13-22. Propose relocating the 'mob/demob section title to the overall dates of the project, then title each section based upon the major portions of work.	Accepted. Field activities and sampling activities did not occur over the exact same span of time. Included in the field activities period of time were mobilization, demobilization. **ADEC-Accepted August 24, 2017** First paragraph of Section 5.2 will be revised to state: "*NEC sampling activities occurred from 10 through 22 August 2016. Groundwater sampling activities at the MOC occurred from 10 through 16 August and are presented under separate cover*

#	Page #	Section	ADEC Comment	Response
				(USACE 2017). Soil, sediment, and surface water sampling activities occurred from 13 through 22 August 20 **ADEC-Accepted August 24, 2017**
13.	5-4	5.2.1	Re: the statement in this and other associated sections throughout the document that sample grids and collection locations were surveyed, staked, and collected 'across the three historical decision units', please elaborate the discussion re: the issue with the sample locations staked in the road as well as the reference to the 'three decision units' since these statements appear to be contradictory and unclear re: what ADEC understood as the objectives outlined in the approved work plan vs. what appears to have been implemented in the field.	Accepted in part. The intent of the sampling was to confirm that the decision units capture the extent of contamination. **ADEC-Accepted August 24, 2017** The text will now indicate that some sample locations were outside the decision units. **ADEC-Accepted August 24, 2017** Third sentence of Section 5.2.1 will be revised to state: "*Sample locations were the center point of either 20-foot or 10-foot sample grids that spanned across the three historical decision units and adjacent areas*". **ADEC-Accepted August 24, 2017** In text Photo 6-2 caption will be revised to state: "*Sampling a tussock at SS-24 near the southwestern edge of the MDU at Site 8 on 18 August 2016*". **ADEC-Accepted August 24, 2017**
14.	5-5	5.2.1	Please elaborate on the discussion of sample locations such as SS-020 which is shown in Photo 5-6, i.e. re: whether or not the observed lithology/soil profile is indicative of anthropogenic disturbances or naturally occurring.	Accepted. No evidence of anthropogenic disturbance was noted below the vegetative mat. The last sentence of the first paragraph of Section 5.2.1 will be revised to state: "*No specific evidence of anthropogenic disturbance was noted below the vegetative mat*". **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
15.	5-6	5.2.1	Re: the classification of soil and sediment samples, while ADEC realizes that this was the objective per the agreed upon and established definition for sediment at all NEC sites to date, this subject should be discussed further in prospective resolution to determine the most appropriate way to report the information; both in this report and future actions. Consider whether the report should evaluate the locations and/or areas that were previously delineated as sediment or soil during prior actions but were then delineated differently/the opposite in 2016. This should be applied to both the Site 8 and Suqi River AOCs throughout the report in conjunction with also discussing the ranges of detection concentrations and not just exceedances based upon whether the sample location/material was classified as soil or sediment. Recommend revising/combining the two sentences in the last paragraph of this section; i.e. relocate the second sentence to the beginning, omit the first part of first sentence and combine to one statement.	Discuss during comment resolution meeting. Delineation has not been performed in the past and historical statements regarding sediment and/or soil at Site 8 may be subjective. The goal of this effort was not to reclassify previous sampling efforts but to make the distinction between the two media less subjective. **ADEC-Accepted August 24, 2017** Accepted. The last sentence/paragraph of Section 5.2.1 will be revised to state: "*Sediment and soil samples collected from Site 8 were analyzed for DRO by Alaska Method 102 (AK102), RRO by AK103, and PAH by EPA Method SW8270D*". **ADEC-Accepted August 24, 2017**
16.	5-7	5.2.2	Please elaborate the description under Photo 5-8. ADEC presumes that the subject organic layer is the surface material that was removed to access the target material to be sampled.	Accepted. The photo caption will better describe that the vegetative layer shown was removed in order to collect the sediment sample. The caption will be revised to state: "*Organic layer encountered and removed prior to sampling sediment at Suqi River sample location S29-SD-009 on 15 August 2016*". **ADEC-Accepted August 24, 2017** A similar change will be made to the Photo No. 15 caption in Appendix E. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
17.	5-8	5.2.2	Please discuss the rationale re: why the analytes for surface water samples were not the same as the sediment samples. **ADEC-Partially Accepted August 24, 2017; the proposed revision should also reference the site -specific cleanup levels for sediment (along with soil and surface water), since the COCs associated with these matrices should also be included for the rationale for analytes associated with the 2016 Suqi River sampling and analysis – which should have included all COCs associated with upgradient removal actions, with emphasis on Site 28.**	Accepted. The rationale for the analytical suites for the Suqi River will be included. The second and fourth sentences of the third paragraph of Section 5.2.2 will be revised to state: "…*and xylenes by EPA Method SW8260 based on the DD SSCLs for surface water*" and "*The sediment analytes included constituents that exceeded soil evaluation criteria for soil following sediment removal activities at Site 28 plus the addition for PCBs*". **ADEC-Partially Accepted August 24, 2017; please see further response on the left.**
18.	5-9	5.2.2	Please state/clarify in the photo description what is indicated in Photo 5-10 as a white colored material on the water surface. Per other comment/request to include a chain of sequential photos in the report that depicts the entire length of the investigated stretches of the Suqi, it would also be helpful to add the photo IDs to a new figure with an arrow depicting the view perspective for the purposes of improving the CSM. It would also be helpful to indicate the direction of flow in all applicable photos; i.e. 'View facing north, flow to the west.' **ADEC-Noted August 24, 2017; given that the work plan objectives included photographing project areas/AOCs, with regard to evaluating fate and transport pathways along a stretch of stream or river, this implies that the stretches of the river pertinent to this project would be well documented – i.e. from Site 28 all the way to the estuary. This is primarily for the purpose of supporting the demonstration of potential**	Accepted. A description of the white material on the water surface will be added to the end of the first sentence in the captions for Photo 5-10 and Appendix E Photo No. 21 as follows: "*; while the source of the downstream foam was not investigated, it is likely the result of natural decomposition*. **ADEC-Accepted August 24, 2017** Accepted. Water flow direction will be added to in-text photograph captions and those in Appendix E. **ADEC-Accepted August 24, 2017** A photographic series of the entire Suqi River was not collected as part of this effort. The photographs presented in Appendix E are in chronological order. **ADEC-Noted August 24, 2017; please see further response on the left.**

#	Page #	Section	ADEC Comment	Response
			contaminant sources (or lack thereof) to the Suqi River and not just sampling locations.	
19.	5-10 – 5-11	5.4	Please revise/amend the references to 'in accordance with the work plan' in this section by specifying/referencing the actual permit, regulatory requirement, etc. to clarify that while the detailed information is included in the work plan, it is not an issue associated with 18AAC75; i.e. state 'per the [specific permit/regulatory requirement] that is included in the work plan', and then specify those issues that are a requirement of 18AAC75, ADEC Guidance, etc. Please apply this throughout the report where applicable. Table 5-1: applicable statements, references, sections, tables, etc. in this report need to clarify that this effort was conducted in conjunction with the mobilization and implementation of the 2016 MOC MNA Monitoring work plan; since the statement 'and groundwater sampling at the MOC' in the table note appears to be the only actual mention of this issue in the entire report – and is potentially confusing to a reader. It would be helpful to include a summary of this issue in the introduction section at the very beginning of both respective reports. Please also apply all applicable comments in this template for the subject Site8/Suqi report to the draft 2016 MOC MNA Monitoring report.	Accepted. Reference to the 2016 WP will be removed from Section 5.4. **ADEC-Accepted August 24, 2017** The first reference will be replaced with the following text: "*…feet each were disposed of by ECC in accordance with the Resource Conservation and Recovery Act and state waste regulations*". Please see text at the end of this document. **ADEC-Accepted August 24, 2017** Additionally, Section 5.2 will state specific SOPs. Text will be revised to state: "*All samples were collected, labeled, stored, and shipped in accordance with Jacobs Standard Operating Procedures 2000, 3000, 4000, 5010, 5030, and 7000 provided in the 2016 work plan (USACE 2016b)*". **ADEC-Accepted August 24, 2017** Accepted. Section 5.2 will introduce the concurrent groundwater sampling event. First paragraph of Section 5.2 will be revised. See response to comment #12 above. **ADEC-Accepted August 24, 2017** Accepted. Applicable comments will be applied to the MOC report. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
20.	6-1	6.1	In association with other similar comments, please elaborate on the rationale to select sample locations within the roadbed, how this relates to historical site characterization and monitoring, the selected remedy and DD, etc. Photo 6-1: Please indicate on this and/or other applicable photos and references the sample locations which are located outside of the historical decision units, roadbed, etc.	Discuss during comment resolution meeting. The rationale was to select sample location across and adjacent to the three decision units. However, while positioning the proposed sampling locations at Site 8, the field team identified that some of the proposed locations were within the roadbed and road toe. **ADEC-Accepted August 24, 2017; please ensure that this is clearly explained in the report.** Accepted. The captions for photos from Site 8 will be revised to state location relative to the decision units whenever possible. **ADEC-Accepted August 24, 2017** Changes will also be made to Appendix E. **ADEC-Accepted August 24, 2017** For example, the caption for Photo 5-5 will be revised to state: "*Typical depth of samples (1 to 2 feet bgs) collected from Site 8 on 17 August 2016; this sample was collected southwest of the UDU and northwest of the MDU from SS-045. View facing down*". **ADEC-Accepted August 24, 2017**
21.	6-2	6.1	Photo 6-2: Please clarify in the description that the area within the view is outside of the decision unit (not sampled) or if this was actually a sample location; and if then specify the location ID. Please elaborate on and/or revise the references to 'discontinuous surface water ponds' since the term 'pond' doesn't seem necessarily applicable; rather i.e. discontinuous ephemeral surface water'; noting that ADEC's understanding is that the surface water conditions	Accepted. See response to comment #13. **ADEC-Accepted August 24, 2017** Accepted. See response to comment #2. **ADEC-Accepted August 24, 2017** Surface water conditions were not the only observations used to distinguish sediment from soil. Again, see response to comment #2. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			(especially re: presence or absence of surface water) associated with Site 8 are essentially in constant flux depending on the time of year, status of accumulated precipitation, etc. Is the sediment associated with areas where surface water was present indicative of material that would have been transported downgradient from another location and deposited at the subject 2016 sample location?	Since samples were collected beneath the vegetative mat, the material that was sampled does not likely reflect recently deposited sediment. Additionally, the density of the vegetation throughout Site 8 would likely limit surface transport. **ADEC-Accepted August 24, 2017; however please include RTC and clarification with applicable statements and sections throughout the report.**
22.	6-3	6.2	Photo 6-4: Please indicate the sample ID in the photo description if this was a sample location. Please also elaborate the respective applicable narrative discussions to clarify if the observed water below the mat was delineated to be the actual groundwater elevation at the time and/or if this was saturated soil/organic matter that drained as a result of disturbance.	Accepted. The sample location will be included. The caption for Photo 6-4 will be revised to state: "*Water present below the vegetative mat at Site 8 sample SS-020 in the LDU on 18 August 2016. View facing down*". **ADEC-Accepted August 24, 2017**
23.	6-3	6.2	Re: the title of this section and associated references to 'extent of contamination' throughout the report, does the extent of the sampling and analyses conducted in 2016, which was limited to the upper most profile, actually provide a thorough overall characterization of the total extent of contamination at Site 8 or only that which is located in the upper most profile based upon the surface water migration pathway? Re: the discussion of 2016 RRO detections and 'no record of anthropogenic RRO sources at Site 8' in the last paragraph on this page, and elsewhere throughout the document where applicable, please revise/amend statements and discussions throughout the document by providing more supporting information/data associated with the historical evaluations of biogenic fractions of NEC soils/sediments. Please also clarify that the SG cleanup data is for evaluation purposes	Accepted. References to the extent of contamination at Site 8 (Section 1.1 and header of Section 6.3) will be revised to state: "*lateral extent*" and/or "*nature and lateral extent of contamination*" throughout the document. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. How should we apply the chromatographic evidence where observed DRO range and RRO range response does not match calibration standard patterns for reference DRO or RRO material? **ADEC - Tentatively Accepted August 24, 2017; per agreed upon revisions/amendments to the**

#	Page #	Section	ADEC Comment	Response
			only and not approved by ADEC for making final determinations re: site characterization, whether cleanup levels have been achieved etc. ADEC notes other statements throughout the report that RRO exceedances will not be discussed further due to contributing the detected concentrations to biogenic interference - which is not appropriate and should be revised.	**report that were discussed/concurred by the project team during the August 10, 2017 comment resolution meeting.**
24.	6-4	6.2	Table 6-1: This table and other applicable narrative discussions throughout the document should also reference and elaborate on ranges of significant detections and not just exceedances; since the sampling and analysis is intended to evaluate the fate and transport (which would include contributions from any source) and not just exceedances related solely to the location of sample collection. Please revise/amend the discussion in the last two paragraphs of this section re: the sample location S08-SS-013 to clarify whether or not the subject contamination in soil was taken into consideration during development and monitoring of the decision units and to also clarify that the migration to surface water pathway is also a concern; both via surface transport as well as hydrologically connected groundwater and surface water. ADEC notes further that based upon indication of elevations across the site as depicted in Figure A-3, that the flow direction appears to trend towards S08-SS-013 and from there continuing downgradient to where Site 8 discharges into the stream. Please revise/amend the last statement of this section to clarify that although the State does not have promulgated sediment cleanup levels, that there are both site-specific cleanup levels identified in the DD, and, that ADEC generally considers the NOAA SQuiRT criteria as a starting point for exposure risk evaluations associated with sediment.	Discuss during comment resolution meeting. The focus of this report is to provide additional data for future periodic reviews which would determine if the current understanding of fate and transport or the CSM should be revised. **ADEC-Accepted August 24, 2017** Accepted. Text will be revised to clarify the locations of the 2016 exceedances in relation to known historical contamination. See text at the end of the document for Section 6.3. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. The focus of this report is to provide additional data for future periodic reviews which would determine if the current understanding of fate and transport or the CSM should be revised. **ADEC-Tentatively Accepted August 24, 2017; please include the RTC in the applicable narrative sections of the report to ensure this is captured going forward.** Discuss during comment resolution meeting. SSCLs for sediment are referred to and used for comparison in the preceding paragraphs.

#	Page #	Section	ADEC Comment	Response
				Recommend deleting last paragraph in its entirety. NOAA SQuiRT tables do not include petroleum hydrocarbons in sediment and the 2-Methylnaphthalene value is higher than the SSCL **ADEC-Accepted August 24, 2017**
25.	6-5	6.2.1	Please clarify the statement in the last sentence of this section, which appears to be a general summary and postulation statement rather than having been stated and re-quoted in final approved reports over the stated years. Further, ADEC does not necessarily concur with the statement that SG cleanup results indicated 'up to 80 and 70 percent' reduction as stated; noting that many of the SG cleanup results were actually similar to and higher than the primary non-SG cleanup results from samples collected from numerous sites. Similar to other comments associated with SG cleanup results, this issue needs to be revised/amended and elaborated on further throughout the report.	Accepted. The last sentence of Section 6.3.1 will be revised to state concentration changes found at Site 8 in particular: "*Results from NEC FUDS samples with the silica gel cleanup typically indicated a significant reduction in both DRO and RRO across NEC, and at Site 8 by six and forty-two percent, respectively (see Appendix G) (USACE 2011a, 2012, 2013)*". **ADEC-Accepted August 24, 2017** The supporting numerical evidence will be supplied in Appendix G. **ADEC-Accepted August 24, 2017**
26.	6-5	6.3	Similar to comment above, ADEC does not consider 'extent and magnitude' appropriate as a title and/or reference for applicable sections and narrative discussions throughout the report. Please consider revising 'extent and magnitude' to i.e. 'Updated CSM of Residual Contamination at 2016 Suqi River Sample Locations'. Please revise/amend the first sentence of this section, and also apply to similar statements throughout the document, to clarify the total number of samples being referenced; i.e. '[A total of]…samples [were] collected…'.	Accepted in part. The Sections 6.3 and 6.4 headers and subsequent mentions of "nature and extent" will be revised to state: "*nature and lateral extent*". **ADEC-Accepted August 24, 2017** Accepted. The statement will include "*total*". First sentence of Section 6.4 will be revised to state: "A total of five surface water and 11 sediment samples…". **ADEC-Accepted August 24, 2017** Accepted. While the determination of the cause of the sheen was not investigated, the sheen was

#	Page #	Section	ADEC Comment	Response
			Please elaborate on the sheen which was observed and discussed in the later portion of the first paragraph of this section. Was there any indication of whether the sheen was biogenic or petrogenic, was the sheen confined to a 'location' or did it extend along a reach of the river, could it be traced to any specific location, was the sheen the result of disturbance during sediment sample collection, etc.?	confined to a limited area and noted before field personnel entered the Suqi River. **ADEC-Accepted August 24, 2017** The seventh sentence of Section 6.4 will be revised to state: "*While isolated pools of surface water sheen were observed at S29-002 and S29-003 (Photo 6-5) prior to disturbance or sample collection, the source and whether or not the sheen was biogenic or petrogenic were unknown*". **ADEC-Accepted August 24, 2017** Photo caption beneath Photo 6-5 on page 6-6 will also be updated to "Photo 6-5: Sheen observed prior to collecting sediment from S29-SD-003 on 15 August 2016. View facing down." **ADEC-Accepted August 24, 2017**
			Please revise/amend the last two sentences on this page. The second to last sentence is potentially misleading/contradictory and requires further resolution discussion. The statement is making a connection between sediment sample and surface water results based upon a different list of analytes; while also stating that results 'do not support an anthropogenic source' for the observed sheen.	Accepted. Reference to sediment results will be removed. **ADEC-Accepted August 24, 2017** The third to last sentence (formerly the second to the last sentence) of Section 6.4 will be revised to state: "*results from the 2016 sampling effort for total aromatic hydrocarbons (TAH) and TAqHs in surface water do not support an anthropogenic source for sheen*". **ADEC-Accepted August 24, 2017**
			The last sentence on this page should be revised/amended to clarify that while the 2016 results indicate that prior remedial actions as well as remaining upgradient sources of contamination (i.e. Site 28), were not resulting in contaminant migration via the surface water pathway at the	Accepted. Text will be changed to present other sources of contamination and historical sheen. See text at end of this document. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			time of sampling, that sheens been previously observed in the Suqi River when disturbing sediment and/or stream bank material, and that the MOC and Site 28 contamination sources that remain are potential ongoing/future sources of contamination migration to downgradient areas. Please revise/amend the discussion further in this section to clarify if the statements re: 2016 analyses results are based on drinking water criteria for surface water and/or SSCLs for sediment only; and/or if analyses results might indicate other ecological exposure risk(s). Please also apply revisions to statements in this section re: RRO concentrations in sediments as indicated in other similar comments above. **ADEC - Tentatively Accepted August 24, 2017; per agreed upon revisions/amendments to the report that were discussed/concurred by the project team during the August 10, 2017 comment resolution meeting.**	Accepted. As stated in Section 4.0, results were compared to criteria presented in the 2016 WP. The second to last sentence of Section 6.4 will be revised to state: "*Surface water TAH and TAqH results were below SSCLs*". **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. How should we apply the chromatographic evidence where observed DRO range and RRO range response does not match calibration standard patterns for reference DRO or RRO material? **ADEC - Tentatively Accepted August 24, 2017; please see further response on left.**
27.	6-6	6.4	Please state the date(s) associated with the stated 'commencement of remedial actions at Site 28' and also specify when actions were considered complete.	Accepted. The dates of the remedial actions at Site 28 will be changed. **ADEC-Accepted August 24, 2017** The first sentence of Section 6.5 will be revised to state: "*Flow measurements were collected from the Suqi River to compare to measurements collected in 2001 and 2002 prior to the 2010 through 2013 remedial actions at the Site 28 Drainage Basin (Figure A-6.1)*". **ADEC-Accepted August 24, 2017** Similarly, the last sentence of Section 6.4 will be revised to state: "*Remedial action efforts from*

#	Page #	Section	ADEC Comment	Response
				2010 through 2013 at the Site 28 Drainage Basin do not appear to have caused contamination to migrate to the Suqi River or its estuary". **ADEC-Accepted August 24, 2017**
28.	6-8	6.4	Please re-review and consider revising the second sentence on this page to clarify the context and points that are actually being made. Are the points in this sentence being made as a comparison to the 2001 and 2002 data; otherwise wouldn't one anticipate the increased velocity and discharge from the drainage basin inputs and that the upgradient drainage inputs would be less than the sum of the total downstream of the confluence? Please elaborate on the potential differences between the 2001/02 and 2016 measurements that are either known or postulated based upon seasonal and/or precipitation events associated with the 2016 field event; vs. the overall characteristics of the river when it is ice-free and flowing. Are the two sets of river measurement data comparable? Please also elaborate on the role of the river flow measurements and evaluation of changes over time in evaluating the contamination fate and transport issues within the drainage.	Accepted. As presented in the first sentence of Section 6.5, the 2016 flow measurements are being compared to those that were collected in 2001 and 2002. The results presented are those based on measurements collected by field personnel. It is possible that even though the field team avoided the observable eddy, the eddy and estuary conditions (intact sand berm) may have affected the measurements. See revised Section 6.5 text at the end of this document. **ADEC-Accepted August 24, 2017** Accepted. Dates of measurement collection will be added to the text in Section 6.5 along with water level information. See text at the end of this document. Please note: the heavy precipitation event in 2016 (mentioned in the text) occurred after all streamflow measurements were collected. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. The intent of sampling at the Suqi River was to determine whether the remedial activities at Site 28 impacted the Suqi River by revisiting previous sampling locations and comparing historical results to the 2016 results. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			Table 6-2: Please include the dates associated with the collection of measurement data. Were all measurements associated for each cross section collected on the same day and were there potentially notable fluctuations based on short-term changes in site conditions, precipitation, etc.?	Accepted. The date flow measurements made will be added to the notes of Table 6-2. Note will state: "*All measurements were made on 16 August 2016 within a three hour period*". **ADEC-Accepted August 24, 2017**
29.	6-9	6.4	Based upon the photographs (6-6 and 6-7) of the estuary berm, it appears that the berm is composed primarily (if not entirely) of tidal material. Is this the case and is there any visual indication of sediment material buildup on the south side of the berm – material that indicates active transport and deposition within the estuary from upgradient sources? Is the surface water on the south side of the berm intertidal and was surface water flowing from the Suqi River and discharging all the way up/in to the estuary at the time of inspection/data collection? Please state the tide status of the two different photograph events and relative differences in tide; also the photograph locations appear to be significantly different i.e. photo 6-6 appears to be much closer to the eastern edge of the estuary than photo 6-7.	Accepted. The berm appeared to be comprised primarily of sand. There was no observable evidence of sediment material buildup on the south side of the berm. The field team did not observe surface water being affected by intertidal forces. However, the team did observe the Suqi River flowing into the Suqi River estuary (see response to comment #28 above). **ADEC-Accepted August 24, 2017** Tide information will be presented with appropriate photos in the text and Appendix E similar to the following: "*For Northeast Cape (No. 2435), using Nome as a reference station, predicted low tide (0.1 ft mean lower low water) at 1609 on 15 August 2016 and high tide (1.8 ft mean lower low water at 0115 on 16 August 2016 (NOAA [National Oceanic and Atmospheric Association] 2015)*". **ADEC-Accepted August 24, 2017** Additionally, a photo (Photo No. 17) will be added to Appendix E that better depicts the terminus of the estuary. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
30.	6-10	6.5	ADEC does not necessarily concur with the biogenic interference discussion in the second paragraph on this page. It is also not necessarily appropriate to exclude the RRO results from discussion in the data quality assessment, especially when asserting that no distinguishable distillate fingerprint was observed. The biogenic interference section that is included in a later appendix in the report should be moved to the beginning of the document and elaborated/discussed more thoroughly with regard to the potential impacts to the results.	Discuss during comment resolution meeting. How should we apply the chromatographic evidence where observed DRO range and RRO range response does not match calibration standard patterns for reference DRO or RRO material? **ADEC - Tentatively Accepted August 24, 2017; per agreed upon revisions/amendments to the report that were discussed/concurred by the project team during the August 10, 2017 comment resolution meeting.** Section 6.5 will be moved to Section 6.1. **ADEC-Accepted August 24, 2017** For Section 1.2.9 (now Section 1.2.1), see response to comment #37. **ADEC-Accepted August 24, 2017**
31.	7-1	7.0	Please provide headers/paragraph breaks etc. to better differentiate the discussion of Site 8 from the Suqi River, noting that the sentence at the top of the bullets states Site 8 but then transitions in the bullets to the Suqi without indication/separation. Please revise/amend references to 'drainage basin' to clarify if this is specifically Site 28 and/or intended to reference the overall Suqi drainage (or other sub drainages); please apply this clarification throughout the document. Re: the last bullet on this page, please see and apply comment(s) above associated with the sand berm and the tidal impacts on the estuary. Are there photos available from both low and high tide events that can be included in the report?	Accepted. See response to comment #1. **ADEC-Accepted August 24, 2017** Accepted. The drainage basin will be clarified to specifically reference Site 28. Last bullet of Section 7.0 will be revised to state: "*…result of in-flow from the Site 28 Drainage Basin…*". **ADEC-Accepted August 24, 2017** No photos of the berm at low tide and high tide were collected. The field personnel did not travel to the estuary terminus on a daily basis. Only two trips were made to the estuary terminus during the sampling event. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
32.		Figure A-2	Please include AOC boundaries and/or call out IDs on this and all applicable figures for all of the NEC sites; i.e. Site 28 Drainage Basin, Site 21, roofing tar area, etc.	Accepted. AOC polygons will be added to Figures A-2 (similar to Figure A-2 of the LTMP), A-5, A-6.1, A-6.2, and A-6.3 and labeled as "*Remediation Site*". **ADEC-Accepted August 24, 2017**
33.		Figure A-3	Please revise/replace references to 'local' and 'regional' groundwater flow direction and actually state the name of the site and/or 'general site wide' respectively to avoid confusion. Please include applicable date(s) in all figure titles and legend entries, actions, etc. Please apply this revision for all applicable figures. Also revise the title by inserting '...Surface Soil [Samples] At…] and also add a figure note to clarify that these samples were designated sediment or soil based on field and sample observation at the time of	Accepted. Additional errors were noted. Figures A-3 and A-4 will include "*Site 8 Surface Water Flow Direction*". Figures A-5, A-6.1, A-6.2, and A-6.3 will include "*General Site Wide Groundwater Flow Direction*". **ADEC-Accepted August 24, 2017** Accepted. Figures will be revised to include 2016 as appropriate. Figure A-2 legend will be revised to include "*2016 Area of Interest*". Figure A-3 title will be revised to include "*2016 Distribution of Sediment and Surface Soil Samples at Site 8*". Figure A-4 title will be revised to state "*2016 Site 8 Sediment and Surface Soil Exceedances*". Figure A-5 title will be revised to state "*2016 Suqitughneq River Surface Water & Sediment Exceedances*". Figures A-6.1 through A-6.3 title will be revised to state "*2016 Suqitughneq River Cross Sections*". **ADEC-Accepted August 24, 2017** Legends will be revised to include sample year. **ADEC-Accepted August 24, 2017** Accepted. See response to comment above. A note will be added to state: "*Samples designated as sediment or soil based on field observations at the*

#	Page #	Section	ADEC Comment	Response
			sample collection; and that this is not necessarily a site wide delineation.	*time of sample collection*". **ADEC-Accepted August 24, 2017**
34.		Figure A-4	Please include dates for all actions in the legend. Please also include a figure note as well as detail in the respective applicable sections that states the sample depths, range of depths, etc. The respective narrative sections should also discuss any limitations that sample depths may have on adequately characterizing the overall extent of contamination at the site and associated migration pathways. Figure A-4 has a lot of good information, however ADEC recommends adding a new figure that depicts the boundary of the extent of site investigation to date (i.e. 2016 if that is the furthest horizontal extent to date), and then to depict all of sample locations for all matrices where respective cleanup level exceedances were observed (i.e. as red with different shapes similar to Figure A-4) but then to do the same for all locations where notable concentrations were detected however were below respective cleanup levels (i.e. in yellow) and exclude the insignificant detections/non-detects. This would provide a better CSM for evaluation of the fate and transport concerns. Please clarify if all of the prior samples associated with sediment were delineated/considered sediment; noting that the pre-2016 samples indicated in the legend are all 'sediment and surface water'.	Accepted in part. Legend will be revised to include "*2016*" before all 2016 sample results and historical sediment exceedance will be revised to state "2004". **ADEC-Accepted August 24, 2017** A note will be added to state: "*Sediment and soil sample depths ranged from 0.5 feet to 2.5 feet below ground surface*". Sample depths are discussed in the first paragraph of Section 5.2.1. Samples were collected in accordance with the WP; no visual contamination was noted. **ADEC-Accepted August 24, 2017** The current Figures A-3 and A-4 depict the lateral extent of historical sampling at Site 8. While samples collected in 2016 were distinguished as sediment or soil, historical samples results were interchangeably referred to as sediment or soil and would make the requested assessment difficult to complete. **ADEC - Tentatively Accepted August 24, 2017; per agreed upon revisions/ amendments to the report that were discussed/concurred by the project team during the August 10, 2017 comment resolution meeting.** See response to comment #33 for Figures A-3 and A-4 title revision. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
				Accepted. The legend will be revised to state "*Sediment/Soil & Surface Water Sample*". Earlier presentation of sample matrices at Site 8 did not consistently present sediment or soil. It is not the purpose of this effort to reclassify earlier sampling efforts. **ADEC-Accepted August 24, 2017**
35.		Figure A-5	Please apply all applicable comments on other figures above to this figure. Recommend revising 'regional' to 'Suqi River Drainage Basin' for the groundwater flow direction. Similar to the Site 8 depictions of analyses results, the Suqi results need to be depicted and evaluated based on ranges of concentrations and not just exceedances/non-exceedances since these areas are being evaluated for fate and transport concerns and not just whether an exceedance is observed at a specific location at a point in time.	Accepted. Title will be revised; see response to comment #33. The historical sediment samples in the legend will be revised to state the sample year. **ADEC-Accepted August 24, 2017** Accepted in part. Flow arrow label will state "*General Site Wide Groundwater Flow Direction*". See response to comment #33. **ADEC-Accepted August 24, 2017** Accepted. Ranges of concentrations will be presented. See response to comment #3. **ADEC-Accepted August 24, 2017; per responses to RTC #3.** Discuss during comment resolution meeting. The intent of sampling at the Suqi River was to determine whether the remedial activities at Site 28 impacted the Suqi River by revisiting previous sampling locations and comparing historical results to the 2016 results. **ADEC-Accepted August 24, 2017**
36.		Figure A-6	It would be helpful to provide an enhanced, closer aerial view/figure for the Site 28 Drainage Confluence Area and depict the different flow directions, river cross section data, etc.	Accepted. The extent for Figure A-6.1 will be zoomed in slightly while Figure A-6.2 will be zoomed in significantly. Additionally, arrows will

#	Page #	Section	ADEC Comment	Response
			It would be helpful to add a few smaller flow direction arrows along the path of the river sections, drainage basin, etc. to better indicate the path of surface water flow as compared to the indicated generalized flow of the overall Suqi drainage basin. Please label/call out all significant site features i.e. the pond in the middle of the figure, the estuary, the direction to the marine shoreline, etc. It would also be helpful to label the road.	be placed along the Suqi River and Site 28 drainage basin to depict surface water flow direction for all A-6 Figures. **ADEC-Accepted August 24, 2017** Accepted. See response above. **ADEC-Accepted August 24, 2017** Accepted in part. Significant site features will be labeled. **ADEC-Accepted August 24, 2017**
37.		Appendix B	Table B-1: Please add a table note to clarify whether duplicate totals for the sediment and soil samples at Site 8. Were there four duplicates or eight for the total of 75 samples? 1.2.3: The narrative of the report mentions a trip blank that was excluded that is not mentioned here. Please clarify. 1.2.8: Potential further resolution discussion necessary re: the discussion of LOD discrepancies and the comparison discussion of cleanup levels vs. site-specific DD criteria; noting the draft report's position on the RRO results and other biogenic interferences. Please provide better clarification and elaborated discussion on these issues here and elsewhere throughout the report where applicable. 1.2.9: As noted in prior comments, given the importance/impact of the stated biogenic interference, this section should be relocated to the beginning of the report and expanded by amending with correlation	Accepted. The following note will be added to Table B-1, "*A total of 8 duplicates were collected for soil and sediment at Site 8*". **ADEC-Accepted August 24, 2017** The DQA will be revised to include discussion regarding the lack of an equipment blank at Site 8 (Section 1.2.12). Please see text at the end of this document. **ADEC-Accepted August 24, 2017** Discuss during comment resolution meeting. Despite laboratory results with LODs greater than ADEC cleanup criteria, LODs did not exceed the soil SSCLs presented in the DD. **ADEC-Accepted August 24, 2017** Accepted. Section 1.2.9 will be moved to Section 1.2.1. **ADEC-Accepted August 24, 2017** Definitive statements will be removed or altered. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
			references, data sets and trends observed, etc. Please also revise 'definitive statements on this subject to, for example in the second sentence 'indicated a high potential to bias the results.'. Please revise the statement in this section that SG cleanup was not utilized for this sampling effort; since ADEC presumes this is meant to state that SG cleanup analyses was not conducted on 2016 samples. The report makes repeated references that SG cleanup results actually confirm a bias to the historic and the 2016 results. Noting further that this rationale appears to have been applied to the sample information that is listed in table B-2 and requires further clarification. What is the data/information in Table B-2 implying if SG cleanup analyses was not conducted in 2016?	Please see text at the end of this document for revised text. **ADEC-Accepted August 24, 2017** Accepted. Reference to silica gel cleanup will be removed from the DQA. **ADEC-Accepted August 24, 2017** Section 1.2.1 (formerly Section 1.2.9) identifies that chromatograms were visually evaluated and compared to calibration chromatograms to determine likely biogenic interference. Table B-2 presents samples where a chemist determined that results were significantly affected by the observed interference. See revised text at the end of this document. **ADEC-Accepted August 24, 2017**
38.		Attachment B-1	Table B-1-1: This table indicates multiple samplers for the same samples, which is also indicated on sample containers observed in many of the photos and field log. Please discuss and clarify this in table notes and applicable narrative sections throughout the document. The data quality assessment should also discuss any impacts that may have resulted over the start/stop times, different sampling days with different samplers, etc.; or clarify the multiple samplers listed and demonstrate no impacts. Each sample should be marked/indicated for the primary sampler; noting the rationale is unclear for why multiple sampler initials are listed on one container. Please include references to acronyms and abbreviations in all tables and specify those which are not in other primary lists.	Accepted. The following text will be added to the DQA Section 1.2.3, "*Multiple samplers were utilized at Site 8. The sampling team consisted of soil diggers, container labeler, compositor, and classifier. The team worked cohesively and in a timely manner. There was no impact to the data.*" **ADEC-Accepted August 24, 2017** Accepted. Notes will be included in the sample summary. **ADEC-Accepted August 24, 2017**

#	Page #	Section	ADEC Comment	Response
39.		Attachment B-3	Note that the stated ADEC file number is incorrect; should be .013 and not .023.	Accepted. This number has been changed. Please see response to comment #1. **ADEC-Accepted August 24, 2017**
40.		Appendix C	It would be helpful to include a site-specific photo in this appendix for each of the respective cross sections; and also include these photos in the photo log.	Accepted. Photos will be added to Appendix C for cross sections 002 and 004. Photos were not collected at cross sections 001 and 003. **ADEC-Accepted August 24, 2017**
41.		Appendix E	Please indicate the associated site for each photo description; i.e. Photo 10 is presumed to be Suqi River. Similar/associated with prior comments above, it would be helpful to have a sequenced order of photos for transects/views of the Suqi and other drainage features from the estuary upward/upgradient.	Accepted. Site names (such as Suqi River, Site 8, and the Airstrip) have been added to all photos as appropriate. **ADEC-Accepted August 24, 2017**
42.			**End of ADEC Comments**	

Executive Summary, 2nd Bullet

Sample locations with concentrations above SSCLs were generally found adjacent to Cargo Beach Road's western toe at Site 8. DRO concentrations in sediment and soil ranged from 190 mg/kg to 11,000 mg/kg and 11 mg/kg J,B to 19,000 mg/kg, respectively. RRO concentrations in sediment and soil ranged from 1,800 mg/kg to 11,000 mg/kg and 130 mg/kg QL to 8,500 mg/kg, respectively. Sample locations with diesel-range organics (DRO) and residual-range organics (RRO) exceeding SSCLs were identified outside the historical decision unit boundaries. The eastern edge of elevated DRO soil levels has not been defined and may extend under the shoulder of the road. 2-Methylnaphthalene concentrations in sediment ranged from not detected to 6.8 mg/kg. **ADEC-Accepted August 24, 2017**

Executive Summary, 3rd Bullet

Naturally occurring organic material in sediment and soil identified in other areas throughout NEC were found at Site 8. Chromatographic interference to DRO and RRO sample concentrations was likely due to the presence of biogenic organics (see Section 1.2.9 in Appendix B). **ADEC-Accepted August 24, 2017**

Executive Summary, 4th Bullet

Surface water and sediment samples collected from the Suqi River and estuary in 2016 did not contain analytes above the SSCLs; this assumes RRO levels are attributed to biogenic organics (see Section 1.2.9 in Appendix B). In surface water samples, total aromatic hydrocarbons (TAH) concentrations were 0.0007 mg/L and total aqueous hydrocarbon (TAqH) concentrations ranged from 0.000807 mg/L to 0.0008233 mg/L. In sediment samples, DRO concentration ranged from 110 mg/kg QJ, QN to 670 mg/kg, RRO concentrations ranged from 930 mg/kg to 5,700 mg/kg, 2-methylnaphthalene ranged from not detected to 0.71 mg/kg J,QL,QN, arsenic ranged from 1.27 mg/kg to 5.82 mg/kg, chromium ranged from 3.42 mg/kg to 22.7 mg/kg, lead ranged from 3.95 mg/kg to 22.7 mg/kg, zinc ranged from 14.4 mg/kg to 42.2 mg/kg; the remaining analytes with SSCLs were not detected. **ADEC-Accepted August 24, 2017**

Section 2.2.1, Surface Water

Surface water sampling occurred at Site 8 from 2010 through 2012 and in 2014. Samples collected from 2010 through 2012 were analyzed for DRO, residual-range organics (RRO), and polycyclic aromatic hydrocarbons (PAH) and results were below ADEC surface water standard criteria. In 2010, 2011, and 2013, only DRO and RRO were detected in the surface water samples collected from the LDU. DRO was found at concentrations of 0.064 mg/L J in 2010 (USACE 2011a), 0.061 mg/L J in 2011 (USACE 2012), and 0.031 mg/l J in 2012 (USACE 2013). RRO concentrations were 0.055 mg/L J in 2010 (USACE 2011a), 0.058 mg/L J in 2011 (USACE 2012), and 0.039 mg/l J in 2012 (USACE 2013). While the 2010 primary and field duplicate surface water samples from the MDU had detectable concentrations of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, DRO, and RRO, PAH results were estimated below ADEC surface water standard criteria and DRO and RRO concentrations were below ADEC surface water standard criteria ranging from 0.38 mg/L to 0.44 mg./L and 0.56 mg/L and 0.7 mg/L, respectively (USACE 2011a). Although BTEX and PAH concentrations were not detected, the primary and field duplicate samples collected from the MDU had DRO and RRO in concentrations ranging from 0.19 mg/L QN to 0.28 mg/L QN and 0.28 mg/L QN to 0.44 mg/L QN, respectively, in 2011 (USACE 2012). In 2012, m & p xylenes, ,o-xylene, toluene, 1-methylnaphthalene, 2-methylnaphthalene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorine, naphthalene, phenanthrene, pyrene, GRO, DRO, and RRO were detected in the primary and field duplicate surface water samples collected from the MDU (see Table H15 in Appendix H [USACE 2013]). DRO concentrations ranged from 0.97 mg/L QN to 1.6 mg/L QN and RRO concentrations ranged from 0.24 mg/L QN to 0.45 mg/L QN (USACE 2013). In 2014, surface water samples were analyzed for gasoline-range organics (GRO), DRO, RRO, benzene, toluene, ethylbenzene, and xylene (BTEX), and PAHs. Two surface water samples (one primary and one duplicate) were collected from the Middle Decision Unit (MDU) and one surface water sample was collected from the Lower Decision Unit (LDU) at the same locations as the 2012 surface water samples. The primary and field duplicate surface water samples from the MDU contained total aqueous hydrocarbons (TAqHs) levels of 0.0193 and 0.0329 milligrams per liter (mg/L), respectively. The TAqH levels exceeded the site-specific cleanup levels (SSCLs) of 0.015 mg/L. The TAqH levels in the sample from the LDU closest to the Suqi River at 0.00242 mg/L did not exceed the SSCL. The TAH levels from both the MDU and LDU were below the SSCL of 0.01 mg/l at 0.0088 mg/L and 0.002 mg/L, respectively. No surface water sheen was observed at either location at the time of sample collection (USACE 2015b).

ADEC-Accepted August 24, 2017

Section 2.2.1, Sediment, 2nd, 3rd, and 4th paragraphs

From 2010 through 2012, discrete samples were collected from eight random grid nodes in each decision unit and composited to provide one representative sample from each decision unit; these samples were analyzed for both DRO and RRO before and after silica gel cleanup, PAHs, and total organic carbon (TOC). Samples were inconsistently referred to as sediment and/or soil during this time so the application of the appropriate DD-specified SSCLs is not possible.

Samples collected from the MDU and LDU exceeded the SSCLs for sediment identified in the DD (USACE 2009) for DRO (3,500 mg/kg), RRO (3,500 mg/kg), and 2-methylnaphthalene (0.6 mg/kg) in 2010 and 2012 as follows:

In 2010 the MDU primary sample exceeded the sediment SSCL for 2-methylnaphthalene at 7.5 mg/kg (USACE 2011a). The MDU primary sample contained DRO at 7,100 mg/kg and RRO at 3,300 mg/kg (below the sediment SSCL).

In 2010 the MDU field duplicate exceeded the sediment SSCL for DRO at 9,300 mg/kg, RRO at 5,300 mg/kg, and 2-methylnaphthalene at 7.6 mg/kg.

In 2010 the LDU sample contained 2-methylnaphthalene at 1.2 mg/kg (USACE 2011a).

In 2012 the LDU primary and field duplicate samples contained for 2-methylnaphthalene, at 1.7 mg/kg and 1.9 mg/kg, respectively (USACE 2013).

For sediment and soil samples collected from Site 8, all analytes in 2011 and the remaining analytes in 2010 and 2012 were below sediment SSCLs. While most analytes were present in concentrations less than 10 percent of the SSCL or not detected, 2-methylnaphthalene, anthracene, naphthalene, and fluorine were detected at greater than 10 percent of the sediment SSCLs (see Table F3 in Appendix F [USACE 2013]). **ADEC-Accepted August 24, 2017**

Table 2-1

Sample ID/ Decision Unit	Sample Type	Year	DRO (mg/kg)	RRO (mg/kg)	2-Methylnaphthalene (mg/kg)
		Sediment SSCL	**3,500**	**3,500**	**0.6**
		Soil SSCL	**9,200**	**9,200**	**--**
04NE08SD102	Discrete	2004	19,500	3,880	NA
04NE08SD103	Discrete	2004	6,700	4,360	NA
UDU	Composite	2010	660[1]	6,300[1]	0.0068
		2011	58[1]	380[1]	0.0035
		2012	290[1]	2,700[1]	ND (0.0039)
MDU	Composite	2010	7,100[1]	3,300[1]	7.5
			9,300*[1]	5,300*[1]	7.6*
		2011	1,800	1,100	0.15
		2012	960[1]	2,100[1]	0.3
LDU	Composite	2010	2,800	1,600[1]	1.2
		2011	550	820	0.210
			1,500	690	0.092
		2012	2,900[1]	2,400[1]	1.7
			2,500*[1]	2,200*[1]	1.9*

Notes:
-- = not specified
* = field duplicate sample
NA = not analyzed
ND = not detected
[1] Concentration decreased after application of silica gel cleanup.
For definitions, refer to the Acronyms and Abbreviations section.

ADEC-Accepted August 24, 2017

Section 2.2.2

RIs conducted at the Suqi River, also known as Site 29, between 1994 and 2004 identified DRO as the only contaminant of potential concern. These investigations are summarized in the DD as follows (USACE 2009):

In 1994, surface water samples were analyzed for GRO, DRO, and BTEX. Surface water samples did not exceed drinking water cleanup levels.

In 1996, sediment and surface water samples were analyzed for DRO and PCBs. Sediment samples contained DRO at 25,000 mg/kg approximately 850 feet downgradient of the drainage basin (Site 28). Subsequent sampling efforts in 1998 and 2001 in this area did not duplicate this contamination level in sediment. Surface water samples did not exceed drinking water cleanup levels. (USACE 2009).

In 1998, sediment samples were analyzed for DRO, RRO, BTEX, and PAHs, and contained DRO ranging from 11 to 2,200 mg/kg. Surface water samples did not exceed drinking water cleanup levels.

In 2001, sediment samples were analyzed for DRO, RRO, PAHs, polychlorinated biphenyls (PCB), TOC, total solids, chromium, lead, and zinc while surface water samples were analyzed for DRO, RRO, and PCBs. Sediment contained DRO ranging from 15 to 1,400 mg/kg. Surface water samples did not exceed drinking water cleanup levels.

In 2004, sediment samples were analyzed for GRO, DRO, RRO, BTEX, PAHs, PCBs, pesticides, TOC, and mercury while surface water samples were analyzed for GRO, DRO, RRO, BTEX, PAHs, and PCBs. Sediment samples contained DRO ranging from 157 to 988 mg/kg. Surface water samples did not exceed drinking water cleanup levels. **ADEC-Accepted August 24, 2017**

Section 4.0

Deviations from the 2016 work plan (USACE 2016b) occurred during the execution of fieldwork. None of the deviations significantly affected the data usability. The work plan deviations were as follows:

Project Wide:

In the absence of DD-based SSCLs for soil, by USACE request analytical results from soil samples collected in 2016 were screened against Title 18 of the Alaska Administrative Code (AAC), Section 75 (18 AAC 75) Tables B1 and B2, promulgated in November 2016 (ADEC 2016). The November guidance

ADEC-August 24, 2017; revise/replace references to 'guidance' in associated with 'promulgated cleanup levels' to avoid confusing with actual guidance.

was published after the 2016 work plan (USACE 2016a) was accepted. The 2016 WP referenced 18 AAC 75 Tables B1 and B2, which was promulgated in January 2016. For all soil analytes measured as part of the 2016 field effort, the November 2016 values presented in Tables B1 and B2 (ADEC 2016) were more stringent than those referenced in the 2016 WP (USACE 2016a).

Some final sampling locations at Site 8 and the Suqi River estuary were not surveyed using a real-time kinematic Global Positioning System (GPS) or mapping grade GPS. ECO-Land LLC performed an initial survey stakeout of all planned sampling locations on 13 August 2016. During sampling, it was determined that some sample locations would need to be moved. ECO-Land LLC returned to NEC on 18 August 2016. However, the survey gear was left in Nome. After communication between field personnel and the USACE, it was determined that the swing-tie method at Site 8 and a compass and tape measure at the Suqi River would be used to identify the position of relocated sample collection points (see Photo No. 14 in Appendix E). Although resurvey was planned, heavy rainfall flooded the estuary and the water depth made wading into the Suqi River impossible. For additional information, see below.

Site 8:

Soil and sediment PAH samples were analyzed by ALS Environmental using U.S. Environmental Protection Agency (EPA) Method SW8270D instead of EPA Method SW8270-SIM due to laboratory error. While the limits of detection (LODs) for soil samples were greater than ADEC evaluation criteria, all LODs were less than SSCLs (USACE 2009). For additional information, refer to the DQA in Appendix B.

A Site 8 equipment blank was not collected and submitted for laboratory analysis. The 2016 WP required one equipment blank sample be collected following the decontamination of hand tools used to collect soil samples at Site 8. For additional information, refer to the DQA in Appendix B.

Some sample locations were relocated to minimize the collection of **non-native material**. Six proposed locations were several feet into the roadbed and could not be accessed with hand tools (see Photos No. 29 and 30 in Appendix E). After discussions with the USACE, Site 8 sample locations 004, 013, 021, 039, 073, and 075 were relocated so that no more than approximately 1 foot of roadbed would need to be moved to access **undisturbed soil**. Due to large cobbles encountered at 2 feet below ground surface (bgs), similar to those lining the toe of the road, sample location 054 was also relocated. **ADEC-Accepted August 24, 2017; noting**

additional comments and red highlighted references. Please revise/amend the mention and discussion of the highlighted references above to better clarify. The objective wasn't so much related to not sampling the 'non-native material' as it was ensuring that the most likely profile of potential extent of contamination was targeted. Further, 'undisturbed soil' should be better specified, similar to the sentence prior associated with 'non-native material'; noting that the soil/profile(s) located directly underneath the roadbed are actually disturbed.

Suqi River:

The original stakeout did not match the locations proposed in the 2016 work plan (USACE 2016a). In order to collect sediment samples adjacent to historical sample locations, sample locations 005, 006, and 007 were not collected in the surveyed location. Using a compass and tape measure, an attempt was made to collect samples in the proposed locations; these sample locations are estimated (see Photo No. 14 in Appendix E).

Due to heavy rainfall during the field effort, survey lath, put in place on 13 August and 15 August 2016, marking sediment sample locations in the Suqi River estuary were left in place. At the time of attempted retrieval on 23 August 2016, survey lath for samples 004 through 010 were underwater and could not be safely retrieved due to water depth.

Flow measurements were collected from the Suqi River at two points at Cross Section S29-002 (Figure A-6.2). Although flow measurements were collected from the midpoint of the Suqi River channel, the midpoint at this location had an eddy (see Photo No. 21 in Appendix E). An additional velocity measurement was collected 1 foot closer to the right edge of water (when facing downstream) from the midpoint and used to calculate discharge at this location.

ADEC-Accepted August 24, 2017

Section 5.4

Investigation-derived waste (IDW) was transported and disposed of in accordance with all applicable local, state, and federal regulations. IDW included used personal protective equipment, sampling spoons, decontamination water, and general refuse. Solid wastes were stored in contractor bags and four bags of approximately 5 cubic feet each were disposed of by ECC in accordance with the Resource Conservation and Recovery Act and state waste regulations. Wastewater generated during decontamination was collected in a 5-gallon bucket. The liquid waste was transferred to a GAC filter drum and gravity-fed through the filter prior to discharge on-site (Table 5-1). Discharge was performed downgradient of adjacent sampling. After use, the GAC filter drum was transported to Anchorage via Northern Air Cargo and returned to ECC for re-use. Sanitary waste collected from the portable toilet system was collected and disposed of by ECC (USACE 2016b). **ADEC-Accepted August 24, 2017**

Section 6.1, 3rd paragraph

Biogenic interference from naturally occurring organic material (NOM) likely contributed to DRO and RRO concentrations in sediment and soil and biased the analytical results (see Section 1.2.9 in Appendix B). DRO exceedances of the SSCL presented in the text are attributable to POL contamination. Biogenic interference likely contributed to all RRO results because no distinguishable residual-range distillate product fingerprint was observed when sample chromatograms were compared to calibration chromatograms. Therefore, RRO exceedances are not discussed in this section. **ADEC-Partially Accepted August 24, 2017; noting project team concurrences on revising/amending this discussion further to better support the statements and associations to biogenic interference.**

Section 6.3, 2nd, 3rd, 4th, and 5th paragraphs

In 2016, sediment samples exceeded the SSCLs of 3,500 mg/kg for DRO, 3,500 mg/kg for RRO, and 0.6 mg/kg for 2-methylnaphthalene. For analytes with sediment SSCLs, sample concentrations of DRO ranged from 190 mg/kg to 11,000 mg/kg, RRO ranged from 1,800 mg/kg to 11,000 mg/kg, 2-methylnaphthalene ranged from not detected to 6.8 mg/kg, fluorene ranged from not detected to 0.41 mg/kg J, naphthalene ranged from 0.69 mg/kg J, and phenanthrene ranged from not detected to 0.25 mg/kg J; acenaphthene, benzo(g,h,i)perylene, fluoranthene, and indeno(1,2,3-cd)pyrene were not detected (see Table B-1-3 in Appendix B). Although RRO exceeded the sediment SSCL from 22 of the sample locations, there is no record of anthropogenic RRO sources at Site 8 and all RRO detections are likely to be biogenic in nature (see Section 1.2.9 in Appendix B).

In 2016, soil samples exceeded the SSCL of 9,200 mg/kg for DRO (Table 6-1). For analytes with soil SSCLs, sample concentrations of DRO ranged from 11 mg/kg J,B to 19,000 mg/kg, RRO ranged from 130 mg/kg QL to 8,500 mg/kg, and naphthalene ranged from not detected to 3.2 mg/kg J,QH (See Table B-1-2 in Appendix B).
In 2016 DRO exceeded the sediment SSCL in S08-SD-026 and S08-SD-068 at 11,000 mg/kg and 7,600 mg/kg, respectively. Both samples were silty, fine sand, in close proximity to the historical sediment samples collected in 2004, and within the boundaries of the decision units.
In 2016 DRO exceeded the soil SSCL in S08-SS-013 and S08-SS-030 at 19,000 mg/kg and 14,000 mg/kg, respectively. While a notable fuel odor was present during the collection of both samples, a visible sheen was observed on water that accumulated within the sample boring during the collection of S08-SS-013. Location S08-SS-013 was slightly outside of eastern extent of the LDU and approximately 20 feet downgradient of the 2004 DRO exceedance of 19,500 mg/kg. Composite samples were collected in 2010 and 2012 nearby S08-SS-013. Location S08-SS-030 was east of the LDU extent along the toe of Cargo Beach Road and upgradient of a 2004 DRO exceedance of 6,700 mg/kg. **ADEC-Accepted August 24, 2017**

Table 6-1
2016 SSCL Exceedances in Sediment and Soil at Site 8

Sample Location	Matrix	DRO (mg/kg)	2-Methylnaphthalene (mg/kg)
Sediment SSCL		**3,500**	**0.6**
S08-SD-026	Sediment	**11,000**	ND [0.2]
S08-SD-068		**7,600**	**6.8**
Soil SSCL		**9,200**	**--**
S08-SS-013	Soil	**19,000**	7.5 QH,QN
S08-SS-0139*		**17,000**	3.8 QH,QN
S08-SS-030		**14,000**	14

Notes:
-- = not specified
* = field duplicate sample
Bold = exceeded SSCL
ND = not detected
No RRO exceedances are presented in Table 6-1.
For definitions, refer to the Acronyms and Abbreviations section.

ADEC-Accepted August 24, 2017

Section 6.3

A total of five surface water and 11 sediment samples collected from the Suqi River and estuary in 2016 did not exceed SSCLs (Figure A-5). For analytes with surface water SSCLs, surface water concentrations of total aromatic hydrocarbons (TAH) were 0.0007 mg/L and TAqHs ranged from 0.000807 mg/L to 0.000823 mg/L (see Table B-1-5 in Appendix B). For analytes with sediment SSCLs, sample concentrations of DRO ranged from 110 mg/kg QL,QN to 670 mg/kg QL,QN, RRO ranged from 930 mg/kg to 5,700 mg/kg, 2-methylnaphthalene ranged from not detected to 0.71 mg/kg J,QL,QN, arsenic ranged from 1.27 mg/kg to 5.82 mg/kg, chromium ranged from 3.42 mg/kg to 22.7 mg/kg, lead ranged from 3.95 mg/kg to 15.3 mg/kg, and zinc ranged from 14.4 mg/kg to 42.2 mg/kg; PCBs, benzo(g,h,i)perylene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene were not detected (see Table B-1-4 in Appendix B). Although RRO exceeded the sediment SSCL of 3,500 mg/kg at three sample locations collected from the Suqi River estuary in 2016, RRO is likely attributed to biogenic interference (see Section 1.2.9 in Appendix B). Evaluation of chromatograms from samples collected in 2016 to calibration chromatograms did not indicate patterns typical of middle distillate or residual range fuel products.

Sediment sampling results from 2016 did not confirm remaining historical contamination. Historical sampling of the Suqi River was performed before SSCLs were documented in the 2009 DD (USACE 2009). However, when comparing historical sediment and surface water results to SSCLs, one sediment sample collected in 1996 exceeded the DRO SSCL of 3,500 mg/kg at 25,000 mg/kg. Subsequent sampling efforts in 1998 and 2001 near the DRO exceedance were unable to replicate the high DRO concentration (USACE 2009).
While isolated pools of surface water sheen were observed at S29-002 and S29-003 (Photo 6-5) prior to disturbance or sample collection, the source and whether or not the sheen was biogenic or petrogenic were unknown; results from the 2016 sampling effort for TAHs and TAqHs in surface water do not support an anthropogenic source for sheen. Surface water TAH and TAqH results were below SSCLs. Sheens have been observed during past sampling efforts as a result of sediment or streambank material disturbance. Although remedial action efforts from 2010 through 2013 at the Site 28 drainage basin and current remaining sources of contamination were not resulting in contaminant migration via the surface water pathway at the time of sampling, remaining MOC and Site 28 contamination are potential ongoing sources of contaminant migration to downgradient areas including the Suqi River or its estuary. **ADEC-Accepted August 24, 2017**

Section 6.4, 1st, 2nd, 5th and 7th paragraphs

Flow measurements were collected from the Suqi River to compare to measurements collected in 2001 and 2002 prior to the 2010 through 2013 remedial actions at the Site 28 drainage basin (Figure A-6.1). Measurements were collected immediately upstream and downstream of the drainage basin confluence from 21 through 22 August 2001 and on 14 August 2002. Additional measurements were collected upstream from the Suqi River culvert near the airstrip in 2002; no measurements were collected downstream of the Suqi River culvert near the airstrip in 2002 because no active flow was recorded. The Phase II RI noted the difference in the Suqi River water level between 2001, a year of high Suqi River water level, and 2002, a year of low Suqi River water level (USACE 2003). In 2016, flow measurements were recorded on 16 August 2016 from approximately 100 feet upstream and downstream from the drainage basin confluence (Cross Sections S29-001 and S29-002 as shown on Figure A-6.2), and upstream and downstream from the Suqi River culvert near the airstrip (Cross Sections S29-003 and S29-004 as shown on Figure A-6.3), respectively. Photographs taken at the time of the 2016 flow measurement collection (see Photos No. 20 through 23 in Appendix E) indicate that the Suqi River water level was below the ordinary high water level.

Mean flow velocity and discharge were calculated for each cross section. Mean flow velocity was calculated using the “0.2, 0.4, 0.8 Method” published in the *Open Channel Profiling Handbook* (Marsh-McBirney 2001). The velocities recorded at 20 and 80 percent of the total depth at the channel midpoint were averaged together; the resulting average velocity was calculated with the velocity recorded at 40 percent of the total depth to result in the mean velocity at the midpoint of the Suqi River. Total discharge was calculated using mean velocity and total area of each cross section.

Cross Section S29-002 was a smooth gravel and silt streambed, located in the Suqi River approximately 100 feet downstream of the confluence of the Site 28 Drainage Basin with the Suqi River. This cross section was the narrowest and deepest channel measured, at 8 feet across and a maximum depth of 3.4 feet (Appendix C). Noting an eddy in the midpoint of the channel, field personnel measured velocity and discharge 1 foot from the midpoint closer to the right edge of the water (Section 4.0). This point had the greatest mean velocity at 1.31 feet per second (ft/sec) and discharge at 21.9 ft^3/sec. Although the instantaneous velocities were measured 1 foot from the midpoint closer to the right edge of the water, the eddy may have affected the velocity measurements.

Cross Section S29-004, located approximately 100 feet downstream from the Suqi River culvert near the airstrip, was a shallow, boulder-lined streambed measuring 22 feet across (Appendix C). The mean velocity was 0.37 ft/sec, and the discharge was 10.17 ft^3/sec. While the Suqi River was observed to be flowing past the Cross Section S29-004, the sand berm at the terminus of the Suqi River estuary may have affected the velocity measurements.
ADEC-Accepted August 24, 2017

Table 6-2

Cross Section	Location	Width (feet)	Midpoint (feet)	Depth at Midpoint (feet)	Mean Velocity (ft/sec)	Discharge (ft^3/s)	Bed Characteristics
S29-001	100-feet upstream of the Site 28 drainage basin confluence	8.5	4.25	3.2	0.43	7.00	Rocky bed; sides silty with organics
S29-002	100-feet downstream of the Site 28 drainage basin confluence	8	4	3.2	1.31[1]	21.88	Smooth gravel and silt bed
S29-003	100-feet upstream of the culvert on the Suqi River near the airstrip	10.5	5.25	1.2	0.99	12.80	Boulder bed
S29-004	100-feet downstream of the culvert on the Suqi River near the airstrip	22	11	1.2	0.37	10.17	Boulder bed

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DQA Section 1.2.1, Biogenic Interference

Naturally occurring organic compounds in soil and sediment have been reported in previous sampling efforts at NEC. The naturally occurring organics add to high levels of DRO and RRO and are likely to bias the results. This biogenic interference was likely observed in Site 8 soil and sediment samples and Suqi River sediment samples. For 2016 Site 8 and Suqi River samples, the chromatograms for the AK102/103 analysis were visually evaluated and compared to calibration chromatograms to determine if biogenic interference was significantly contributing to reported concentrations. All RRO results appear to be significantly affected by biogenic interference and no distinguishable residual-range distillate product (i.e., motor oil) fingerprint was observed. For the DRO range, a discernable middle distillate product (i.e., diesel fuel) was observed in some Site 8 and Suqi River samples. If the chromatogram contained a flat baseline with occasional peaks inconsistent with the DRO pattern observed in higher concentration samples, the primary contribution of the DRO results was identified as biogenic interference. Table B-2 lists samples where the DRO result was attributed to the biogenic interference. It is recommended future sampling efforts at Site 8 and Suqi River utilize the silica gel cleanup procedure for the evaluation of biogenic interferences and their contribution to the Method AK102 and Method AK103 sample results.

ADEC-Accepted August 24, 2017

DQA Section 1.2.12, Equipment Blank

A Site 8 equipment blank was not collected and submitted for laboratory analysis. The 2016 WP required one equipment blank sample be collected following the decontamination of hand tools used to collect soil samples at Site 8. Decontamination procedures were followed using laboratory-grade detergent, potable water, and deionized water rinses; however, these procedures were not verified with an equipment blank sample. The data quality is affected since the decontamination procedures for Site 8 were not verified. **ADEC-Accepted August 24, 2017**

Comments of Alaska Community Action on Toxics on the 2016 Monitored Natural Attenuation Groundwater Sampling Report at the Main Operations Complex and 2) Site 8 and Suqi River Surface Water and Sediment Sampling Report

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

Submitted June 7, 2017

1) **2016 Monitored Natural Attenuation Groundwater Sampling Report at the Main Operations Complex**

Executive Summary (ES)

The document states that the results are compared to clean-up levels established through the 2009 decision document. It should be noted that the tribe does not necessarily concur that these clean-up levels are health protective and that they should have been an official party to the record of decision on a government-to-government basis.

- page ES-1: Question—are there any monitoring wells still in place in addition to the fifteen from which samples were collected during this RAO?
  No
- The ES indicates that natural attenuation is occurring at the MOC. How is this measured? How is this more than a subjective, qualitative judgement? Please quantify and provide justification.
  Please refer to the detailed discussion in Section 6.0. Multiple chemical parameters were measured and analyzed to support the conclusion natural attenuation is occurring in groundwater at the site.
- The document indicates that contaminant concentrations have "generally" decreased over time. Please provide a summary here of the specific wells where concentrations have declined and to what extent. Saying that concentrations have "generally" decreased is too subjective.
  Please refer to the detailed discussion in Section 6.0. The executive summary is meant to be an overview of sampling and conclusions.
- The statement that "attenuation of DRO is predicted to be complete in 2035" is not verified. What is this prediction based on? Even if this were true (and we believe that 2035 is an underestimate of the length of time to completion), this length of time for completion of MNA is unacceptable because it allows for continuing and harmful exposures to fish, wildlife, and people. Furthermore, it is likely that the fuel-related compounds are serving as a "vehicle" for the mobilization and transport of substances such as PCBs.
  Verification of the predicated attenuation of DRO date can only occur closer to the time (2035) of predicted attenuation. Estimates of the rate of natural attenuation are based on modeling and analysis of trends over time (Appendix C-3). PCBs analyzed by SW8082 were part of the 2016 test methods, and PCBs (as Aroclors) were not detected in any of MOC groundwater wells sampled in 2016. The protectiveness of the remedy will be evaluated in the next Five Year Review.

Introduction

- Indicate if and how the tribe was consulted on the 2016 Work Plan.
  All USACE documents are made available for review and comment at the Information Repositories. Notices were sent to stakeholders on 13 June 2016.
- The decision document does not represent the interest of the tribes or the people of St. Lawrence Island. We do not agree that clean-up levels defined in the decision document are protective of the environment or human health.
  USACE appreciates the difference in perspective as shared by ACAT and the people of St. Lawrence Island and will continue to work cooperatively with all stakeholders to implement the requirements of the Decision Document in accordance with the CERCLA requirements.
- We have concern about at least one photo (Appendix E) that shows a visible sheen.
  Results from the 2016 sampling effort for DRO and RRO in sediment and total aromatic hydrocarbons and TAqHs in surface water do not support an anthropogenic source for the sheen shown in Photo 6-5 on page 6-6 of the draft report.

Site Description and History

- Need to describe the profound influence of climate warming which is likely affecting mobilization and transport of contaminants in and around St. Lawrence Island.
  The next Five Year Review may consider the effects of climate change on potential mobilization and transport of contaminants.
- Break up is often occurring earlier than June now.
  Noted.
- Page 2-3: The document states that contractors have observed significant changes in surface water characteristics at multiple locations across the site. What are the changes that contractors are observing? How does this affect fate and transport of contaminants?
  The complete text from the Bristol report will be added to Page 2-3 as follows: "Bristol observed significant changes in surface water characteristics at multiple locations across the site, most notably at a location directly south (uphill) from Site 26 where surface water runs through a culvert underneath the road that runs from the MOC to the borrow source. This drainage originated in the Kinipaghulghat Mountain valley and exhibited variable flow in late spring/early summer. The drainage would flow for days at a time but would run dry later into the summer during drier periods." The effects of variable surface water would not have a direct effect on MOC sample results. However, the precipitation variability that manifests as surface water variability would affect groundwater elevations.
- Under the Land and Resource Use section, page 2-4: As we have said repeatedly in prior comments, it is important to indicate that the military displaced a permanent village at NE Cape. NE Cape was and is more than a place "seasonally occupied." It is considered a village site. By describing it as merely a place that is seasonally occupied, the Corps and their contractors diminish the historical and continuing importance of the site from the cultural, and spiritual perspective of the people of the Island. By diminishing the importance of NEC, the Corps mispresents and potentially underestimates the hazards, risks and exposure pathways of contaminants associated

with the area. Surface waters and springs in the area are currently used and traditional drinking water sources. Salvaged materials that are likely contaminated with lead, PCBs, asbestos and other harmful substances continue to be used for building material for homes not only at NE Cape, but throughout the Island. The significant quantities of hazardous waste on the Island were left without the free, prior and informed consent of the people of St. Lawrence Island, in violation of the 1952 agreement with the Tribe and in violation of international law.

A draft Health Consultation prepared by the Agency for Toxic Substances and Disease Registry (ATSDR) dated July 2017 concluded there is no apparent health hazard associated with the Northeast Cape site. ATSDR's assessment contained the following findings: 1) eating fish from Northeast Cape in the summer (3 months) is not expected to harm people's health; 2) eating greens and berries from Northeast Cape year-round is not expected to harm people's health; 3) accidentally ingesting soil and drinking Suqitughneq (Suqi) River surface water are not expected to harm people's health; and 4) there is not enough contact with site contaminants to suggest that exposures are contributing to cancer and birth defects. The following statements in the report are accurate: "Local subsistence hunting camp structures are located adjacent to Site 3 and are seasonally occupied", and "Currently, there are no permanent NEC residents; however, representatives of Savoonga have indicated a desire to re-establish a permanent residential community at the site in the future." Remedial actions have removed contaminated soil containing contaminants above levels identified in the 2009 Decision Document for the Northeast Cape FUDS. Groundwater sampling at the MOC has indicated natural attenuation of residual petroleum constituents is occurring in site groundwater. Surface water samples collected from the Site 28 Drainage and Suqi River have not contained contaminants above levels identified in the 2009 Decision Document. Data collected to date indicate residual contaminants in sediment at Site 28 are not migrating. Remedial actions conducted under the NALEMP have removed contaminated building materials from structures at the NVNC.

In addition to the endangered species mentioned, bowhead whale should be included.

Bowhead whale (endangered) will be added to the endangered/threatened species list on page 2-4 of the report.

- In addition to berries and reindeer as important subsistence foods, please include the fact that NE Cape is also used for other food and medicinal plants, including such plants as roseroot, coltsfoot, and willow.

  Roseroot, coltsfoot, and willow will be added to section 2.1.4 of the report.
- It is important to indicate that the habitat and subsistence resources in and around NE Cape are significantly and adversely affected by the military contamination and perturbations. Resident and anadromous fish populations and their habitats are not recovering. The people of St. Lawrence Island can no longer fish for the once abundant tomcod or salmon there, for example. The seal haul out was disturbed and has not recovered.

  The USEPA conducted an evaluation of the USACE cleanup efforts at Northeast Cape and concluded in February 2013 the cleanup is consistent with CERCLA and the National Contingency Plan. The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. The sand berm that naturally, periodically develops at the mouth of the Suqi River creates a barrier to fish that would otherwise migrate from the ocean and into the river. The significant and adverse effects described above are noted as a continuing concern of the tribe and community.

- The document states that materials were initially abandoned in place due to the high cost of off-island transport. It should be noted that significant quantities of equipment and hazardous materials remain at the site in the shallow subsurface, thus providing continuing sources of contaminants that affect the environment and health. From the perspective of the people of St. Lawrence Island, this contamination has contributed significantly to health disparities, including a cancer crisis. The high cost to the health and well-being of the people of St. Lawrence Island must be considered in decisions about clean up decisions as primary prevention and protective measures.
  The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded remedies at Northeast Cape FUDS are currently protective.
- Page 2-6: the document indicates that remedial actions occurred through 2014. It should be noted that the tribe and ACAT assert that the cleanup is far from complete. The site is being closed prematurely without adequate characterization and clean up.
  The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded remedies at Northeast Cape FUDS are currently protective.
- Page 2-6: The document indicates that the primary sources of contamination are spills and leaks of fuel products. It should also include PCBs from transformers and electrical equipment, pesticides, heavy metals, solvents.
  PCBs from transformers and electrical equipment, and vehicle maintenance fluids, such as glycol and solvent will be added to the second paragraph on Page 2-6.
- Page 2-6 bottom of para 3: although the document indicates that the northern edge of the MOC has petroleum in subsurface soils at levels below the risk-based levels identified in the decision document, we do not agree that these levels are health protective and it is incumbent upon the Corps to remove this contamination per the 1952 agreement.
  The USACE has followed the requirements of the DDs, which were developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded remedies at Northeast Cape FUDS are currently protective.
- Page 2-7: this document misrepresents the ISCO by deeming it as not an effective means of remediation. As stated previously by the TAPP advisor and ACAT, the remediation was conducted improperly and against the scientific and technical methods and protocol recommended by Dr. Scrudato. It cannot be claimed in this document that the ISCO method is ineffective when it was improperly implemented. In fact, the characterization in the document of the ISCO pilot test is an outright misrepresentation!
  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.
- Page 2-7: Para 2 indicates up-, cross-, and source area monitoring wells. Several

downgradient monitoring wells should be added in order to provide a more complete picture of the fate and transport of contaminants in the groundwater. Permanent monitoring wells cannot be constructed in the tundra downgradient of the MOC because the freeze/thaw cycle will destroy the wells. No contaminants have been detected in surface water samples collected from the Site 28 Drainage and Suqi River. This has provided evidence contaminated groundwater is not migrating into surface water downgradient of the MOC.

- Page 2-8: Monitoring wells 88-4 and 88-5 should be re-instated and included in the monitoring of groundwater at the MOC. The document acknowledges that they "provide valuable information regarding historical downgradient contamination." Given this, it is likely that they would continue to provide valuable information. Monitoring wells 14MW02, -04, and -05 were installed slightly downgradient of the locations of former monitoring wells MW88-4 and 88-5. Monitoring wells 14MW02, -04, and -05 are considered suitable replacements for former monitoring wells MW88-4 and 88-5.

Page 3-1: Key Field Personnel
The table should indicate qualifications of the key personnel, particularly of the Project Chemist and Analytical Laboratory PM. What laboratory was used for analyses?
Qualifications of key personnel were included in Table 4-3 on page 4-7 of the Field Sampling Plan, which was part of the Final Work Plan dated August 2016. Analytical laboratory information was included in the Work Plan and in Table 3-1 on Page 3-1 of the draft reports.

Page 4-1: Work Plan Deviations
The document should include justification for each of the deviations and how they affected data quality rather than simply claiming that they did not affect data "usability."
The second sentence of Section 4-1 will be revised as follows: "None of the deviations significantly affected data usability or data quality."

Page 5-1: Mobilization and Demobilization
The document should disclose the total costs including transportation, charter flights, lodging etc. Given all of the days when inclement weather prohibited travel to NE Cape, is this method of mobilization cost effective compared with establishing a temporary base of operations at NEC? What are the cost comparisons used to justify this method of mobilization? By doing it this way, the Corps and their contractors bypass the Native Village of Savoonga and/or Gambell and thus not making it possible to include community oversight/community monitor(s) who are present at the NE Cape site when the sampling is occurring. In the future, community oversight/monitors should be included in all sampling programs at NE Cape.
Costs for the method of mobilization utilized during 2016 fieldwork were less than if a temporary camp had been mobilized, setup, operated, and demobilized from Northeast Cape. During the Long Term Management Plan public presentation in Savoonga on 26 July 2016, a request was made by a community member 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 which occurred during August 2016. 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. This request will be integrated into the planning phase for 2018 activities.

Page 5-5: Sampling Activities
Additional contaminants should have been included in the sampling program and should be analyzed in future sampling programs, including TCE (and other solvents), mercury, pesticides, and PCBs.
Contaminants identified during multiple remedial investigations and subsequent sampling and remedial actions were included in the sampling program.

Page 5-6: Waste Management
The document should indicate where solid wastes were disposed. The document indicates that wastewater and sanitary waste were disposed on site according to 2016 WP. Did the Corps receive permission for this from the landowner and tribe? If not, this is a violation of the 1952 agreement, requirements for government-government consultation, and possibly other laws that would prohibit the dumping of waste on private lands.
All solid waste was removed from the site and disposed of at the Nome Landfill. The following will be added to as the last sentence of section 5.3: "Solid wastes were disposed at the Nome Municipal Landfill located in Nome, Alaska."

Table 5-1—define the constituents of general refuse.
The following footnote will be added to Table 5-1; "General refuse included spent personal protective equipment, sanitary waste, sampling materials, and empty food containers."
Page 6-5, Table 6-4. It is incorrect to label this table "Analytical Natural Attenuation Results from 2016" because there are no comparative data included in the table from prior years with which to assess the differences in values for these parameters and the effectiveness of natural attenuation. It would be more accurate to simply title the table "Analytical results from 2016."
The title of Table 6-4 will be revised to "2016 Analytical Natural Attenuation Parameter Results" as these results are specific to the 2016 samples. Please note that the historic results and 2016 results for these parameters can be found in Appendix C-2.1

Page 6-6 para 2: The first sentence states that "groundwater quality in samples…indicate natural attenuation is occurring. Although the parameters measured seem to indicate anaerobic petroleum degradation is occurring, there is no quantification of the direct measures of petroleum degradation in the wells that is necessary in order to substantiate this claim. These data (actual values of petroleum concentrations over time) should be presented in a succinct and clear manner in this section rather than in various, poorly designed tables and graphs in the Appendices. A quantification such as percentage of degradation and/or statistical analysis with representation of actual values/concentrations over time should be indicated for each well.
As noted in the comment evidence of natural attenuation is present based on the groundwater parameters measured in 2016. The analytical parameters selected for testing were defined in the work plan without deviation. Presentation of the time series DRO plots presented in Appendix C-3.2 will be simplified in the final report.

Page 6-6, Section 6.3: Contamination of Groundwater
The document does not demonstrate that concentrations have decreased over time with any kind of statistical analysis, so this is an unsubstantiated claim.

Section 6 of the report will be revised to separate the comparisons to SSCLs, ADEC Cleanup Levels, and analyte trends into separate subsections. Additionally, the statement about decreasing trends will be revised to be specific to DRO as follows:
"The DRO concentration in two (14MW04, and 14MW05) of the three monitoring wells (14MW02, 14MW04, and 14MW05) with 2016 SSCL exceedances have generally decreased over time since monitoring began in 2014. The DRO concentrations in monitoring well 14MW02 have slightly increased since monitoring began in 2014" Please note this statement for 14MW04 and 14MW05 is based on the geometric regressions found in Appendix C-4.1 and C-4.2. Additionally, a Mann-Kendal analysis for DRO trends will be added for 14MW02, 14MW03, and 14MW05.

The fact that there are so many exceedances of SSCLs in groundwater confirm our previous assertion that monitored natural attenuation is not an adequate method to address the contamination and prevent further harm. Additional removal of contamination sources and active remediation of groundwater is necessary in order to adequately protect environmental and human health.
The USACE has followed the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded remedies at Northeast Cape FUDS are currently protective.

6.3.1—Current Contaminant Exceedances in Groundwater
Sentence 2: DRO, naphthalenes, total and dissolved arsenic, chromium, and lead exceeded 2016 ADEC levels—this does not indicate the well(s) in which these exceedances were found.
Section 6.3.1 will be revised to separate out the comparative discussion of SSCLs versus 2016 ADEC Cleanup Levels. The wells which generated the exceedances will be identified in the text.

Table 6.5
This represents a significant number of exceedances and indicates the need for active remediation rather than passive natural attenuation to reduce levels of these contamination to safe levels.
The USACE has followed the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded remedies at Northeast Cape FUDS are currently protective.

Values should be presented as ppb.
Disagree. The sample results, SSCLs, and 2016 ADEC cleanup levels were shown in milligrams per liter to make comparison of sample results with SSCLs and 2016 ADEC cleanup levels an easy task. If a result exceeded the SSCL, then the result was shown in bold text and gray highlight so it was visually apparent.

Page 6-10, para 1: we are concerned that poor QA/QC may have resulted in the low biased reporting.
The revised text in Section 6 will include a revised discussion of the QL qualified DRO results as follows:
"Samples from wells 14MW06, 14MW03, and 14MW01 were also qualified QL as the extracts were analyzed past 40 days from extraction. The QL qualifier did not affect data usability in this case since analysis within hold time produced lower results than those obtained from the out of hold time analysis which occurred 2 days past the extract hold time."

Page 6-10, para 2: the document indicates that there is no known anthropogenic source of lead at the MOC. What about lead acid batteries, ammunition, leaded gas or aviation fuel? Lead is a potent neurotoxic chemical and it has been established that there is no safe level of exposure.
This is concerning from a public health perspective since this is a potential source of drinking water.
It is unknown whether lead-acid batteries, ammunition, leaded gas and aviation fuel were present at the MOC. As a result, the source of lead is likely not anthropogenic, but instead likely a result of local geology. As stated in the Northeast Cape Long Term Management Plan, groundwater at the MOC should not be used as a drinking water source until RAOs (i.e., SSCLs) are met.

Page 6-10, para 3: the document indicates that there is no anthropogenic source of arsenic and the levels should be attributed to background concentrations. No background or control samples were taken to substantiate this assertion. There could be anthropogenic sources at the MOC such as arsenic-based pesticides, pyrotechnics, or metallurgical applications. The document also does not substantiate the assertion that chromium levels should be attributed to background levels.
Possible sources could include electroplating, metallurgical applications.
There is no indication arsenic-based pesticides, pyrotechnics, or metallurgical applications were present at the MOC. As a result, the source of arsenic is likely not anthropogenic, but instead likely a result of local geology.

Page 6-12: Data indicate that levels of such substances as DRO in some wells are not declining and in fact show highest concentrations in 2015 and 2016. Also MW88-4 should not have been removed after the 2012 sampling program—it is necessary to evaluate the effectiveness of the POL-excavation and the well should be re-installed and sampled in future monitoring.
Only one well of the three wells with 2016 DRO SSCL exceedances, 14MW02, contained DRO levels which were higher than previous DRO results. At 14MW02, three monitoring events have occurred. The 2014 result of 1.3 mg/L obtained during the first year the well was installed is slightly lower than the 2015 result (1.6 mg/L) and 2016 result (1.6 mg/L). Monitoring well MW88-4 was removed during the course of contaminated soil excavation. It was not feasible to preserve the well because the contaminated soil surrounding the well was removed and disposed off site. Monitoring wells 14MW04 and 14MW05 were installed as replacement wells downgradient of the former location of monitoring well MW88-4.

Page 6-13: Identify possible sources/source areas for naphthalene.
Although naphthalene in 14MW01 and 14MW02 exceeded the recently lowered ADEC Groundwater Cleanup levels, the assessment of potential sources is beyond the scope of this report.

Page 6.4: The document indicates that natural attenuation is occurring based on measured groundwater parameters. However, there is no statistical substantiation of this for the actual contaminant levels.
The Section titled "Natural Attenuation of DRO" will be revised in the final report to clarify only the geometric regression plots for 14MW04 and 14MW05 and the measured geochemical parameters in the area are the basis of the statement natural attenuation is occurring.

14MW02 indicates that exceedances of DRO SSCLs are occurring, yet this well is deemed not suitable to be analyzed for natural attenuation. This is not logical. It is important to continue to monitor trends in this well.
The discussion of 14MW02 results will be added to Section 6.4 in the final report.

We do not agree that adequate justification has been provided for the prediction that attainment for SSCLs will occur with natural attenuation by 2035. This is highly speculative. And it is not acceptable that these levels will persist far into the future, posing a continuing threat to human health and the environment.
Groundwater monitoring data for most of the existing in-plume MOC wells is limited to the last three years. This will be clarified in Section 6.5 as follows:
"The three years of monitoring results for these wells were assessed for statistical trends using both the Mann-Kendal trend test and geometric regression plots. However, the low number of measurements can only provide a coarse assessment of this primary line of evidence."
As stated in the Northeast Cape Long Term Management Plan, groundwater at the MOC should not be used as a drinking water source until RAOs (i.e., SSCLs) are met.

Page 7-1, Conclusions: the assertion in para 2 that natural attenuation is occurring in some wells is more accurate that what is stated in the executive summary. However, the document does not provide convincing information or statistical analysis of the trends over time that are necessary to substantiate claims that MNA is an effective method. We are not convinced that monitored natural attenuation is adequately effective. We also find it unacceptable that attenuation will not be complete at least until 2035, a speculative date at best.
Groundwater monitoring data for most of the existing in-plume MOC wells is limited to the last three years. This will be clarified in Section 6.5 as follows:
"The three years of monitoring results for these wells were assessed for statistical trends using both the Mann-Kendal trend test and geometric regression plots. However, the low number of measurements can only provide a coarse assessment of this primary line of evidence."
Additionally, the following will be added to Section 6.4: "Based on both the geometric regression plots from monitoring wells 14MW04 and 14MW05 and the results of the geochemical parameters in the area, natural attenuation is occurring."

2) 2016 Site 8 and Suqi River Surface Water and Sediment Sampling Report

Executive Summary

ES-1: more extensive sampling is needed to define the edge of the area contaminated with elevated DRO levels.
Sampling performed during 2016 at Site 8 defined the western boundary of soil containing elevated levels of DRO. The airstrip access road exists along the eastern boundary of Site 8 and acts as a cover for soil containing elevated DRO levels. There is no pathway for the petroleum constituents to adversely affect human health or the environment, so defining the eastern boundary is not necessary.
It is possible to separate biogenic from anthropogenic sources of DRO/RRO. The problem of interference indicates an inferior laboratory and/or analytical method.
Interferences observed in the soil results from Northeast Cape do not indicate laboratory inferiority in this case. Samples were processed using accepted DRO/RRO test procedures,

AK102 and AK103, developed by the State of Alaska, and adopted into regulation by 18 AAC 78. The text below is the entire paragraph from Section 4.1 of the AK102 method: "Other organic compounds including, but not limited to, animal and vegetable oil and grease, chlorinated hydrocarbons, phenols, phthalate esters and biogenic terpenes are measurable under the conditions of this method."

ES-2: cannot assume that RR levels can be attributed to biogenic sources—this is not

justified.
The report assertion that biogenic sources are the primary contributing factor to chromatographic patterns generating RRO results for 2016 Northeast Cape samples is based on an interpretation. The chromatographic interpretation is reasonable based on the comparison of the patterns produced by the calibration standards versus the patterns observed in the sample.

Page 2-4, Section 2.1.5 Land and Resource Use
Please see our comments provided for this section in the previously reviewed document above. These also apply to this corresponding section.
Please see our response above.
Page 2-5, Section 2.2.1, Site 8.
We think that Eugene Toolie knows the specific location of the break.
Mr. Eugene Toolie is welcome to provide the USACE with a different location for the pipeline break. The exact location may never be known. The location of the pipeline break near Site 8 can be inferred from site data and will remain approximate.
Page 2-6. The fact that TAqH levels exceed SSCL indicates that there are continuing sources that prevent the restoration and recovery of these surface waters and biota. These source areas must be fully removed.
The TAqH levels in the surface water sample closest to the Suqi River did not exceed the SSCL. This indicted petroleum constituents were not migrating offsite. The USACE has followed and will continue to follow the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded the remedy for this site is currently protective.

Regarding the "DD-selected remedy," the tribe was not properly consulted on a government-government basis as a full party to the Record of Decision. We believe the selected remedy to be inadequate.
As the USACE has stated in the past, 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 have been appropriate to have requested Tribal signatures on the DDs.
Page 2-7: these past exceedances are unacceptably high. It appears that no sampling was done of this area in 2016. Why was this not done?
The objective of sample collection during 2016 was to delineate the extent and magnitude of

petroleum contaminated sediment at Site 8 in support of recommendations contained in the First Five-Year Review Report. These data will be used to ensure the most heavily impacted area(s) are included within Decision Unit boundaries during future incremental sampling events likely to occur during the next Five-Year Review.

The sampling effort for surface waters and sediments is far from adequate for Site 8 and the Suqi River. Additional analytes must be included as stated in our comments on the previous document: TCE (and other solvents), PCBs, mercury, pesticides.

The objective of sampling sediment at Site 8 was to delineate the extent and magnitude of petroleum contaminated sediment at Site 8 in support of recommendations contained in the First Five-Year Review Report. These data will be used to ensure the most heavily impacted area(s) are included within Decision Unit boundaries during future incremental sampling events likely to occur during the next Five-Year Review. The objective of sampling surface water and sediment from select locations along the Suqi River was to verify Site 28 remedial actions did not affect the river. As a result, analytes were selected based on results for confirmation samples collected from Site 28 following remedial actions within Site 28.

Page 2-9. Evaluation by ATSDR was grossly insufficient and inconclusive.

Noted. USACE does not have purview over ATSDR reports.

Page 4-1, Work Plan Deviations.

Deviations are not adequately justified and we think they compromise the results and conclusions.

The second sentence of Section 4-1 will be revised as follows: "None of the deviations significantly affected data usability or data quality. Data qualifiers were assigned to the data based on the rules established in the work plan. Under those work plan rules, none of the conditions identified with the 2016 data required results to be rejected.

Page 6-3: these sediment and soil level exceedances associated with Site 8 are disturbing and indicate that further characterization and active removal is needed.

The USACE has followed and will continue to follow the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded the remedy for this site is currently protective.

The claim that RRO detections/exceedances can be attributed to biogenic sources is unjustified and indicates poor analysis.

The report assertion that biogenic sources are the primary contributing factor to chromatographic patterns generating RRO results for 2016 Northeast Cape samples is based on an observation. The chromatographic interpretation is reasonable when a comparison of the patterns produced by the calibration standards versus the patterns observed in the sample.

Page 6-5. It is necessary to properly characterize the eastern extent of contamination and excavate to remove contaminated soil/sediment.

Sampling performed during 2016 at Site 8 defined the western boundary of soil containing elevated levels of DRO. The airstrip access road exists along the eastern boundary of Site 8 and acts as a cover for soil containing elevated DRO levels. The USACE has followed and will continue to follow the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded the remedy for this site is currently protective.

Page 6-5, Section 6.3. Extent and Magnitude of Contamination at Suqi River
Five surface water and 11 sediment samples is not adequate to assess the extent of contamination in the Suqi River and estuary. Conclusions about effectiveness of prior remedies cannot be made. More comprehensive sampling is needed that includes analytes listed above.
The objective of sampling surface water and sediment from select locations along the Suqi River was to verify Site 28 remedial actions did not affect the river. As a result, analytes were selected based on results for confirmation samples collected from Site 28 following remedial actions within Site 28. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded the remedy for this site is currently protective.

Page 6-10. Biogenic interference can be attributed to poor laboratory and/or analytical procedures. This is unacceptable and compromises the integrity of this report.
Interferences observed in the soil results from Northeast Cape do not indicate laboratory inferiority in this case. Samples were processed using accepted DRO/RRO test procedures, AK102 and AK103, developed by the State of Alaska, and adopted into regulation by 18 AAC 78. The text below is the entire paragraph from Section 4.1 of the AK102 method: "Other organic compounds including, but not limited to, animal and vegetable oil and grease, chlorinated hydrocarbons, phenols, phthalate esters and biogenic terpenes are measurable under the conditions of this method."

Page 6-1—Conclusions
Cannot attribute RRO to biogenic sources—unjustified.
The report assertion that biogenic sources are the primary contributing factor to chromatographic patterns generating RRO results for 2016 Northeast Cape samples is based on an interpretation. The chromatographic interpretation is reasonable based on the comparison of the patterns produced by the calibration standards versus the patterns observed in the sample.

We concur that further removal actions are necessary. Better analytical methods are needed to discern anthropogenic sources and to remove interferences.
Although removing impacted sediment and soil at Site 8 may be an alternate remedy, the USACE has followed the requirements of the DD, which was developed in accordance with the CERCLA. The First Five-Year Review, which was performed in accordance with the CERCLA, concluded the remedy for this site is currently protective.

Samples were processed using accepted DRO/RRO test procedures, AK102 and AK103 in this case, developed by the State of Alaska and adopted into regulation by 18 AAC 78. Results from samples using the silica gel cleanup procedures typically indicated a significant reduction in DRO and RRO concentrations.

In the Suqi River, we do not believe that RRO can be attributed to biogenic interference.
Similarly to the soil samples, the report assertion biogenic sources are the primary contributing factor to chromatographic patterns generating RRO results for 2016 Northeast Cape samples is

based on an interpretation. The chromatographic interpretation is reasonable based on the comparison of the patterns produced by the calibration standards versus the patterns observed in the sample.

End of comments and responses.