

DECLARATION OF PROJECT CLOSURE DECISION
For
FORMERLY USED DEFENSE SITE CON/HTRW PROJECT -02

ATKA CAPE KUDUGNAX (F10AK1063)
ATKA ISLAND, ALASKA

STATEMENT OF BASIS

Authority for the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) for Containerized Hazardous, Toxic and Radioactive Waste (CON/HTRW) projects is derived from the DERP, 10 USC 2701-2707. The decision to close out the CON/HTRW project (F10AK1063-02) is based on the 2019 Project Closure Report; and, the results of site investigation (SI), removal activities, and supplemental investigations completed by the United States Army Corps of Engineers – Alaska District (USACE-AK) in 2014, 2015, 2017, and 2019.

SITE DESCRIPTION AND HISTORY

The Atka Cape Kudugnax FUDS property is located on Atka Island approximately 1,100 miles southwest of Anchorage, Alaska and approximately 110 miles northeast of Adak, Alaska in the Andreanof Island group of the Aleutian Islands (Appendix A, Figure 1). The site is located approximately 7 miles northeast of the Village of Atka on the northeastern shore of Nazan Bay, in Sections 9 and 10, Township 92 South, Range 175 West, Seward Meridian.

The Atka Cape Kudugnax Naval Radio Station is a former naval facility located on the north entrance to Nazan Bay on Atka Island. This site was built to support air operations at the former Atka Air Force Auxiliary Field (F10AK0851) located approximately 7 miles to the southwest, during World War II.

The adjacent Atka Air Force Auxiliary Field (F10AK0851) was acquired from the Department of the Interior in September 1942 and used intensively until 1945. In June 1942, the Navy evacuated the community and burned many buildings during evacuation. Military facilities were built primarily along the Nazan Bay north of the village site. An observation post was established on Korovin Bay; an aircraft control service site was located on Graham Hill north of the harbor; a radio range site at Cape Kudugnax; and a weather station on Seguam Island. The Army-built airfield was operational by November 1942 and served as a base for fighter and bomber operations against Japanese-held Kiska. The Atka facilities were primarily used as a way station between Adak and Fort Glenn on Umnak Island.

The Atka Cape Kudugnax radio range site became operational in March 1943, and improvements included radio masts, a radio building, a generator building, barracks, and a mess hall. The radio range site was closed in July 1944 and improvements were

abandoned in place. The Department of Interior subsequently transferred all lands in the area of the radio range site to the Atxam Native Corporation in February 1979 under the Alaska Native Claims Settlement Act.

DESCRIPTION OF THE SELECTED REMEDY AND IMPLEMENTATION

The CON/HTRW activities conducted in 2014 and 2015 included the removal of contamination sources including aboveground storage tanks (ASTs), drums, transformers, and batteries; the removal of contaminated soil associated with these sources, and the transportation and disposal of all removed waste streams. During the 2014 and 2015 activities additional World War II-vintage drums were discovered near an unnamed lake. The surrounding soil showed indications of POL contamination which was assumed to have resulted from leaks associated with the corroded drums. As a result, an additional removal action was completed in 2017 which involved the removal of the drums and contaminated soil located near the unnamed lake. In 2019 surface water sampling was conducted at the unnamed lake to ensure residual soil DRO contamination was not adversely impacting the adjacent surface water. Based on the laboratory results and field observations, there are no indications of surface water impacts from the residual soil DRO contamination remaining at the site.

DECLARATION

In accordance with the Defense Environmental Restoration Program for Formerly Used Defense Sites, the U.S. Army Engineer District, Alaska, has completed all CON/HTRW activities at the Atka Cape Kudugnax FUDS (F10AK1063-02), Atka, Alaska. This Declaration of Project Closure Decision supports the conclusion that all known sources of CON/HTRW have been remediated. Remaining contaminated soil is of limited quantity, does not pose an imminent and substantial endangerment, and represents a minimal risk to human health and the environment. No further actions are required by the Department of Defense at this project location. This decision may be reviewed and modified in the future if any new information becomes available which indicates the presence of eligible sites that may cause a risk to human health or the environment.

This Declaration of Project Closure Decision has been prepared and approved by the undersigned in accordance with paragraph 6-8 of the FUDS Program Policy, Engineer Regulation (ER) 200-3-1, May 10, 2004.

_____ Date _____
PHILLIP J. BORDERS
COL, EN
Commanding

Project Closeout Report

Containerized Hazardous, Toxic and Radioactive
Waste (CON/HTRW)
Project No. F10AK1063-02

Atka Cape Kudugnax Formerly Used Defense Site
(FUDS)

Atka Island, Alaska

December 2019



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ACRONYMS AND ABBREVIATIONS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AST	aboveground storage tank
BD/DR	Building Demolition and Debris Removal
BTEX	benzene/toluene/ethylbenzene/xylenes
COC	contaminants of concern
CON/HTRW	Containerized Hazardous, Toxic, and Radioactive Waste
COPC	contaminant of potential concern
CSM	Conceptual Site Model
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DRO	diesel range organics
FUDS	Formerly Used Defense Site
GRO	gasoline range organics
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
POL	petroleum, oil, and lubricant
RCRA	Resource Conservation and Recovery Act
RRO	residual range organics
SI	site inspection
SVOC	semi-volatile organic compound
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

1.0 INTRODUCTION

This report has been prepared to document the completion of the Containerized Hazardous, Toxic and Radioactive Waste (CON/HTRW) site investigation and removal activities conducted in 2014, 2015, 2017, and 2019 at Cape Kudugnax on Atka Island, Alaska and to recommend project closure. The Authority for the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS), 10 U.S.C. § 2701-2707, is the Defense Environmental Restoration Account, 10 U.S.C. § 2703. The DERP-FUDS authorizes the cleanup of contamination resulting from past military activities at sites that were owned by, leased to, or otherwise possessed by the United States and under the jurisdiction of the Secretary of Defense at the time of the release of contamination, but transferred from DoD's jurisdiction by 17 October 1986. In 2002, an Inventory Project Report (INPR) was completed and three projects were approved for the Atka Cape Kudugnax property: Building Demolition/ Debris Removal (BD/DR) (F10AK1063-01), CON/HTRW (F10AK1063-02) and HTRW (F10AK1063-03). The BD/DR Project Closeout Report was finalized in August 2016. The HTRW Project Closeout Report was finalized in July 2018.

This Project Closeout Report is issued by the Alaska District, USACE pursuant to ER 200-3-1, paragraph 4-7.4.1.1.

This report supports the conclusion that the CON/HTRW work performed is complete and that no further action is required at the site to be protective of human health and the environment. This report will also serve as the Atka Cape Kudugnax FUDS property closure.

1.1 Site Location and Description

The Cape Kudugnax FUDS property is located on Atka Island approximately 1,100 miles southwest of Anchorage, Alaska and approximately 110 miles northeast of Adak, Alaska in the Andreanof Island group of the Aleutian Islands (Appendix A, Figures 1 & 2). The site is approximately 7 miles northeast of the Village of Atka on the northeastern shore of Nazan Bay, in Sections 9 and 10, Township 92 South, Range 175 West, Seward Meridian.

The Cape Kudugnax Naval Radio Station is a former naval facility located on the north entrance to Nazan Bay on Atka Island. This site was built to support air operations at the former Atka Air Force Auxiliary Field (F10AK0851) located approximately 7 miles to the southwest, during World War II.

At the time of the Site Inspection, the Cape Kudugnax FUDS property included downed radio antenna towers, standing and dilapidated buildings, aboveground storage tanks (ASTs), drums, transformers, insulators, and lead acid batteries. The site consisted of three known debris areas including the East Radio Site, the West Barracks Site, and the Lagoon Drum Site (Appendix A, Figure 2). The West Barracks Site is situated approximately one-quarter mile west of the East Radio Site. Both the West Barracks Site and the East Radio Site are elevated and included buildings or debris. The Lagoon Drum Site encompassed various drums located along the lagoon shoreline (Appendix A, Figure 3).

1.2 History

Cape Kudugnax naval radio station was built to support air operations at the former Atka Air Force Auxiliary Field (F10AK0851) located approximately 7 miles to the southwest, during World War II. The adjacent Atka Air Force Auxiliary Field (F10AK0851) was acquired from the Department of the Interior in September 1942 and used until 1945. In June 1942, the Navy evacuated the village of Atka and burned many of the community buildings to prevent them from being used by the Japanese. Military facilities were built primarily along the Nazan Bay north of the village site. An observation post was established on Korovin Bay; an aircraft control service site was located on Graham Hill north of the harbor; a radio range site at Cape Kudugnax; and a weather station on the adjacent Seguam Island. The airfield was built as a base for fighter and bomber operations against Japanese-held Kiska. Atka facilities were primarily used as a way station between Adak and Fort Glenn on Umnak Island.

The Cape Kudugnax naval radio station became operational in March 1943. Improvements included radio masts, a radio building, a generator building, barracks, and a mess hall. The site was closed in July 1944 and improvements were abandoned in place. The Department of Interior subsequently transferred all lands in the area site to the Atxam Native Corporation in February 1979 under the Alaska Native Claims Settlement Act.

1.3 Previous Investigations

While conducting site visits associated with Atka Air Force Auxiliary Field in 1998, USACE personnel were informed by village officials of the debris located at Cape Kudugnax. A site visit was conducted in order to ascertain the extent of potential contamination at the site which resulted in a collection of aerial photography, limited site sampling and initial scoping activities (USACE, 1999).

The United States Environmental Protection Agency (USEPA) conducted a Preliminary Assessment and Site Inspection in 2005 that included limited sampling in areas of apparent contamination. One background sample and four source soil samples were collected. Two source soil samples were collected from the East Radio Site and two from the Lagoon Drum Site on the western edge of the lagoon. All samples showed elevated metal levels though data validation was not provided and the number of samples was limited (USEPA, 2006).

The Aleutian Pribilof Islands Association (APIA) and Chilkat Environmental visited the site in 2012 and observed two failed transformers, one leaking transformer, and two insulators, all suspected to contain polychlorinated biphenyls (PCBs) (APIA, 2013).

2. REMOVAL ACTIVITIES

2.1 Removal Action Introduction

The objective of the DERP-FUDS Program is to reduce, in a timely, cost-effective manner, the risk to human health and safety and the environment resulting from past DOD activities (USACE 2004). The CON/HTRW activities conducted in 2014 and 2015 resulted in the removal of contamination sources including above ground storage tanks (ASTs), drums, transformers, and batteries; contaminated soil associated with these sources and the transportation and disposal

of all removed waste streams. An additional removal action was completed in 2017 involving the removal of a small drum cluster and contaminated soil discovered during the site inspection. The CON/HTRW activities (F10AK106-02) were conducted concurrently with the BD/DR project (F10AK1063-01) and HTRW project (F10AK1063-03).

Surface and subsurface soil samples were collected prior to and concurrent with the removal and site inspection operations. Samples were collected from areas of suspected contamination within the FUDS property boundary and analyzed for gasoline range organics (GRO), diesel range organics (DRO), residual range organics (RRO), volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and Resource Conservation and Recovery Act (RCRA) metals. Contaminants of potential concern (COPCs) at the sites included GRO, DRO, RRO, benzene, toluene, ethyl benzene, and xylenes (BTEX); polycyclic aromatic hydrocarbons (PAHs); inorganics; and PCBs. Upon completion of source and contaminated soil removal, confirmation sampling data indicate that the remaining contaminants of concern (COCs) are DRO and arsenic.

Analytical data for soils was compared to the Title 18 Alaska Administrative Code (AAC) Chapter 75 Section 341 (18 AAC 75.341) Table B1 and B2 – Method Two cleanup levels applicable to the “Over 40 Inch Zone” (USACE, 2014). The most stringent of the cleanup levels were used for comparison.

2.2 Removal Activities

2.2.1 East Radio Site

All visible buildings, structures, drums, and other debris were removed and transported offsite during the BD/DR project operations in 2014-2015. The remaining man-made features include the radio station building concrete pad, the generator building concrete perimeter footer, and the two concrete generator pads within the generator building perimeter footer. Approximately 796.63 tons of soil was excavated at the East Radio Site including 717.03 tons from the Final Petroleum/Oil/Lubricants (POL) Excavation, 24.1 tons from the generator building excavation, and 10.8 tons from the radio station transformer excavation.

Confirmation soil sample data indicates that the remaining COC at the East Radio Site is DRO. All other analytical results were either below laboratory detection limits or, if present, were detected below applicable ADEC cleanup levels. Contamination remains in excess of the DRO Method Two cleanup level of 230 mg/kg for Migration to Groundwater in two samples: ATER-SS-114 at 330 mg/kg of DRO; and, ATER-SS-115 at 430 mg/kg (see Appendix A. Figure 4). Alternative cleanup levels were generated using site specific soil data (0.017 g/g Total Organic Carbon) as inputs for the ADEC Method Three Calculator (see Appendix B). The residual contamination is below the alternative DRO cleanup level of 3,800 mg/kg for Migration to Groundwater for the most stringent receptor (residential).

2.2.2 West Barracks Site

All visible building debris, asbestos-containing material (ACM), drums, and other debris were removed and transported offsite under the BD/DR project. Approximately 91.83 tons of soil was excavated at the West Barracks Site. This includes 22.8 tons from the drum pile excavation, 12.68 tons from over-excavation of the wood-stave tank, 46.05 tons from the burn pit excavation, and 10.3 tons from the transformer excavation. Confirmation sampling results were

either below laboratory detection limits or at concentrations below the applicable ADEC cleanup levels, with the exception of arsenic (see Appendix A, Figures 5 & 6).

Arsenic sample results averaged 2.75 mg/kg, with a maximum concentration of 15 mg/kg. Literature reviews of arsenic background concentrations in Alaska soils average 17.3 mg/kg with a range of 5 mg/kg to 750 mg/kg, indicating a high degree of variability within the natural environmental (Gough, et. al., 1988). The maximum concentration of 15 mg/kg is within the arsenic background range found in Alaskan soil. Additionally, recent studies at the former Atka Air Force Auxiliary Field FUDS (F10AK0851), calculated a background screening level of 23.5 mg/kg for arsenic, using the Hazard Ranking Rule (USACE, 2018).

2.2.3 Lagoon Drum Site

All visible drums, drum debris, and drum carcasses were removed from the Lagoon Drum Site during the BD/DR project. Drums were fairly evenly distributed along the east and west shorelines of the lagoon with fewer drums found along the north shoreline. Sensory observations (visual, olfactory) and photoionization detector (PID) headspace field screening indicated the localized presence of POL contamination in soils beneath individual drums or drum clusters at the Lagoon Drum Site (USACE, 2016).

In 2014, approximately 7 tons of POL-contaminated soil was excavated from the footprints of seven drums or drum clusters. Ten primary soil samples (and one duplicate) were collected in association with the Lagoon Drum Site, and analyzed for GRO, DRO, RRO, VOCs, PAHs, lead and mercury. All analytical results were either non-detect or detected below applicable ADEC cleanup levels, with the exception of DRO. Four samples, two confirmation and two surface soil, exhibited DRO contamination in excess of the ADEC Method Two cleanup level of 230 mg/kg for Migration to Groundwater: ATLD-SS-005 at 420 mg/kg, ATLD-SS-007 at 2,200 mg/kg; ATLD-SS-009 at 890 mg/kg, and ATLD-SS-010 at 1,400 mg/kg (see Appendix A, Figure 7.). Due to boggy terrain, these sites could not be safely accessed by heavy equipment during 2014 and 2015 field activities. As a result, these locations were not further excavated and soil exhibiting DRO in excess of the Method Two cleanup levels remain (USACE, 2016). Based upon alternative cleanup levels calculated using Method Three and site specific soil data, all sample concentrations are below the alternative DRO cleanup level of 3,800 mg/kg for Migration to Groundwater for the most stringent receptor (residential).

2.2.4 Lake Drum Area (aka Drum Cluster Site)

The Lake Drum Area (Appendix A, Figure 3.) was identified during the 2014-2015 site inspection. A cluster of three highly corroded World War II-vintage drums were found located in a dry lake bed alongside the trace of an old military road that traverses portions of Atka from Nazan Bay to the former Cape Kudugnax Naval Radio Station. The surrounding soil showed indication of POL contamination which was assumed to have leaked from the corroded drums. The drums were removed and barged off the island with other scrap steel generated during the BD/DR phase. One primary surface soil sample and a duplicate sample were collected from the footprint of the drum cluster and analyzed for GRO, DRO, RRO, VOC, PAH, lead and mercury. All analytes were below the applicable ADEC cleanup levels with the exception of DRO at two locations: ATLD-SS-011 at 53,000 mg/kg and ATLD-SS-FLD2 (Field Duplicate at ATLD-SS-011 location) at 66,000 mg/kg (see Appendix A, Figure 7, inset map). (USACE, 2016).

In 2017, a supplemental removal action resulted in the excavation of 26.1 tons of POL-contaminated soil from the Lake Drum Area (Appendix A, Figure 8). Additional contaminated soil removal was not feasible due to the presence of the lake, large rocks, and toe of an adjacent bluff. Five of seven confirmation samples collected from the excavation sidewalls and floor contained DRO in excess of the Method Two Migration to Groundwater cleanup level of 230 mg/kg with concentrations ranging from 39.3 mg/kg to 7,620 mg/kg (north sidewall of excavation area) (USACE, 2018). Additional excavation was not feasible in this direction due to the presence of the lake. Alternative cleanup levels were generated using site specific soil data (0.017 g/g Total Organic Carbon) as inputs for the ADEC Method Three Calculator (see Appendix B). The alternative cleanup levels for DRO using the most stringent receptor (residential) are 3,800 mg/kg (Migration to Groundwater pathway), 8,300 mg/kg (Ingestion pathway); and 60,500 mg/kg (Inhalation pathway). Only one soil sample result ATDCSS02 (7,620 mg/kg) exceeded the Migration to Groundwater Alternative Cleanup Level of 3,800 mg/kg.

In 2019, a site visit was conducted to collect surface water samples at the lake adjacent to the location of soil sample ATDCSS02 in an effort to confirm residual DRO was not adversely affecting surface water quality. One surface water sample and associated quality control samples were collected from the lake edge directly north of the 2017 soil sample ATDCSS02 (Appendix A, Figure 8). The samples were analyzed for BTEX via method 8260, PAH via method 8270 SIM, and DRO via method AK102. All BTEX, PAH, and DRO results were non-detect (ND). Total aromatic hydrocarbons (TAH) and total aqueous hydrocarbons (TAqH) were calculated using ADEC guidance (ADEC, 2017) using the limit of detection (LOD) for summation in the case of non-detected results. As all BTEX and PAH results were non-detected, the totals were calculated using only the laboratory LODs for summation. Total aromatic hydrocarbons (TAH) was calculated to be 0.0042 milligrams per liter (mg/L). Total aqueous hydrocarbons (TAqH) was calculated to be 0.0046 mg/L. Both TAH and TAqH were well below the screening criteria of 0.01 mg/L and 0.015 mg/L respectively. Based on the laboratory results and field observations during the 2019 site visit, there are no indications of surface water impacts from the residual DRO contamination in soil at the site.

3. EXPOSURE PATHWAYS AND RISK EVALUATION

3.1 Exposure Pathways

An ADEC Conceptual Site Model (CSM) Human Health Scoping Form was completed as part of the site inspection for the East Radio Site and the Lagoon Drum Site. The scoping form identifies the potential contaminant release mechanisms, impacted media, and possible exposure pathways that may be considered as complete to potential current and future receptors. A complete exposure pathway includes a contamination source, exposure media, and the route for exposure between a potential receptor and the contaminant. However, a complete exposure route does not necessarily indicate a substantial risk to human health or the environment. The CSM evaluates the remaining concentrations of contaminants in surface and subsurface soils, air, dust and biota for the East Radio Site and the Lagoon Drum Site.

The affected media were evaluated to determine potential exposure pathways to human receptors. Release mechanisms included spills and releases from tanks and other equipment. The only impacted media is soil. The potential for impacts to air are considered insignificant due to the depth, concentration, and the type of contamination (DRO) remaining. The following potential exposure pathways were identified:

1. Incidental Soil Ingestion of DRO;
2. Inhalation of fugitive dust containing DRO;
3. Inhalation of outdoor air containing DRO; and
4. Ingestion of wild foods containing DRO

3.2 Risk Evaluation

The potential future receptors for the site are trespassers, subsistence users, and construction workers. There are currently no personal residences, occupied buildings, or construction underway within the area. Free product has not been detected at any of the sites associated with this project. Groundwater was not encountered during any excavation activities and is believed to be extremely limited in availability or potentially absent in some areas. The City of Atka, located approximately 5 miles from the site, the closest community to the project site on the island, obtains its water supply from surface water sources. There is an insignificant risk of exposure to the remaining DRO-contaminated soil. After evaluating the use of the site, nature of the contaminants and location of impacted media, the residual impacts are considered insignificant. Table 3-1 lists the exposure media for potential current and future receptors, identifies the significance for exposure, and differentiates between the East Radio Site and the Lagoon Drum Site.

Table 3-1: Evaluation of Potential Exposure Pathways and Media on Receptors

Potential Exposure Pathways	Exposure Media	Sites	
		East Radio Site	Lagoon
Incidental Soil Ingestion	Soil	I	I
Dermal Absorption of Contaminants from Soil	Soil	No	No
Inhalation of Fugitive Dust	Soil	I	I
Inhalation of Outdoor Air	Air	I	I
Inhalation of Indoor Air	Air	No	No
Inhalation of Fugitive Dust	Air	I	I
Direct Contact with Sediment	Sediment	No	No
Ingestion of Wild or Farmed Foods	Biota	I	I

No: No potential for exposure.

C: Potential for exposure to Current receptors.

F: Potential for exposure to Future receptors.

I: Potential for Insignificant exposure for Current or Future receptors.

S: Potential for Significant exposure for Current or Future receptors.

4. SUMMARY OF THE DECISION

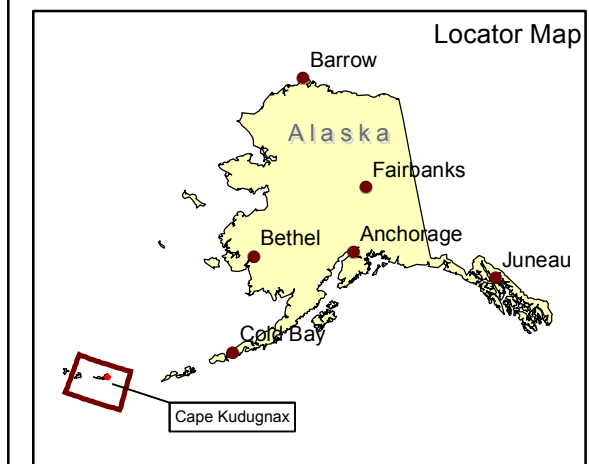
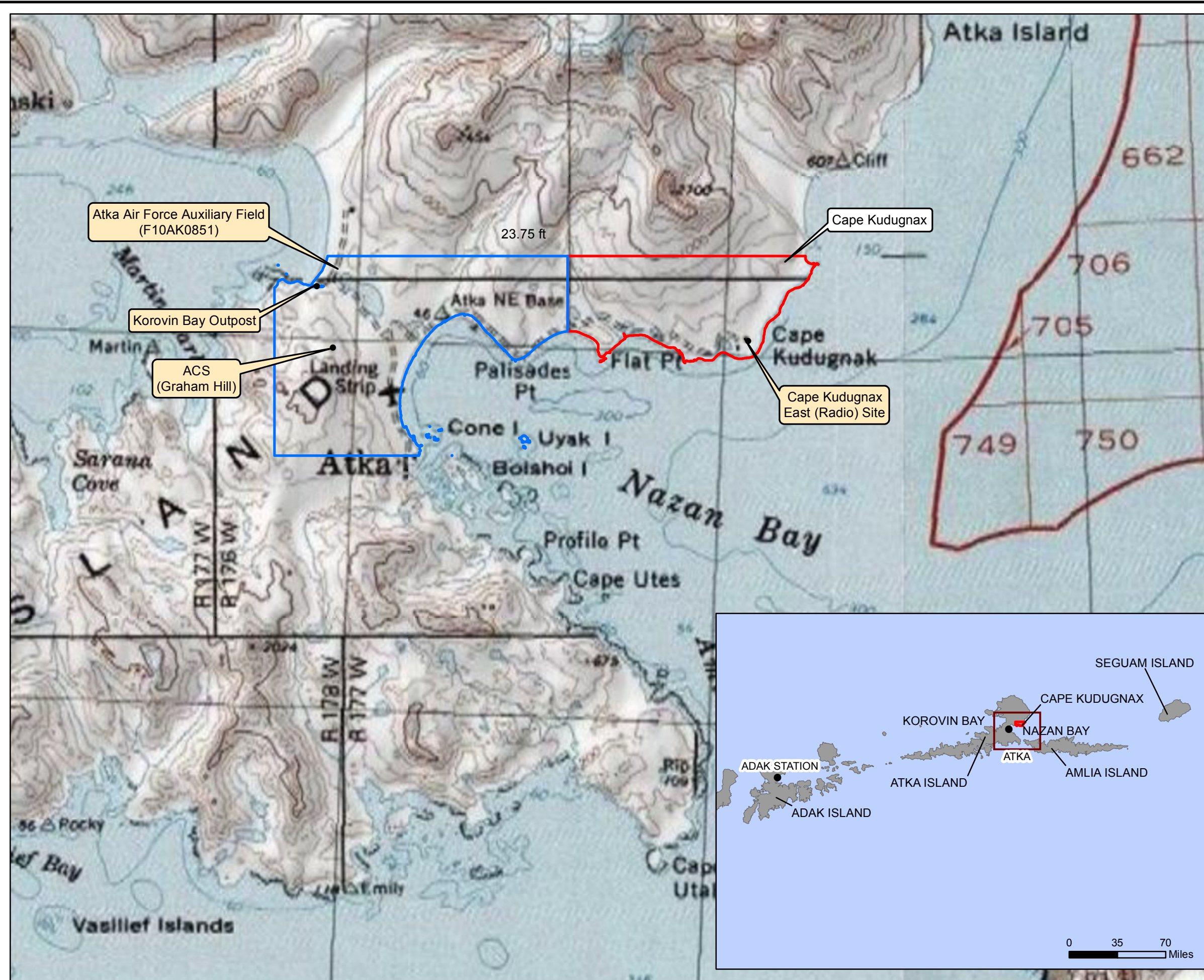
All of the CON/HTRW removal action objectives for the project and property have been met. Based upon the results of the removal activities completed at the site from 2014 to 2017, confirmation sampling results, and the risk evaluation, the USACE has determined that no further action is required for the Cape Kudugnax CON/HTRW Project -02, and project closure is protective of public health, welfare, and the environment. This Project Closeout decision may be reviewed and modified in the future if any new information becomes available indicating the presence of eligible CON/HTRW that may cause an unacceptable risk to human health or the environment. This report also serves as the Atka Cape Kudugnax FUDS property closure.

5. REFERENCES

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Appendix A

Figures



Legend

- Area of Interest
- ▭ Cape Kudugnax FUDS Boundary
- ▭ Atka Air Force Auxiliary Field FUDS
- ▭ Boundary (F10AK0851)

Notes:
1. Source: ESRI Topographic Basemap data

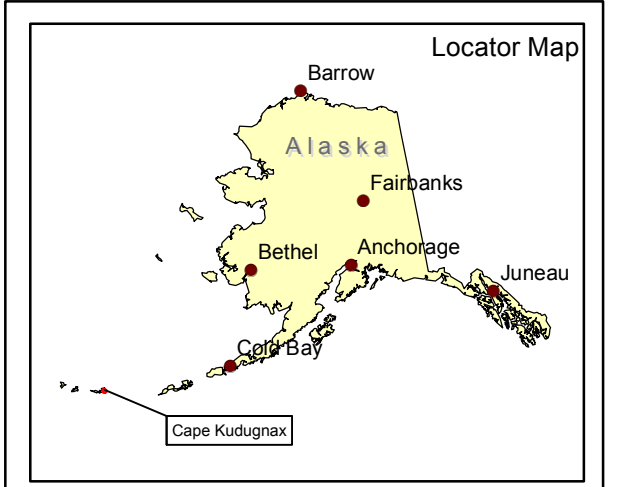


Figure 1

Site Location
Cape Kudugnax FUDS
Atka Island, Alaska

Drawn By: BK/JG	Date: 12/12/14
Checked By: GB	Contract No. W911KB-14-D-0007





- Legend**
- Site Areas
 - FUDS Boundary

Notes:
 1. Image source: Bing Maps
 2. Locator map data source: ESRI data

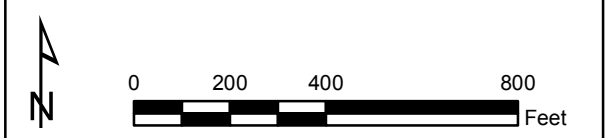

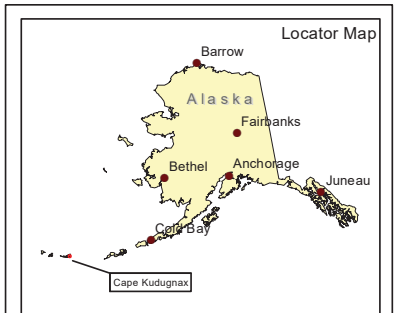
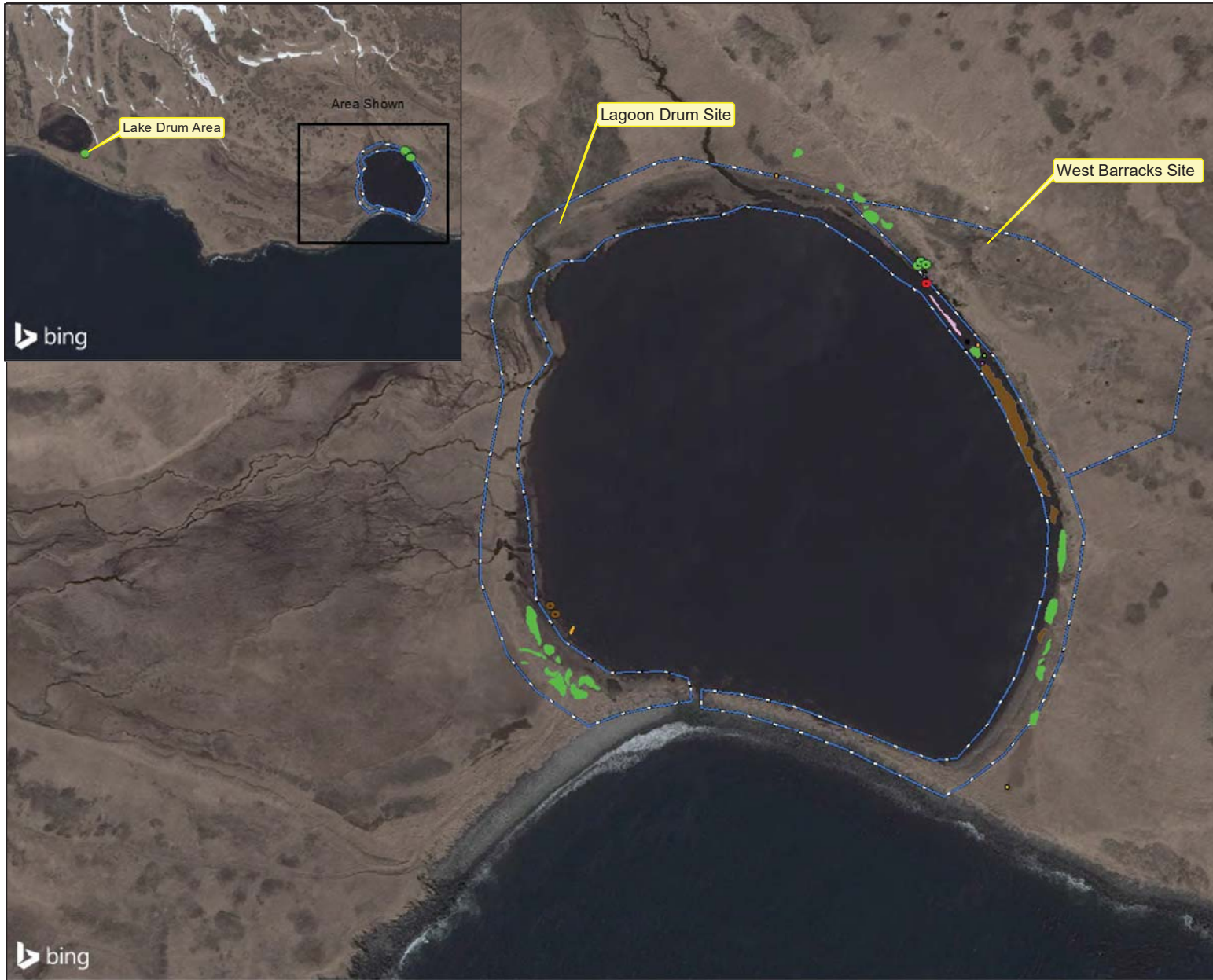


Figure 2

**East Radio Site, West Barracks Site
 and Lagoon Drum Site Locations
 Cape Kudugnax FUDS
 Atka Island, Alaska**

Drawn By: BK/JG	Date: 12/12/14	 U.S. Army Corps of Engineers
Checked By: GB	Contract No. W911KB-14-D-0007	



Legend

- 2 Buried Drums
- Drum Ring in Water
- Random Drum
- Metal Debris
- Pipe Valve
- Rubber Hose
- Spring Pipe
- Pipe
- ▭ Site Outline
- ▨ Drums
- ▭ Drum Pile
- ▨ Buried Drums
- ▭ Ring Pile
- ▭ Shoreline Debris

Notes:
 1. Image source: Bing Maps
 2. Locator map data source: ESRI data

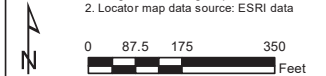


Figure 3

**Site Inspection Features Lagoon Drum Site and Lake Drum Area
 Cape Kudugnax FUDS
 Atka Island, Alaska**

Drawn By: BK/JG	Date: 11/6/15
Checked By: GB	Contract No. W911KB-14-D-0007



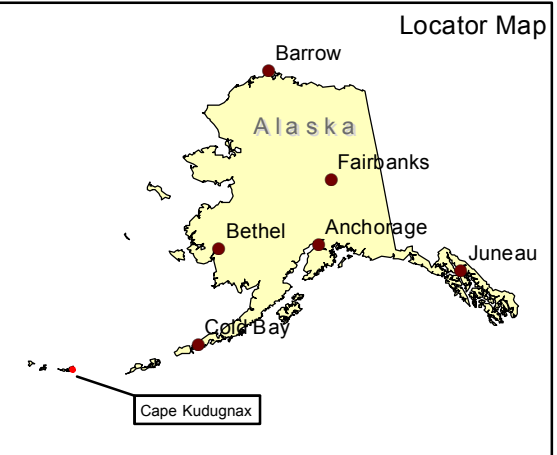
U.S. Army Corps of Engineers

Samples associated with the radio building PCB excavation were analyzed for: GRO,DRO,RRO,PAHs,Lead,Mercury and PCBs

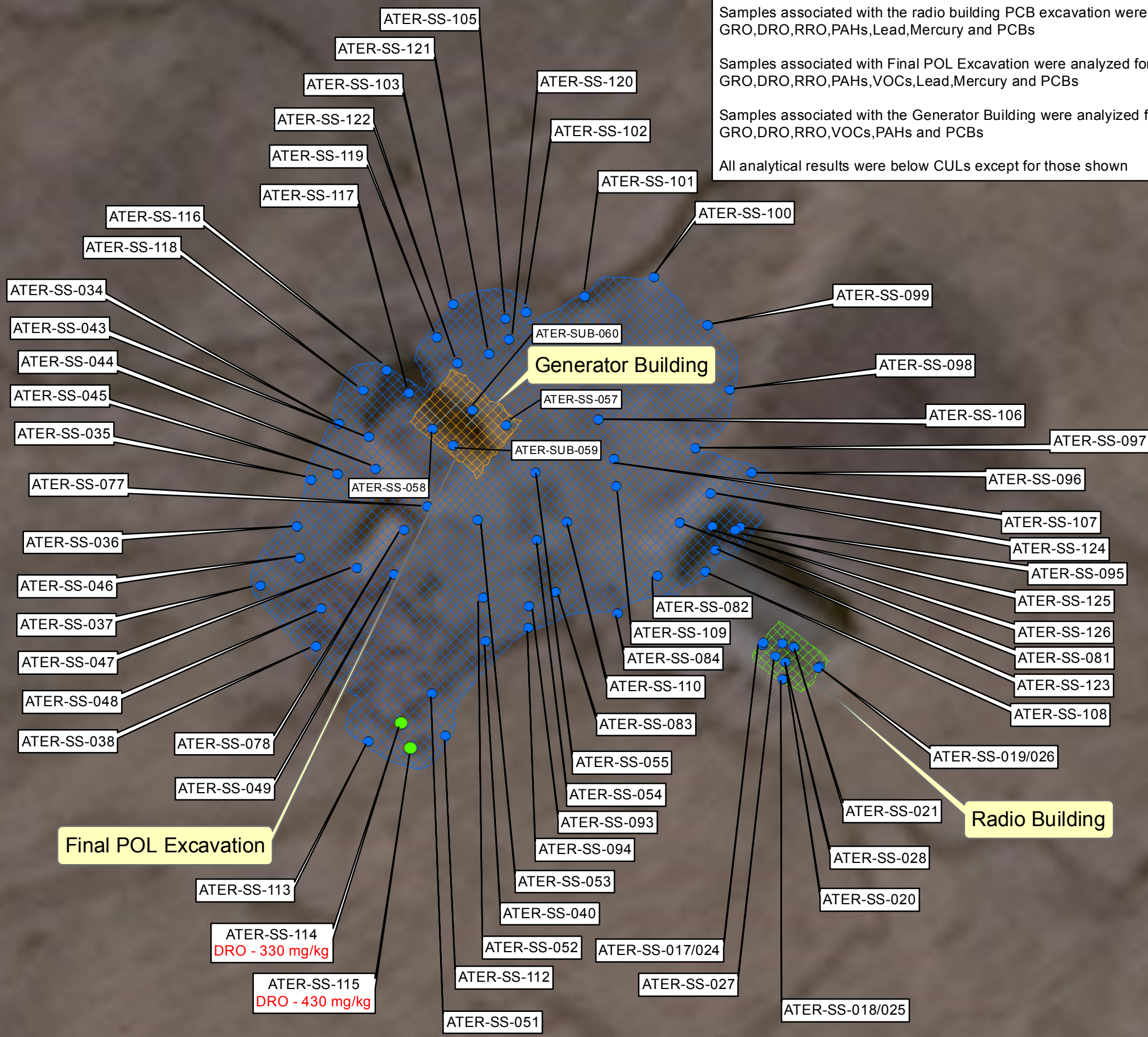
Samples associated with Final POL Excavation were analyzed for: GRO,DRO,RRO,PAHs,VOCs,Lead,Mercury and PCBs

Samples associated with the Generator Building were analyzed for: GRO,DRO,RRO,VOCs,PAHs and PCBs

All analytical results were below CULs except for those shown



- Legend**
- Sample Locations With COCs Below CULs
 - Sample Locations With COCs Above CULs
 - ▨ Generator Building Excavation
 - ▨ Final POL Excavation 2015
 - ▨ Radio Building PCB Excavation
 - ▭ Site Area



Notes:
 1. Image source: Bing Maps
 2. Locator map data source: ESRI data

0 12.5 25 50 Feet

Figure 4
Confirmation Sample Locations
at the East Radio Site - South
Cape Kudugnax FUDS
Atka Island, Alaska

Drawn By: BK/JG	Date: 11/6/15	
Checked By: GB	Contract No. W911KB-14-D-0007	

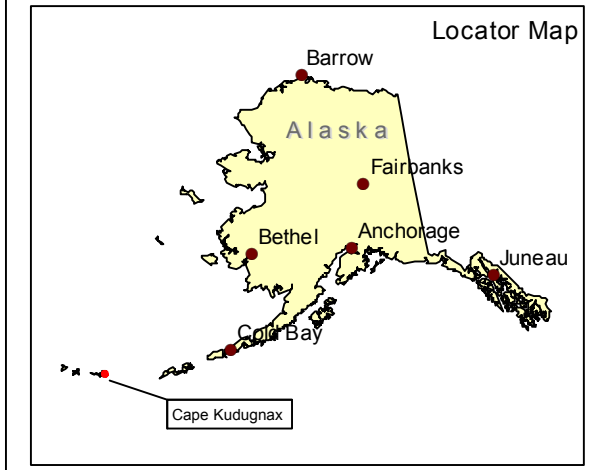
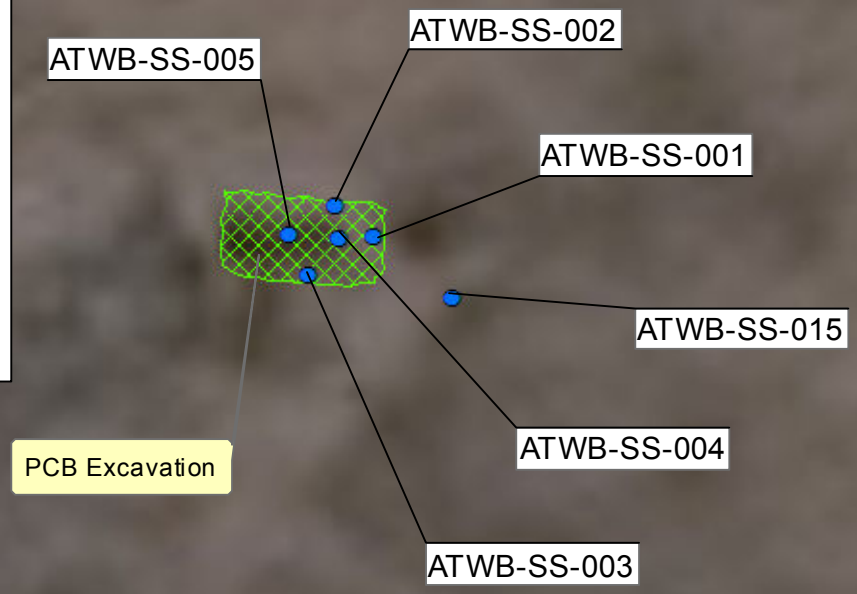


Note:
 Wood Stave Excavation samples were analyzed for:
 GRO,DRO,RRO,VOCs,SVOCs,8 RCRA Metals, Vanadium and Nickel

PCB Tranformer Excavation sampled for:
 GRO,DRO,RRO and PCBs

Burn Pit Excavation sampled for:
 DRO,RRO,8 RCRA Metals, Vanadium and Nickel

Unknown Pit sampled for:
 GRO,DRO,RRO,SVOCs,VOCs,PCBs,8 RCRA Metals, Vanadium and Nickel



- Legend**
- Sample Locations With COCs Exceeding CULs
 - Sample Locations With COCs Below CULs
 - ▣ Burn Pit Excavation
 - ▣ Wood Stave Tank Excavation
 - ▣ Wood Stave Tank (Removed)
 - ▣ PCB Excavation
 - ▣ Burn Pit (Removed)
 - ▣ Unknown Pit

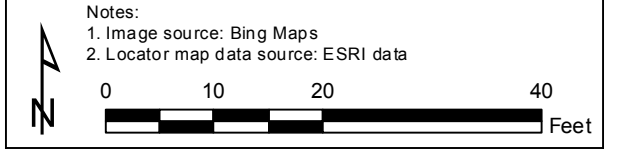
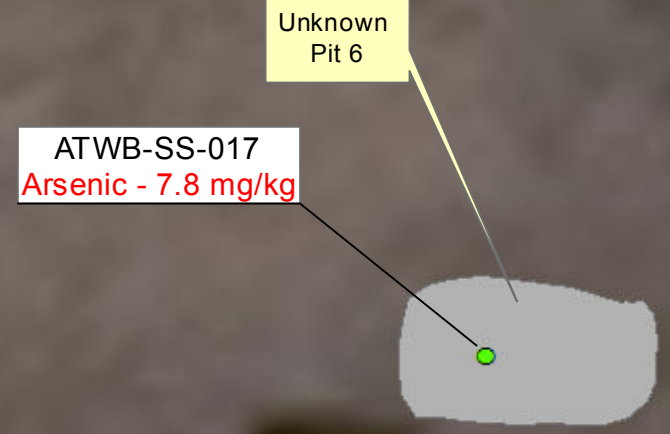
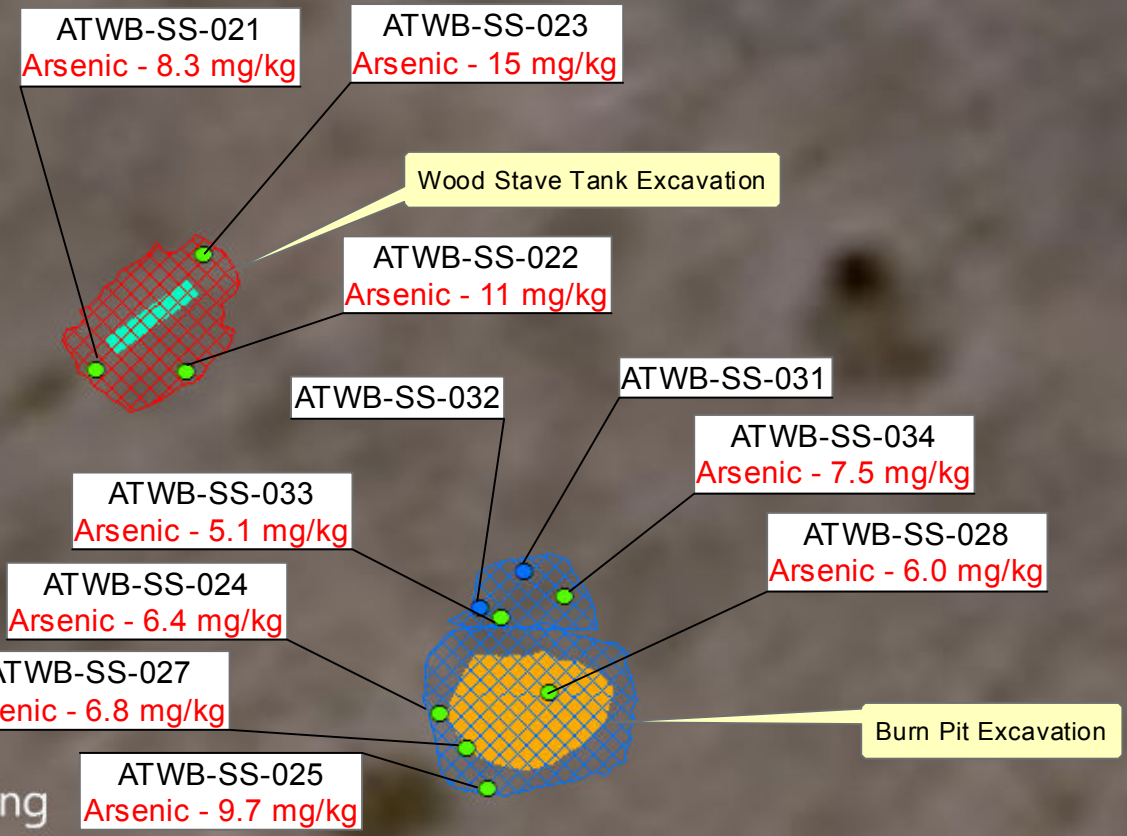


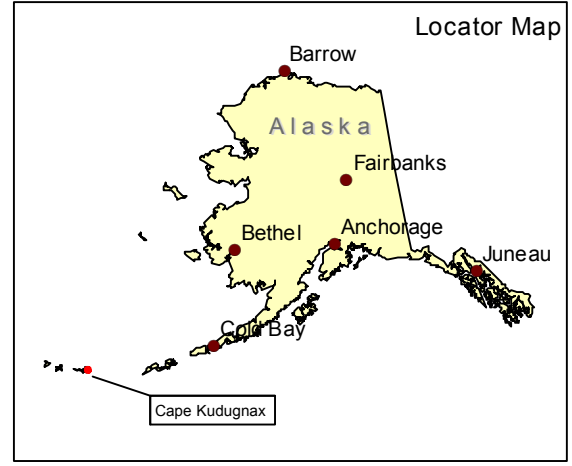
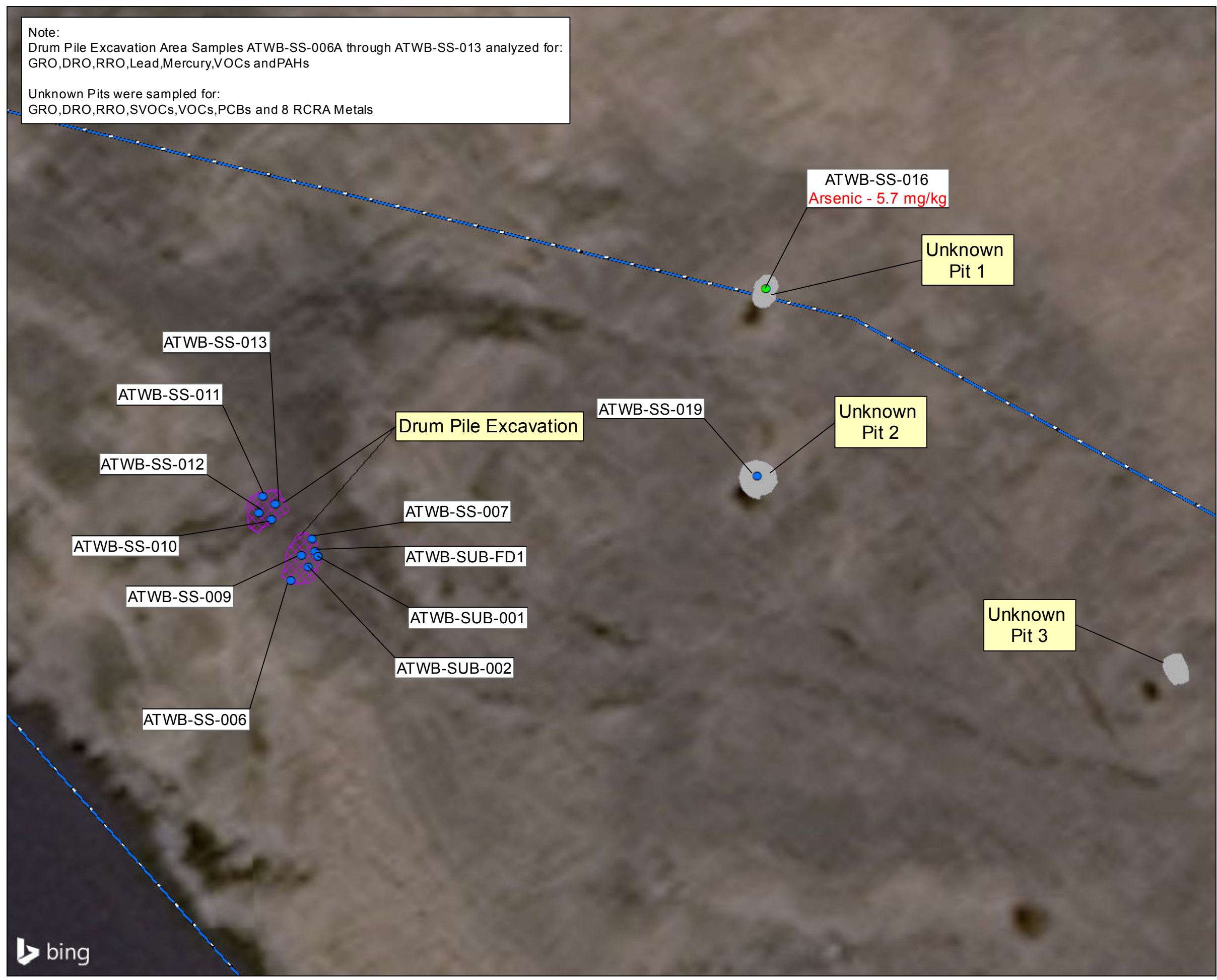
Figure 5
West Barracks Site - East Excavation Areas
 Cape Kuduganax FUDS
 Atka Island, Alaska

Drawn By: BK/JG	Date: 11/6/15	
Checked By: GB	Contract No. W911KB-14-D-0007	



Note:
 Drum Pile Excavation Area Samples ATWB-SS-006A through ATWB-SS-013 analyzed for:
 GRO,DRO,RRO,Lead,Mercury,VOCs andPAHs

Unknown Pits were sampled for:
 GRO,DRO,RRO,SVOCs,VOCs,PCBs and 8 RCRA Metals



- Legend**
- Sample Locations With COCs Exceeding CULs
 - Sample Locations With COCs Below CULs
 - Drum Pile Excavation
 - Unknown Pit
 - Site Area

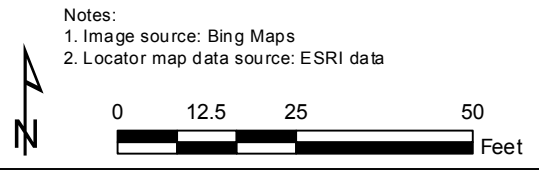
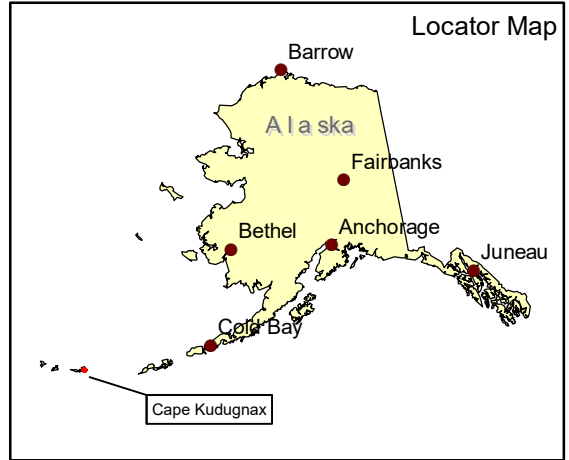
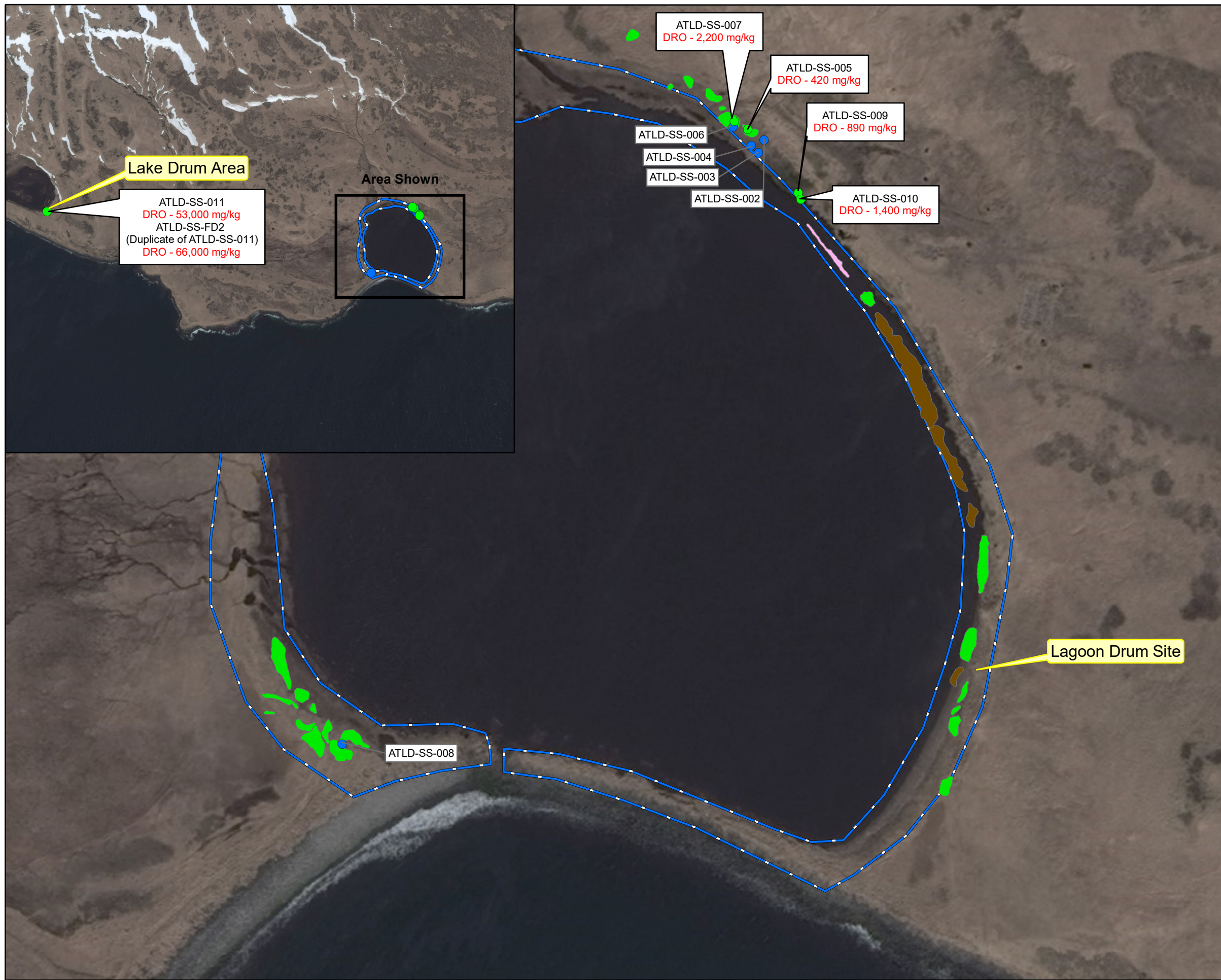


Figure 6

**West Barracks Site -
 West Excavation Areas**
 Cape Kudugnax FUDS
 Atka Island, Alaska

Drawn By: BK/JG	Date: 11/6/15	
Checked By: GB	Contract No. W911KB-14-D-0007	





Legend

- Sample Locations With COCs Exceeding CULs
- Sample Locations With COCs Below CULs
- Drum Pile (Removed)
- Ring Pile (Removed)
- Shoreline Debris (Removed)
- Site Area

Notes:
1. Image source: Bing Maps
2. Locator map data source: ESRI data

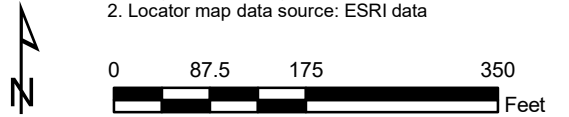


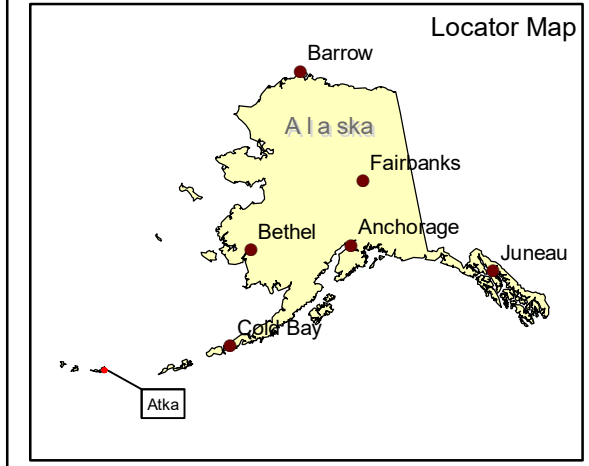
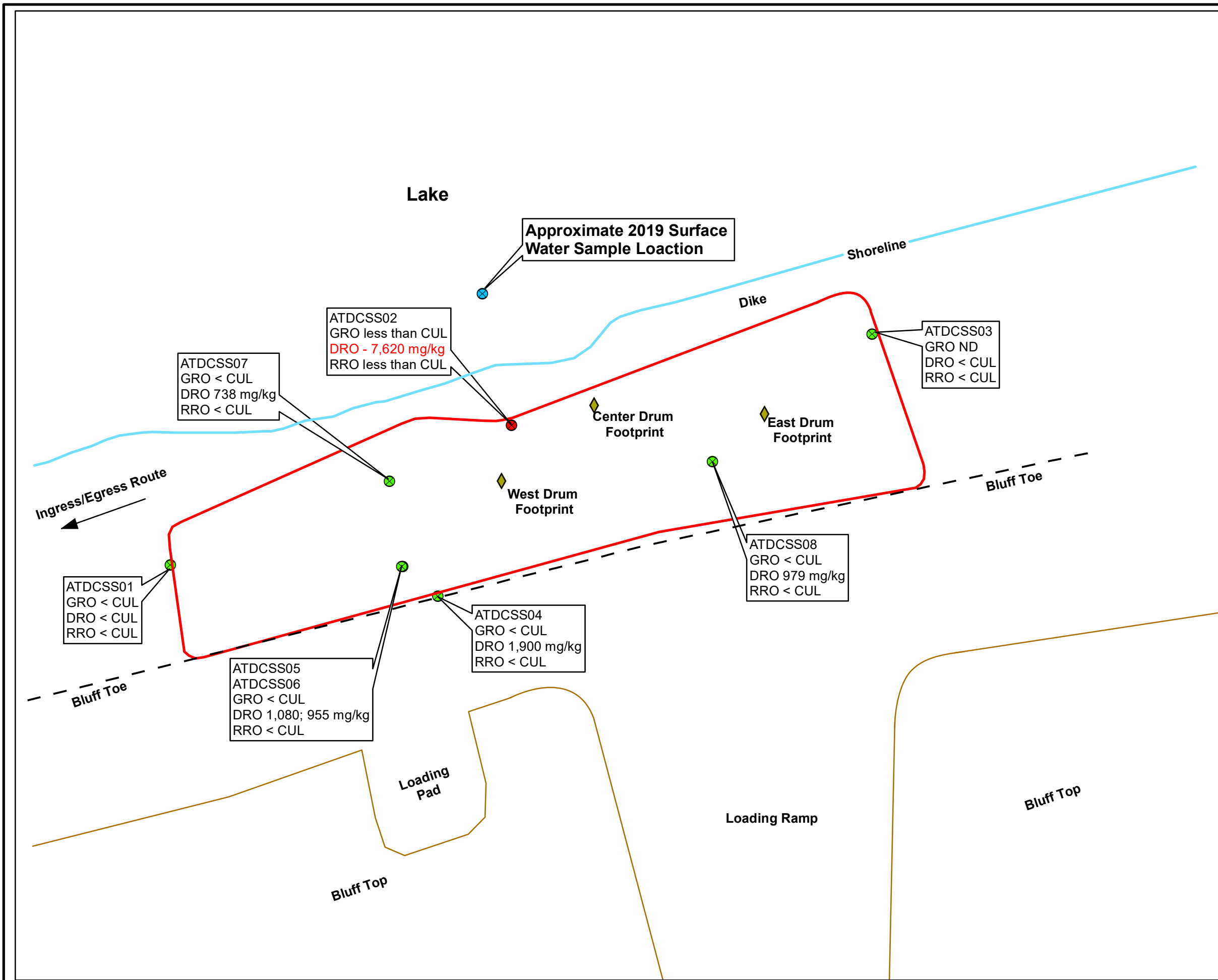
Figure 7

Sample Locations Lagoon Drum Site and Lake Drum Area
Cape Kudugnax FUDS
Atka Island, Alaska

Drawn By:	Date:
Checked By:	Contract No.:



U.S. Army Corps of Engineers

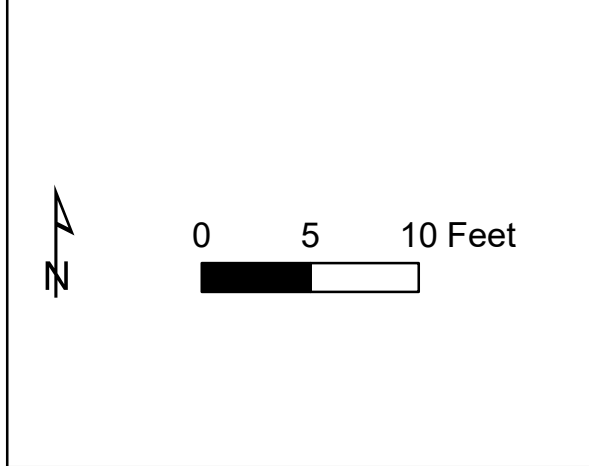


Legend

- ◆ Former Drum Footprint
- DRO > CUL
- GRO, DRO, RRO < CULs
- ⊗ 2019 Surface Water Sample Location
- ▭ Approximate extent of residual DRO contamination

Migration to Groundwater Alternative Cleanup Level for DRO = 3,800 mg/kg

2017 Sample Results and Approximate 2019 Sample Location



**Cape Kudugnax Lake Drum Area
Atka, Alaska**

Appendix B:

ADEC Method Three Calculator Cleanup Levels

Petroleum Cleanup Level Calculator

Cape Kadugnak 2018 CON/HTRW

Site zone and exposure scenario: Over 40-inch Zone - Residential Exposures

Cleanup Level Calculations

7/20/2018

Chemical	CAS	Type	Calculations
DRO Aliphatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level: 8300 mg/kg
			Inhalation Cleanup Level: 79100 mg/kg
			Groundwater Cleanup Level: 3.7 mg/L
			Migration to Groundwater: 109000 mg/kg
DRO Aromatic		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level: 3300 mg/kg
			Inhalation Cleanup Level: 24200 mg/kg
			Groundwater Cleanup Level: 1.5 mg/L
			Migration to Groundwater: 1500 mg/kg
DRO (Total)		Organic Non-Carcinogenic Petroleum	Ingestion Cleanup Level: 8300 mg/kg
			Inhalation Cleanup Level: 60500 mg/kg
			Groundwater Cleanup Level: 1.5 mg/L
			Migration to Groundwater: 3800 mg/kg

Please Note

Chemical	Notes
DRO Aliphatic	The Maximum Allowable DRO Aliphatic concentration is 10000 mg/kg
DRO Aromatic	The Maximum Allowable DRO Aromatic concentration is 5000 mg/kg
DRO (Total)	The Maximum Allowable DRO concentration is 12500 mg/kg

The parameters used to calculate the above cleanup levels and the parameters' default values are as follows:

Volatilization Pathway Parameters

Symbol	Description	Value	Default	Units
ρ_b	Dry soil bulk density	1.5	1.5	g/cm ³
n	Total soil porosity	0.434	0.434	L _{pore} /L _{soil}
Θ_w	Water-filled soil porosity	0.15	0.15	L _{water} /L _{soil}
Θ_a	Air-filled soil porosity	0.284	0.284	L _{air} /L _{soil}
w	Average soil moisture content	0.1	0.1	g _{water} /g _{soil}
f _{oc}	Organic carbon content of soil	0.017	0.001	g/g

Groundwater Pathway Parameters

Symbol	Description	Value	Default	Units
Θ_w	Water-filled soil porosity	0.3	0.3	L _{water} /L _{soil}
Θ_a	Air-filled soil porosity	0.13	0.13	L _{air} /L _{soil}
w	Average soil moisture content	0.1	0.1	g _{water} /g _{soil}

K	Aquifer hydraulic conductivity	876	876	m/yr
i	Hydraulic gradient	0.002	0.002	m/m
L	Source length parallel to groundwater flow	32	32	m
I	Infiltration rate	0.13	0.13	m/yr
d _a	Aquifer thickness	10	10	m