

# STATE OF ALASKA

## DEPARTMENT OF ENVIRONMENTAL CONSERVATION DIVISION OF SPILL PREVENTION AND RESPONSE CONTAMINATED SITES PROGRAM

SARAH PALIN, GOVERNOR

610 University Avenue  
Fairbanks, AK 99709-3643  
PHONE: (907) 451-2752  
FAX: (907) 451-5105  
www.dec.state.ak.us

File: 2404.38.014

September 19, 2008

Larry Beck  
BLM Anchorage Field Office  
6881 Abbott Loop Road  
Anchorage, Alaska 99507

RECEIVED

SEP 23 2008

Anchorage Field Office

Re: March 2008 Kolmakof Mine, Napaimute, Alaska Partial Work Plan Approval

Dear Mr. Beck:

The Department of Environmental Conservation (DEC), Contaminated Sites Program has reviewed the Kolmakof Work Plan/Sampling and Analysis Plan prepared by MACTEC Engineering and Consulting, Inc. on behalf of the Bureau of Land Management, and received by the DEC on September 18, 2008. This report describes site characterization efforts to be conducted at an abandoned Mercury Mine located on the Kuskokwim River near Napaimute, Alaska.

Due to the short field season and the late start date, the scope of work has been split into work proposed to be complete yet this fall, with the remainder of the scope of work to be completed next summer. This work plan approval pertains only to the work proposed to be completed this fall which should include: background sampling at the 4 areas of concern, soil sampling at the former explosives shed, a geophysical survey of the former mine pit, a limited hazardous waste removal, and an asbestos/lead based paint survey.

The work plan states that the 2008 field investigation activities will include surface-water sampling. The surface water sampling plan provided is inadequate and is not approved. Similarly, the 2009 tailings investigation and release investigation sections of the report do not provide enough information and cannot be approved at this time. BLM had previously proposed using multi-increment (MI) sampling, however, the work plan submitted proposes discrete rather than MI sampling. If BLM intends to use MI rather than discrete sampling, a sampling plan must be submitted and approved prior to sample collection.

The work plan also describes sample collection and analysis by Selective Sequential Extraction (SSE) for the determination of biogeochemically relevant inorganic mercury fractionation using proprietary methodology. DEC will need to review and approve the proprietary methodology before conclusions can be drawn regarding the risk of exposure to mercury at the site.

Prior to mobilization this fall please provide DEC with an addendum to the work plan that states the name and qualifications of the person who will be doing the sample collection at the site, and the

name and location, of the ADEC approved analytical laboratory that will be conducting the sample analysis. An e-mail submittal will be acceptable.

A separate work plan will need to be submitted prior to commencing work next year. Please allow ADEC adequate time to review and respond to the work plan prior to the field season. Inadequate review could be costly if it is later decided that the data collected is insufficient, and requires an additional mobilization to the site.

If you have any questions, please contact me at 451-2752, or by e-mail at [Kim.DeRuyter@alaska.gov](mailto:Kim.DeRuyter@alaska.gov).

Sincerely,



Kim DeRuyter  
Environmental Program Specialist

cc: Stephen Wrenn



"DeRuyter, Kimberly S  
(DEC)"  
<kim.deruyter@alaska.gov>  
09/22/2008 02:19 PM

To Larry\_Beck@ak.bim.gov  
cc "Wrenn, Stephen" <SCWRENN@mactec.com>  
bcc  
Subject Work Plan - Partial Approval

<<2008 SC WP Approval.PDF>>

Larry,

I sent the attached letter out on Friday, and forgot to send you an e-mail version. As we discussed in our phone conversation, I only approved a portion of the work plan, the approval includes background sampling at the 4 areas of concern, soil sampling at the former explosives shed, a geophysical survey of the former mine pit, a limited hazardous waste removal, and an asbestos/lead based paint survey. The surface water sampling along with all of the work proposed for 2009 will require a separate work plan. Typically we would expect you to submit a revised work plan, but due to the quick TAT, we will leave it as it is. I did request some information be provided in an addendum to the work plan. If possible provided the addendum prior to mobilization. It can just be sent as an e-mail attachment.

Please submit the 2009 work plan well in advance of the anticipated mobilization date.

Thank You

Kim

Kim DeRuyter

Environmental Program Specialist

Contaminated Sites Program

Department of Environmental Conservation

610 University Ave

Fairbanks, AK 99709

Phone 907-451-2752

Fax 907-451-5105



E-mail [Kim.deruyter@alaska.gov](mailto:Kim.deruyter@alaska.gov) 2008 SC WP Approval.PDF



engineering and constructing a better tomorrow

September 17, 2008

Ms. Terese Bertini, Contracting Officer  
U.S. Department of the Interior  
BUREAU OF LAND MANAGEMENT  
Alaska State Office  
222 West 7<sup>th</sup> Ave. #13  
Anchorage, Alaska 99513-7599

**Work Plan/Sampling and Analysis Plan  
Kolmakof Mine Site EE/CA  
Near Napaimute, Alaska  
Contract NAC40273, Task Order NAD082010**

Dear Ms. Bertini:

MACTEC Engineering and Consulting, Inc. (MACTEC), prepared this work plan/sampling and analysis plan (WP/SAP) for the site investigation at the Kolmakof Mine Site located near Napaimute, Alaska (Figure 1). Information gathered during the investigation will be used to develop corrective action alternatives for analysis in an engineering evaluation/cost analysis (EE/CA). The Bureau of Land Management (BLM) assigned the statement of work (SOW) to MACTEC under task order NAD082010 to contract NAC040273.

This WP/SAP is prepared in accordance with the quality assurance program plan (QAPP), prepared by MACTEC. Work performed under the BLM's hazardous materials disposal program will be conducted according to the QAPP; the program-level safety and health plan; the site-specific health and safety plan supplement; and methods, guidance, and procedures in the Alaska Department of Environmental Conservation's Underground Storage Tank Procedures Manual, Oil and Hazardous Substances Pollution Control Regulations (Title 18, Alaska Administrative Code, Chapter 75 [18 AAC 75]), and the Alaska Water Quality Standards (18 AAC 70).

**SITE DESCRIPTION AND BACKGROUND**

The Kolmakof Mine Site (KMS) is an abandoned cinnabar (mercury) mine on lands currently managed by the BLM. The KMS is located approximately 19.5 miles east of Aniak and approximately 9 miles west of Napaimute on the north bank of the Kuskokwim River. The KMS is within the Napaimute Village Townsite selection (F-14900-A2); and is scheduled to be conveyed to The Kuskokwim Corporation (TKC) in accordance with the Alaska Native Claims Settlement Act.

It is thought that the Kolmakof cinnabar deposit was first discovered by Russian explorers in about 1838, making it one of Alaska's earliest mineral discoveries. Mining of cinnabar at KMS dates to about 1881, although all of the structures found there by 2006 are of a more modern age from about the 1940's and newer. Available records indicate that cinnabar was mined and shipped to off-site refineries on an episodic basis, with the last production occurring in 1970. Most of the production occurred from a small open pit area, although there was some underground mining. A small amount of mercury may have been extracted from cinnabar ore at on-site retorts, but the majority was shipped off-site for processing. It is

believed that about 250 flasks worth of mercury were produced by the Kolmakof Mine; a flask holds 2.5 quarts of "quick-silver". The KMS mine claims were determined to be "abandoned and void" in 1993.

In 1999 BLM was notified by the U.S. Environmental Protection Agency (EPA) that a contractor was to conduct a Preliminary Assessment/Site Inspection (PA/SI) of the KMS under EPA's Superfund Technical Assessment and Response Team (START) Program. Correspondence from EPA and its contractor state that they had identified potential for mercury and other toxic metals contamination from the tailings, mill, and retorting operations. The correspondence identifies several areas of concern such as that there may have been a mercury retort facility at the "upper camp" and that tailings may be impacting wetlands, surface, or groundwater. In 2000 EPA notified BLM that the SI was cancelled because BLM had stated BLM would conduct the investigation under Department of Interior's delegated CERCLA authority. During 2000 BLM conducted site inspections and determined that removal of hazardous materials was warranted. The BLM removed several drums of chemicals and burned-down a shed containing several cases of commercial-grade explosives.

## **STATEMENT OF WORK**

The activities summarized below are included in the SOW.

- Prepare a detailed WP/SAP and a site-specific safety and health plan that supplements the program-level plans.
- Perform field investigation activities (soil and surface-water sampling, geophysical surveys, wetlands survey).
- Prepare an EE/CA to present corrective action alternatives. The EE/CA will include a summary of findings from the field investigation activities and will incorporate the necessary environmental assessment (EA) components following the National Environmental Policy Act (NEPA) and BLM's *National Environmental Policy Act Handbook* (1988).

## **2008 FIELD INVESTIGATION ACTIVITIES**

Field investigation activities will include soil and surface-water sampling, asbestos and lead-based paint sampling, geophysical surveys, and a limited removal action. The objectives, locations, and methods for each of these activities are described below. Figure 2 shows the investigation areas and provides a summary of the SOW and sample locations where appropriate (locations are approximate and will be adjusted on the basis of conditions encountered in the field).

### **Background Study**

**Objective.** A background metals sampling program will be performed in accordance with EPA 540-R-01-003 / OSWER 9285.7-41 "Guidance for Comparing Background and Chemical Concentrations in Soil for CERCLA Sites." This will involve the retrieval of a combination of surface and subsurface soil samples from several areas presumed to be unaffected by the mining activities in order to establish the naturally occurring concentrations of As, Cr, Hg and Ni. Nine surface and nine subsurface samples will be retrieved from each of the four identified Areas of Concern (AOC): Camp Area, Mill Area, Mine Pit,

and Mining Waste Rock/Tailings Dump Area (see Figure 2). The sample locations will be selected in the field and will be areas that appear to be unaffected by activities associated with mining. A total of 36 surface soil (0 to 6" below ground surface) and 36 subsurface soil samples (more than 6" below ground surface) plus 10% QA will be collected. All samples will be analyzed by EPA Method 6010 for As, Cr and Ni and by EPA method 7471 for Hg.

In addition to the background sampling program, a total of 10 samples will be collected from the AOCs for analysis by Selective Sequential Extraction (SSE) for the determination of biogeochemically relevant inorganic mercury fractionation. These samples will be submitted to Frontier Geosciences in Seattle using their proprietary methodology that was developed to support previous USGS research. The SSE analysis will support future efforts to identify bioavailability should elevated concentrations of Hg be reported. This can significantly decrease uncertainty when evaluating analytical results with regard to risk to human health and the environment.

**Locations.** The background samples will be retrieved from each of the following areas: Camp Area, Mill Area, Mine Pit, and Mining Waste Rock/Tailings Dump Area.

**Methods.** A stainless steel hand auger or hand tools (breaker bar, shovel, or auger) will be used to complete the borings or test pits.

Each sample will be immediately containerized. Field personnel will use a new pair of nitrile gloves for each sample. Laboratory-supplied sample containers will be completely filled. Sample quantities, laboratory analysis, and required quality control are summarized in Table 1.

Soil sampling equipment decontamination procedures will consist of Alconox<sup>®</sup> wash and deionized water rinse, as described below:

- Before collecting individual soil samples, sampling equipment will be cleaned with an Alconox<sup>®</sup> solution and double rinsed with deionized water.
- Sample containers will be cleaned and prepared by the analytical laboratory.

**Table 1. Background Soil Sampling Requirements**

Analysis	Method	Container	Preservative	Primary Samples	QC	Trip	MS/MSD
As	EPA 6010	1 4-oz amber TLC	None	72	8	0	0
Cr							
Ni							
Hg	EPA 7471	1 4-oz amber TLC	None	72	8	0	0

Notes:

MS/DS = matrix spike/matrix spike duplicate

TLC = teflon-lined cap

## **Geophysical Survey**

**Objective.** The area of the former mine site is being considered as a possible location for an onsite monofill to be used for the disposal of building materials at the site. MACTEC will perform a geophysical survey to identify depth to bedrock using either ground-penetrating radar (GPR) equipment or seismic refraction. Either method should provide an efficient and economical option for identifying depth to bedrock in the selected area. A total of six surface and subsurface soil samples will be retrieved from the area of the geophysical investigation to be analyzed for Hg content to verify the natural concentrations at this site.

**Locations.** The geophysical survey will be performed at the former mine site.

**Methods.** Initially, the proposed area will require clearing. Presently, the site is heavily overgrown with small saplings and brush that will need to be removed before a geophysical survey can be performed. Once the site has been cleared, the geophysics team will establish a 20-foot grid (approximately 0.8 acres). The geophysical investigation will be performed using GPR equipment initially. Should bedrock be too deep to be adequately identified using GPR, the team will switch to seismic equipment. A graphic profile of the subsurface will be produced showing soil layers and depth to bedrock.

## **Asbestos / Lead-based Paint Survey**

**Objective.** MACTEC will conduct an asbestos-containing materials (ACM) and lead-based paint (LBP) survey of the 5 structures identified below.

**Locations.** The structures as identified in the RSI are the one remaining camp building, two sheds, the Mill Building, the Wall Tent Building plus the newly-identified building near the mill site.

**Methodss.** MACTEC will employ the BLM's XRF (Niton XL 3t 600 Environmental Analyzer) for metals screening by direct reading off the target surfaces. The XRF will produce a direct concentration of the lead and/or mercury content of the target material. MACTEC will also collect representative samples of any shingles and/or mastics. Plug samples will be retrieved from the wooden framing members and will be submitted to TestAmerica's Anchorage analytical laboratory to determine Hg content. The results of this sampling/survey will be used to determine disposal options for the structures.

## **Characterize & Dispose of Debris and other Wastes**

**Objective.** A number of items located at the mine site have been characterized as hazardous and require removal and disposal.

**Methods.** The following items will be placed in appropriate shipping containers (drums/supersacks/cy box w/liner) and transported to Emerald Alaska's (Emerald) Anchorage facility where they will be characterized and transported to an appropriate disposal facility:

- a. Beer keg, sewer pipe, and open-topped container (split 55-gal drum), with cinnabar concentrates contained in them from the Retort Mound area;

- b. Fire bricks, poured concrete, wood beams, and steel articles from the retort mound (if determined to be contaminated with Hg);
- c. Hg flasks containing residual Hg from the "Large Shed"; and
- d. Up to 1 cubic yard of Hg contaminated soil from where small beads of elemental Hg were observed on the Large Shed floor during the RSI. This Hg is assumed to be residual Hg spilled from one or more of the above flasks. MACTEC will carefully delineate the Hg spill from cinnabar that may be present on the floor of this shed.

The sewer pipe will be cut into manageable pieces using a grinder or other cutting tool. Each of the above will be placed into 1-cy supersacks for transport and disposal.

Most of this work will require that the field team members that are in direct contact with the debris be protected by Level C PPE using air-purifying respirators and chemically-resistant clothing to avoid inhalation, ingestion or dermal contact with Hg.

Those materials that contain Hg and require cutting prior to transport (which can release Hg vapors) will require personnel to be in Level B PPE and will require upgrading the workers to supplied-air, full-face respirators.

MACTEC will also dispose of the following other hazardous materials:

- a. Two each lead-acid batteries. One is located within the Generator Shed at the camp, and the other is installed in the abandoned pick-up truck. These batteries will be transferred to an appropriate container (i.e., fiber drum) for transportation to Emerald's Anchorage facility pending appropriate disposal options.
- b. Up to 55 gallons of residual fuel/water from drums at the KMS. It is known that there are several gallons of liquid of an unknown nature in a fuel drum at the retort mound area. Nearly all of the drums at the KMS have been found to be empty except for the aforementioned drum. MACTEC will inspect, characterize, and properly dispose of any liquids from all drums at the KMS. The liquids will be transferred to a 55-gallon drum for transportation to Emerald's Anchorage facility pending appropriate disposal options.
- c. Fuel, oil, and anti-freeze that may remain in the derelict pick-up truck, and the air compressor in the pit area. All liquids will be drained, collected and transferred to a 55-gallon drum for transportation to Emerald's Anchorage facility pending appropriate disposal options.

### **Explosives residue characterization**

**Objective.** MACTEC will retrieve 5 soil samples at the location of the burned explosive shed to determine extent of explosives residue under the previously identified layer of lime. The samples will be submitted for laboratory analysis for Nitroaromatics by EPA Method 8330.

**Locations.** Samples will be retrieved from the former location of the explosive shed.

**Methods.** The surface materials (including organics and lime) will be scraped away using a trowel or other sampling device. Once the underlying mineral soil is exposed, a sample will be retrieved using a clean, decontaminated steel sample collection device and placed into a 4-oz glass jar.

**Table 2. Explosives Shed Soil Sampling Requirements**

Analysis	Method	Container	Preservative	Primary Samples	QC	Trip	MS/MSD
Nitroaromatics	EPA 8330	1 4-oz amber TLC	None	5	1	0	0

Notes:

MS/DS = matrix spike/matrix spike duplicate

TLC = teflon-lined cap

## 2009 FIELD INVESTIGATION ACTIVITIES

The 2009 field season will focus on release investigations at sites identified in the RSI. The removal actions will be performed to characterize the extent and concentration of contaminants at the site at various known areas. An addendum to this document will be developed to better describe the procedures used during site characterization and sampling activities planned for the 2009 field season.

### Tailings Investigation

MACTEC will conduct an investigation to determine the impact that the Tailings Dump is having on the Kuskokwim River. Co-located sediment and water samples will be retrieved from three locations: upstream, adjacent to the pile, and downstream from the pile. These samples will be analyzed for As, Cr and Hg.

### Release Investigations

Release investigations to identify metals contamination will be performed at 8 locations as identified in the RSI and detailed below. Because metals tend to remain in place and do not tend to migrate far from the point of release, hand sampling using shovels and/or hand augers will be employed at these locations to retrieve surface and shallow subsurface soil samples. These locations will be screened using the XRF instrument to identify the metals concentrations in the soil. A total of 7 soil samples (6 primary plus 1 QA duplicate) will be collected from each location for submittal to an Anchorage analytical laboratory for analysis.

Site	Contaminant(s)
Retort Mount	As, Cr, Hg
Ball Mill Building (Chute area)	As, Cr, Hg
Settling Pond	As, Hg, Ni
Creek (near Ball Mill)	As, Hg, Ni

Ditch (west of Ball Mill)	As, Cu, Hg, Ni
Large Shed	As, Hg
Between Large & Small Sheds	As, Hg
Ditch (beneath Ball Mill)	As, Hg, Ni

Any soils excavated during release investigation will be considered as investigation-derived waste (IDW) and placed in supersacks and stored onsite pending receipt of laboratory analyses.

**Petroleum Hydrocarbon Release Investigations.**

Release investigations will be performed to identify fuels/petroleum hydrocarbons at seven locations. These investigations will be performed with a combination of hand tools and an excavator. It is assumed that releases (if any) will be limited and will not warrant the additional expense of bringing a drilling rig to the site. Hand tools, such as trowels, shovels and hand auger equipment, will be used until it appears that the release exceeds the ability of these tools.

**Objectives.** to identify fuels/petroleum hydrocarbons at seven locations as detailed below.

Site	Contaminant(s)
Large Shed	DRO
Drum Area 1 (Generator Shed)	DRO/RRO & GRO/BTEX
Drum Area 2 (Retort Mound)	DRO/RRO & GRO/BTEX
Drum Area 3 (along road to mill site)	DRO/RRO & GRO/BTEX
Drum Area 4 (near Large Shed)	DRO/RRO & GRO/BTEX
Pickup Truck	DRO/RRO & GRO/BTEX
Compressor	DRO/RRO & GRO/BTEX

Any soils excavated during release investigation will be considered as IDW and placed in supersacks and stored onsite pending receipt of laboratory analyses.

**DECONTAMINATION**

During the field programs, all site workers will be required to be decontaminated each day before leaving the site in order to eliminate the tracking of site contaminants and/or invasive, non-native plant and noxious weeds off of BLM-managed lands. The decontamination area will be set up near the Camp area close to the boat access at the Kuskokwim River. In addition, pressure washing equipment will be used on each piece of equipment prior to their leaving the site to comply with NEPA policy by preventing and controlling invasive non-native plant and noxious weed introduction or spreading per EO 13112.

## **FIELD DOCUMENTATION AND SAMPLE NUMBERING**

The following types of field documentation will be required.

- Sample labels
- Field logs
- Sample record log
- Photograph log

Observations made during sample collection, such as sample depth, materials observed, and a description of sample location, will be recorded in the field logbook. A sketch identifying sample locations relative to a temporary marker (rebar or stake) and clearly labeled photographic records of sample locations and procedures will be documented. Each sample location will be photographed and marked with a survey lathe labeled with the sample number. Samples will be located with a handheld GPS unit. In addition to GPS coordinates, reference points will be established as needed, physical measurements to sample locations and site features that may be present, allowing the source areas to be located on the site base map.

The samples will be numbered as follows: **XXKMSYYZZ**, where **XX** is the year, **KMS** is Kolmakof Mine Site, **YY** is the sample number, and **ZZ** is the sample type.

Field quality control samples will be labeled and numbered in the same manner. Sample types (**ZZ** in the sample number) will be designated as follows:

- **SO** – subsurface soil
- **SS** – surface soil

September 17, 2008  
Work Plan/Sampling and Analysis Plan  
Kolmakof Mine Site EE/CA  
Ms. Therese Bertini  
BUREAU OF LAND MANAGEMENT  
Page 9

Thank you for the opportunity to be of continued service. Please call Stephen Wrenn at (907) 563-8102 if you have questions.

Sincerely,

**MACTEC Engineering and Consulting**



Stephen Wrenn  
Program Manager

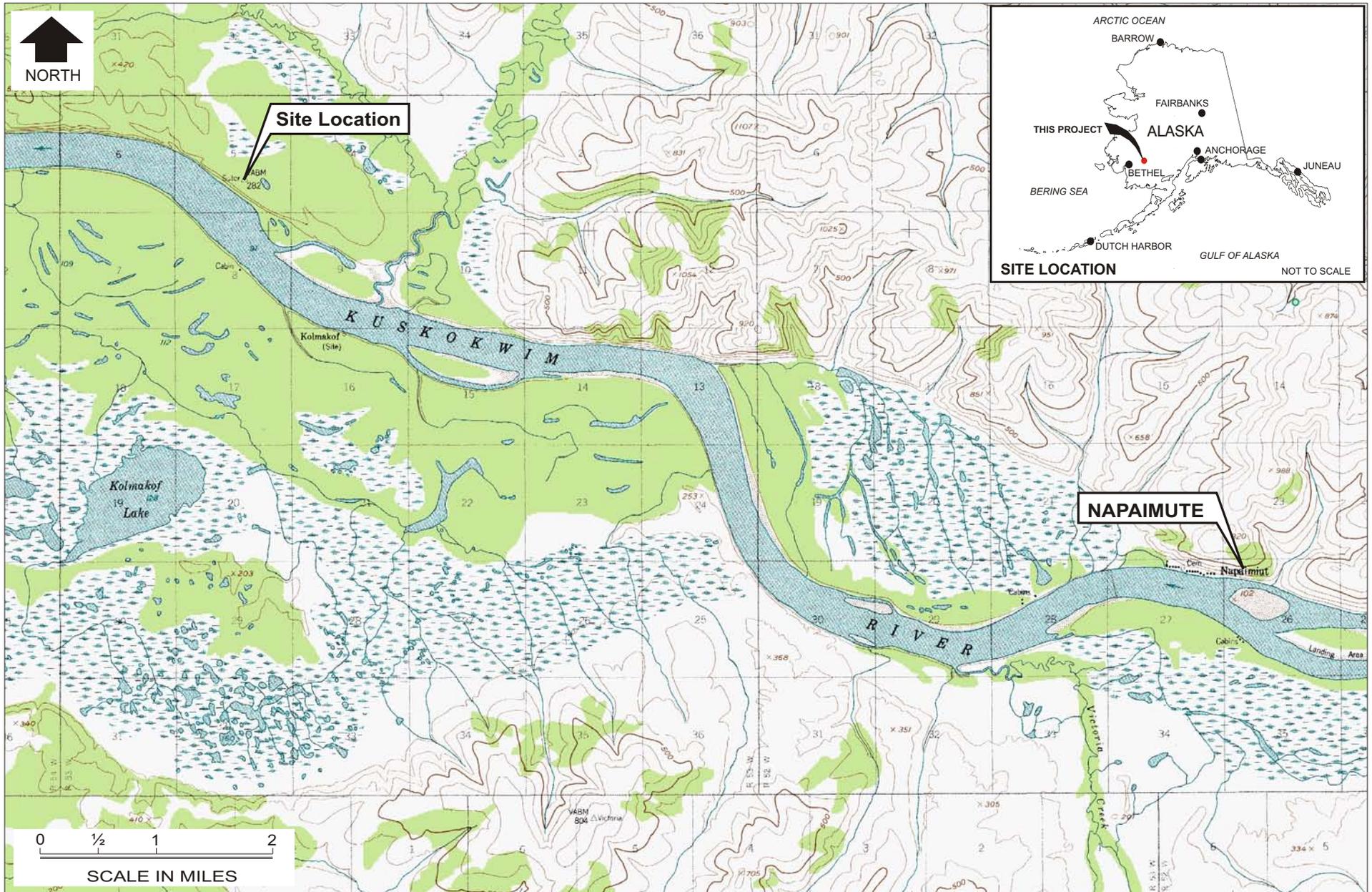


Michael Finnegan  
Senior Engineer

QC/TE/sw

Attachments: Figure 1 – Site Location and Vicinity Map  
Figure 2 – Camp Area and Retort Mound Site Plan  
Figure 3 – Site Plan

cc: Mr. Wayne Svejnoha, Bureau of Land Management, Alaska State Office



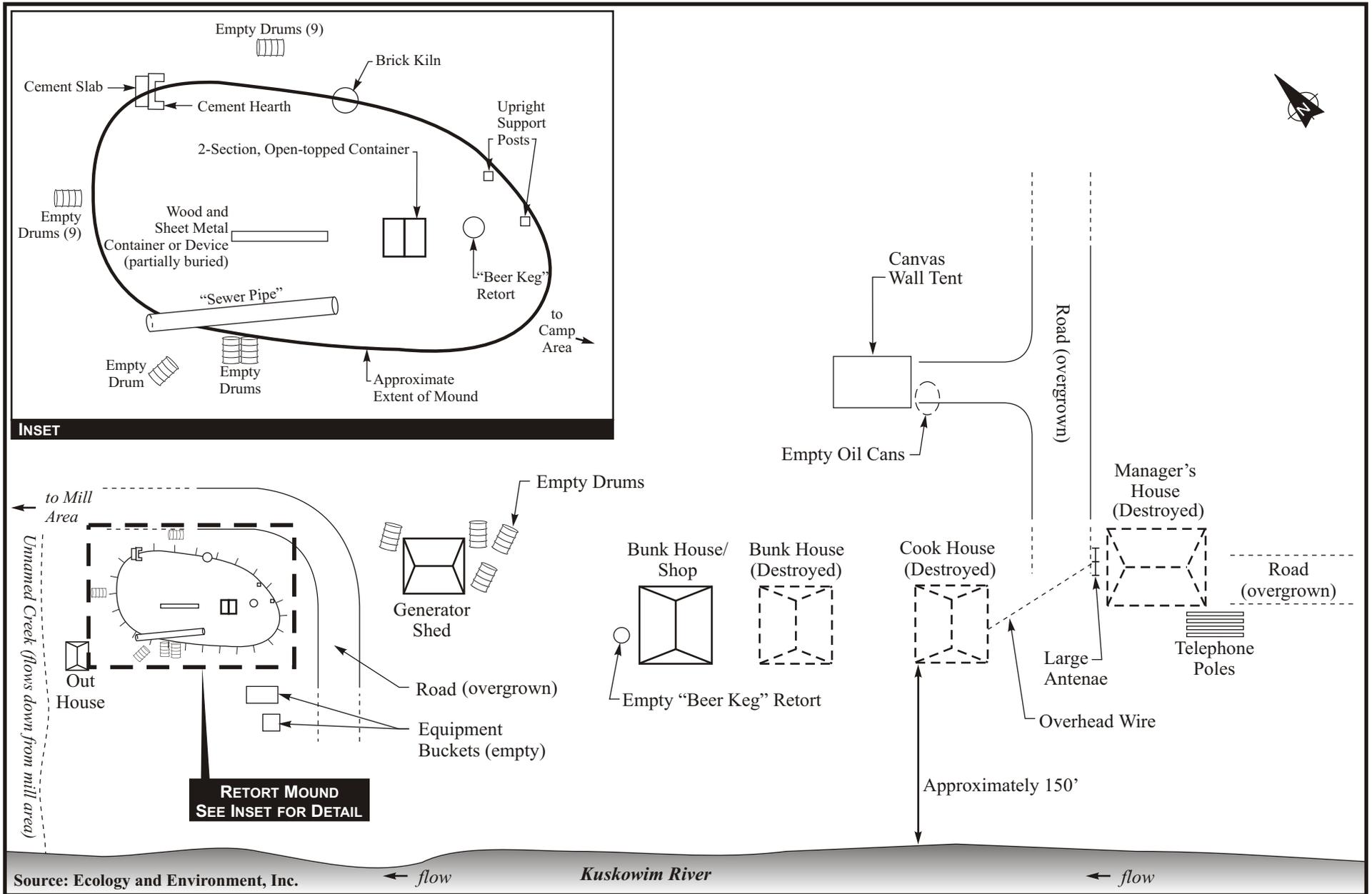
Site Location and Vicinity Map

FIGURE

Kolmakof Mine Site EE/CA  
Near Napaimute, Alaska

1



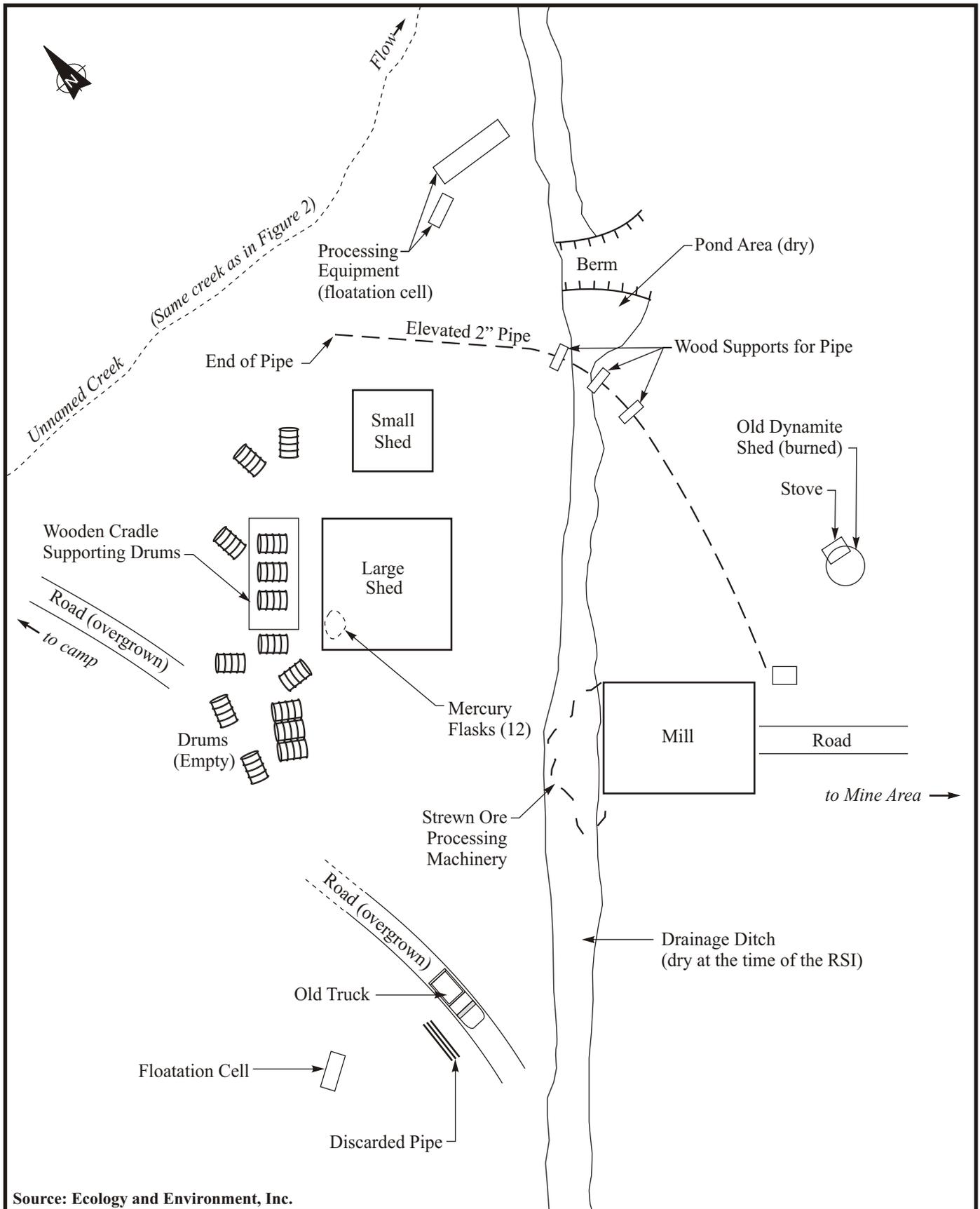


**Camp Area & Retort Mound Site Plan**

FIGURE

Kolmakof Mine Site EE/CA  
Napaimute, Alaska

**2**



Source: Ecology and Environment, Inc.



**Site Plan**

Kolmakof Mine Site EE/CA  
Napaimute, Alaska

FIGURE

**3**

DRAWN  
SF

PROJECT NUMBER  
4038080005

APPROVED  
SCW

DATE  
9/2008

FILE NAME  
4038080005c3.cdr