

# STATE OF ALASKA

## DEPT. OF ENVIRONMENTAL CONSERVATION

### DIVISION OF SPILL PREVENTION AND RESPONSE CONTAMINATED SITES PROGRAM

SEAN PARNELL, GOVERNOR

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File: 2434.38.001

April 7, 2010

Jennifer Jancauskas  
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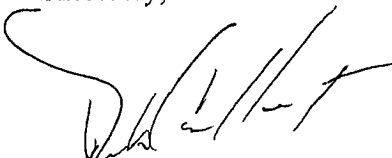
Re: Revised Record of Decision, Newtok Federal Scout Armory

Dear Ms. Jancauskas:

Enclosed is a copy of the signed revised Record of Decision (ROD) for the Newtok Federal Scout Armory. The Alaska Department of Environmental Conservation concurs that the migration to groundwater pathway is incomplete and the most stringent of the inhalation or ingestion cleanup levels apply.

The Alaska Army National Guard (AKARNG) resubmitted the ROD with revisions of the contact person and the signatory for the AKARNG and inserting an AEDB-R number.

Sincerely,



Deb Caillouet  
Environmental Program Specialist



**ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION**  
**Division of Spill Prevention and Response**  
**Contaminated Sites Program**  
**555 Cordova Street**  
**Anchorage, Alaska 99501**  
**Attn: Deb Caillouet**

**RECORD OF DECISION**  
**Alaska Army National Guard**  
**Newtok Federal Scout Armory**  
**Soil and Groundwater Cleanup Levels**

**Legal Description:** A tract of land on the shore of the Bering Sea north of Nelson Island at approximately Latitude 60 56' North, Longitude 164 37' West.

Described as follows:

Beginning at the northeast corner of school building existing in 1958; thence N. 22 W., 700 Feet to the point of beginning; thence S. 68 W., 250 Feet; thence N. 22 W., 200 Feet; thence N. 68 E., 250 Feet; thence S. 22 E., 220 Feet to the point of beginning.

The FSA is located in the Cape Bethel Recording District, Alaska. A parcel located within Section 24, Township 10 North, Range 87 West, Seward Meridian. Consists of 1.26 acres in Newtok, Lot 2, United States Survey No. 4042. United States Geological Survey (USGS) topographic quadrangle map, Baird Inlet (D-8).

**Site Location:** Newtok is a village located north of the Ninglick River and adjacent to the Kealavik River, 94 miles northwest of Bethel. The Alaska Army National Guard (AKARNG) Newtok Federal Scout Armory (FSA) is located on the northwest side of the village between the Airport Lake and the Kealavik River (Figure 1).

**Database Record key:** 1992250118902  
**File Number:** 2434.38.001  
**Hazard ID:** 1558  
**AEDB-R Number:** CCAK242931

**Name and Mailing Address of Contact Party:**

AKARNG

SFC Nick Knowles  
CFMO/Environmental  
Building No. 57024  
Fort Richardson, AK 99505

## **Contaminants of Concern/Media Impacted Based on this Record of Decision:**

**Soil:** Diesel range organics (DRO), residual range organics (RRO), and xylenes were detected in peat and shallow organic silt to depths of 0-1.5 feet below ground surface (bgs) at concentrations greater than the Alaska Department of Environmental Conservation (ADEC) Method Two, Under 40 Inch Zone, Ingestion and Inhalation cleanup levels (18 AAC 75.340 Tables B1 and B2).

**Surface Water:** Toluene was detected in surface water onsite at concentrations greater than water quality standards (18 AAC 70).

**Regulatory Authorities:** Site Cleanup Rules (18 AAC 75.325 -18 AAC 75.390), and Water Quality Standards (18 AAC 70).

**Other relevant guidance/policy:** ADEC Site Closure Memorandum dated July 24, 2009 and ADEC Policy Guidance on Developing Conceptual Site Models dated November 30, 2005.

**Site Information:** Newtok is located adjacent to the Kealavik River in coastal plain lowlands of the Yukon-Kuskokwim Delta, 94 miles northwest of Bethel, Alaska (Figure 1). The Newtok FSA is located on the northwest side of the village between the Kealavik River and Airport Lake.

Soil in this area is composed of stratified deposits of fine, organic-bearing sands and silts topped by a thick peat mat. Vegetation on and around this site is typical of tundra wetlands. The flat topography of the region causes floodwaters to spread slowly during rainy seasons, reducing the potential for sediment transport and redeposition.

During the summer thaw months a suprapermafrost active zone layer exists which contains seasonally perched groundwater. High mineral content, salinity, and turbidity cause this water to be non-potable. Drinking water for the village is obtained from a lake that is located approximately 2,000 feet from the site. In winter, melted snow is utilized for drinking water. All drinking water is treated in a plant before being piped to multiple watering points in the village.

Permafrost at the site begins at approximately 1 foot bgs and is continuous to approximately 240 feet bgs based on a local well log. The most recent investigation in 2006 confirmed a shallow depth to permafrost of approximately 1 foot bgs.

**Site History:** An estimated 300 to 400 gallons of heating oil was spilled at the Newtok FSA in June 1992. This release affected an area approximately 25' by 50'. Figure 2 provides Armory and structure locations along with previous sample locations, results, and an outline of the 1992 spill area.

Remedial activities were conducted in October 1992 in response to the heating oil spill. Bethel Environmental Protection Company (BEPCO) personnel were successful in recovering approximately 125 gallons of oil from the spill area using containment ditches, absorbent booms, absorbent pads, a pressure washer, and mop skimmer. No further remedial efforts have taken place at this site.

A site assessment (SA) was conducted in September 1994. DRO concentrations in the eight analytical soil samples collected during the SA ranged from 1,200 to 14,000 mg/kg at 0.5 to 1.0 feet bgs.

Benzene, toluene, ethylbenzene, and total xylenes (BTEX) were detected at concentrations less than Method One, Level D cleanup criteria proposed for the 1994 SA.

A remedial investigation (RI) was conducted in 1998. Sixteen soil samples were collected during the RI to better characterize the contamination identified during the 1994 SA. GRO, DRO, and RRO concentrations in soil were noted to be greater than ADEC Method Two Under 40-Inch Zone, Migration to Groundwater cleanup levels proposed for the RI. In addition, DRO and RRO values in the active zone water exceeded the ADEC Table C cleanup levels. Lab results indicated that the organic content and percent moisture of the soil were both high, and likely high biased the sample results (OEES, 2000). All soil sampling efforts during the SA and RI focused on characterizing the contamination in the peat and organic silt and not in the underlying mineral soil.

An Alternative Cleanup Level (ACL) investigation was performed in 2004 in accordance with 18 AAC 75.340(e). This investigation focused specifically on the mineral soil horizon beneath the organic silt. Maximum contaminant concentrations detected in the 13 analytical soil samples collected were 56.7 mg/kg DRO, 11.7 mg/kg GRO, 0.160 mg/kg toluene, and 0.388 mg/kg total xylenes. Benzene and ethylbenzene were not detected at concentrations greater than the method reporting limit. Four active zone water samples were also collected from the FSA site. Two of these active zone water samples had DRO concentrations greater than Table C cleanup levels (AMEC, 2006): one in the spill area and one adjacent to the spill area.

A second RI was conducted in 2006. Twenty-eight soil samples were collected from 22 soil borings. Permafrost was encountered at approximately 1.0 foot bgs in soil borings. Twenty-one samples were collected from the naturally organic rich peat layer at depths of 0.5 to 1.0 feet bgs. The remaining seven samples were collected from the underlying organic silt. Selected samples were analyzed for DRO, RRO, GRO, and BTEX. The maximum contaminant concentrations identified were 130,000 mg/kg DRO, 11,000 mg/kg RRO, 1,100 mg/kg GRO, 4 mg/kg benzene, and 110 mg/kg total xylenes. Hydrocarbon and total organic carbon (TOC) analyses results from several background samples suggest that a large amount of organic matter resulted in a high bias in the reported soil concentrations for DRO (Hoeftler, 2008).

Three temporary well points were installed during the second RI in 2006. One well was placed near the former AST where the 1992 fuel oil spill had originated. The second well was placed in the outer yard of the armory property in a presumed background location. The third well was placed near drums and debris that were considered a potential contamination source. All wells were set at a depth of approximately 19 inches bgs. The well screens spanned both the peat and organic silt. Wells were sampled for GRO, BTEX, DRO, and RRO compounds. Sample results indicated that GRO, DRO, and RRO were present in the active zone water at concentrations greater than the 18 AAC 75.345(b) Table C Groundwater cleanup levels. However, potential biogenic interference from the organic matter and elevated total dissolved solids (TDS) may have resulted in high-biased contaminant concentrations in the active zone water (Hoeftler, 2008).

Four surface water samples were collected on site during the second RI in 2006. Samples were analyzed for polycyclic aromatic hydrocarbons (PAH), total aromatic hydrocarbons (TAH), and total aqueous hydrocarbons (TAqH) by EPA Methods 625 and 602. All four samples were found to contain various concentrations of toluene, a TAH compound. Laboratory results were compared to

the 18 AAC 70 water quality standards. Two of the four samples exceeded the 0.010 mg/l limit for TAH due to the presence of toluene. The source of the toluene is unknown as other common TAH compounds were non-detect and the toluene detections were not within the area of the 1992 spill. In addition, the validity of these samples may be questionable due to particulates in the samples (Hoefer, 2008).

Maximum reported onsite contaminant concentrations per media type:

Soil:

Benzene = 4.0 mg/kg (collected in peat at 0-0.5 feet bgs, Hoefer 2008)  
Toluene = 29 mg/kg (collected in silt at 0.5-1.0 feet bgs, Hoefer 2008)  
Ethylbenzene = 17 mg/kg (collected in silt at 0.5-1.0 feet bgs, Hoefer 2008)  
Total Xylenes = 110 mg/kg (collected in silt at 0.5-1.0 feet bgs, Hoefer 2008)  
GRO = 1,100 mg/kg (collected in peat at 0-0.5 feet bgs, Hoefer 2008)  
DRO = 130,000 mg/kg (collected in peat at 0-0.5 feet bgs, Hoefer 2008)  
RRO = 50,000 mg/kg (collected in peat at 1.5 feet bgs, OEES 2000)

Groundwater:

Benzene = 0.0013 mg/l  
Toluene = 0.019 mg/l  
Ethylbenzene = 0.0037 mg/l  
Total Xylenes = 0.018 mg/l  
GRO = less than method detection limits (< 0.120 mg/l)  
DRO = 19 mg/l  
RRO = 16 mg/l

Laboratory results for samples collected from active zone water in 2006 during the RI (Hoefer, 2008) are not considered representative of site conditions due to high turbidity and suspected biogenic interference. Therefore, the values reported above are from the 2000 RI report (OEES, 2000).

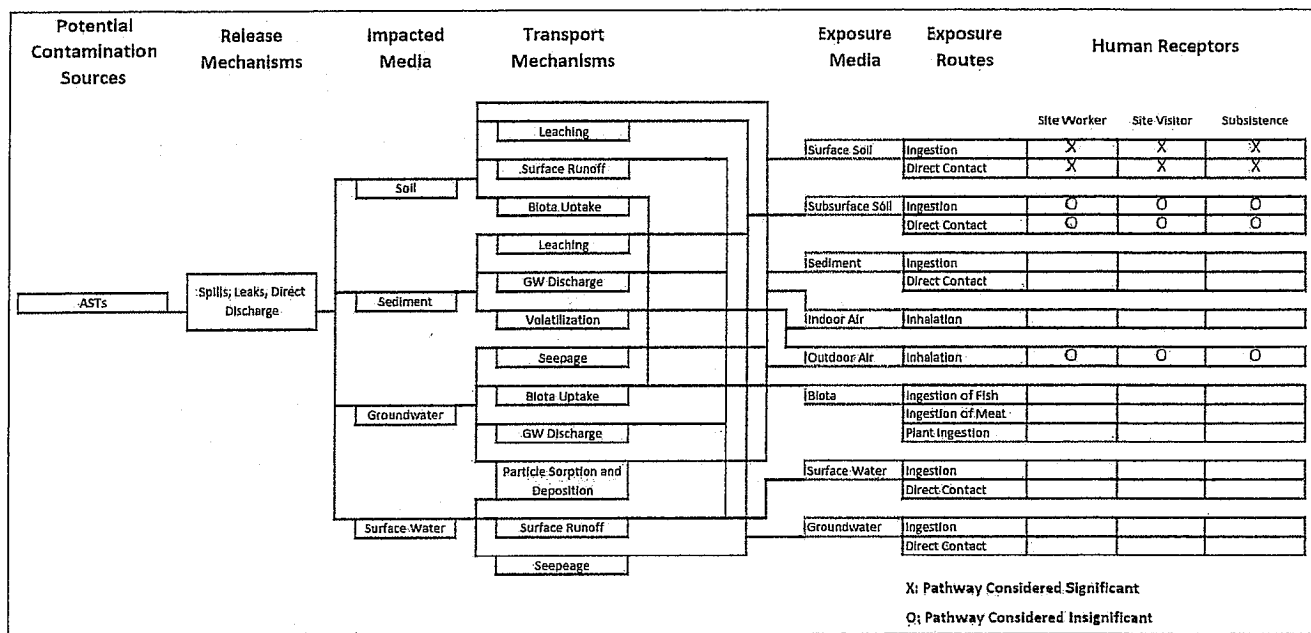
Surface Water:

PAH = 0.0013 mg/l (specific analyte: 1,2-Dichlorobenzene)  
Benzene = less than method detection limits (< 0.000074 mg/l)  
Toluene = 0.41 mg/l  
Ethylbenzene = less than method detection limits (< 0.000088 mg/l)  
Xylenes (Total) = less than method detection limits (< 0.0002 mg/l)  
TAH = 0.41 mg/l  
TAqH = 0.41 mg/l

Surface water samples were collected during the 2006 Remedial Investigation conducted by Hoefer Consulting Group (Hoefer, 2008). According to this investigation, there are no natural surface waters in the Newtok FSA site. Surface water samples were collected from shallow, seasonal, ponded water or water captured in partially buried drums east of the New Armory. The validity of the sample results were deemed questionable due to particulates in the samples (Hoefer, 2008).

**Completed routes of exposure:** A conceptual site model (CSM) for the Newtok FSA, shown below, was developed in accordance with ADEC Guidance on Developing Conceptual Site Models (2005). Potential impacted media shown in the CSM are primarily surface, defined as soil within 2 feet of the ground surface; subsurface soil, defined as soil 2-15 feet bgs (ADEC, 2005); suprapermafrost groundwater; and surface water. The completed routes of exposure identified in the CSM are summarized below:

- Surface soil ingestion and direct contact pathways are complete under current and reasonable future conditions due to the shallow depth of soil contamination
- Subsurface soil ingestion and direct contact pathways are complete but considered insignificant because contaminant concentrations are below 1/10<sup>th</sup> the ingestion cleanup levels as specified in 18 AAC 75.345, Table B1 (ADEC, 2005). Furthermore, exposure to subsurface soils is not likely because all village utilities and structure foundations are constructed above ground. There are no foreseeable construction activities that would require excavation of soil onsite.
- Ingestion of groundwater is not a complete pathway because the suprapermafrost groundwater encountered on site is not considered a drinking water source (details explained below)
- Surface water on the property is not considered a significant potential exposure media because the locations sampled are typically seasonal in nature, and surface water is not likely to be used as a drinking water source. As a result, the exposure pathway for onsite surface water is not considered significant.
- The biota exposure pathway is not a completed route of exposure for the Newtok FSA because compounds of potential concern for bioaccumulation (listed in Appendix A of ADEC's Guidance document) are not present at the site.
- In general, the outdoor air transportation pathway, though complete, is not considered significant due to the diffusive and dilution effects that disperse volatile chemicals in the breathing zone and due to the climate that typically keeps the soil wet, frozen, or snow covered.
- The vapor intrusion pathway (migration of volatile compounds from subsurface soil or groundwater into overlying buildings) at the site is not considered complete (even though ADEC's Guidance document suggests that potential exposure could occur within 100 vertical feet) due to building construction on floating foundations, which raise the building floors several feet off the ground
- Inhalation of volatile compounds in household water is not a complete pathway because contaminants are confined in the surface soil, subsurface soils, and suprapermafrost groundwater. Contaminants are not likely to migrate to sources of drinking water or water used for household purposes via these media.



**Basis for Cleanup Levels Selected:** Based on the CSM outlined above and the completed routes of exposure, the Newtok FSA meets the conditions detailed in 18 AAC 75.350 to determine that groundwater is not a potential drinking water source nor is it a transport media allowing the migration of hazardous substances.

In accordance with 18 AAC 75.350, the suprapermafrost groundwater at the Newtok FSA is not considered to be a current, future, or potential drinking water source because the following conditions are met:

- Groundwater is not used for a private or public drinking water system;
- Groundwater is not used within the zone of contribution of an active private or public drinking water system.
- Groundwater is not within a recharge area for a private or public drinking water well, a wellhead protection area, or a sole source aquifer;

Groundwater is not a reasonably expected potential future source of drinking water based on an evaluation of:

- The limited availability of the groundwater; shallow depth to suprapermafrost groundwater, and the presence of continuous permafrost.
- The quality of water has high mineral content, salinity, and turbidity and is susceptible to contamination from multiple point and non-point sources.
- Existence of a preferred alternative source of drinking water.

Groundwater is not expected to be transported or act as a transport mechanism for hazardous substances to a current or potential future source of drinking water for the following reasons:



- Areal extent of groundwater is minimal.
- There are no existing supply wells.
- Future groundwater supply wells are unlikely because the village of Newtok is relocating to Nelson Island.
- No likelihood of an aquifer connection between the suprapermafrost and subpermafrost aquifers.
- The hydrogeologic and topographical characteristics of the site limit contaminant migration to the village's drinking water source.
- Suprapermafrost groundwater exposure is limited to 4-6 months annually due to snow and frozen ground conditions.

Groundwater (active zone, suprapermafrost water) beneath the site is neither a current nor a reasonably expected potential future source of drinking water and meets the conditions detailed in 18 AAC 75.350. Therefore ADEC Method Two, Under 40-Inch Zone soil cleanup levels for ingestion and inhalation pathways are applicable to the Newtok FSA. These soil cleanup levels are protective of human health, safety and welfare, and the environment. The Method Two soil cleanup levels that are applicable to the Newtok FSA are summarized in Table 1.

Subsurface soils with DRO concentrations above the Method Two, Under 40 Inch Zone, Migration to Groundwater cleanup levels of 250 mg/kg should not pose future threats to any surface waters or drinking waters because there are no foreseeable reasons to excavate soils nor transplant soils offsite. All structures in the village, including utilities, are constructed above ground. There are no reasons to excavate. Furthermore, soils on property are not likely to be used as backfill due to the large quantities of peat. Peat is not an adequate material for backfill or support purposes and is not expected to be collected for such purposes.

Groundwater cleanup standards for the site are based on the default groundwater cleanup levels found in Table C of 18 AAC 75.345(b). However, the groundwater cleanup levels provided in 18 AAC 75.345(b) Table C should not apply to this site. These groundwater cleanup levels are associated with groundwater that is considered a current, future, or potential drinking water source; or for the purposes of evaluating whether the water will act as a transport medium for hazardous substance migration. Groundwater at the Newtok FSA site meets the conditions detailed in 18 AAC 75.350 to determine that groundwater is not a potential drinking water source nor is it a prospective transporting mechanism for hazardous substances.

**Cleanup Levels:** The Method Two, Under 40 Inch Zone, Migration to Groundwater cleanup levels should not apply to soil contamination levels at this site. Instead, the applicable pathways to determine the appropriate cleanup levels for the site are the soil ingestion and inhalation pathways. When the ingestion and inhalation cleanup levels differ, the most stringent cleanup level of the two will apply. The following table summarizes the Method Two soil cleanup levels based on 18 AAC 75.341 Tables B1 and B2 that are applicable to the Newtok FSA.

<b>Table 1</b> <b>Method Two – Petroleum Hydrocarbon Soil Cleanup Levels, Under 40-Inch Zone</b> <b>(From 18 AAC 75.341 Tables B1 and B2)</b>		
Analyte	Cleanup Level (mg/kg)	Pathway
Gasoline Range Organics (GRO)	1,400	Ingestion/Inhalation
Diesel Range Organics (DRO)	10,250	Ingestion
Residual Range Organics (RRO)	10,000	Ingestion
Benzene	11	Inhalation
Toluene	220	Inhalation
Ethylbenzene	110	Inhalation
Xylenes	63	Inhalation

The groundwater cleanup levels listed in 18 AAC 75.345 Table C are associated with groundwater that is considered a current, future, or potential drinking water source; or groundwater that acts as a transport mechanism for hazardous substance migration. Active zone groundwater at the Newtok FSA site does not satisfy these classifications. Therefore, Table C cleanup levels should not be applicable to this site.

**Cleanup Alternatives Analyzed:** Due to the presence of contaminants in the peat and active zone groundwater, several cleanup alternatives were evaluated. The remedial alternatives evaluated for the site included: monitored natural attenuation; bioremediation; excavation and onsite thermal desorption; excavation, transportation, and disposal; groundwater pump and treat; and chemical oxidation.

**Cleanup Alternative Selected/Basis:** Based on existing information, it is estimated that there is approximately 25 cubic yards of soil at the Newtok FSA with petroleum concentrations (DRO, RRO, and xylenes) greater than the ADEC Method Two, Under 40-Inch Zone cleanup levels for ingestion and inhalation pathways. The contamination is concentrated in the surface organics and peat layer at 0 to 1 foot bgs. The proposed remedial approach for the site is excavation, transportation, and disposal at a permitted disposal facility. This alternative is protective of human health, safety, welfare, and the environment, is practical and effective, and complies with regulations.

**Description of Cleanup Plan:** Under the selected remedial alternative, contaminated soil with DRO concentrations greater than ADEC Method Two, Under 40-Inch Zone cleanup levels for ingestion and inhalation pathways will be removed and transported to a permitted treatment or disposal facility. Soil with contaminant concentrations less than 10,250 mg/kg used as backfill for the remedial excavation will not be placed in surface water or other environmentally sensitive areas in accordance with 18 AAC 70.

In addition, surface water will be monitored to ensure that contaminant concentrations meet 18 AAC 70 water quality standards. Any exposed water due to excavation will not be considered surface water but instead will be considered suprapermafrost, active zone groundwater. This active zone water is not considered a current or potential future drinking source or a transport mechanism for hazardous substances.


Institutional controls (ICs) should not be required at the site because the following conditions are met:

- There are no current or potential future uses of the suprapermafrost aquifer, including aquaculture that exposes humans to hazardous substances or threatens the ecological health.
- Surface water is seasonal in nature and not likely to be used for any purposes that would expose humans to hazardous substances or threaten the ecological health of the property.
- The native soils at the site are not suitable for structural fill.
- All utilities and building foundations in the village of Newtok are above ground thus it is unlikely that soils at the site would be disturbed or transported off site in the future

**Review of Cleanup Action after Site Closure:** When the site meets the applicable cleanup levels, the cleanup can be considered complete without ICs per 18 AAC 75.380(d)(1) and Site Closure Memorandum dated July 24, 2009, subject to the following conditions:

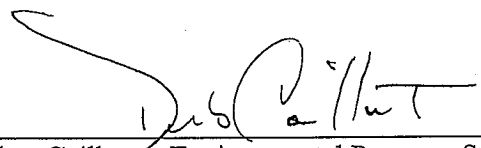
- i. Any proposal to transport soil off site requires ADEC approval in accordance with 18 AAC 75.325(i) where GRO, DRO, or RRO are present above the migration to groundwater cleanup levels.
- ii. Soil containing residual contamination may not be placed in surface water or other environmentally sensitive area in accordance with 18 AAC 70.
- iii. Under 18 AAC 75.380(d)(1), ADEC may require additional site characterization or cleanup action if new information is discovered which leads ADEC to make a determination that the cleanup described in this Record of Decision is not protective of human health, safety, and welfare or the environment.

The undersigned parties concur with this Record of Decision for the Newtok FSA.

  
Joel T. Gilbert  
LTC, IN  
Alaska Army National Guard

02 APR 10

Date

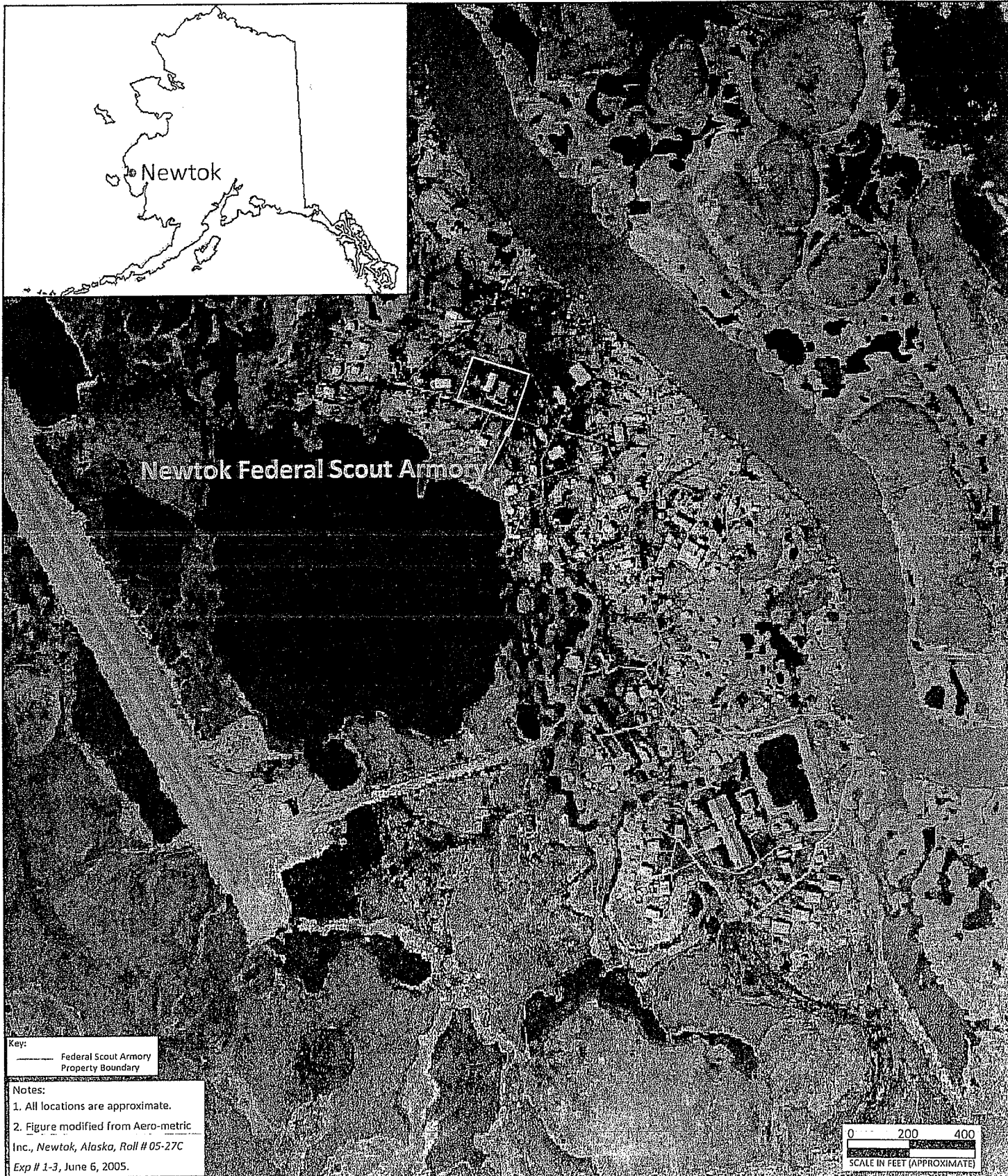
  
Debra Caillouet, Environmental Program Specialist  
ADEC Contaminated Sites Program

April 7, 2010

Date

2 Encl:

1. Figure 1. Newtok Federal Scout Armory, State and Site Vicinity Maps
2. Figure 2. Newtok Federal Scout Armory, Previous Sample Locations and Results



## Newtok Federal Scout Armory

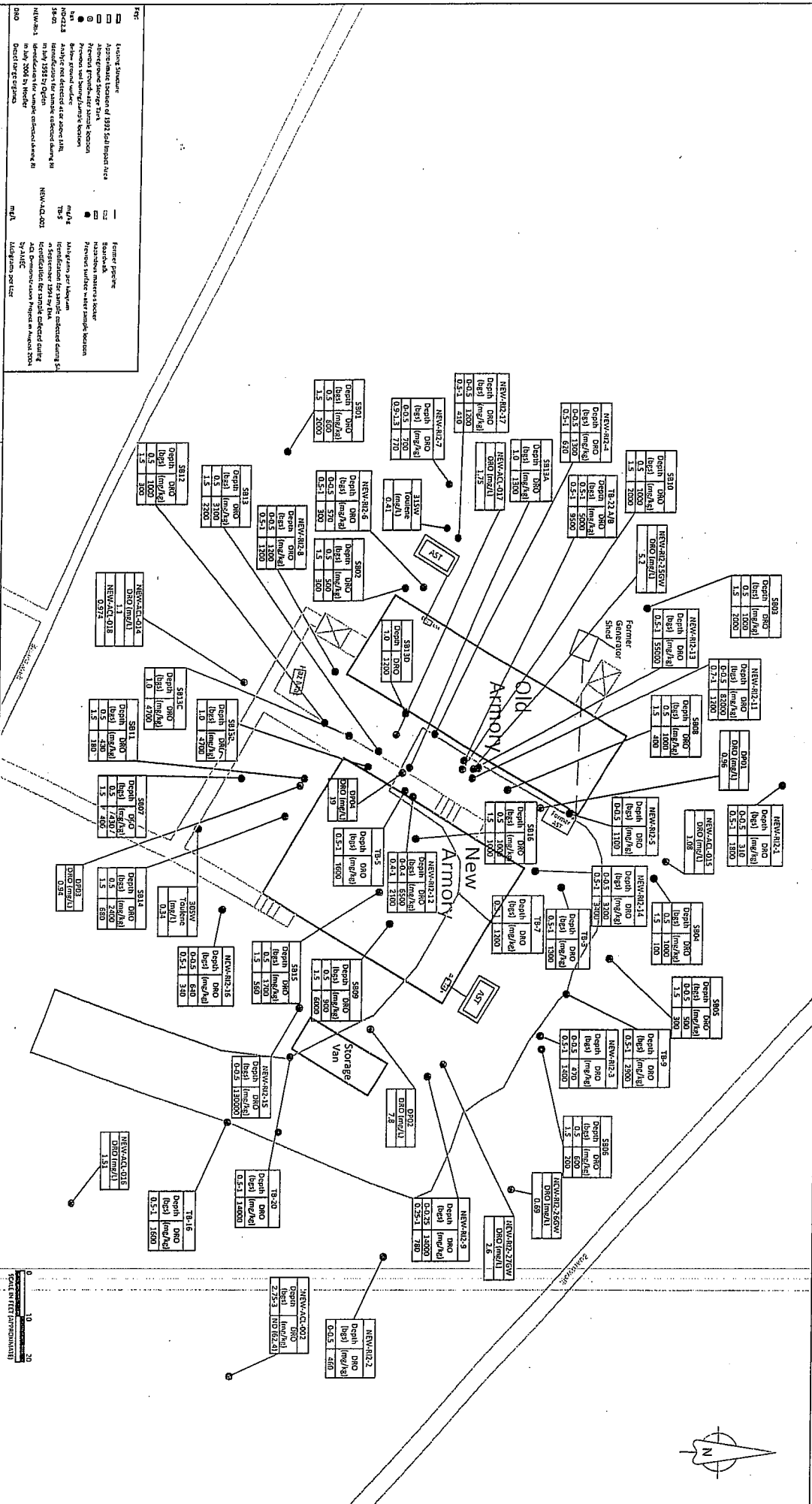
### State and Site Vinicity Maps

Ahtna  
Engineering

Date:  
02-03-2010  
Drafted By:  
L.O.  
Project Number:  
20067.03

Figure Number:

1



Notes:

1. All locations are approximate.
2. Figure modified from site plan provided by AKARING in 2009.

Previous Sample Locations and Results

